

# ***IBBK***

## DL385SI

# **service manual**



# Catalog

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# Chapter One About Maintenance

## 1.1 Safety precautions

### 1.1.1 Power Safety Warning

Voltage of Portable DVD is safe low voltage, but there is 220V AC high voltage on Power Adapter, it can cause damage to body ! Maintenance personnel should take extra care.

### 1.1.2 Precautions for antistatic

Movement and friction will both bring static electricity which causes serious damages to integrated IC. Though static charge is little, when a limited quantity of electric charge is added to large scale integrated IC, as the capacitance is very small in the meantime, now the integrated IC is very much easy to be struck through by static electricity or the performance will decrease. Thus static electricity prevention is of extraordinary importance. The following are several measures to prevent static electricity:

1. Use a piece of electric conduction metal with the length of about 2 metres to insert into the earth, and Fetch the lead wire from the top of the surplus metal and connect to the required static electricity device. The length and depth of the metal embedded under the earth should be determined according to the wettability of the local soil. For humid places, it may be shorter, and longer and deeper for dry places. If possible, it can be distributed and layed in terms of “#” shape.

2. On operating table-board, the antistatic table cushion should be covered and grounded.

3. All devices and equipments should be placed on the antistatic table cushion and grounded.

4. Maintenance personnel should wear antistatic wrist ring which should be grounded.

5. Places around the operating position should also be covered with electric conduction cushion or Painted with antistatic paint.

### 1.1.3 Precautions for display screen

1. Display screen is breakable article, so please protect carefully when carrying and prevent fingers or hard objects striking the screen to damage structure of the screen.

2. When cleaning screen, do not use organic chemicals. You should use cloth and use small amount of special cleaning liquid in places difficult to clean.

#### **1.1.4 Precautions for laser head**

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

#### **1.1.5 About placement position**

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

### **1.2 Maintenance method**

#### **1.2.1 Electric resistance method**

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

#### **1.2.2 Voltage method**

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

#### **1.2.3 Current method**

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

#### **1.2.4 Element substitution method**

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

#### **1.2.5 Cutting method**

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

### **1.2.6 Visualized method**

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

### **1.2.7 Comparison method**

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

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

## **1.3 Required device for maintenance**

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

# Chapter Two

## Functions and Operation Instructions

### 2.1 Features

This portable DVD player has a color large-format TFT LCD and the newest decoding processor, and due to this fact enables you to enjoy high-quality picture and sound. The reading discs mechanism has the latest error protection, so it can work in difficult conditions of shaking and vibration.

#### Compatible Disc Types:

#Digital video playback: DVD-Video, Super VCD, VCD compatibility

#MPEG-4 standard support: compatibility with Divx3.11, Divx4, Divx5, Divx Pro, XviD compressed video files

#Digital audio playback: CD-DA and HDCD compatibility

#Fully compatible with compressed audio files such as Mp3 and WMA

#Digital graphic albums playback: Kodak Picture CD, JPEG compatibility

#### Video:

#Color TFT LCD

#S-Video output for TV connection

#Composite video output for TV connection

#Composite video inputs for external signal source

#### Audio:

#Stereo signal input for external signal connection

#Digital decoders, providing Dolby Digital/DTS audio stream playing

#Built-in stereo audio system

#Headphones output

#### Storage battery

| Working time | MP3 playback (closed lid) | DL370SI | DL372SI | DL375SI | DL377SI | DL385SI | DL387SI | DL3103SI |
|--------------|---------------------------|---------|---------|---------|---------|---------|---------|----------|
|              |                           | 5h.     | 5h.     | 6h.     | 4h.     | 6h.     | 4h.     | 5h.      |
|              | MP3+JPEG playback         | 2.5h.   | 2.5h.   | 3h.     | 2h.     | 4h.     | 2h.     | 2.5h.    |
|              | DVD playback              | 3h.     | 3h.     | 3.5h.   | 2.5h.   | 4.5h.   | 2.5h.   | 3h.      |

#### Others:

#Compatible disc types: CD-R/CD-RW, DVD-R/DVD-RW, DVD+R/DVD+RW

#Russia, CIS and Baltic States adaptation interface and filenames, ID3-tags and CD-Text support simplifies device operation

#"Memory" function enables to save the last point after stop playback

#"Source" function enables to select video signal source

#"Q-Play" function provides direct playback and allows to skip commercial that is not possible to rewind

#"Virtual Keyboard" function provides more convenient DVD playback control

#"Browser" function provides easy access to playback control

#Parental control function to protect children from watching inappropriate discs

#Large capacity battery enables to watch movies outdoors

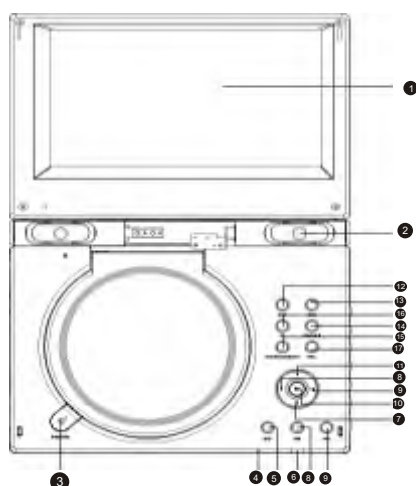
#Electrical connector for external equipment(5V)

#Modern shaking and vibration protection technology

#Good transportation bag

## 2.2 Set list

|                                              |      |
|----------------------------------------------|------|
| Portable DVD player.....                     | 1pcs |
| Battery .....                                | 1pcs |
| Charger/adapter.....                         | 1pcs |
| Adapter cable.....                           | 1pcs |
| Auto charger/adapter.....                    | 1pcs |
| Remote control .....                         | 1pcs |
| Batteries for remote control(AAA size )..... | 2pcs |
| S-Video output cable.....                    | 1pcs |
| Optical cable .....                          | 1pcs |
| Stereo audio cable.....                      | 1pcs |
| Cable for composite video signal.....        | 1pcs |
| Transportation bag.....                      | 1pcs |
| Headrest bracket.....                        | 1pcs |
| Soft cover bag .....                         | 1pcs |
| Warranty card.....                           | 1pcs |
| User manual.....                             | 1pcs |
| Headphones .....                             | 1pcs |
| Screw for headrest bracket.....              | 4pcs |



- ❶ **TFT LCD**
- ❷ **Built-in loud-speaker**
- ❸ **OPEN/CLOSE button**
- ❹ **Operation mode indicator**
- ❺ **STOP button**  
Press to stop the playback.
- ❻ **Sensor of infrared beams**
- ❼ **REW/DOWN button**  
Press to skip reverse/down.
- ❽ **PREV/LEFT button**  
Press to play from previous mark/left.
- ❾ **NEXT/RIGHT button**

Press to play next/right.

- ❿ **PLAY/PAUSE button**

- ⓫ **FWD/UP button**

Press to skip forward/up.

- ⓬ **SETUP button**

Press to switch setup mode.

- ⓭ **MENU button**

Press to switch disc menu.

- ⓮ **DVD/AUX IN button**

Press to switch between DVD/AUX IN.

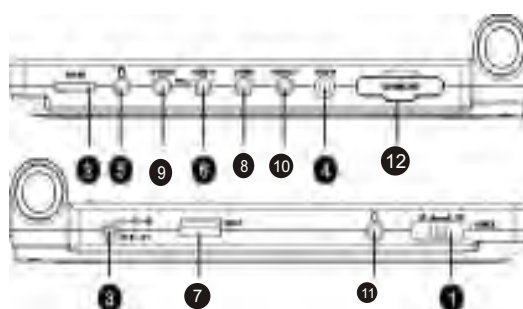
- ⓯ **DVD/USB/CARD READER button**

- ⓰ **P/N button**

Press to switch between PAL/NTSC.

- ⓱ **PANEL button**

Press to switch between cursor function buttons/virtual control panel.



- ❶ **Power button**

Press to switch off the player.

- ❷ **VOLUME adjuster**

- ❸ **Power socket**

- ❹ **Composite video input**

- ❺ **Headphones output-1**

- ❻ **Stereo audio input**

- ❼ **USB-port**

- ❽ **S-Video output**

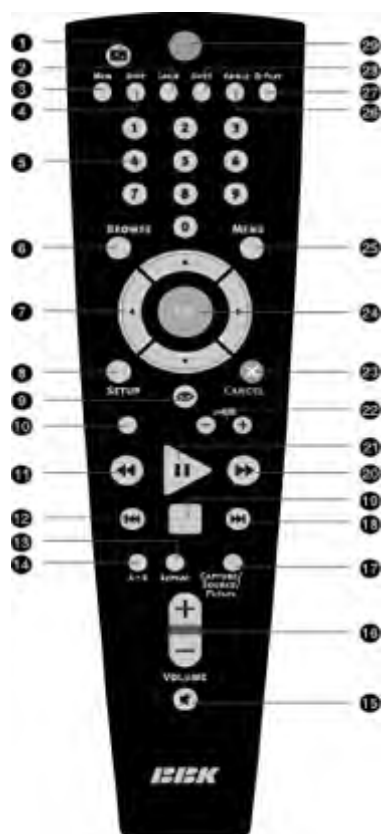
- ❾ **Audio output**

- ❿ **Videp output**

- ⓫ **Headphones output-2**

- ⓬ **SD/MMC/MS**

## 2.3 Remote control general view



CAPTURE button (for DL370SI,DL372SI)

Press to save picture as a screensaver.

SOURCE button(DL375SI,DL385SI,  
DL3103SI)

Press to change DVD/USB/CARD READER  
mode.

PICTURE button (DL377SI,DL387SI)

Press to change picture mode.

### 18 Button

Press to skip forward.

### 19 Button

Press to stop the playback.

### 20 Button

Press to start forward/forward scanning.

### 21 Button

Press to normal playback/pause.

### 22 ZOOM+/- button

Press to zoom in/out.

### 1 Screensaver button

Activation of screensaver function.

### 2 LANG button

Press to change language.

### 3 MEM button

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

### 4 DISP button

Press to display the disc information.

### 5 Numeric buttons

### 6 BROWSE button

Press to turn on/off the browser function.

### 7 CURSOR buttons

### 8 SETUP button

Press to switch to setup mode.

### 9 Button

Press to turn on/off the virtual control panel.

### 10 /SOURCE button

 Button(for all models except DL387SI)

Press to change image setting.

SOURCE button (for DL387SI)

Press to change DVD/USB/CARD READER  
mode.

### 11 Button

Press to start rewind/rewind scanning.

### 12 Button

Press to skip backward.

### 13 REPEAT button

Press to repeat playback.

### 14 A-B button

Press to repeat the selected portion.

### 15 Button

Press to turn on/off the sound.

### 16 VOLUME+/- button

Press to adjust the volume.

### 17 CAPTURE/SOURCE/PICTURE button

### 23 CANCEL button

Press to go one level back/cancel current operation.

### 24 OK button

### 25 MENU button

DVD disc menu/PBC function.

### 26 ANGEL button

Press to change the camera angel.

### 27 Q-PLAY button

Press to turn the Q-Play mode on.

### 28 SUBT button

Press to change the subtitles language.

### 29 Button

Button  (for

DL370SI,DL372SI,DL385SI,DL3103SI)

Press to switch into standby.

Button  (for DL375SI,DL387SI)

Press to switch the device on.

## 2.4 FUNCTION SETTINGS

### 2.4.1 Function selection and change

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

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



1. For example, if you wish to change the image settings, You have to select the image item and press the OK or RIGHT key.
2. Using the UP/DOWN buttons, select the desired item and press OK or RIGHT button. For example, select the TV format item. Settings will appear on the screen. Then select the desired TV 16:9 and press OK for confirmation.



3. Press LEFT for exit to previous menu level.
4. Press SETUP to exit setup menu.

### 2.4.2 Language settings

1. Menu: interface language set-up

#Options: Russian, English, Ukrainian, Romanian.

#Default option: Russian.

2. DVD menu: selection of disc menu language

3. Sound: selection of translation language

#Disc menu/translation language options:

Russian, English, Estonian, Lithuanian, Kazakh, Romanian, Belarusian, Ukrainian, Chinese.

#Default menu/translation language option: English.

#Selection of other languages: select the OTHERS item using the wheel and press OK. Enter the language code using the numeric buttons and press OK.

#If the language you selected is not recorded on the DVD disc, another available language will be used.



4. 5. DVD/MP4 Subtitles: selection of subtitles language

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

#Default option: Off.

#Selection of other languages: select the OTHERS item using the wheel and press OK. Enter the language code using numeric buttons and press OK.

#If the language you selected is not recorded on the DVD/MP4 disc, another available language will be displayed.

### 2.4.3 Image settings menu

1. TV system: TV system selection

#Options: Auto, PAL, NTSC.

#Default option: Auto.



## 2. TV Format: image ratio settings

# Options: 4:3 pan&scan, 4:3 letterbox and 16:9 TV.

#Default option: 16:9 TV.

#Some discs are recorded with support of only one ratio.

The selected ratio must comply with the TV screen.

### 2.4.4 Sound settings menu

#### 1. Mixer

a) Configuration: setting of the mode for conversion

Of L+R to L or R.

#Options: L+R, R, L.

#Default option: L+R.

b) Max volume of headphone\*: this item is used to set the maximum volume headphone.

#Options: Low, Medium, High

#Default : Low.

c) Max volume of speaker: this item is used to set the maximum volume of speaker.

#Options: Low, Medium, High

#Default : Medium.



#### 2. Digital 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 player's digital outputs, the decoded signal is transferred to analog outputs. Decoding is performed by the built-in decoder of the DVD player. 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 player's digital outputs.

B) LPCM: set-up of digital audio output options to comply with different amplifiers and receivers.

#Options: 48 kHz 16 bit, 96 kHz 24 bit.

#Default option : 48 kHz 16 bit.

#### 3. Tuning

A) Max volume: max volume limiting

#Using the cursor buttons, adjust the max volume level.

#Press the LEFT key to return to sound correction set-up menu.

B) Equalizer: equalizer modes

#Options: Off, rock, pop, live dance, techno, classics, 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 cursor buttons.

#Press the LEFT button to return to sound correction set-up menu.

### 2.4.5 Playback settings



#### 1. DVD

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

#Options: Yes, No.

#Default option: No.

#### 2. VCD/SVCD

PBS menu: PBS menu on/off

#Options: On, Off.

#Default option: On.

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

3. Files: selection of reproduced files on the disc

#Options: Audio, Pictures, Video.

#Default option: A. P. V

4.Repeat: file repeat mode

#Options: Off, Single, All.

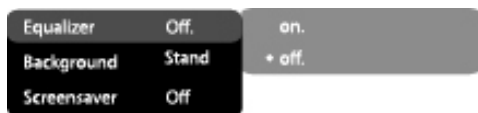
#Default option: Off.

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

#Options: Off, from Top, from Bottom.

#Default option: Off.

### 2.4.6 Preference settings



1.Equalizer: spectrum analyzer

#Options: On, Off.

#Default option: Off.

2.Screensaver: screen saver on/off

#Options: On, Off.

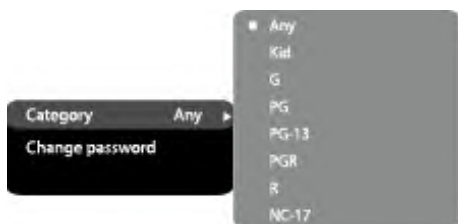
#Default option: On.

### 2.4.7 Family filter settings

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

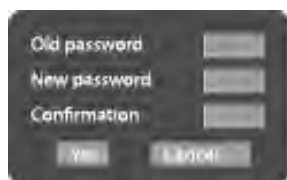
#Options: Any, Kid, G, PG, PG-13, PGR, R, NC-17

#Default option: Any.



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

Default option:7890.



### 2.4.8 Initial settings menu

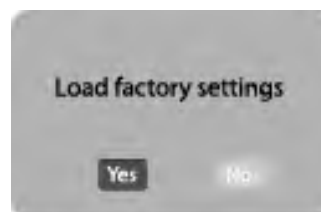
#Press the RIGHT key to enter the initial settings menu, then select the desired item using the cursor buttons and press OK key for confirmation.

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



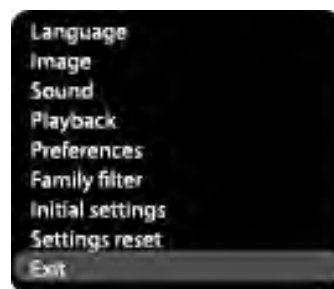
### 2.4.9 Reset settings to default

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



### 2.4.10 Exit settings menu

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



## 2.5 OTHERS

### 2.5.1 Useful notes

#To extend the service life of your DVD player make pauses of not less than 30 seconds between switching off and repeatedly switching on the DVD player.

#Disconnect the DVD player from the wall outlet after shutdown.

#Some DVD player's functions may not be applied to some discs.

#Use supply sources of rated voltage, otherwise the DVD player may not function or be damaged.

#In case of the DVD player's occasional stops, please switch the power supply off and then on again.

## 2.5.2 Trouble shooting

Please check probable causes of malfunction before addressing the service center.

| Sign of trouble                 | Cause of trouble                                                                                                                                     | Actions to eliminate the trouble                                                                                                                                                                       |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No sound                        | 1.Poor audio cable connection.<br>2.Disc dirty or damaged.<br>3.Sound disabled by the MUTE button.                                                   | 1.Make proper connection.<br>2.Clean the disc.<br>3.Press the MUTE button.                                                                                                                             |
| No image                        | 1.Poor video cable connection.<br>2.External video signal input is inactive.                                                                         | 1.Make proper connection.<br>2.Push DVD/AUX IN button.                                                                                                                                                 |
| Black and white image           | 1.Color level adjusted incorrectly.                                                                                                                  | 1.Readjust the color system.                                                                                                                                                                           |
| Discs cannot be read            | 1.Disc not inserted.<br>2.Disc inserted incorrectly.<br>3.Condensation on the DVD player's laser head.                                               | 1.Insert the disc.<br>2.Install the disc with the label side facing up.<br>3.Switch the DVD player on without disc for an hour.                                                                        |
| Remote control does not operate | 1.Remote control is incorrectly directed at the DVD player's screen.<br>2.Distance to the DVD player is in excess of 8 meters<br>3.Run out batteries | 1.Use the remote control according to the manual.<br>2.Decrease the distance to the DVD player.<br>3.Replace both batteries.                                                                           |
| Some functions do not work      | 1.Disc is recorded incorrectly.<br>2.Incorrect key sequence.<br>3.Static voltage on the DVD player's housing.                                        | 1.Wait 5-10 seconds and the DVD player will automatically return to normal state.<br>2.Repeat the operation one more time.<br>3.Switch the DVD player off for 1-2 minutes and then switch it on again. |
| Image fault                     | 1.Battery charge is consumed.                                                                                                                        | 1.Charge your battery or connect adapter.                                                                                                                                                              |
| Errors in normal disc playback  | 1.Defective disc.<br>2.Wrong button is pressed.<br>3.Static discharge.                                                                               | 1.Check the disc.<br>2.Press the right button.<br>3.Switch off the player for 1-2 minutes.                                                                                                             |

## 2.5.3 Technical characteristics

|              |                                                                                                                           | DL370SI | DL372SI | DL375SI | DL377SI | DL385SI | DL387SI | DL3103SI |
|--------------|---------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|----------|
| Disc types   | DVD-Video, DivX3.11, DivX4, DivX5, DivX Pro, XviD, Super VCS, VCD 1.0, 2.0, CD-DA, HDCD, MP3, WMA, Kodak Picture CD, JPEG |         |         |         |         |         |         |          |
| Medium types | CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW                                                                                 |         |         |         |         |         |         |          |
|              | SD, MMC, MS Cards                                                                                                         | -       | -       | +       | +       | +       | +       | +        |

|                        |                                             |                                  |                 |                 |                 |                 |                  |                 |
|------------------------|---------------------------------------------|----------------------------------|-----------------|-----------------|-----------------|-----------------|------------------|-----------------|
| Outputs                | Headphone output                            | 1                                | 2               | 2               | 2               | 2               | 2                | 2               |
|                        | Analogue stereophonic audio output          | -                                | +               | +               | +               | +               | +                | +               |
|                        | Optical digital audio output                | -                                | -               | -               | -               | +               | -                | -               |
|                        | Composite video outputs                     | -                                | +               | +               | +               | +               | +                | +               |
|                        | S-Video output                              | -                                | -               | -               | -               | +               | -                | +               |
|                        | Coaxial digital audio output                | -                                | -               | +               | -               | -               | +                | +               |
| Inputs                 | Stereo audio input                          | 1                                |                 |                 |                 |                 |                  |                 |
|                        | Composite video input                       | 1                                |                 |                 |                 |                 |                  |                 |
| Video characteristics  | Video amplitude                             | 1.0Vp-p(75H)                     |                 |                 |                 |                 |                  |                 |
|                        | Amplitude of video signal no S-Video output | Y:1.0Vp-p(75H) C:0,286 Vp-p(75H) |                 |                 |                 |                 |                  |                 |
| Audio characteristics  | Frequency                                   | 20-20000 Hz(1 db)                |                 |                 |                 |                 |                  |                 |
|                        | Signal-to-noise Ratio                       | >100 db                          |                 |                 |                 |                 |                  |                 |
|                        | Total harmonic distortion                   | < 0.01%                          |                 |                 |                 |                 |                  |                 |
| General Specifications | TFT color display                           | 7"                               | 7"              | 7"              | 7"              | 8"              | 8"               | 10"             |
|                        | Power supply                                | ~100-250; 50/60                  | ~100-250; 50/60 | ~100-250; 50/60 | ~100-250; 50/60 | ~100-250; 50/60 | ~100-250; 50/60  | ~100-250; 50/60 |
|                        | Power consumption,w                         | 12                               | 16              | 16              | 13              | 16              | 15               | 37              |
|                        | Dimensions,mm                               | 205*149*39.5                     | 190*163*38.2    | 219*151.2*29.6  | 220*149*41.7    | 220*166*28      | 245.5*167.8*30.7 | 266*183*28      |
|                        | Mass,kg                                     | 0.735                            | 0.835           | 0.759           | 0.775           | 0.877           | 0.88             | 1.2             |

#Specifications are subject to change without notice.

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

# Chapter Three Principle and Servicing

## Section One Principle of the Player

### 3.1.1 Block diagram of the player

DL385SI is composed of decode circuit, servo circuit, audio circuit, video circuit and power circuit.

Block diagram of the player is shown in the figure 3.1.1.1:

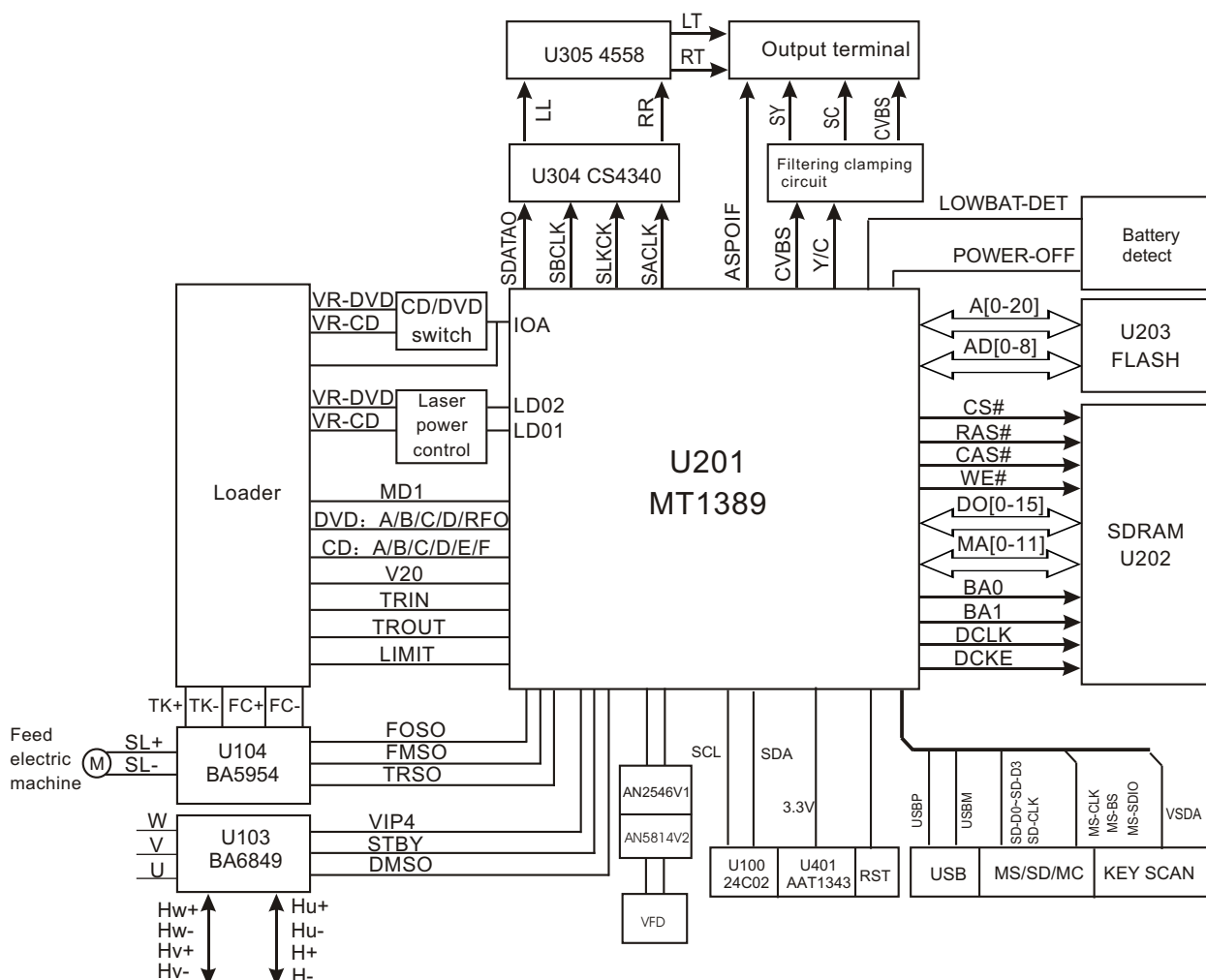


Figure 3.1.1.1 Block diagram of the player

### 3.1.2 Introduction to IC functions

IC function introduction of the player is shown in the following table:

| PCB board           | Location NO.     | IC model       | Function                                 |
|---------------------|------------------|----------------|------------------------------------------|
| Decode board 2385-2 | U101             | 24C02N         | EEPROM                                   |
|                     | U102             | HS0038B3V      | Receiving head                           |
|                     | U103             | BA6849FP       | Servo drive                              |
|                     | U104             | BA5954FM       | Servo drive                              |
|                     | U105             | LM393          | Comparator                               |
|                     | U201             | MT1389FE/B     | Decode chip                              |
|                     | U202             | HY57V641620HGT | 64M SDRAM                                |
|                     | U203             | 29LV160BE      | 16M FLASH                                |
|                     | U209             | LM4863MTE      | Headphone amplifying                     |
|                     | U301             | XC6202P802PR   | Voltage stabilizing IC                   |
|                     | U303             | XC6202P502PR   | Voltage stabilizing IC                   |
|                     | U304             | CS4340A        | DA conversion                            |
|                     | U305             | 4558           | Audio amplifying (operation amplifier)   |
|                     | U306, U402, U403 | RT9701CB       | Power supply switch                      |
|                     | U401             | AAT1343T2      | DC-DC pulse width adjustment             |
|                     | U404             | LM1117MP-ADJ   | Voltage stabilizing IC                   |
|                     | U405             | AAT1102M       | DC-DC conversion                         |
|                     | U501             | AU9362         | USB/card read control                    |
|                     | U502             | ADG713         | Electronic switch                        |
| Main board 4385-2   | U401             | PT2222A        | Button encoding control                  |
| Drive board C385-2  | U1               | AN2546FH       | Video encoding, LCD drive                |
|                     | U2               | MN5814         | Video encoding, LCD drive                |
|                     | U5               | TDA4665T       | Baseband detection                       |
|                     | U7               | NJM2082        | VCOM signal amplifying                   |
|                     | U8               | LMC7101        | Operational amplifier                    |
|                     | U9               | 74HC4066       | Electronic switch                        |
| Charge board B383-3 | IC1              | S3F9454        | 8-bit single chip unit, charge control   |
|                     | IC2              | TL431          | 3-end adjustable divergence datum source |
|                     | IC3              | LM358M         | Operational amplifier                    |
| Power adapter       | IC1              | TOP246Y        | Power switch IC                          |
|                     | IC2              | HS817          | Photoelectric coupler                    |
|                     | IC3              | AZ431          | Precision voltage stabilizer             |
| Remote controller   | U801             | PT2222A        | Button encoding control                  |

## Section Two Unit Circuit Principle

### 3.2.1 Servo processing circuit

1. DL385SI adopts SANYO 62 loader and MTK decode scheme (MT1389B+FLASH (16M)+SDRAM (64M)) and its servo circuit is composed of front end signal processing, digital servo processing, digital signal processing IC MT1389B and drive circuit Ba5954, in which MT1389B is also the main composed part of decode circuit. Servo processing circuit block diagram is shown in the figure 3.2.1.1:

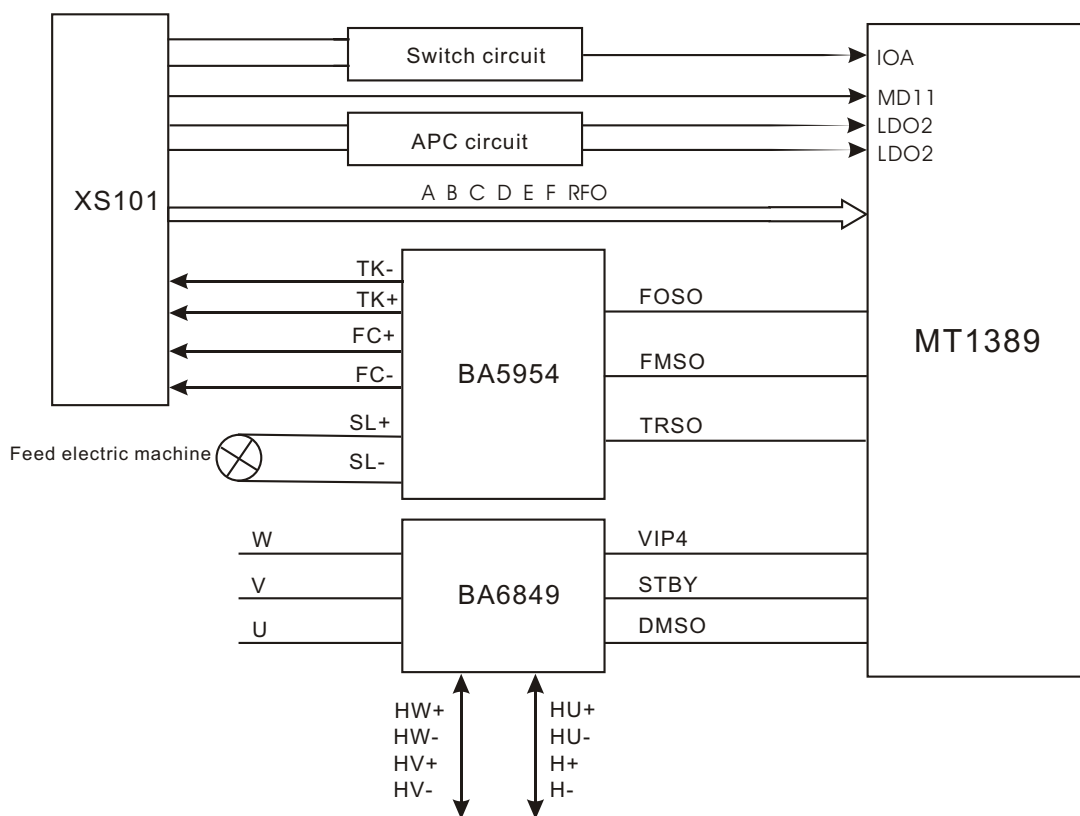


Figure 3.2.2.1 Servo processing circuit block diagram

2. Working principle: after power on or closing door (door detect switch SW601/SW602 on charge board closes), loader pick-up begins to reset, focus and main axis begin to rotate and pick-up begins to identify disc information to judge whether it is CD or DVD disc to make the corresponding control action. Meanwhile MT1389 also adjusts laser output power through laser power control circuit. When loader reads disc information, signals A, B, C, D, E, F form through photoelectric conversion to give to Mt1389

(DVD has signals A, B, C, D only) and also Therefore signal, and then input from pin 2~11, 18, 19 of MT1389, after being processed and amplified by MT1389 internal pre-amplifier, now signals are precessed in two parts inside MT1389: one part forms the corresponding servo control signals after being processed by digital servo signal circuit inside Mt1389 and then outputs FOO, TRO, TRO, DMO and FMO

Digital servo control signal from pin 42, 41, 37 and 38 o MT1389, through the integration circuit composed of capacitor and resistor, become analog servo control signal FOSO, TRSO, FMSO and send to drive circuit BA5954 for drive amplifying, and bring along focus winding, trace winding, feed electric machine and main axis signal (DMSO) after amplifying to send to drive circuit BA6849 for drive amplifying to bring along main axis electric machine, in which focus and trace servo are used to correct objective lens position accurately; feed servo is used to bring along pick-up to make radial and large range movement, which belongs to the preliminary adjustment to pick-up position; main axis servo is used to control main axis electric machine to read signal in the means of constant line speed to bring along disc to rotate. After being amplified by VGA voltage control amplifier inside MT1389 and even frequency compensation, the other part signals switched into digital signal through internal A/D conversion. When loader reads CD/VCD signals, these signals perform EFM demodulating inside MT1389 and then finish CIRC error correction and then output to rear stage for AV decoding; when loader reads DVD signals, these signals perform ESM demodulating inside MT1389 and then finish RSPC error correction and then send to rear stage for decoding. Compared with general DVD players, this machine has no disc trat in/out circuit and manual means is adopted.

### 3. Loader signals explanation is shown as follows:

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

|    |          |                 |      |      |      |                                                                                           |
|----|----------|-----------------|------|------|------|-------------------------------------------------------------------------------------------|
| 13 | V20      | Input loader    | 2.04 | 2.06 | 2.03 | Reference voltage                                                                         |
| 14 | Vcc      | Input loader    | 5.04 | 5.04 | 5.02 | Supply voltage for loader                                                                 |
| 15 | E        | Input MT1389    | 2.06 | 2.45 | 2.03 | Disc data signal                                                                          |
| 16 | Blanking | handling in air | 0.01 | 0    | 0    | unused                                                                                    |
| 17 | VR-CD    | Input loader    | 0.21 | 0.01 | 0    | Through the handling inside loader, make sure MD11 is 180mV when reading CD               |
| 18 | VR-DVD   | Input loader    | 0.01 | 0.2  | 0    | Through the handling inside loader, make sure MD11 is 180mV when reading DVD              |
| 19 | LD-CD    | Input loader    | 0.09 | 2.1  | 0    | CD laser power control signal                                                             |
| 20 | MDII     | Input MT1389    | 0.21 | 0.2  | 0    | CD and DVD laser power monitoring signal                                                  |
| 21 | HFM      | Input loader    | 5.04 | 5.04 | 5.02 | High frequency overlapping signal produces laser with different wave length inside loader |
| 22 | Blanking | unused          | 0.01 | 0.1  | 0    |                                                                                           |
| 23 | LD-DVD   | Input loader    | 2.21 | 0.1  | 0    | DVD laser power control signal                                                            |
| 24 | GND      | unused          | 0.01 | 0.01 | 0    | Grounding                                                                                 |

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

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

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

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

### 3.2.2 CD/DVD switch circuit

1. CD/DVD switch circuit is shown in the figure 3.2.2.1:

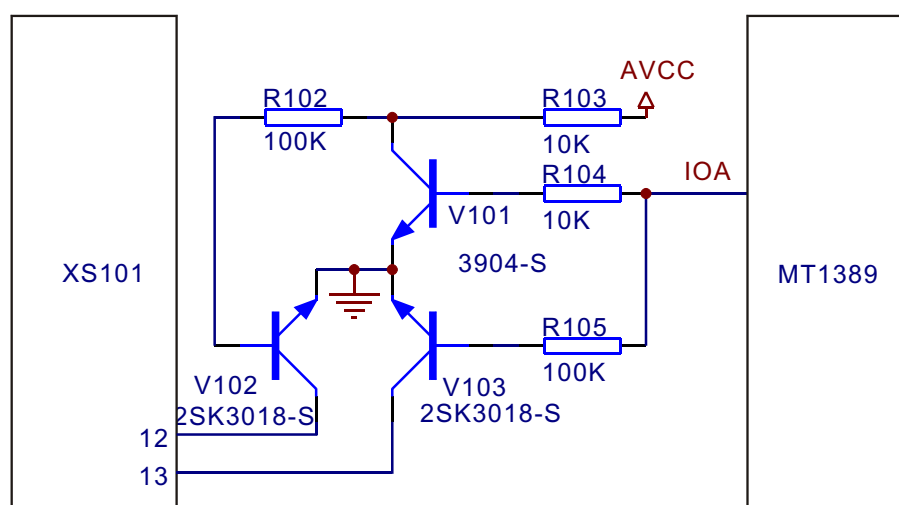


Figure 3.2.2.1 CD/DVD switch circuit

2. Working principle: after loading disc into machine, IOA port of the player defaults high level to make V103 saturated on and forms loop together with CD laser power control circuit, meanwhile IOA also goes to PD IC directly for switch and disc begins to rotate. When servo processing system recognises the disc inside is not CD, IQA pin outputs low level to make V103 cut off, V102 is connected and forms loop together with DVD laser power control circuit on loader to perform the action of reading DVD disc. After disc tray ejects out, IOA still maintains the state before opening door. If the machine cannot recognise which disc is, IQA pin will switch continuously until disc is read out or system judges no disc in.

Note: V102 are V103 are MOS tube (voltage drop is small when saturated on) .

### 3.2.3 Laser power control circuit

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

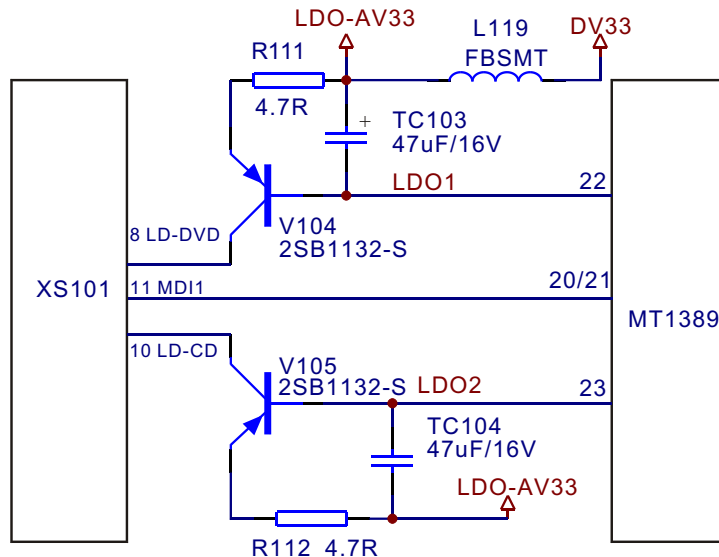


Figure 3.2.3.1 Laser power control circuit diagram

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

When reading VCD disc, laser power becomes weak and voltage of MDI pin 1 reduces; MT1389 voltage reduces and XS101 pin 10 voltage increases to reach the purpose of boosting laser power. When laser power is too strong, MDI pin 1 voltage increases to make Mt1389 voltage increase and XS101 pin 10 voltage decrease to reach the purpose of reducing laser power to form an auto power control circuit. When reading DVD disc, pin 21 is detect signal input pin, pin 22 is drive control output pin and the working principle is the same with that when playing VCD.

### 3.2.4 DC-DC switch circuit

1. DC-DC switch circuit is shown in the figure 3.2.4.1:

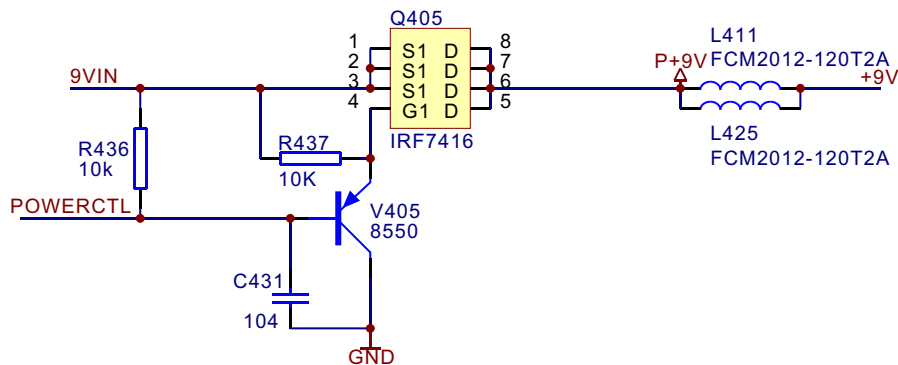


Figure 3.2.4.1 DC-DC switch circuit diagram

2. Working principle: when power switch SW603 cuts off, POWERCTL is high level, V405 cuts off, MOS tube Q405 is in cut off state, DC-DC circuit has no voltage input, DC-DC circuit does not function and machine is in power-off state. After SW603 closes, POWERCTL becomes low level, V405 is connected to make Q405 on, +9V voltage begins to supply power for DC-DC circuit and DC-DC circuit begins to work. Take V33 as instance, we give some introduction to circuit voltage stabilizing:

As shown in the figure 3.2.4.2, after connecting with +9V power, AAT1343 (U401) begins to work. Pin 8 outputs a pulse voltage to control triode V402 and V404 connected each other and control voltage change of Q402 gate electrode. When Q402 gate electrode is high level, MOS tube is connected, +9V power reaches L404 through MOS tube and TC406 saves energy of inductor and charges capacitor, D402 is freewheel diode. When MOS tube cuts off, L discharges energy and its induced electromotive force makes diode connected and TC406 discharges load at the same time with current direction unchanged to form a serial switch voltage stabilizing circuit.

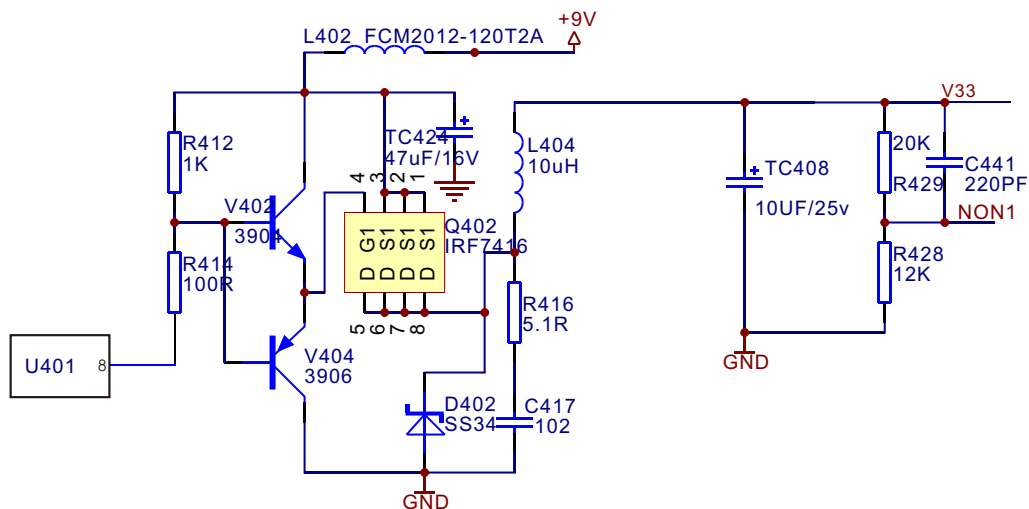


Figure 3.2.4.2 DC OUT control circuit diagram

### 3.2.5 Battery voltage detect circuit

1. Battery voltage detect circuit is shown in the figure 3.2.5.1:

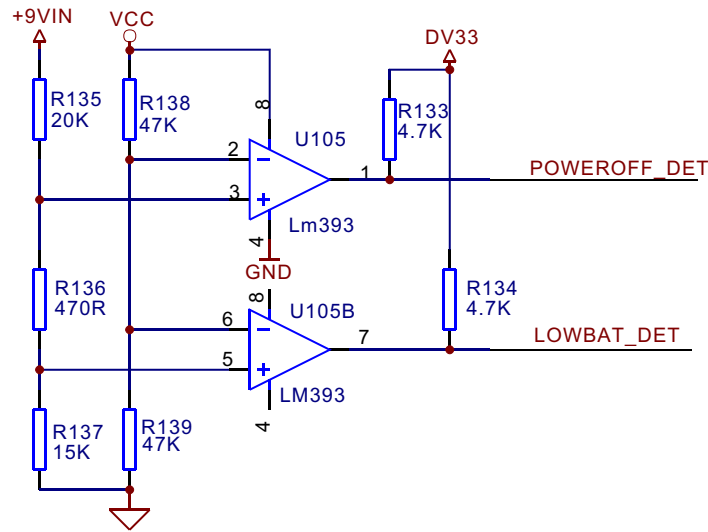


Figure 3.2.5.1 Battery voltage detect circuit

2. Working principle: U105 is an operational amplifier and used as a comparator in circuit. Reverse input end inputs a VCC 5V, through resistor R138, R139's voltage division, reference voltage (2.5V) is achieved. After +9 VIN power performs voltage division b R135, R136, R137, the achieved two groups of voltage are supplied for the in-phase input end of operational amplifier. When in-phase input end voltage is lower than 2.5V, output end of the operational amplifier outputs a low level to decode chip who carries out the corresponding acts. In this machine, when input voltage is lower than 6.5V, pin7 of operational amplifier outputs low level to make screen display low battery; when input voltage is lower than 6.1V, pin 1 of operational amplifier outputs low level to perform power-off acts.

### 3.2.6 Audio output circuit

1. Audio output circuit block diagram is shown in the figure 3.2.6.1:

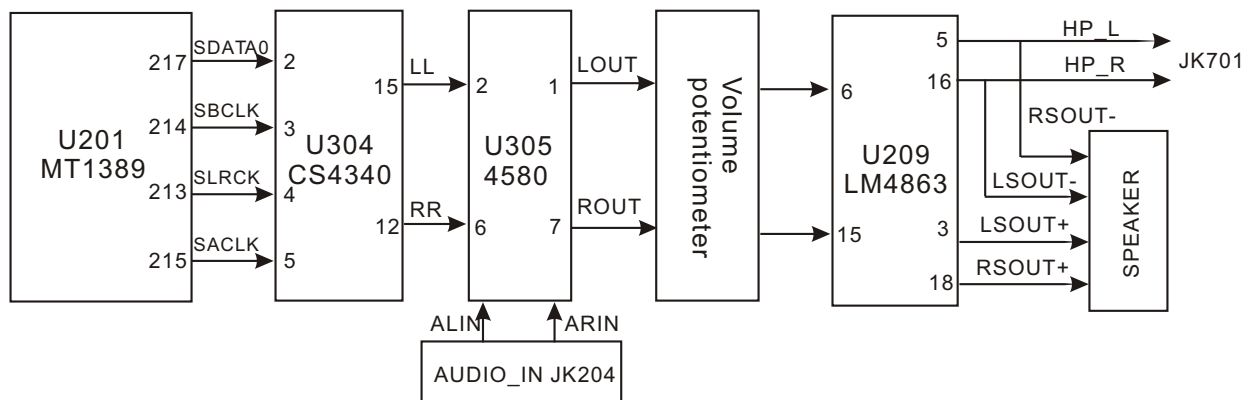


Figure 3.2.6.1 Audio output circuit block diagram



### 3.2.7 Screen-off detect control circuit

1. Screen-off detect control circuit is shown in the figure 3.2.7.1:

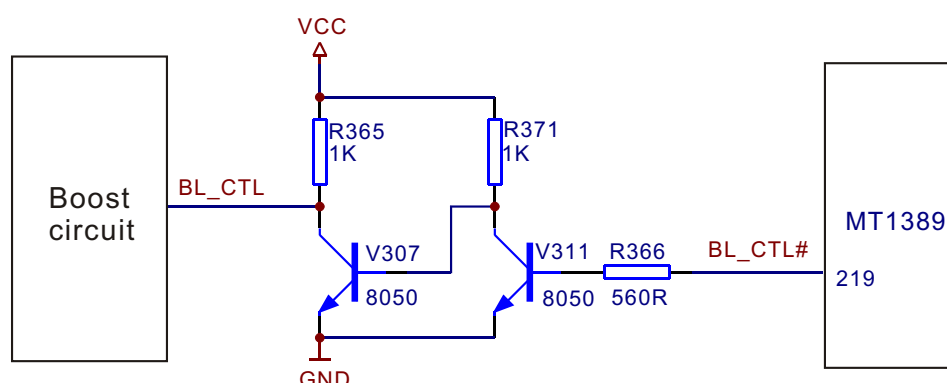


Figure 3.2.7.1 Screen-off detect control circuit diagram

2. Working principle: when switch SW501 cuts off, SW becomes low level; STBA is pulled down to bottom; U306 and U402 stop +5V voltage output; U405 stops LX output; doubling circuit stops +17V and -13V voltage; power supply part of display screen does not work and display screen is off. When switch SW501 cuts off, U306, U402 and U405 begin to output voltage; power supply part of screen begins to power on; pin 219 of Mt1389 outputs high level to make BL\_CTL high level, boost circuit begins to work to begin to lighten back light board.

### 3.2.8 Video encoding and LCD—TFT drive circuit

1. Video encoding and LCD—TFT drive circuit block diagram is shown in the figure 3.2.8.1:

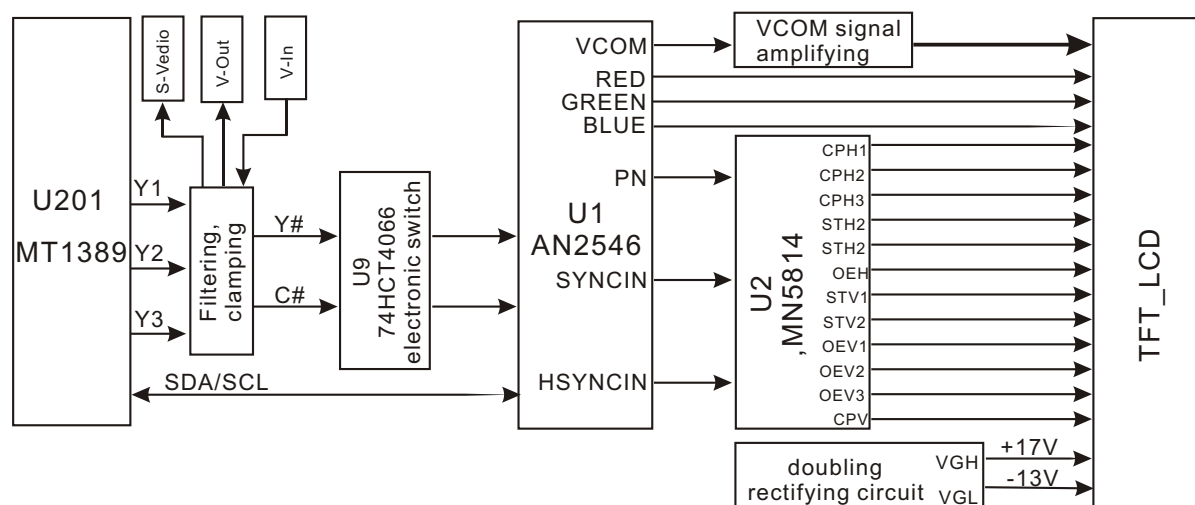


Figure 3.2.8.1 Video encoding and LCD—TFT drive circuit block circuit

2. Working principle: decode chip outputs digital video signals. One path, through filtering and clamping circuit, outputs from S—vedio and Vout of decode board; the other path inputs to TFT drive board together with Vin and then inputs to AN2546 through electronic switch 4066 for encoding, and then restore digital signals into 3 base color signal through to drive LCD screen for display.

VCOM signal amplifying circuit: after being amplified by U1(NJM2414), VOCM outputs to display screen and is used as colour filtering plate of screen.

AN2546 controls through IIC means and then outputs line and field signals to MN5814 to control brightness and position parameters of screen.

### 3.2.9 Doubling circuit

1. Working of display drive circuit needs high voltage, so +5V voltage is doubled, shown in the figure 3.2.9.1:

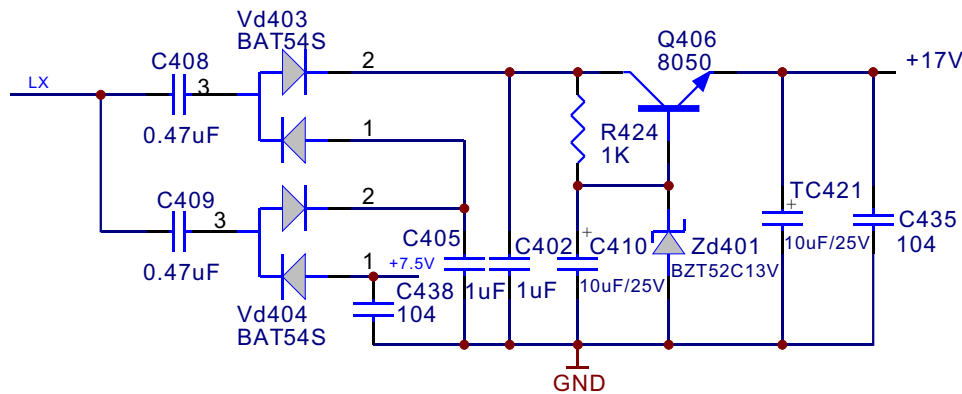


Figure 3.2.9.1 Doubling rectifying circuit diagram

2. Working principle: after DC-DC conversion by U405, +5V voltage is sent to the two groups of doubling rectifying circuit composed by VD403-VD406 to rectify the power sent from pin 5 of U405. When LX input is negative half period, -14V DC voltage forms in Q404 collector electrode and -13V voltage outputs through ZD402 voltage stabilizing and is supplied for VCOM signal amplifying circuit and display screen. When LX input is positive half period, because the doubling rectifying circuit composed by VD403, VD404 and C405 cannot generate the required voltage, the 7.5V DC power achieved from VD402 rectifying is superposed on pin 1 of VD404, which is directly superposed to voltage stabilizing circuit Q406, ZD401 for voltage stabilizing, and then +17V DC power is outputted and supplied for other drive signals of screen, from socket J1 to drive board, and then outputted by J3 to drive screen.

Note: not to judge whether boost board is good or not. Make detect head of oscillograph close to high voltage output line (do not contact) and you may see a sine wave with 60K from the oscillograph, which means boost board has AC output. Main fault of boost board is : no back light or back light is dark. (If this PCB board has damage, do not repair and change it directly)

3. Function introduction to display screen pins is shown as follows:

| Pin | Symbol | I/O | description                                                                  |
|-----|--------|-----|------------------------------------------------------------------------------|
| 1   | GND    | -   | Ground                                                                       |
| 2   | VCC    | P   | Power line for logic                                                         |
| 3   | VGL    | P   | Gate driver negative voltage                                                 |
| 4   | VGH    | P   | Gate driver positive voltage                                                 |
| 5   | STV1   | I/O | Gate driver START PULSE 1                                                    |
| 6   | STV2   | I/O | Gate driver START PULSE 2                                                    |
| 7   | CKV    | I   | Gate driver scanning clock                                                   |
| 8   | U/D    | I   | Up/Down scanning change                                                      |
| 9   | OEV    | I   | Gate driver output enable                                                    |
| 10  | Vcom   | I   | HORIZONTAL SYNCHRONIZATION SIGNAL(Voltage applied to color filter substrate) |
| 11  | Vcom   | I   | Voltage applied to color filter substrate                                    |
| 12  | L/R    | I   | Right / Left scanning change                                                 |
| 13  | MOD    | I   | Sampling mode change (H: Simultaneous, L: Sequential)                        |
| 14  | OEH    | I   | LATCH PULSE FOR COLUMN DRIVER                                                |
| 15  | STH2   | I/O | Source scanning start signal 2                                               |
| 16  | STH1   | I/O | Source scanning start signal 1                                               |
| 17  | CPH1   | I   | INPUT DATA CLOCK                                                             |
| 18  | CPH1   | I   | INPUT DATA CLOCK                                                             |
| 19  | CPH1   | I   | INPUT DATA CLOCK                                                             |
| 20  | Vcc    | P   | Power line for logic                                                         |
| 21  | GND    | P   | Ground                                                                       |
| 22  | VR     | I   | Red video signal                                                             |
| 23  | VG     | I   | Green video signal                                                           |
| 24  | VB     | I   | Blue video signal                                                            |
| 25  | AVdd   | P   | Power                                                                        |
| 26  | AVss   | P   | Ground                                                                       |

### 3.2.10 Charge circuit and protection circuit

1. Battery: lithium-ion polymer chargeable battery. Charge method follows constant current firstly and then constant voltage, and then charge is performed in constant voltage status.

2. Lithium battery protection is divided into 3 parts (this PCB board is not repaired inside battery components): A. Over-voltage protection, that is charge protection; B. Under-voltage protection, that is

Over-discharge protection; C. Over-current protection (including short-circuit protection). The protection delay and delay time for the above three items are different from each other, from 2 second to 0.1 second to 10ms and delay is adjustable. Two lithium protection, no matter it is over-voltage protection or under-voltage protection, they are both the relationship of "or", as long as one core reaches the condition, it is protected. This requires two battery cells on one group battery are equal basically, otherwise the entire capacity will be damaged seriously (when in over-voltage protection, battery cell of high voltage is protected firstly; when in under-voltage protection, low voltage battery cell is protected firstly).

3. Charge part (charge board is a separate PCB inside the player): core of charge part is single-chip machine, which adopts 10-bit A/D conversion PWM (12bits). Scheme of 8-bit single-chip machine of SAMSUNG Company (S3C9454) has the following features:

(1) Single-chip machine is with 10-bit A/D conversion with the precision 1/1024. Generally speaking, negative voltage of NI-MH is 3-6mv ( $6\text{mv}/1500\text{mv}=1/250$ ), which can be satisfied well.

Lithium battery precision can be up to 5mv. Considering adjusting error,  $\pm 20\text{mv}$  can be achieved, that is  $4.2\text{V}\pm 0.02\text{V}$ , so the advantage of high precision is obvious.

(2) PWM (Pulse Width Modulator) with the single-chip machine is used to control DC/DC conversion directly. The control method is supplied by software to achieve different constant current and constant voltage curve (different charge means may be designed according to client's requirement). The entire line is simple, with low-cost, high reliability, high efficiency power switch and little heat radiation.

(3) NI-MH, NI-CD, LI-ION battery may be charged well. How to judge whether it is fully charged: A. Max voltage; B. Max temperature increase; C. Negative voltage; D. Max charge time. It can be tested quickly (within 15 minutes) after fully charged and being loaded again and charge stops (this is very important for NIMH and NICD to prevent over charge to damage battery). When battery voltage is low, use small current to charge to restore the damaged battery.

4. Working principle: when external power adapter supplies power, power is supplied for charge circuit through DCB\_IN1, and then supplied working voltage for IC1 after being voltage stabilized by the voltage stabilizing circuit composed by QB12 and IC2. IC1 is single-chip machine of charge management control.

To supply power for PU, TL431 and a NPN are adopted. Though elements are many, precision is high, easy to correct and reach 1% and less adjusting. U602 and V601 compose it.

QB4, QB3, QB2 and Qb1 compose switch DC/DC circuit. Qb2 and Qb3 compose standard push-pull circuit to drive QB1 to make Qb1 switch waveform good and decrease heat radiation.

QB1, LB1, CB7 and DB2 compose classical STEP DOWN circuit. When QB1 is connected, current is supplier power for battery and saved energy for inductor. When Qb1 cuts off, electric energy in inductor discharges through DB21 to charge battery.

LM358 is a classical in-phase amplifying circuit. The reason of adding amplifying circuit is decrease

Resistance test and heat radiation.

Function of QB6 is supply power for control end. When INPUT+ is low level, Qb6 is connected and battery supplies power for load. When INPUT+ is high level, power adapter supplies power for load.

QB9 and QB10 compose protection circuit. When charge circuit or battery has trouble, B electrode of QB10 is high level, QB9 cuts off and 9V power stops supplying power for battery.

### 3.2.11 Panel control circuit and remote control circuit

Panel control circuit adopts HT6222 control circuit to control and its working voltage is 3.3V. After inputting button information, serial data signals are achieved through HT6222 internal processing and then transmitted to decode board through pin VSDA and then to decode chip IR pin (111) through a separation diode. Function of separation diode is prevent the inter-disturbancebetween button function and remote control function and avoid performing incorrect instructions.

### 3.2.12 Decode circuit

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

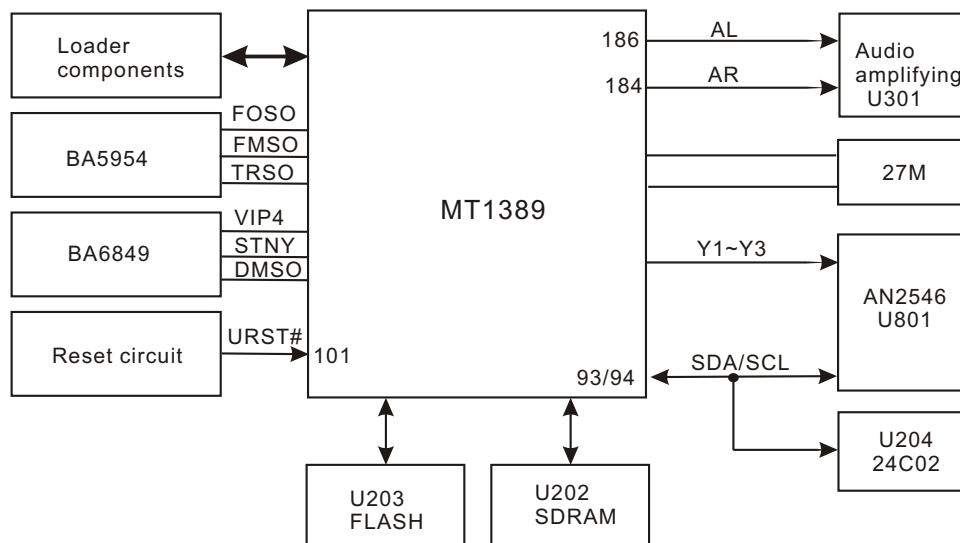


Figure 3.2.12.1 Decode circuit block diagram

#### 2. Working principle

(1) Power: Mt1389 has two groups of power supply. One group is 1.8V voltage achieved through Lm1117 (U404) voltage stabilizing and it is supplied for logic circuit inside IC; and the other group is 3.3V voltage after DC-DC conversion. Also FLASH and SDRAM meet the conditions of power supply.

(2) System clock: clock signal is an important factor for the working of the player. Whether there is clock signal and whether it is normal both will affect the normal working of the player. This player adopts external clock (27M) which inputs to pin 229 of MT1389 and clock signal is generated from crystal oscillator X201.

### (3) Data communication

1) Communication of MT1389 and SDRAM: the communication of MT1389 and SDRAM is to save the large amount of data after MT1389 decoding for calling up at any time. As shown in the figure 3.2.12.2, DMA0~DMA10 are address signals, DQ0~DQ15 are data signals, DCLK is synchronous clock, DCKE is enabled end, CS is chip selection signal, WE is write enabled signal and RAS, CAS are line and row address gating signals.

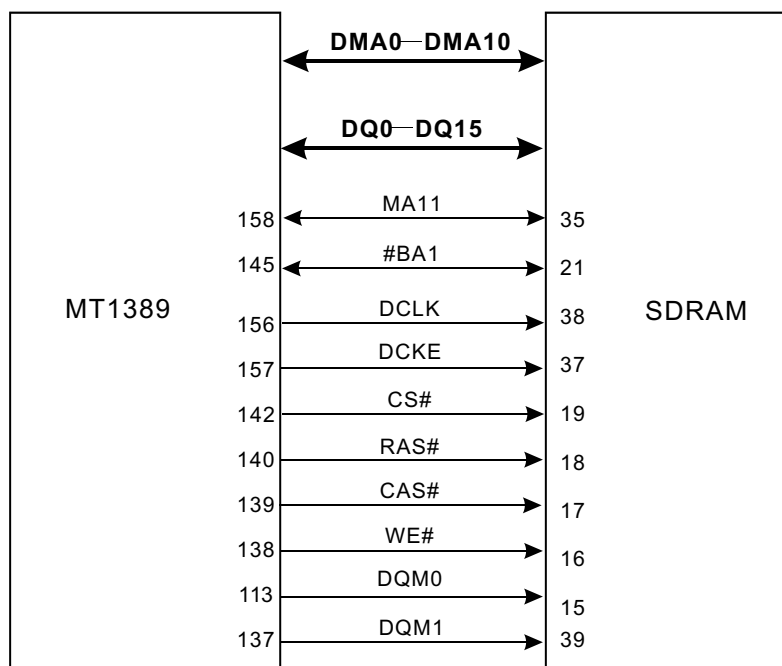


Figure 3.2.12.2 MT1389 and SDRAM communication block diagram

### 2) Communication of MT1389 and FLASH

Communication of MT1389 and FLASH is call the program and working instruction saved inside FLASH when power on. As shown in the figure 3.2.12.3, A0~A21 is address line, 2AD0~AD14 is data line, DWR# is read-write control, DCE# is chip selection and DRD# is read operation.

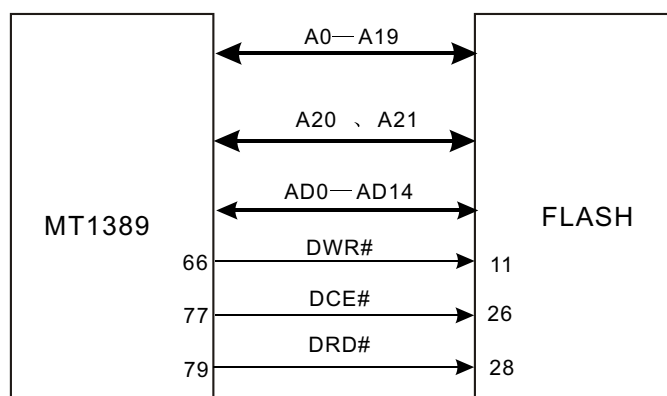


Figure 3.2.12.3 MT1389 and FLASH communication block diagram

### 3. AV output

(1) Video: MT1389 integrates video encoder inside. Analog video signals may output from inside MT1389 directly. DL385SI needs to output analog signal and the signal output is shown as follows:

- |            |            |
|------------|------------|
| ◆ P194: Y1 | ◆ P196: Y2 |
| ◆ P198: Y3 | ◆ P200: Y4 |
| ◆ P202: Y5 | ◆ P203: Y6 |

(2) Audio MT1389 integrates audio D/A conversion inside, so analog audio signals output from inside MT1389 directly, and digital signals may also output and is converted by external D/A conversion IC with optical output function. DI385 needs to output digital signal. Pin 217 of Mt1389 outputs serial digital audio signal SDATA0, through DAC conversion by CS4340, AL and AR audio signals output.

### 3.2.13 Mute circuit

1. Mute circuit is shown in the figure 3.2.13.1:

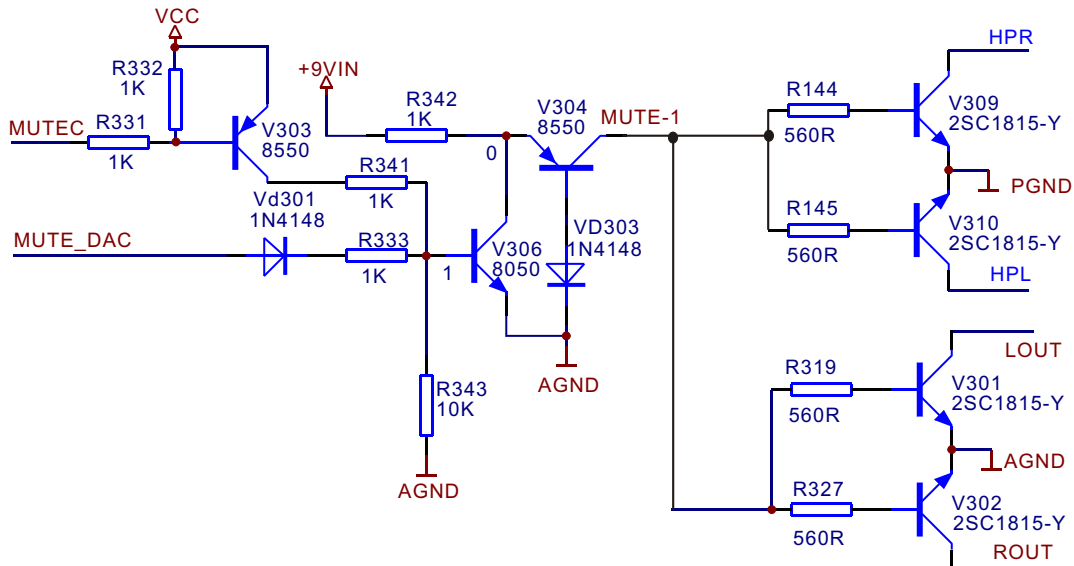


Figure 3.2.13.1 Mute circuit diagram

2. Working principle: after machine begins to power on with +9V, power arrives at the base electrode of V301, V302, V309, V310 through CE electrode of V304 to make triode saturated on; audio signals output and headphone output are short-circuited to ground to remove the noise generated when power on. After machine resets and begins to read disc, pin 151 of MT1389 outputs a high level to make pin MUTE-1 becomes low level from high level; V301, V302, V309 and V310 cut off for base electrode is low level and audio signals may output normally.

After power on and reading disc, pin 16 of CS4340 outputs high level MUTE-1, triode V303 cuts off, V306 cuts off at the same time, MUTE-1 is high level audio signal without output to prevent clutter noise output. After reading finishes, when CS4360 detects there is audio signal, MUTE-1 becomes low level, pin MUTE-1 switches from high level to low level and audio signals output normally.

### 3.2.14 Reset circuit

1. Reset circuit is shown in the figure 3.2.14.1:

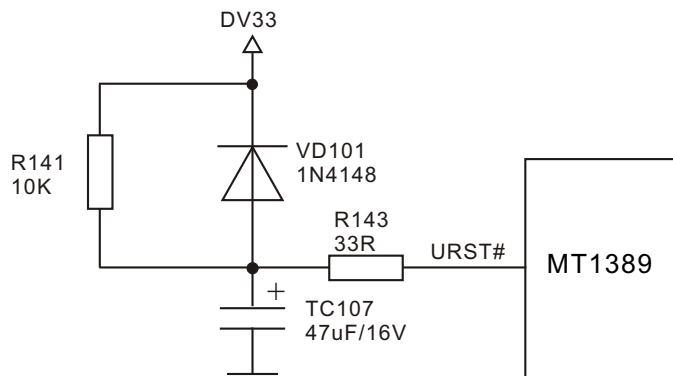


Figure 3.2.14.1 Reset circuit diagram

2. Working principle: after power on, DV33 charges TC107 through R141. Voltage on two sides of capacitor cannot change suddenly, so anode voltage of TC107 increases gradually and its increase time depends on R141 and TC107. When machine is working normally, this voltage is the same with power voltage on the whole. After power off, electric charge saved in TC107 discharges through VD101 to ensure the reliable reset when power on the next time.

### 3.2.15 USB/card read circuit

DL385SI has external USB jack and card reader slot, which may read USB device and content on storage card.

1. When machine switches in USB state, shown in the figure 3.2.15.1, pin 186 of MT1389 discharges a high level signal USBCTL, U403 high level begins to work and output +5V USB supply power, select switch ADG713 selects USB jack path.

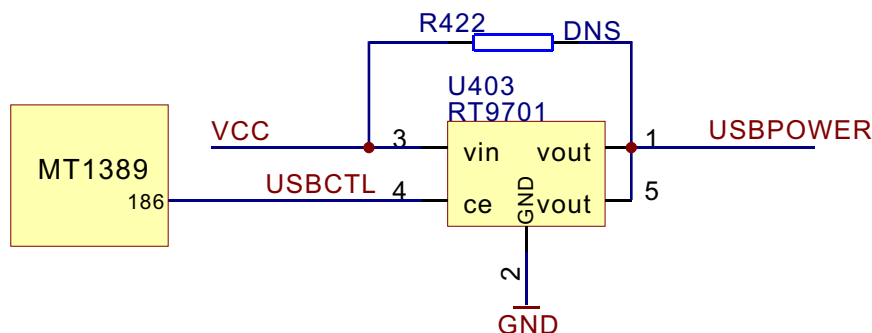


Figure 3.2.15.1 USB circuit diagram

2. When machine switches in card reading state, shown in the figure 3.2.15.2, pin 170 of MT1389 discharges a high level signal USB/CARD CTRL, V406 is connected to make USB/CARD CTRL1 pull down, select switch ADG713 selects card reading jack, card reading is controlled by AU9362, after AU9362 reads the content of storage card through internal decode processing, USBM1 and USBP1 send them to decode chip MT1389 for processing through switch ADG713.

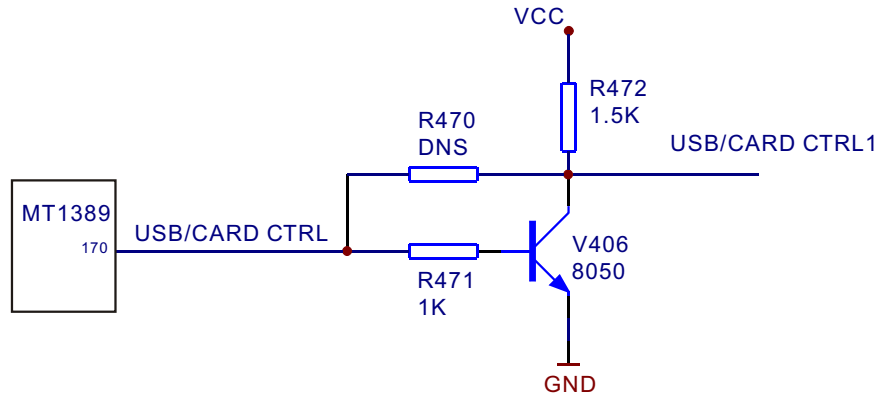


Figure 3.2.15.2 Card reading circuit diagram

## Section Three Servicing Cases

### 3.3.1 Servicing cases

[Example 1] Symptom: not read disc

Description: not read any disc

Analysis and troubleshooting: firstly, press door detect switch and check whether laser pick-up has reset and can return inside loop and it is normal; then check whether pick-up has infrared ray emits out and hoe is the light emission strength (do not look at the laser through eyes vertically, which is harmful to your eyes, and look in certain tilting angle) and it is normal; load disc, observe disc rotation speed and it is normal at beginning but speed is high at last, and pick-up moves all the time but cannot find disc information; from the above, we firstly think that pick-up focus may probably have trouble and not find the beginning information. Change loader components and trouble us removed.

[Example 2] Symptom: no OSD

Description: machine cannot read disc and there is no picture

Analysis and troubleshooting: firstly check each power supply circuit 9V, 3.3V, 1.8V, 5V and they are normal; check the detect signal control line BL\_CTL to boost board, back light voltage 9V and boost board output and they ate normal; check whether detect switch locks or whether it is invalid and there is no problem; check CVBS signal on R97 there is no; check power supply of Mt1389, U202 (SDRAM), U203 (FLASH), U204 (EEPROM) and it is normal; check pin 1, 24, 25, 48 of FLASH data line (since FLASH pin is dense and the 4 pins are on side and convenient to measure) and find that 2 pins have no waveform, the other 2 pins have waveform but it is incorrect; after changing FLASH, trouble is removed.

[Example 3] Symptom: white screen

Description: disc reading is normal, sound is normal, screen cannot display picture and white screen appears.

Analysis and troubleshooting: white screen means that boost board working is normal, so we preliminarily judge that display drive part has trouble. Check each voltage of 3.3V, 2.5V of U1 and they are both normal; check input and output signals CVBS, SDL, SCL, YUV, STH, VCOM0 and find that there is no VCOM0 signal; after changing U1, trouble is removed.

[Example 4] Symptom: headphone has no output

Description: speaker and headphone have no output

Analysis and troubleshooting: use oscillator to test whether there is sound signal that outputs to headphone terminal and there is no; test whether left and right of TC221, TC222 electrolyse capacitor has waveform output and there is no; check whether mute circuit is normal, MUTE signal is low level and result is normal; check pin 6, 15 of U209 (LM4863 headphone/speaker drive) and there is sound signal input; after changing U209, trouble is removed.

[Example 5] Symptom: power not on

Description: after power on, machine has not any response

Analysis and troubleshooting: check whether 9V voltage comes through charge board and it is normal; check Q401, QB402 and there are 5V, 3.3V conversion, which is normal; check power supply of each channel and find L412 has no 1.8V output, so we doubt U404 has trouble; after changing U404, trouble is removed.

[Example 6] Symptom: not read sic

Description: not read any disc

Analysis and troubleshooting: firstly press disc open detect switch and observe pick-up focus and light emission and they are normal; after changing pick-up, trouble still exists; load disc to read disc, when pick-up begins focus, pick-up cannot be searched and it slides quickly back and forth on feed axis; use oscillator to test focus and trace signals and they are all clutter; check digital signals on front end of resistance-capacitance integrating of focus and trace and they are still clutter; check A, B, C, D, RF signals and they are also clutter; check path between and there is no problem; each capacitor has no rosin joint and joint welding; when checking whether flat cable holder XS101 has rosin joint and find that it seems to have tin silk connecting between 25 and 26; use multimeter to test and it really has short circuit; after remove the electrowelding wire , trouble is removed.

[Example 7] Symptom: there is noise when playing

Description: when no disc is in, there is noise; speaker and headphone both have noise

Analysis and troubleshooting: firstly make sure whether the trouble lies in speaker or in other circuit; use headphone to listen to JK306 headphone and check whether there is noise; if there is, trouble lies in circuit; play 1KHZ standard signal disc and it is easy to test waveform; use oscillograph to test pin 3, 18 waveform of U209 and there is clutter, which should be sine wave in normal cases; then check pin 5, 15 of U209 and input pin of left/right channel and there is still clutter; go on checking to the front stage and test C2103, C2102 waveform and there is clutter; directly test pin 1, 7 of U305 and there is still clutter; check pin 2, 5 of U305 and waveform is normal; test U305 power supply and it is also normal; after changing U305, trouble is removed.

[Example 8] Symptom: black screen

Description: after power on, machine screen has no display

Analysis and troubleshooting: firstly check whether power indicator light emits light to judge whether power is on; if indicator is normal, load a disc and check whether disc reading is normal; listen to speaker and check whether sound is normal to judge whether power is normal basically preliminarily; press screen display detect switch and check whether screen has light flickering; if there is no, check detect signal control line BL\_CTL 5V of boost board, back light voltage 9V of boost board and boost board output and they are all normal; then use induction method to test whether high voltage has output; make oscillograph close to high voltage wire of input display screen and there should be sine wave; after changing screen, trouble is removed.

[Example 9] Symptom: no output

Description: after power on, machine screen has no display and disc reading is not available.

Analysis and troubleshooting: firstly check 3.3V, 1.8V voltage after DC-DC conversion; then test whether crystal oscillator X201 has oscillation and frequency 27.00MHZ is also normal; test URST# reset voltage 3.0V and it is normal basically; then test software data 128M and it is normal; test U202 DCLK, DCKE and there is response, only address line has no response, so we doubt SDRAM has trouble; after changing it, there is still no output; at last we doubt MT1389 has trouble; after changing MT1389, trouble is removed.

[Example 10] Symptom: CD playing has noise

Description: when playing other discs other than CD, it is normal.

Analysis and troubleshooting: firstly check whether there is noise when playing other discs; play DVD disc to test and there is no noise; then listen to headphone and check whether there is noise to confirm whether trouble lies in speaker or the player's circuit and there is still noise; after analysis, DVD is normal, which means DAC audio decode and operational amplifier are normal basically; the data of reprocessing audio may probably have problem, which is caused by SDRAM and decode chip; after changing SDRAM, it is invalid; after changing MT1389, trouble is removed.

[Example 11] Symptom: not read CD disc

Description: DVD disc reading is normal, but CD and VCD disc reading is abnormal.

Analysis and troubleshooting: for DVD disc reading is normal, we preliminarily judge focus and trace are normal basically and doubt whether detect has error; test pin 114 DQS0 voltage of MT1389 and it is about 3.1V, which is incorrect obviously; when reading DVD disc, it is high level and now it is also high level when reading VCD disc; triode VD103 will not be connected at all, and of course loader pick-up CD laser tube will not be lightened; after changing MT1389 directly, trouble is removed.

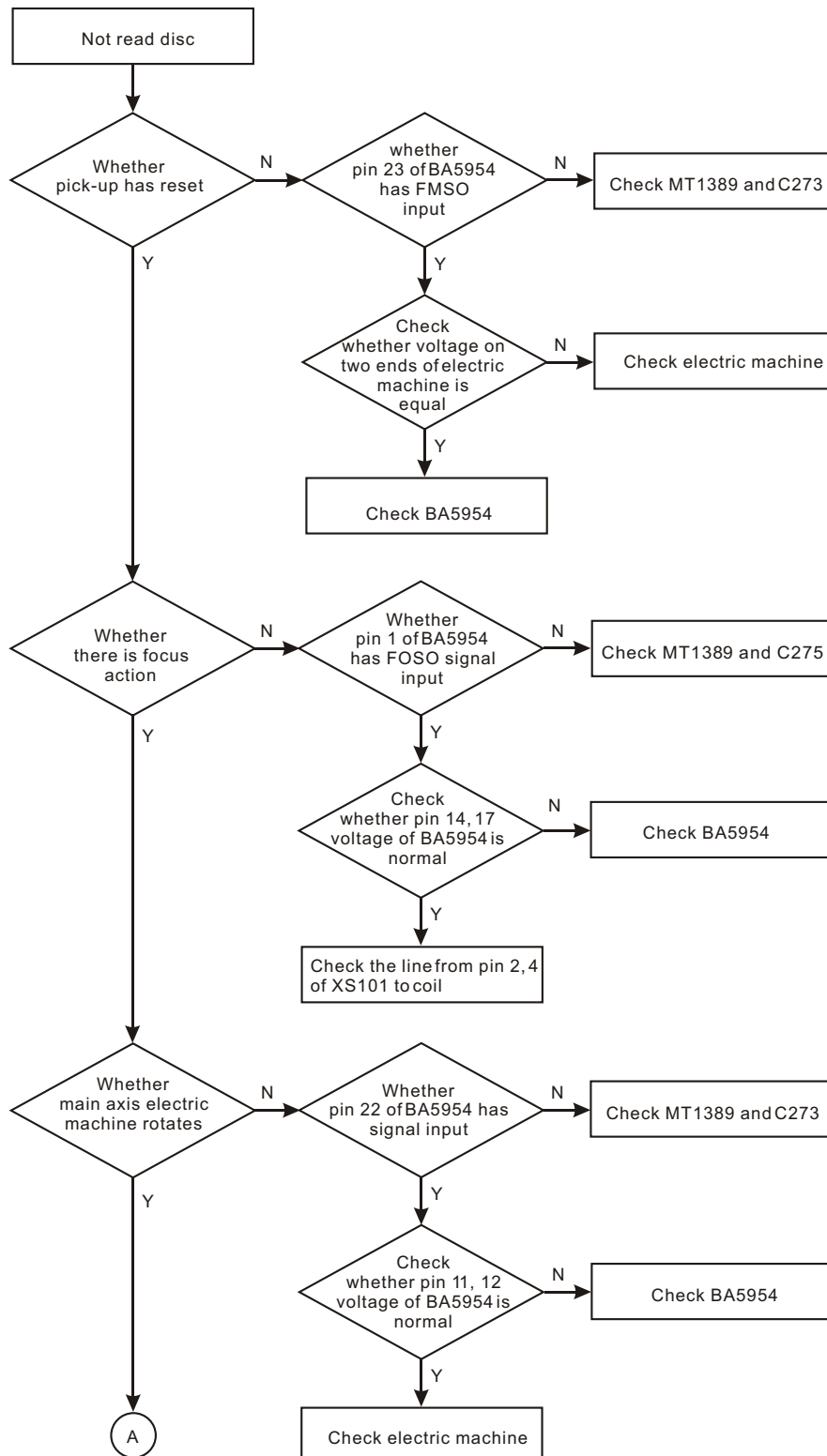
[Example 12] Symptom: not read sic

Description: not read any disc

Analysis and troubleshooting: loader pick-up is in the middle and cannot return to the inner loop after power on; firstly test T+, T- voltage and it is 2.5V, which is normal basically; test feed resistor on loader components and it is about 8-ohm, which is also normal; observe XS102 flat cable holder and find there is one piece of loader 6P flat cable falling off; after pressing it tightly, trouble was removed (this loader always has this trouble, which shows that main axis electric machine does not rotate sometimes, so please observe this plug).

### 3.3.2 Troubleshooting flow chart

1. Troubleshooting process for “Not read sic” is shown in the figure 3.3.2.1:



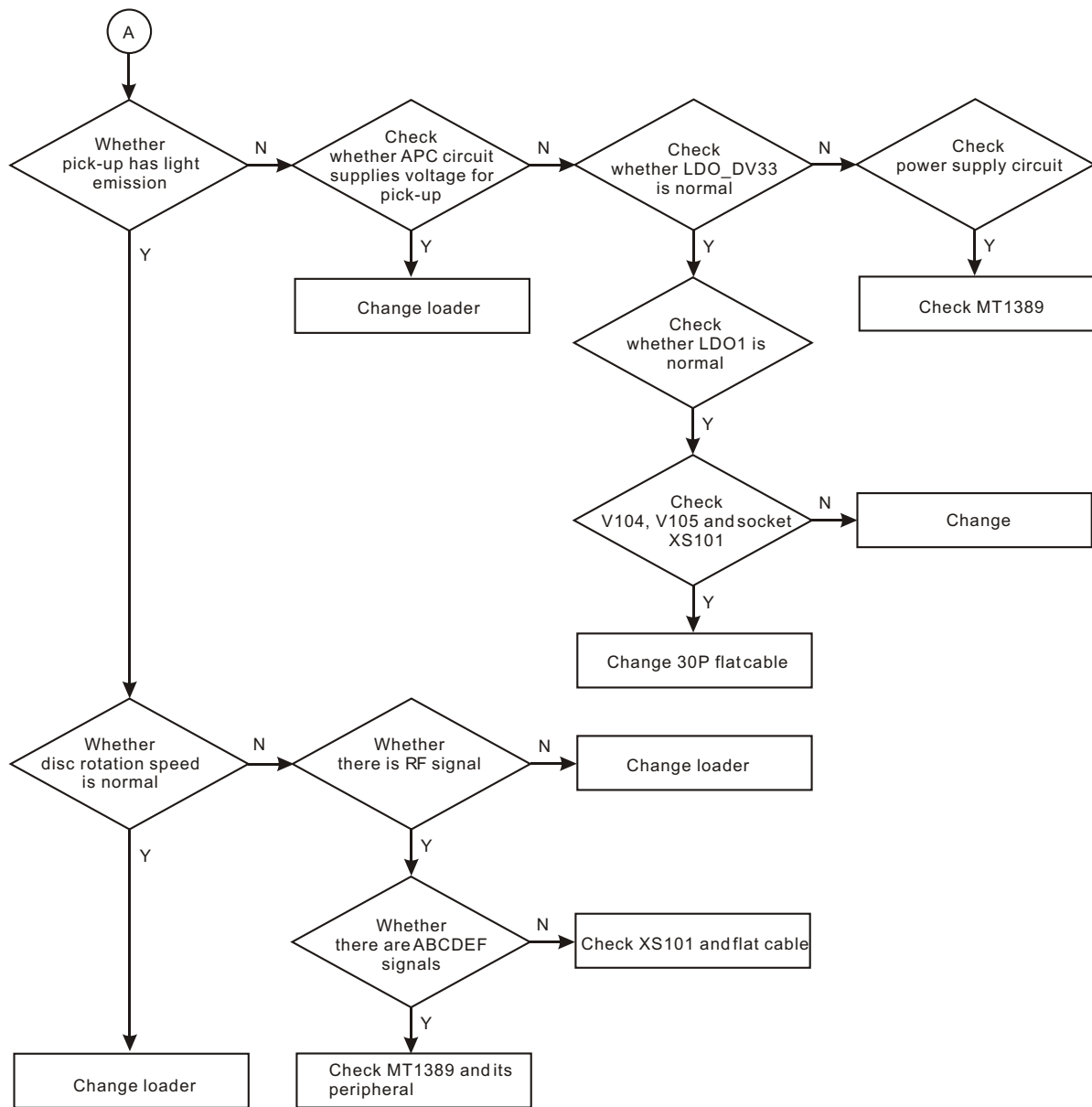
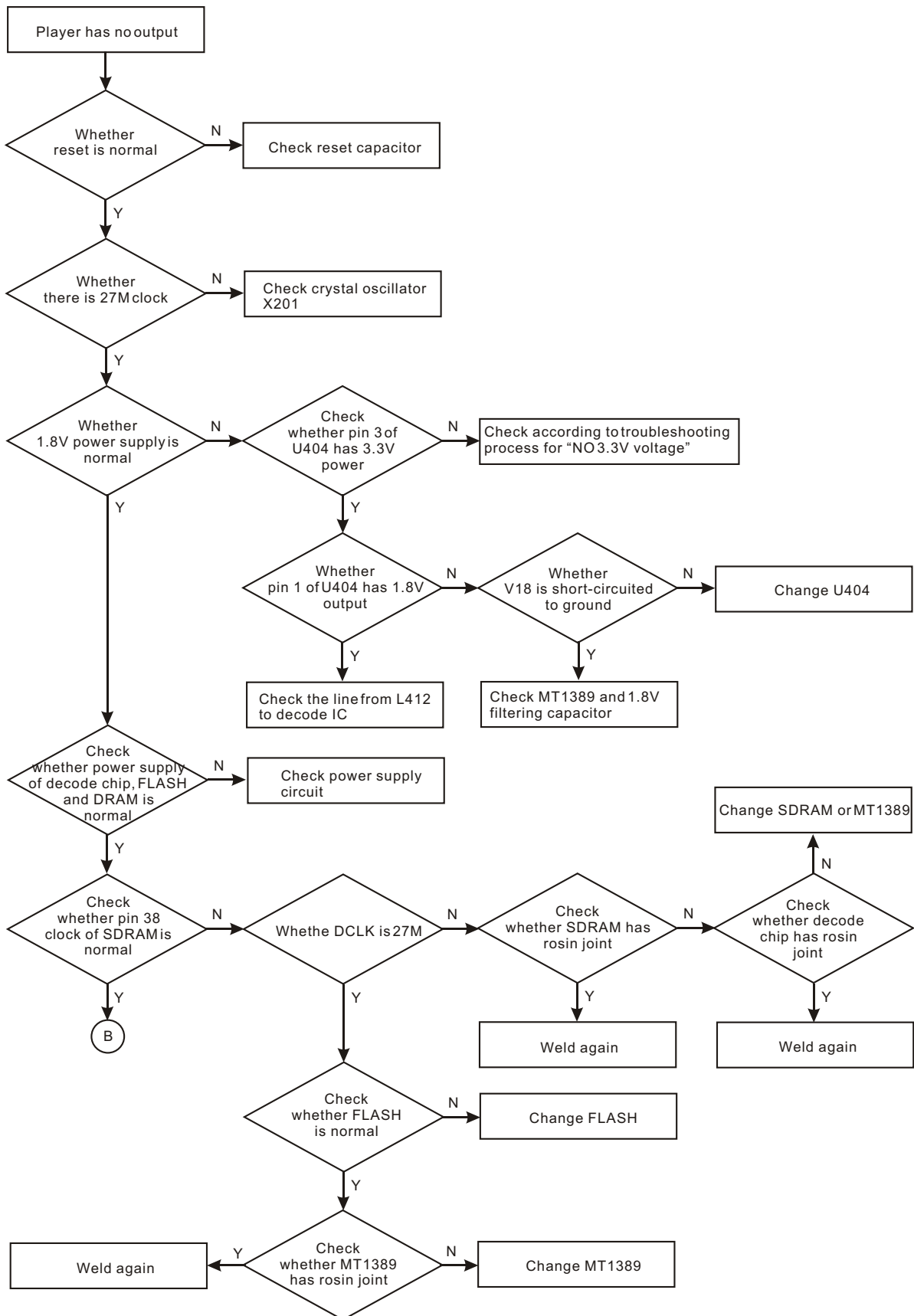


Figure 3.3.2.1 Troubleshooting flow chart for "Not read disc"

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



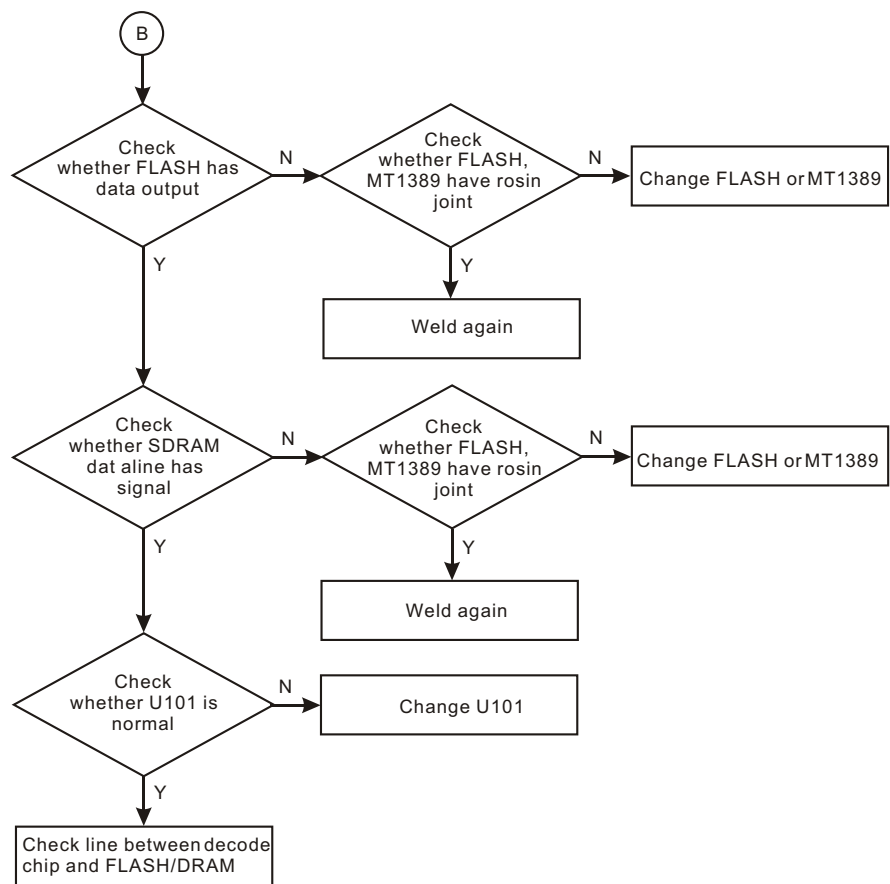


Figure 3.3.2.2 Troubleshooting flow chart for "Player has no output"

3. Troubleshooting process for “No 5V voltage” is shown in the figure 3.3.2.3:

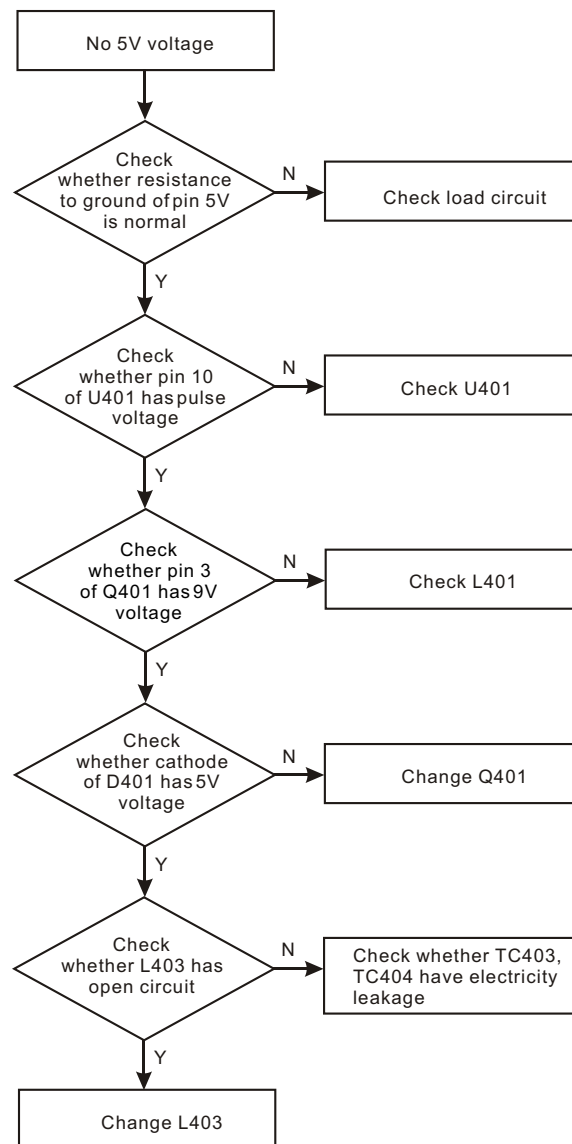


Figure 3.3.2.3 Troubleshooting flow chart for “No 5V voltage”

4. Troubleshooting process for “No DV33V voltage” is shown in the figure 3.3.2.4:

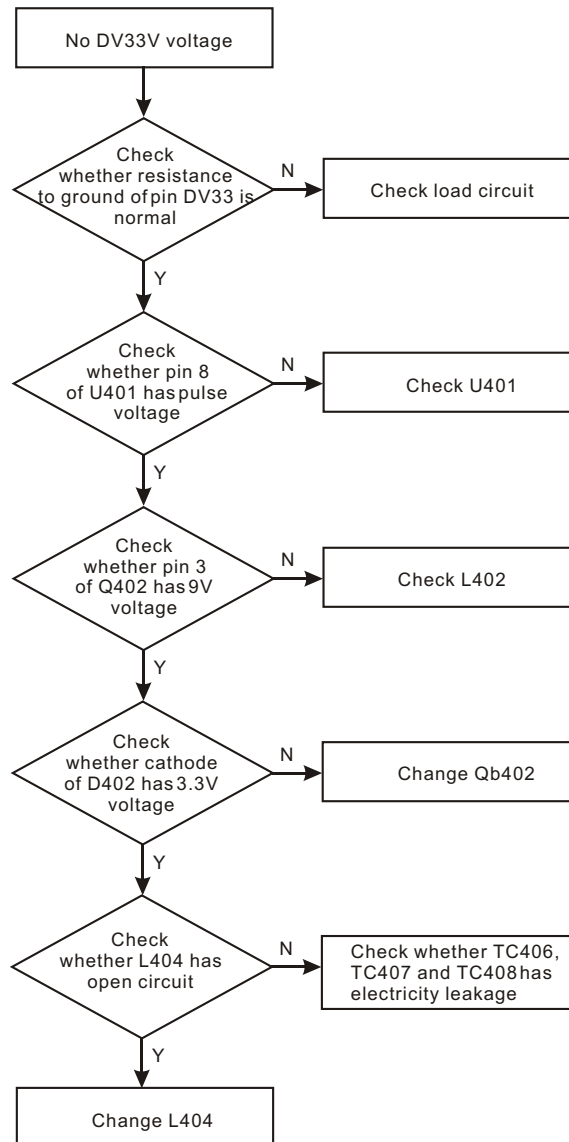
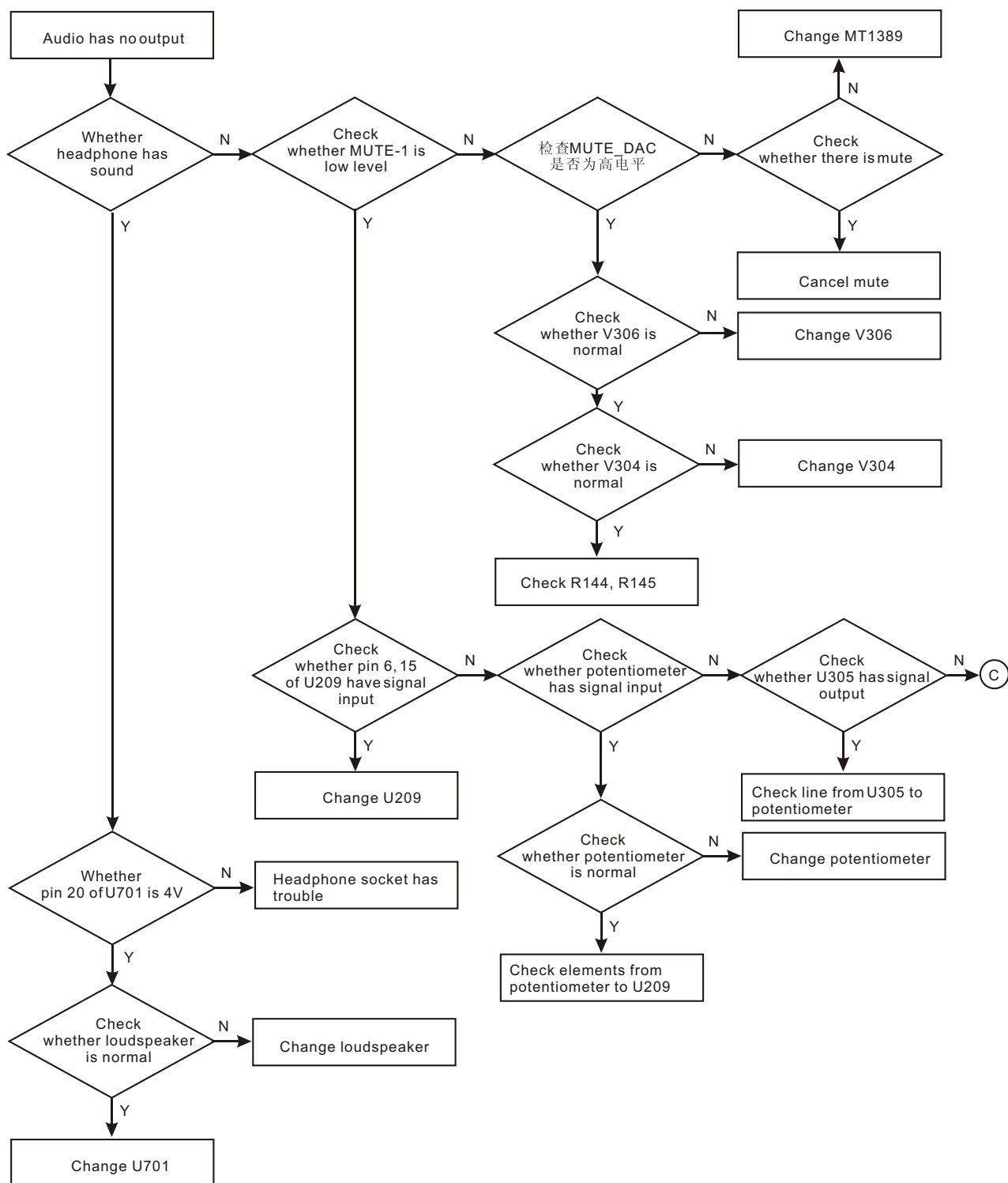


Figure 3.3.2.4 Troubleshooting flow chart for “No DV33V voltage”

5. Troubleshooting process for “Audio has no output” is shown in the figure 3.3.2.5:



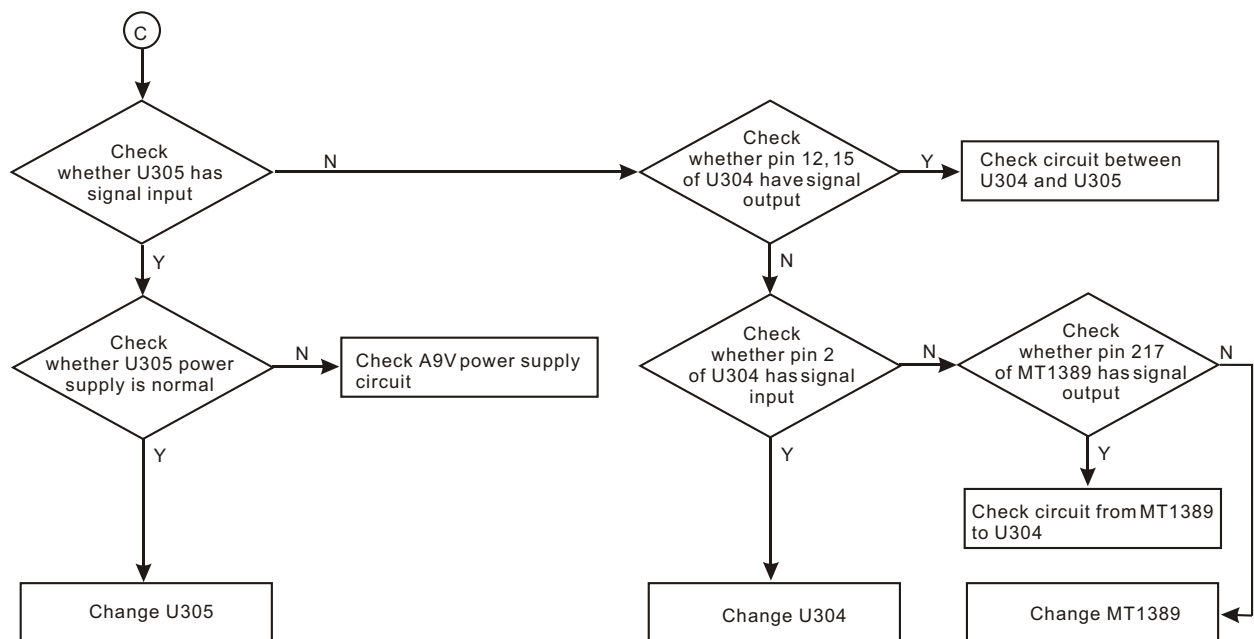
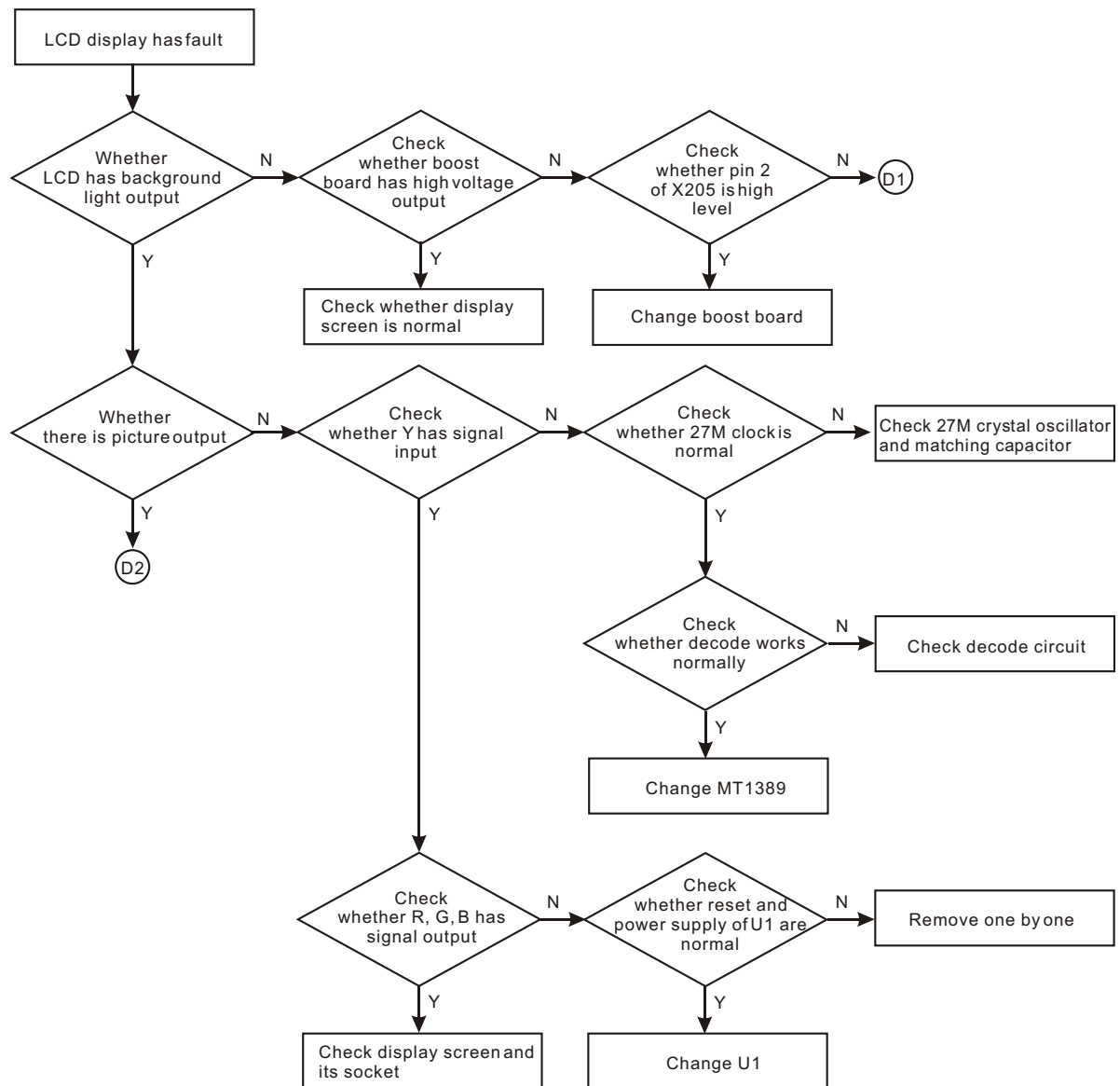


Figure 3.3.2.5.1 Troubleshooting flow chart fro "Audio has no output"

6. Troubleshooting process for “LCD display has fault” is shown in the figure 3.3.2.6:



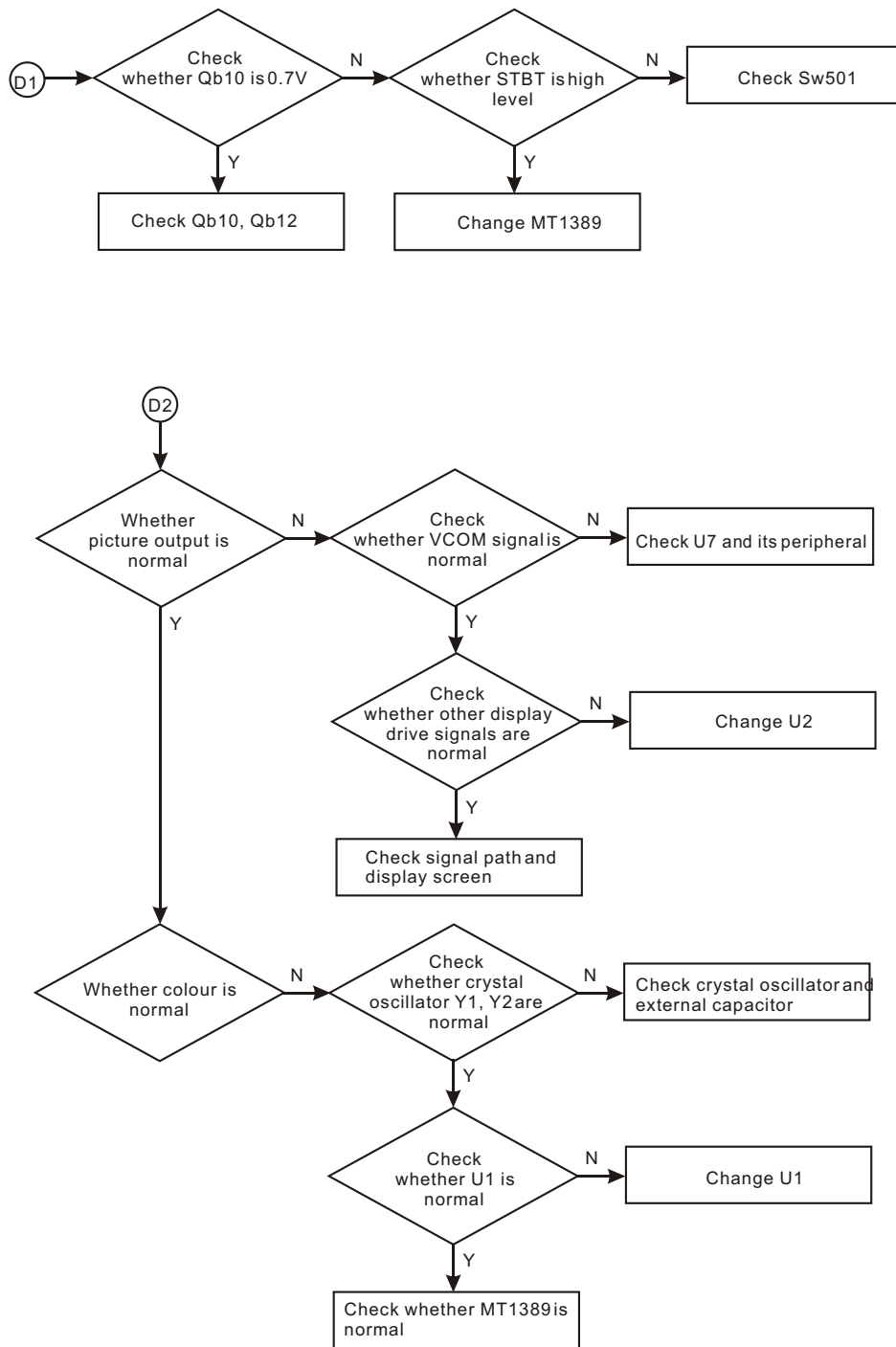
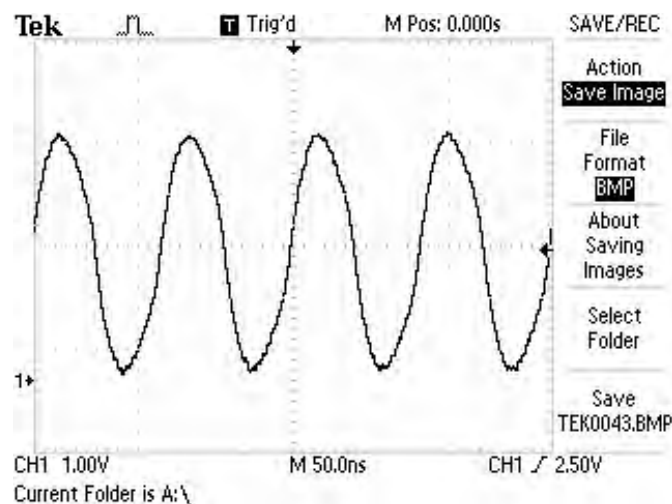


Figure 3.3.2.6 Troubleshooting flow chart for “LCD display has fault”

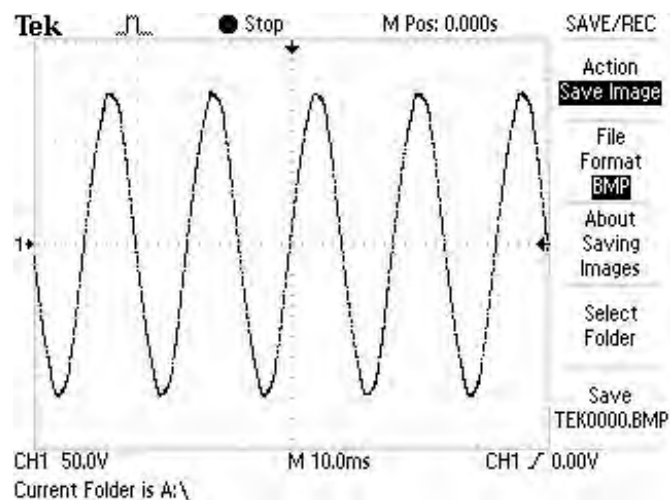
## Section Four waveform diagram

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.

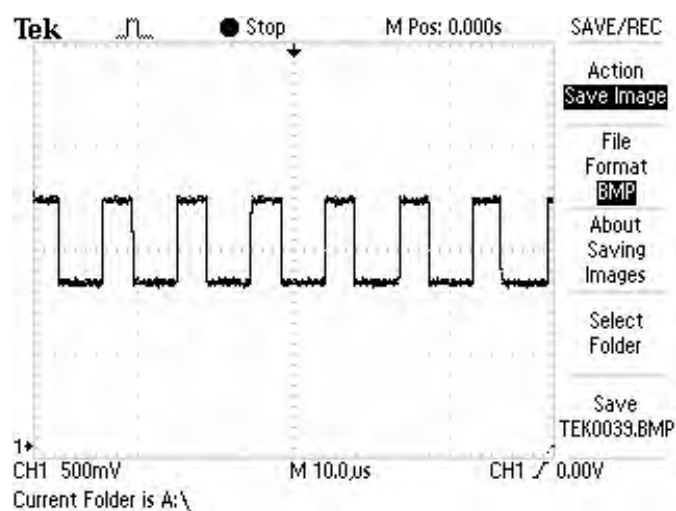
### 1. 8M waveform diagram of pin 2 of charge board IC1



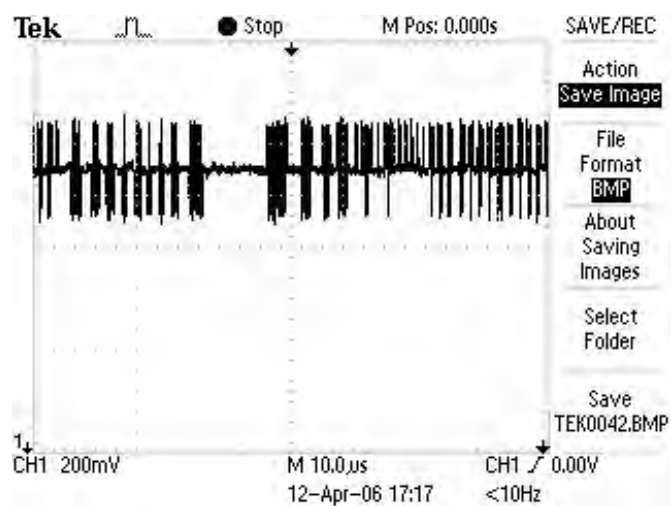
### 2. 27M crystal oscillator waveform diagram



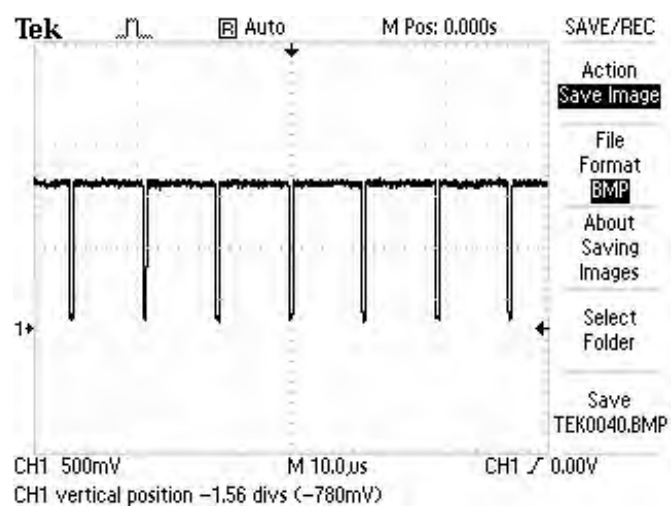
3. Waveform diagram of main axis drive DMO outputted by decode chip



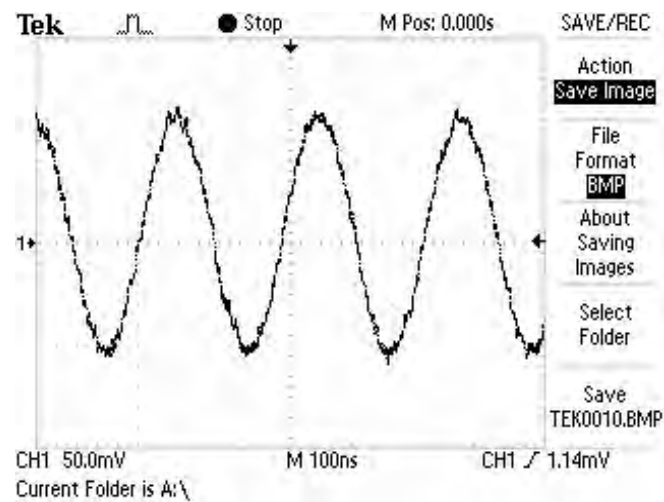
4. Waveform diagram of FOO outputted by decode chip



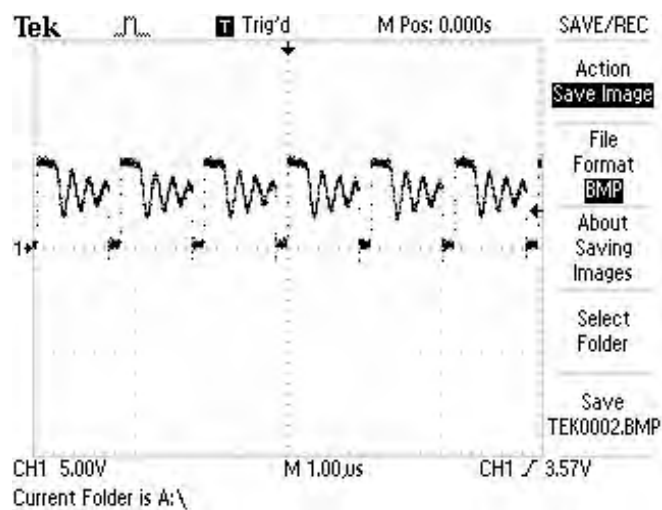
5. Waveform diagram of FMO outputted by decode chip



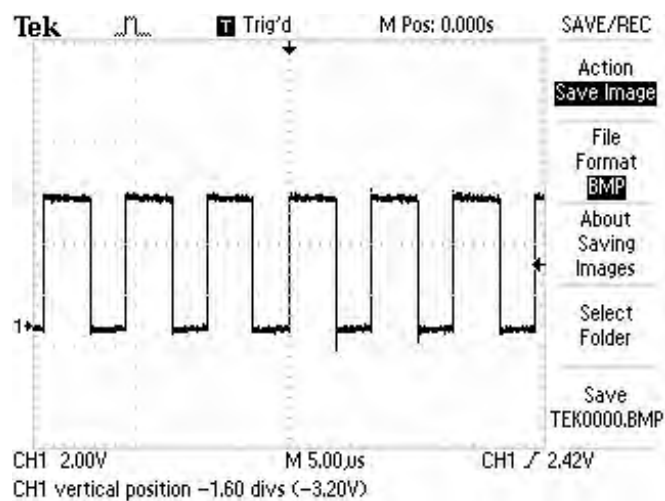
6. Drive board 3.57M crystal oscillator Y1 waveform diagram



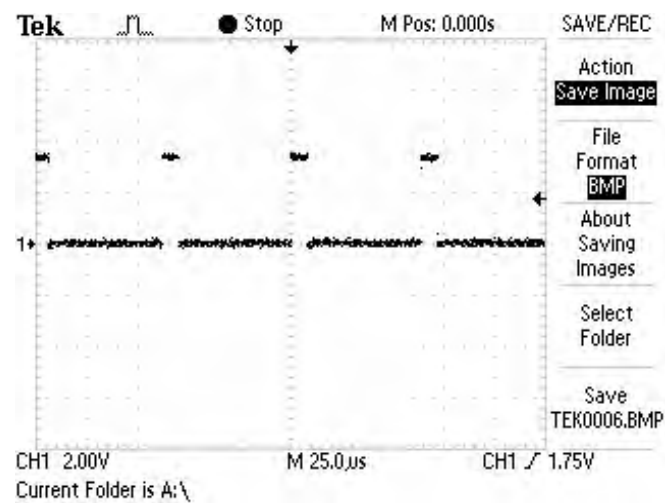
7. Waveform diagram of pin 1 LX signal of G5105.



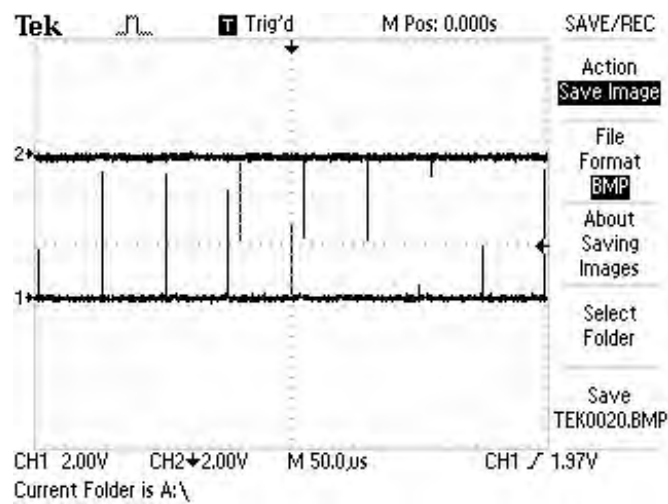
8. Waveform diagram of IC1 pin 13



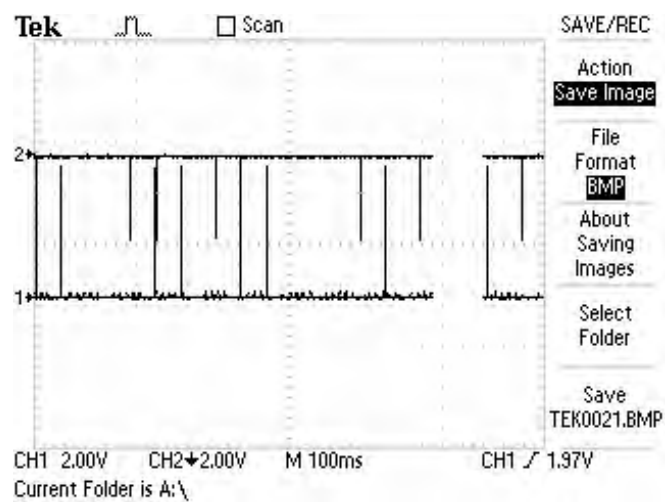
9. Waveform diagram of pin 7 OEH of J3.



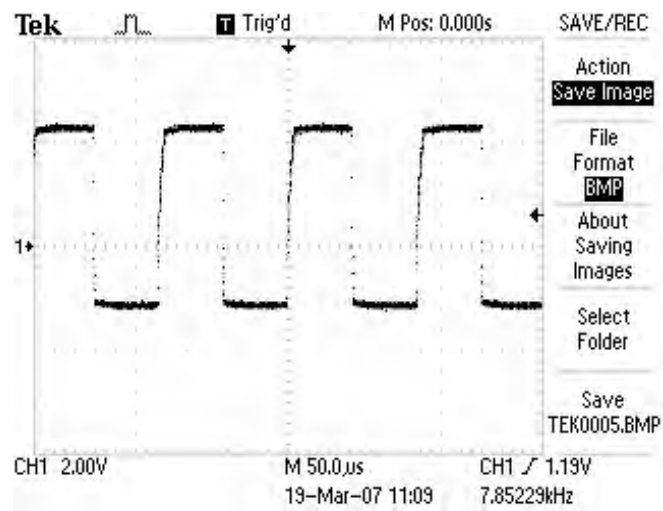
10. Waveform diagram of pin 2 STH1 of J3.



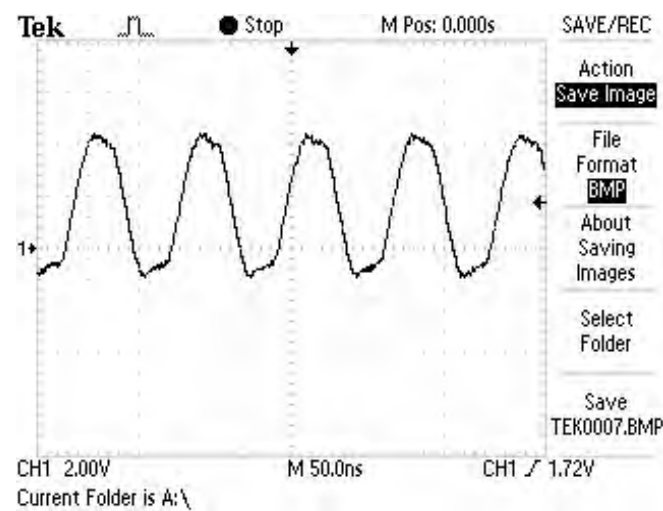
11. Waveform diagram of pin 24 STV1 of J3.



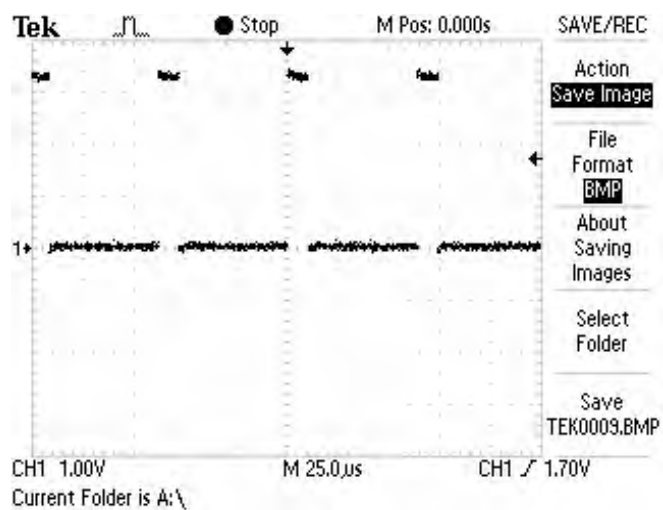
12. Waveform diagram of pin 17 VCOM of J3.



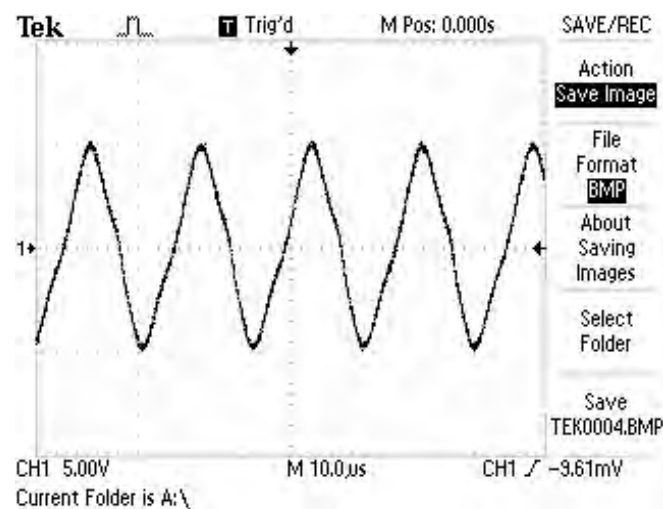
13. Waveform diagram of pin 10 CPH1 of J3.



14. Waveform diagram of pin 22 CPV of J3.

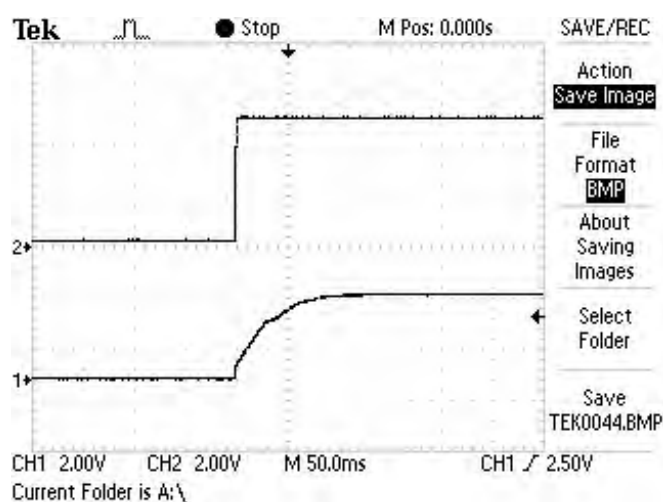


### 15. Back light drive voltage waveform diagram.



Note: since back light drive voltage is high, when testing, do not make oscilloscope contact output terminal directly. Waveform diagram may be tested only when close to output terminal.

### 16. URST waveform diagram



## Section Five Function Introduction to IC

### 3.5.1 function introduction to MT1389B

#### 1. Description

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

#### 2. Features

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

#### 3. PIN Description

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

|    |         |                                                           |   |                                |
|----|---------|-----------------------------------------------------------|---|--------------------------------|
| 4  | DVDC    | DVD-RF high frequency AC coupling<br>signal C             | I | C202, C203, C204               |
| 5  | DVDD    | DVD-RF high frequency AC coupling<br>signal D             | I |                                |
| 6  | DVDRFIP | DVD-RF high frequency AC coupling<br>signal RFIP input    | I | unused                         |
| 7  | DVDRFIN | DVD-RF high frequency AC coupling<br>signal RFIN input    | I |                                |
| 8  | MA      | DVD-RAM main light beam RF DC signal<br>input A           | I | A, B, C, D signals from loader |
| 9  | MB      | DVD-RAM main light beam R DC signal<br>input B            | I | Are coupled by resistor R201,  |
| 10 | MC      | DVD-RAM main light beam RF DC signal<br>input C           | I | R202, R203, R204               |
| 11 | MD      | DVD-RAM main light beam RF DC signal<br>input D           | I |                                |
| 12 | SA      | DVD-RAM subsidiary light beam RF DC<br>signal input A     | I | unused                         |
| 13 | SB      | DVD-RAM subsidiary light beam RF DC<br>signal input B     | I |                                |
| 14 | SC      | DVD-RAM subsidiary light beam RF DC<br>signal input C     | I |                                |
| 15 | SD      | DVD-RAM subsidiary light beam RF DC<br>signal input D     | I |                                |
| 16 | CDFON   | CD focus error negative phase input                       | I |                                |
| 17 | CDFOP   | CD focus error positive phase input                       | I |                                |
| 18 | TNI     | 3 light beam subsidiary PD signal negative<br>phase input | I | E, F signals input directly    |
| 19 | TPI     | 4 light beam subsidiary PD signal positive<br>phase input | I |                                |
| 20 | MDI1    | Laser power monitoring input 1                            | I |                                |
| 21 | MDI2    | Laser power monitoring input 2                            | I |                                |
| 22 | LDO2    | Laser power output 2                                      | O |                                |
| 23 | LDO1    | Laser power output 1                                      | O |                                |

|    |               |                                                         |     |                                                                             |
|----|---------------|---------------------------------------------------------|-----|-----------------------------------------------------------------------------|
| 24 | SVDD3         | Servo 3.3V power                                        |     |                                                                             |
| 25 | CSO/RFOP      | Main servo signal output/RF positive phase output       | O   | R2165 is not used, so this two pins are not used                            |
| 26 | RFLVL/RFON    | RF level output/RF negative phase output                | O   |                                                                             |
| 27 | SGND          | Servo ground                                            |     |                                                                             |
| 28 | V2REFO        | Reference voltage 2.8V                                  | O   |                                                                             |
| 29 | V20           | Reference voltage 2.0V                                  | O   |                                                                             |
| 30 | VREFO         | Reference voltage 1.4V                                  | O   |                                                                             |
| 31 | FEO           | Focus error signal output                               | O   | R2166 unused                                                                |
| 32 | TEO           | Trace error signal output                               | O   |                                                                             |
| 33 | TEZISLV       | Trace zero-passage error input                          | I   | Joint welding with capacitor C207 connected here will cause no disc reading |
| 34 | OP_OUT        | Sensor signal amplifying output                         | O   | Input and output of main axis braking circuit                               |
| 35 | OP_INN        | Sensor signal negative phase input                      | I   |                                                                             |
| 36 | OP_INP        | Sensor signal positive phase input                      | I   |                                                                             |
| 37 | DMO           | Main axis control signal output                         | O   |                                                                             |
| 38 | FMO           | Feed control signal output                              | O   |                                                                             |
| 39 | TROPEN PWM    | CLOSE signal output                                     | O   |                                                                             |
| 40 | PWMOUT1/ADIN9 | The first path PWM signal output/AD general input       | I   | unused                                                                      |
| 41 | TRO           | Trace control signal output                             | O   |                                                                             |
| 42 | FOO           | Focus control signal output                             | O   |                                                                             |
| 43 | USB_VSS       | USB ground                                              |     |                                                                             |
| 44 | USBP          | USB data                                                | I/O | unused                                                                      |
| 45 | USBM          | USB data                                                | I/O |                                                                             |
| 46 | USB_VDD3      | USB 3.3V power                                          |     |                                                                             |
| 47 | FG/ADIN8      | Hall sensor signal input/AD general input               | I   |                                                                             |
| 48 | TDI/ADIN4     | Open-to-position detect signal input/AD general input   | I   |                                                                             |
| 49 | TMS/ADIN5     | Close-to-position detect signal input /AD general input | I   |                                                                             |
| 50 | TCK/ADIN6     | BA5954 enable signal output/AD general input            | O   |                                                                             |

|    |           |                                             |   |                                                                                               |
|----|-----------|---------------------------------------------|---|-----------------------------------------------------------------------------------------------|
| 51 | TDO/ADIN7 | OPEN signal outout/AD general input         | O |                                                                                               |
| 52 | DVDD18    | Digital 1.8V power                          |   |                                                                                               |
| 53 | IOA2      | Micro controller address bit 2              | O | FLASH address signal                                                                          |
| 54 | IOA3      | Micro controller address bit 3              | O |                                                                                               |
| 55 | IOA4      | Micro controller address bit 4              | O |                                                                                               |
| 56 | IOA5      | Micro controller address bit 5              | O |                                                                                               |
| 57 | IOA6      | Micro controller address bit 6              | O |                                                                                               |
| 58 | IOA7      | Micro controller address bit 7              | O |                                                                                               |
| 59 | HIGHA0    | Micro controller address bit 0              | O |                                                                                               |
| 60 | IOA18     | Micro controller address bit 18             | O |                                                                                               |
| 61 | IOA19     | Micro controller address bit 19             | O |                                                                                               |
| 62 | DVSS      | Digital ground                              |   |                                                                                               |
| 63 | APLLCAP   | Analog lock-latched loop external capacitor |   |                                                                                               |
| 64 | APLLVSS   | Analog lock-latched loop ground             |   |                                                                                               |
| 65 | APLLVDD3  | Analog phase-locked loop 3.3V power         |   |                                                                                               |
| 66 | IOWR      | FLASH read-write control signal             | O | Output PWR#, through zero-ohm resistor R297, change to DWR# signal to control FLASH           |
| 67 | A16       | FLASH address bit 16                        | O | FLASH data signal                                                                             |
| 68 | HIGHA7    | Micro controller address bit 7              | O |                                                                                               |
| 69 | HIGHA6    | Micro controller address bit 6              | O |                                                                                               |
| 70 | HIGHA5    | Micro controller address bit 5              | O |                                                                                               |
| 71 | HIGHA4    | Micro controller address bit 4              | O |                                                                                               |
| 72 | HIGHA3    | Micro controller address bit 3              | O |                                                                                               |
| 73 | DVDD3     | Digital 3.3V power                          |   |                                                                                               |
| 74 | HIGHA2    | Micro controller address bit 2              | O | FLASH address signal                                                                          |
| 75 | HIGHA1    | Micro controller address bit 1              | O | FLASH address signal                                                                          |
| 76 | IOA20     | Micro controller address bit 20             | O |                                                                                               |
| 77 | IOCS      | FLASH chip selection                        | O | Output PCE#, through zero-ohm resistor R298, change to DCE# signal to control FLASH           |
| 78 | IOA1      | Micro controller address bit 1              | O | FLASH address signal                                                                          |
| 79 | IOOE      | FLASH output enable                         | O | Output PRD#, through zero-ohm resistor R299, change to DRD# signal to control output of FLASH |

|     |             |                                                  |     |                                 |
|-----|-------------|--------------------------------------------------|-----|---------------------------------|
| 80  | DVDD3       | Power                                            |     |                                 |
| 81  | AD0         | Micro controller address/data bit 0              | I/O | FLASH data signal               |
| 82  | AD1         | Micro controller address/data bit 1              | I/O |                                 |
| 83  | AD2         | Micro controller address/data bit 2              | I/O |                                 |
| 84  | AD3         | Micro controller address/data bit 3              | I/O |                                 |
| 85  | DVSS        | Ground                                           |     |                                 |
| 86  | AD4         | Micro controller address/data bit 4              | I/O | FLASH data signal               |
| 87  | AD5         | Micro controller address/data bit 5              | I/O |                                 |
| 88  | AD6         | Micro controller address/data bit 6              | I/O |                                 |
| 89  | IOA21/ADIN0 | Micro controller address bit 21/AD general input | O   | FLASH data signal               |
| 90  | ALE         | Micro controller address enable                  | O   | unused                          |
| 91  | AD7         | Micro controller address/data bit 7              | I/O | FLASH data signal               |
| 92  | A17         | FLASH address bit 17                             | O   | FLASH address signal            |
| 93  | IOA0        | Micro controller address bit 0                   | O   |                                 |
| 94  | DVSS        | Digital ground                                   |     |                                 |
| 95  | UWR         | Microcontroller write operation                  |     | unused                          |
| 96  | URD         | Microcontroller read operation                   |     |                                 |
| 97  | DVDD18      | Digital 1.8V power                               |     |                                 |
| 98  | UP1_2       | Micro controller port                            |     | unused                          |
| 99  | UP1_3       | Micro controller port                            | O   | Panel communication clock       |
| 100 | UP1_4       | Micro controller port                            | I/O | Panel communication data        |
| 101 | UP1_5       | Micro controller port                            | O   | Panel communication enable      |
| 102 | UP1_6       | Micro controller port                            | O   | I2C clock                       |
| 103 | UP1_7       | Micro controller port                            | I/O | I2C data                        |
| 104 | UP3_0       | Micro controller port                            | O   | HDMI clock                      |
| 105 | UP3_1       | Micro controller port                            | O   | HDMI data                       |
| 106 | UP3_4       | Micro controller port                            | I/O | unused                          |
| 107 | UP3_5       | Micro controller port                            | I/O | Serial communication port       |
| 108 | DVDD3       | Power                                            |     |                                 |
| 109 | ICE         | Micro controller correction mode enable          |     | Ground through 1K resistor R213 |
| 110 | PRST        | Reset input                                      | I   |                                 |

|     |        |                                          |     |                                                                                                           |
|-----|--------|------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------|
| 111 | IR     | Remote control signal input              | I   |                                                                                                           |
| 112 | INT0   | Micro controller intermission 0          | I   | 1392 intermission control                                                                                 |
| 113 | DQM0   | DRAM input/output screen-shielded signal | O   |                                                                                                           |
| 114 | DQS0   | DRAM input/output screen-shielded signal | O   |                                                                                                           |
| 115 | RD7    | DRAM data                                | I/O | SDRAM data line                                                                                           |
| 116 | DVSS   | Ground                                   |     |                                                                                                           |
| 117 | RD6    | DRAM data                                | I/O | SDRAM data line                                                                                           |
| 118 | RD5    | DRAM data                                | I/O |                                                                                                           |
| 119 | DVSS   | Ground                                   |     |                                                                                                           |
| 120 | RD4    | DRAM data                                | I/O | SDRAM data line                                                                                           |
| 121 | RD3    | DRAM data                                | I/O |                                                                                                           |
| 122 | DVDD18 | Digital 1.8V power                       |     |                                                                                                           |
| 123 | RD2    | DRAM data                                | I/O | SDRAM data line                                                                                           |
| 124 | RD1    | DRAM data                                | I/O |                                                                                                           |
| 125 | RD0    | DRAM data                                | I/O |                                                                                                           |
| 126 | RD15   | DRAM data                                | I/O |                                                                                                           |
| 127 | DVDD3  | Digital 3.3V power                       |     |                                                                                                           |
| 128 | RD14   | DRAM data                                | I/O | SDRAM data line                                                                                           |
| 129 | RD13   | DRAM data                                | I/O |                                                                                                           |
| 130 | RD12   | DRAM data                                | I/O |                                                                                                           |
| 131 | RD11   | DRAM data                                | I/O |                                                                                                           |
| 132 | RD10   | DRAM data                                | I/O |                                                                                                           |
| 133 | RD9    | DRAM data                                | I/O |                                                                                                           |
| 134 | DVSS   | Ground                                   |     |                                                                                                           |
| 135 | RD8    | DRAM data                                | I/O | SDRAM data line                                                                                           |
| 136 | DQS1   | DRAM input/output screen-shielded signal | O   |                                                                                                           |
| 137 | DQM1   | DRAM input/output screen-shielded signal | O   |                                                                                                           |
| 138 | RWE    | DRAM wrote enable                        | O   | Output WE#, through 33-ohm resistor R216, change to DWE# to control the write of SDRAM                    |
| 139 | CAS    | DRAM line address selection              | O   | Output CAS#, through 33-ohm resistor R267, change to DCAS# to control the line address selection of SDRAM |

|     |                  |                                    |   |                                                                                                          |
|-----|------------------|------------------------------------|---|----------------------------------------------------------------------------------------------------------|
| 140 | RAS              | DRAM row address selection         | O | Output RAS#, through 33-ohm resistor R266, change to DRAS# to control the row address selection of SDRAM |
| 141 | DVDD3            | Digital 3.3V power                 |   |                                                                                                          |
| 142 | RCS              | DRAM chip selection                | O | Output CS#, through 33-ohm resistor R265, change to DCS# to control the chip selection of SDRAM          |
| 143 | BA0              | DRAM segment address 0             | O |                                                                                                          |
| 144 | DVSS             | Ground                             |   |                                                                                                          |
| 145 | BA1              | DRAM segment address 1             | O | SDRAM address line                                                                                       |
| 146 | RA10             | DRAM address                       | O |                                                                                                          |
| 147 | RA0              | DRAM address                       | O |                                                                                                          |
| 148 | DVSS             | Ground                             |   |                                                                                                          |
| 149 | RA1              | DRAM address                       | O | SDRAM address line                                                                                       |
| 150 | RA2              | DRAM address                       | O |                                                                                                          |
| 151 | RA3              | DRAM address                       | O |                                                                                                          |
| 152 | DVDD18           | Digital 1.8V power                 |   |                                                                                                          |
| 153 | RVREF/ADIN3      | Reference voltage/AD general input | I | unused                                                                                                   |
| 154 | RCLKB            | DRAM clock                         | O |                                                                                                          |
| 155 | DVDD3            | Digital 3.3V power                 |   |                                                                                                          |
| 156 | RCLK             | DRAM clock                         | O |                                                                                                          |
| 157 | CKE              | DRAM clock enable                  | O |                                                                                                          |
| 158 | RA11             | DRAM address                       | O | SDRAM address line                                                                                       |
| 159 | RA9              | DRAM address                       | O |                                                                                                          |
| 160 | RA8              | DRAM address                       | O |                                                                                                          |
| 161 | DVSS             | Digital ground                     |   |                                                                                                          |
| 162 | RA7              | DRAM address                       | O | SDRAM address line                                                                                       |
| 163 | DVSS             | Digital ground                     |   |                                                                                                          |
| 164 | RA6              | DRAM address                       | O | SDRAM address line                                                                                       |
| 165 | RA5              | DRAM address                       | O |                                                                                                          |
| 166 | RA4              | DRAM address                       | O |                                                                                                          |
| 167 | DVDD3            | Digital 3.3V power                 | O |                                                                                                          |
| 168 | RD13/ASDATA<br>5 | Digital video signal               | I | Y7                                                                                                       |

|     |           |                                             |     |                                                             |
|-----|-----------|---------------------------------------------|-----|-------------------------------------------------------------|
| 169 | RD30      | Digital video signal                        | O   | Y6                                                          |
| 170 | RD29      | Digital video signal                        | O   | Y5                                                          |
| 171 | RD28      | Digital video signal                        | O   | Y4                                                          |
| 172 | RD27      | Digital video signal                        | O   | Y3                                                          |
| 173 | DVDD18    | Digital 1.8V power                          |     |                                                             |
| 174 | RD26      | Digital video signal                        | O   | Y2                                                          |
| 175 | DVSS      | Digital ground                              | I   | Ground                                                      |
| 176 | RD25      | Digital video signal                        | O   | Y1                                                          |
| 177 | RD24      | Digital video signal                        | O   | Y0                                                          |
| 178 | DQM3      | DRAM input/output shielded signal           | O   | R225 is not used, so this signal is not used in this player |
| 179 | DQM2      | DRAM input/output shielded signal           | O   | unused                                                      |
| 180 | RD23      | DRAM data                                   | I/O | C7                                                          |
| 181 | RD22      | DRAM data                                   | I/O | C6                                                          |
| 182 | DVDD3     | Digital 3.3V power                          |     |                                                             |
| 183 | RD21      | DRAM data                                   |     | unused                                                      |
| 184 | RD20      | DRAM data                                   |     | VOICCE-DET#                                                 |
| 185 | RD19      | DRAM data                                   |     | FS0                                                         |
| 186 | RD18      | DRAM data                                   |     | PWDN electricity failure control                            |
| 187 | RD17      | DRAM data                                   |     | FS3                                                         |
| 188 | RD16      | DRAM data                                   |     | FS1                                                         |
| 189 | DACVDDC   | DA conversion 3.3V power                    |     |                                                             |
| 190 | VREF      | Reference voltage                           |     |                                                             |
| 191 | FS        |                                             |     |                                                             |
| 192 | YUV0/CIN  |                                             |     | unused                                                      |
| 193 | DACVSSC   | DA conversion ground                        |     |                                                             |
| 194 | YUV1/Y    | Video signal YUV1 output/Y signal output    | O   | Provide Y signal to S-video                                 |
| 195 | DACVDDB   | DA conversion 3.3V power                    |     |                                                             |
| 196 | YUV2/C    | Video signal YUV2 output/C signal output    | O   | Provide C signal to S-video                                 |
| 197 | DACVSSB   | DA conversion ground                        |     |                                                             |
| 198 | YUV3/CVBS | Video signal YUV3 output/CVBS signal output | O   | Provide for video output port (VIDEO)                       |

|     |                 |                                                   |   |                                                   |
|-----|-----------------|---------------------------------------------------|---|---------------------------------------------------|
| 199 | DACVDDA         | DA conversion 3.3V power                          |   |                                                   |
| 200 | YUV4/G          | Video signal YUV4 output /G signal output         | O | Provide Y1 signal for component video output port |
| 201 | DACVSSA         | DA conversion ground                              |   |                                                   |
| 202 | TUV5/B          | Video signal YUV5 output /B signal output         | O | Provide Pb signal for component video output port |
| 203 | YUV6/R          | Video signal YUV6 output /R signal output         | O | Provide Pr signal for component video output port |
| 204 | DVDD3           | Digital 3.3V power                                |   |                                                   |
| 205 | VSYNC/ADIN1     | Field synchronous signal output /AD general input | O | Provide VSYNC                                     |
| 206 | YUV7/ASDATA5    | Video signal YUV7 output/audio serial data        |   | unused                                            |
| 207 | HSYNC/ADIN2     | Row synchronous signal output /AD general input   | O | Provide HSYNC                                     |
| 208 | SPMCLK          |                                                   | I | DISCEJT                                           |
| 209 | SPDATA          |                                                   |   | unused                                            |
| 210 | SPLRCK          |                                                   |   | unused                                            |
| 211 | SPBCK/ASDATA5A5 |                                                   |   | unused                                            |
| 212 | DVDD3           | Digital 3.3V power                                |   |                                                   |
| 213 | ALRCK           | Audio left/right channel clock                    | O | Output audio left/right channel clock             |
| 214 | ABCK            | Audio bit clock                                   | O | Output audio bit clock                            |
| 215 | ACLK            | Audio DAC external clock                          | O | Output audio DAC external clock                   |
| 216 | DVSS            | Digital ground                                    |   |                                                   |
| 217 | ASDATA0         | Audio serial data                                 | O | Output audio R/L serial data                      |
| 218 | ASDATA1         | Audio serial data                                 | O | Output audio SR/SL serial data                    |
| 219 | ASDATA2         | Audio serial data                                 | O | Output audio C/SW serial data                     |
| 220 | ASDATA3         | Audio serial data                                 |   | Output composite audio R/L serial data            |
| 221 | DVDD18          | Digital 1.8V power                                |   |                                                   |
| 222 | ASDATA4         | Audio serial data                                 | O | Give audio IV reset signal                        |
| 223 | DVSS            | Digital ground                                    |   |                                                   |
| 224 | MC_DATA         | MIC digital audio input                           | I | MIC digital audio input                           |
| 225 | SPDIF           | Digital audio signal output                       | O | Digital audio signal output                       |
| 226 | RFGND18         | RF signal ground                                  |   |                                                   |
| 227 | RFVDD18         | RF signal 1.8V power                              |   |                                                   |

|     |         |                                                 |   |  |
|-----|---------|-------------------------------------------------|---|--|
| 228 | XTALO   | Clock output                                    | O |  |
| 229 | XTALI   | Clock input                                     | I |  |
| 230 | JITFO   | RF small signal output                          | O |  |
| 231 | JITFN   | RF signal positive phase amplifying input       | I |  |
| 232 | PLLSS   | Phase locked loop ground                        |   |  |
| 233 | IDACEXP |                                                 |   |  |
| 234 | PLLSS3  | Phase locked loop 3.3V power                    |   |  |
| 235 | LPFON   | Amplifier loop filtering output                 | O |  |
| 236 | LPFIP   | Amplifier loop filtering input                  | I |  |
| 237 | LPFIN   | Amplifier loop filtering input                  | I |  |
| 238 | LPFOP   | Amplifier loop filtering output                 | O |  |
| 239 | ADCVSS3 | Analog conversion 3.3V power                    |   |  |
| 240 | S_VCM   |                                                 |   |  |
| 241 | ADCVSS  | A/D conversion ground                           |   |  |
| 242 | S_VREFP |                                                 |   |  |
| 243 | S_VREFN |                                                 |   |  |
| 244 | RFVSS3  | RF 3.3V power                                   |   |  |
| 245 | RFRPDC  | DC RF error signal input                        |   |  |
| 246 | RFRPAC  | AC RF error signal input                        |   |  |
| 247 | HRFZC   | High frequency RF signal zero-passage<br>detect |   |  |
| 248 | CRTPLP  |                                                 |   |  |
| 249 | RFGND   | RF ground                                       |   |  |
| 250 | CEQP    |                                                 |   |  |
| 251 | CEQN    |                                                 |   |  |
| 252 | OSP     |                                                 |   |  |
| 253 | OSN     |                                                 |   |  |
| 254 | RFGC    |                                                 |   |  |
| 255 | IREF    | Reference power                                 |   |  |
| 256 | AVSS3   | Analog 3.3V power                               |   |  |

## 3.5.2 function introduction to D5954

### 1. DESCRIPTION

D5954 is a servo drive IC with built-in 4-channel drive circuit. Digital focus, trace, feed and main axis drive signal outputted by MT1389E is sent to D5954 for amplifying through RC integration circuit. The focus, trace, feed and main axis drive signal being amplified by D5954 is sent to loader to 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    | P   | 5V power supply                                       |
| 9   | PVCC1  | P   | 5V power supply                                       |
| 10  | PGND   | P   | 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  | VOFC+  | 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   | P   | Ground                                                |
| 20  | VINFTK | I   | Trace feedback signal input                           |
| 21  | PVCC2  | P   | 5V power supply                                       |
| 22  | PREGND | P   | 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 |
|----|------|---|-----------------------|

### 3.5.3 function introduction to BA6849FM

#### 1. DESCRIPTION

The BA6849 series are ICs developed for CD-ROM spindle motor drives. These ICs possess a short brake and reverse rotation brake for two types of brake functions, and also contain FG output and rotation direction detection (FR) circuits, making them high-functionality and high-performance ICs.

#### 2. FEATURES

Three-phase, full-wave, pseudo-linear drive system.

Built-in power save and thermal shutdown functions.

Built-in current limiter and Hall bias circuits.

Built-in FG output.

Built-in rotation direction detector.

Built-in reverse rotation prevention circuit.

Built-in short brake pin.

#### 3. PIN DESCRIPTION

| PIN | Symbol | I/O | Description                                    |
|-----|--------|-----|------------------------------------------------|
| 2   | A3     | O   | Output                                         |
| 4   | A2     | O   | Output                                         |
| 7   | A1     | O   | Output                                         |
| 8   | GND    | P   | GND                                            |
| 9   | H1+    | I   | Hall signal input                              |
| 10  | H1-    | I   | Hall signal input                              |
| 11  | H2+    | I   | Hall signal input                              |
| 12  | H2-    | I   | Hall signal input                              |
| 13  | H3+    | I   | Hall signal input                              |
| 14  | H3-    | I   | Hall signal input                              |
| 15  | VH     |     | Hall bias                                      |
| 17  | CNF    |     | For connection of phase compensation capacitor |
| 18  | SB     |     | Short brake                                    |
| 20  | FR     |     | Rotation direction detection                   |
| 21  | ECR    | O   | Output voltage control reference               |
| 22  | EC     | O   | Output voltage control                         |

|    |     |   |                                                     |
|----|-----|---|-----------------------------------------------------|
| 23 | PS  |   | Power save                                          |
| 24 | FG  | O | FG signal output                                    |
| 25 | VCC | P | Power supply                                        |
| 26 | VM2 | P | Motor power supply 2                                |
| 27 | VM1 | P | Motor power supply 1                                |
| 28 | RNF |   | For connection of output current detection resistor |

### 3.5.4 function introduction to SDRAM

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

| Pin | Name | Function                                 | Signal flow | Pin | Name | Function                                 | Signal flow |
|-----|------|------------------------------------------|-------------|-----|------|------------------------------------------|-------------|
| 1   | VDD  | 3.3V power supply                        | P           | 28  | VSS  | Ground                                   | P           |
| 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                                   | P           | 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                        | P           | 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                                   | P           | 39  | UDQM | Data input/output screen-shielded signal | I           |
| 13  | DQ7  | Data bus                                 | I/O         | 40  | NC   | Blank                                    |             |
| 14  | VDD  | 3.3V power supply                        | P           | 41  | VSS  | Ground                                   | P           |
| 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            | P   |
| 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 | P   |
| 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            | P   |
| 26 | MA3    | Address bus                     | I | 53 | DQ15 | Data bus          | I/O |
| 27 | VDD    | 3.3V power supply               | P | 54 | VSS  | Ground            | P   |

### 3.5.5 function introduction to FLASH

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

| Pin          | Name     | Function                                                                                      | Voltage (when no disc) | Data direction |
|--------------|----------|-----------------------------------------------------------------------------------------------|------------------------|----------------|
| 1-9、16-25、48 | AO-A19   | 20 bit address bus                                                                            |                        | I              |
| 11           | WE       | Write enable signal, low level is effective                                                   | 3.23V                  | I              |
| 12           | RESET    | Reset, low level is effective                                                                 | 3.23V                  | I              |
| 10、13、14     | NC       | Blank pin                                                                                     |                        |                |
| 15           | RY/BY    | Ready/system busy                                                                             | 3.23V                  | O              |
| 26           | CE       | Chip enable, low level effective                                                              | 0V                     | I              |
| 27、46        | VSS      | Ground                                                                                        |                        | P              |
| 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                    | P              |
| 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 LM4863

### 1. Description

The LM4863 is a dual bridge-connected audio power amplifier which, when connected to a 5V supply, will deliver 2.2W to a 4Ω load (Note 1) or 2.5W to a 3Ω load (Note 2) with less than 1.0% THD+N. In addition, the headphone input pin allows the amplifiers to operate in single-ended mode when driving stereo headphones.

Boomer audio power amplifiers were designed specifically to provide high quality output power from a surface mount package while requiring few external components. To simplify audio system design, the LM4863 combines dual bridge speaker amplifiers and stereo headphone amplifiers on one chip.

The LM4863 features an externally controlled, low-power consumption shutdown mode, a stereo headphone amplifier mode, and thermal shutdown protection. It also utilizes circuitry to reduce “clicks and pops” during device turn-on.

### 2. FEATURES

Stereo headphone amplifier mode

“Click and pop” suppression circuitry

Unity-gain stable

Thermal shutdown protection circuitry

SOIC, DIP, TSSOP and exposed-DAP TSSOP and LLP packages

### 3. PIN DESCRIPTION

| PIN No                 | Symbol | I/O | Description      |
|------------------------|--------|-----|------------------|
| 1                      | SHDN   | I   | Shutdown Current |
| 2, 7,9,10,<br>11,12,19 | GND    | P   | Ground           |
| 3                      | +OUTA  | O   | +OUTA            |
| 4,17                   | VDD    | P   | Supply Voltage   |
| 5                      | -OUTA  | O   | -OUTA            |
| 6                      | -INA   | I   | -INA             |
| 8                      | +INA   | I   | +INA             |
| 13                     | +INB   | I   | +INB             |
| 14                     | BYPASS | I   |                  |
| 15                     | -INB   | I   | -INB             |
| 16                     | -OUTB  | O   | -OUTB            |
| 18                     | +OUTB  | O   | +OUTB            |
| 20                     | HP-IN  | I   | Mode select      |

## 3.5.7 function introduction to CS4340

### 1. DESCRIPTION

The CS4340 is a complete stereo digital-to-analog system including digital interpolation, fourth-order deltasigma digital-to-analog conversion, digital de-emphasis and switched capacitor analog filtering. The advantages of this architecture include: ideal differential linearity, no distortion mechanisms due to resistor matching errors, no linearity drift over time and temperature and a high tolerance to clock jitter.

The CS4340 accepts data at audio sample rates from 2 kHz to 100 kHz, consumes very little power, and operates over a wide power supply range. The features of the CS4340 are ideal for DVD players, CD players and settop box systems.

### 2. FEATURES

Complete Stereo DAC System: Interpolation, D/A, Output Analog Filtering

100 dB Dynamic Range

88 dB THD+N

Low Clock Jitter Sensitivity

+3 V to +5 V Power Supply

Filtered Line Level Outputs

On-Chip Digital De-emphasis for 32, 44.1, and 48 kHz

30 mW with 3 V supply

Control of Clicks and Pops

### 3. PIN DESCRIPTION

| PIN No | Symbol     | I/O | Description                |
|--------|------------|-----|----------------------------|
| 1      | RST        | I   | Reset                      |
| 2      | SDATA      | I   | Serial Data                |
| 3      | SCLK       | I   | Serial Clock               |
| 4      | LRCK       | I   | Left/Right Clock           |
| 5      | MCLK       | I   | Master Clock               |
| 6,7    | DIF1, DIF0 | I   | Digital Interface Format   |
| 8      | DEM0       | I   | De-emphasis                |
| 9      | FILT+      | O   | Positive Voltage Reference |
| 10     | VQ         | O   | Quiescent Voltage          |
| 11     | REF-GND    | I   | Reference Ground           |
| 12     | AOUTB      | O   | Analog Output B            |
| 13     | AGND       | P   | Analog Ground              |

|    |       |   |                 |
|----|-------|---|-----------------|
| 14 | VA    | P | Analog Power    |
| 15 | AOUTA | O | Analog Output B |
| 16 | MUTEC | O | Mute Control    |

### 3.5.8 function introduction to 4558

#### 1. Description

The RC4558 and RM4558 devices are dual general-purpose operational amplifiers with each half electrically similar to the  $\mu$ 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 RT9701CB

#### 1. DESCRIPTION

The RT9701 is an integrated 100mΩ power switch for self-powered and bus-powered Universal Series Bus (USB) applications. A built-in charge pump is used to drive the N-channel NMOSFET that is free of parasitic body diode to eliminate any reversed current flow across the switch when it is powered off. Its low quiescent supply current (23 μA) and small package (SOT-25) is particularly suitable in battery-powered portable equipment.

Several protection functions include soft start to limit inrush current during plug-in, current limiting at 1.5A to meet USB power requirement, and thermal shutdown to protect damage under over current conditions.

#### 2. FEATURES

- 100mΩ Typ. High-Side NMOSFET (SOT- 25)
- Guaranteed 1.1A Continuous Current
- 1.5A Current Limit
- Small SOT- 25 Package Minimizes Board Space
- Soft Start
- Thermal Protection
- Low 23 μA Supply Current
- Wide Input Voltage Range: 2.2V ~ 6V
- UL Approved - #E219878

#### 3. PIN DESCRIPTION

| PIN No | Symbol | I/O | Description    |
|--------|--------|-----|----------------|
| 1 , 5  | VOUT   | O   | Output Voltage |
| 2      | GND    | P   | Ground         |
| 3      | VIN    | I   | Power Input    |
| 4      | CE     | I   | Chip Enable    |

### 3.5.10 function introduction to LM1117

#### 1. Description

The LM1117 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% accuracy. 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 SCS 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                      |

## 3.5.11 function introduction to AAT1343

### 1. DESCRIPTION

The AAT1343 provides an integrated two-channel pulse-width-modulation (PWM) solution for the power supply of DC-DC system, this device offers the systems engineer the flexibility to tailor the power supply circuitry to a specific application. Each channel contains its own error amplifier, PWM comparator, dead-time control and output driver. The under-voltage protection, oscillator, short circuit protection and voltage reference circuit are common for the two channels.

Both channel of AAT1343 can be used for DC/DC converter operations including step-up, step-down, and inverting. Dead-time control (DTC) can be set to provide 0% to 100% dead time by resistive divider network. Soft start can be implemented by paralleling the DTC resistor with a capacitor. Two dead time control inputs are assigned for Ch-1 and Ch-2 individually, and dead time control inputs can be used to control on / off operation.

With a minimum number of external components, the AAT1343 offers a simple and cost effective solution.

## 2. FEATURES

Complete PWM Power Control Circuitry

Precision Reference: 2.5V±1% (25 °C)

Under-voltage Lockout Protection

Open Drain Output

Output Short Circuit Protection

Low Dissipation Current: 1.6mA

Dead Time Control: 0 to 100%

Wide Operating Frequency: 10kHz to 800kHz

VDD range: 4.0V to 14V

### 3. PIN DESCRIPTION

| PIN No. | Symbol | I/O | Description                             |
|---------|--------|-----|-----------------------------------------|
| 1       | CT     |     | External timing capacitance             |
| 2       | RT     |     | External timing resistance              |
| 3       | NON1   | I   | Positive input for error amplifier 1    |
| 4       | INV1   | I   | Negative input for error amplifier 1    |
| 5       | FB1    | O   | Output for error amplifier 1            |
| 6       | DTC1   | O   | Output 1 dead time / soft start setting |
| 7       | OUT1   | O   | Output 1                                |
| 8       | GND    | P   | Ground                                  |
| 9       | VDD    | P   | Power supply                            |
| 10      | OUT2   | O   | Output 2                                |
| 11      | DTC2   | I   | Output 2 dead time / soft start setting |
| 12      | FB2    | O   | Output for error amplifier 2            |
| 13      | INV2   | I   | Negative input for error amplifier 2    |
| 14      | NON2   | I   | Positive input for error amplifier 2    |
| 15      | SCP    | I   | Timer latch setting                     |
| 16      | Vref   | O   | Reference voltage (2.5V) output         |

## 3.5.12 function introduction to AAT1102

### 1. DESCRIPTION

The AAT1102 is a step-up DC-DC converter with a 1.6A, 0.23Ω internal switch and pin selectable operating frequency. With the ability to convert 3.3V to multiple outputs of 8V, -8V, and 23V, the AAT1102 is an ideal part for biasing TFT displays.

High switching frequency (640 kHz or 1.3 MHz selectable) allows easy filtering and faster loop performance. An external compensation pin provides the user flexibility in determining loop dynamics, allowing the use of small low equivalent series resistance (ESR) ceramic output capacitors. The device can produce an output voltage as high as 12V from an input as low as 2.6V.

Soft-start is programmed with an external capacitor, which sets the input current ramp rate. In shutdown mode, current consumption is reduced to 0.1µA. The AAT1102 is available in a space-saving 8-pin MSOP package. The ultra-small package and high switching frequency allow the total solution to be less than 1.1mm high.

## 2. FEATURES

1.6A, 0.23Ω, internal switch

90% Efficiency

Adjustable Output from VDD to 12V

640kHz or 1.3MHz Selectable

Switching Frequency

+2.6V to +5.5V Input Range

0.1µA Shutdown Current

Programmable Soft-Start

Small 8-Pin MSOP Package

## 3. PIN DESCRIPTION

| PIN No. | Symbol | I/O | Description                          |
|---------|--------|-----|--------------------------------------|
| 1       | EO     | O   | Compensation Pin for Error Amplifier |
| 2       | IN     | I   | Feedback Pin                         |
| 3       | SHDN   | I   | Shutdown Control Input               |
| 4       | GND    | P   | Ground                               |
| 5       | SW     | O   | Switch Pin                           |
| 6       | VDD    | P   | Supply Pin                           |
| 7       | FREQ   | I   | Frequency Select Input               |
| 8       | SS     | I   | Soft-Start Control Pin               |

## 3.5.13 function introduction to AU9362

### 1. DESCRIPTION

The AU9362 is a single chip USB flash memory reader controller which supports not only the widely used flash memory cards and then manipulating flexible others such as Compact Flash (CF) card, Micro Drive (MD),

Smart Media Card (SMC), XD Picture Card, Memory Stick (MS), Memory Stick Duo, Memory Stick PRO, Secure Digital (SD) and Multimedia Card (MMC), It can be used as removable storage disks in enormous data exchange applications between PC and PC or PC and various consumer electronic appliances.

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

By integrating of various analog components, the AU9362 is the most powerful and most effective solution for various flash memory reader.

## **2. FEATURES**

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

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

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

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

Fully compliant with Memory Stick PRO v1.0 Specification.

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

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

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

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

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

Ping-pong FIFO implementation for concurrent bus operation

Support multiple sectors transfer to 4GB to optimize performance

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

Support slot to slot read/write operation.

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

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

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

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

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

Runs at 12MHz, built-in 48 MHz PLL

Built-in 3.3V regulator

**3. PIN DESCRIPTION**

| PIN No. | Symbol           | I/O | Description                                               |
|---------|------------------|-----|-----------------------------------------------------------|
| 1       | VCCA             | P   | Analog 3.3V input.                                        |
| 2       | GNDA             | P   | Ground. Analog ground.                                    |
| 3       | XTAL1            | I   | Crystal Oscillator Input (12MHz).                         |
| 4       | XTAL2            | O   | Crystal Oscillator Output (12MHz).                        |
| 5       | VCC2CARD         | O   | Connect to Card Power.                                    |
| 6       | VCC5V            | P   | 5V power supply from USB connector.                       |
| 7       | VCC3V            | P   | Internally regulated 3.3V power supply output             |
| 8       | GNDIO            | P   | Chip I/O Ground.                                          |
| 9       | USB_DM           | I/O | USB DM.                                                   |
| 10      | USB_DP           | I/O | USB DP.                                                   |
| 11      | SMWRN            | O   | SMC Write Enable.(0: write enable, 1: write disable.)     |
| 12      | SMALE            | O   | SMC Address Latch Enable. (0: ALE closed, 1: ALE open.)   |
| 13      | SMCLE            | O   | SMC Command Latch Enable. (0: CLE closed, 1: CLE open.)   |
| 14      | SMRDN            | O   | SMC Read Enable. (0: read enable, 1: read disable.)       |
| 15      | SMRBN            | I   | SMC Ready/Busy. (0: busy, 1: ready.)                      |
| 16      | SMDATA0          | I/O | SMC Data0.                                                |
| 17      | SMDATA4          | I/O | SMC Data4.                                                |
| 18      | SMDATA5          | I/O | SMC Data5.                                                |
| 19      | SMDATA6          | I/O | SMC Data6.                                                |
| 20      | ROMD3/ XD SLOTEN | I/O | ROM Data3. XD card slot enable.(0: disable, 1: enable.)   |
| 21      | SMDATA7          | I/O | SMC Data7.                                                |
| 22      | SMDATA3          | I/O | SMC Data3.                                                |
| 23      | SMDATA2          | I/O | SMC Data2.                                                |
| 24      | ROMD6/ XD WPN    | I/O | ROM Data6. XD Write protect (0: protect, 1: not protect.) |
| 25      | SMDATA1          | I/O | SMC Data1.                                                |
| 26      | CFD0             | I/O | CF Card Data0.                                            |
| 27      | CFD1             | I/O | CF Card Data1.                                            |
| 28      | CFD2             | I/O | CF Card Data2.                                            |

|    |         |     |                                                      |
|----|---------|-----|------------------------------------------------------|
| 29 | CFD3    | I/O | CF Card Data3                                        |
| 30 | CFD4    | I/O | CF Card Data4.                                       |
| 31 | CFD5    | I/O | CF Card Data5.                                       |
| 32 | CFD6    | I/O | CF Card Data6.                                       |
| 33 | CFD7    | I/O | CF Card Data7.                                       |
| 34 | CFCDN   | I   | CF Card Detect. Internal pull-up pad.                |
| 35 | CFWRN   | O   | CF Card IOWRN.                                       |
| 36 | CFWEN   | O   | CF Card WE.                                          |
| 37 | CFOEN   | O   | CF Card OE.                                          |
| 38 | CFWTN   | I   | CF Card WAIT.                                        |
| 39 | CFAD9   | O   | CF Card Addr9.                                       |
| 40 | CFAD3   | O   | CF Card Addr3.                                       |
| 41 | CFAD2   | O   | CF Card Addr2.                                       |
| 42 | CFAD1   | O   | CF Card Addr1.                                       |
| 43 | CFAD0   | O   | CF Card Addr0.                                       |
| 44 | CFRDN   | O   | CF Card IORD.                                        |
| 45 | XDCEN   | O   | XD Card Enable. (0: enable, 1: disable.)             |
| 46 | SMCDN   | I   | SMC Card Detect. Internal pull-up pad.               |
| 47 | SMWPN   | I   | SMC Write Protect. (0: protected, 1: not protected.) |
| 48 | EEPCLK  | O   | EEPROM Serial Clock.                                 |
| 49 | EEPDATA | I/O | EEPROM Serial Data.                                  |
| 50 | SMCEN   | O   | SMC Enable. (0: disable, 1: enable.)                 |
| 51 | SDCMD   | I/O | SD CMD.                                              |
| 52 | SDCLK   | O   | SD CLK.                                              |
| 53 | SDDATA  | I/O | SD Data.                                             |
| 54 | SDCDN   | I   | SD Card Detect. Internal pull-up pad.                |
| 55 | SDWP    | I   | SD Write Protect.                                    |
| 56 | GPON7   | I/O | General Purpose Out, used as activity LED.           |
| 57 | XDCDN   | I   | XD Card Detect. Internal pull-up pad.                |
| 58 | VCKK    | P   | Core 3.3V Input.                                     |
| 59 | GNDK    | P   | Ground.                                              |
| 60 | VCCMS   | P   | MS 3.3V Input.                                       |
| 61 | MSINS   | I   | MS Card INS. Internal pull-up pad.                   |

|    |        |     |               |
|----|--------|-----|---------------|
| 62 | MSBS   | O   | MS Card BS.   |
| 63 | MSCLK  | O   | MS Card SCLK. |
| 64 | MSDATA | I/O | MS Card DATA. |

### 3.5.14 function introduction to ADG713

#### 1. DESCRIPTION

The ADG711, ADG712, and ADG713 are monolithic CMOS devices containing four independently selectable switches. These switches are designed on an advanced submicron process that provides low power dissipation yet gives high switching speed, low on resistance, low leakage currents, and high bandwidth. They are designed to operate from a single 1.8 V to 5.5 V supply, making them ideal for use in battery-powered instruments and with the new generation of DACs and ADCs from Analog Devices. Fast switching times and high bandwidth make the parts suitable for switching USB 1.1 data signals and video signals.

The ADG711, ADG712, and ADG713 contain four independent single-pole/single-throw (SPST) switches. The ADG711 and ADG712 differ only in that the digital control logic is inverted. The ADG711 switches are turned on with a logic low on the appropriate control input, while a logic high is required to turn on the switches of the ADG712. The ADG713 contains two switches whose digital control logic is similar to the ADG711, while the logic is inverted on the other two switches. Each switch conducts equally well in both directions when ON.

The ADG713 exhibits break-before-make switching action.

#### 2. FEATURES

- 1.8 V to 5.5 V Single Supply
- Low On Resistance (2.5  $\Omega$  Typ)
- Low On Resistance Flatness
- 3 dB Bandwidth > 200 MHz
- Rail-to-Rail Operation
- 16-Lead TSSOP and SOIC Packages
- Fast Switching Times:  $t_{ON}$  16 ns,  $t_{OFF}$  10 ns
- Typical Power Consumption (< 0.01  $\mu$ W)
- TTL/CMOS Compatible

### 3.5.15 function introduction to LM393

#### 1. DESCRIPTION

The LM193 series consists of two independent precision voltage comparators with an offset voltage

specification as low as 2.0 mV max for two comparators which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. These comparators also have a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

Application areas include limit comparators, simple analog to digital converters; pulse, square wave and time delay generators; wide range VCO; MOS clock timers; multi vibrators and high voltage digital logic gates. The LM193 series was designed to directly interface with TTL and CMOS. When operated from both plus and minus power supplies, the LM193 series will directly interface with MOS logic where their low power drain is a distinct advantage over standard comparators.

## **2. FEATURES**

Wide supply

— Voltage range: 2.0V to 36V

— single or dual supplies:  $\pm 1.0\text{V}$  to  $\pm 18\text{V}$

Very low supply current drain (0.4 mA) — independent of supply voltage

Low input biasing current: 25 nA

Low input offset current:  $\pm 5$  nA

Maximum offset voltage:  $\pm 3$  mV

Input common-mode voltage range includes ground

Differential input voltage range equal to the power supply voltage

Low output saturation voltage, : 250 mV at 4 mA

Output voltage compatible with TTL, DTL, ECL, MOS and CMOS logic systems

## **3.5.16 function introduction to 24C02**

### **1. Description**

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

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

### **2. Features**

Low-voltage and Standard-voltage Operation

– 2.7 (VCC = 2.7V to 5.5V)

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

### 3. PIN DESCRIPTION

| PIN No. | Symbol | I/O | Description           |
|---------|--------|-----|-----------------------|
| 1       | A0     |     | To Ground             |
| 2       | A1     |     | To Ground             |
| 3       | A2     |     | To Ground             |
| 4       | VSS    | P   | To Ground             |
| 5       | SDA    | I/O | Serial Data input     |
| 6       | SCL    | I/O | Serial SCL input      |
| 7       | TEST   | I/O | Test port             |
| 8       | VDD    | P   | Positive Power Supply |

### 3.5.17 function introduction to PT2222A

#### 1. DESCRIPTION

The PT2221 and PT2222 are remote control transmitters utilizing CMOS Technology specially designed for use on infrared remote control applications. They are pin-to-pin compatible with NEC  $\mu$ PD6121 and  $\mu$ PD6122 respectively.

PT2221 is packaged in 20 pins SO and capable of controlling 32 functions and 3 double keys. PT2222, on the other hand, is housed in 24 pins SO and capable of controlling 64 function keys and 3 double keys.

PT2221/2 may be paired with PT2225 to construct a powerful remote control system.

## 2. FEATURES

CMOS Technology

Low Power Consumption (VDD=2.0 ~ 5.5V)

Pin-to-Pin Compatible with  $\mu$ PD6121/ $\mu$ PD6122

Using SEL pin, PT2221 can support 64+6 function codes

Using SEL pin, PT2222 can support 128 + 6 function codes

Customer Code can be selected (please contact PTC for details)

## 3.5.18 function introduction to AN2546FH

### 1. DESCRIPTION

The AN2546FH-A is a video signal processing IC built-in a 5-volt power-supply source driver for TFT color LCD (normally white type), and it supports the NTSC, PAL and PAL-M/PAL-N systems. The main circuitry of this IC includes video-signal processing circuit, color signal processing circuit, interface circuit, synchronizing circuit and many color quality adjusting circuits. This IC converts the composite video signal or separated Y/C signal or RGB signals into RGB signals available for TFT color LCD.

### 2. FEATURES

Supply voltage: 3 V/5 V/7.5 V

Built-in a 5-volt power-supply source driver for TFT type LCD

Low consumption power (typ. 200 mW)

Supporting the NTSC, PAL, PAL-M and PAL-N

Supporting composite, component and color differential signal input

Video signal , analog RGB (2 systems) One is for OSD (analog/digital).

Each mode setting is possible with I2C Bus control.

Electronic volume (D/A converter) built in

Contrast/Brightness/? correction circuit built in

Horizontal and vertical display position adjustment are possible by serial control.

Improvement of weak electric field characteristics (Compared to AN2526FH/AN2526NFH: - 5 dB)

At reverse stop, built-in output gain down function

### 3. PIN DESCRIPTION

| PIN No. | Symbol  | I/O | Description                                 |
|---------|---------|-----|---------------------------------------------|
| 1       | XL_PALN | I   | Crystal oscillator connecting pin 3 (PAL-N) |

|    |             |   |                                                 |
|----|-------------|---|-------------------------------------------------|
| 2  | R-YOUT      | O | R-Y output pin                                  |
| 3  | B-YOUT      | O | B-Y output pin                                  |
| 4  | R-YIN       | I | R-Y input pin                                   |
| 5  | B-YIN       | I | B-Y input pin                                   |
| 6  | VCC1_5V     | P | Signal processing system power supply           |
| 7  | VREF        |   | Internal reference power supply detection pin   |
| 8  | R_ANALOG_IN | I | R-ch. analog signal input pin                   |
| 9  | G_ANALOG_IN | I | G-ch. analog signal input pin                   |
| 10 | B_ANALOG_IN | I | B-ch. analog signal input pin                   |
| 11 | R_DET       |   | R-ch. clamp detection pin                       |
| 12 | G_DET       |   | G-ch. clamp detection pin                       |
| 13 | B_DET       |   | B-ch. clamp detection pin                       |
| 14 | R_OSD_IN    | I | R-ch. OSD input pin                             |
| 15 | G_OSD_IN    | I | G-ch. OSD input pin                             |
| 16 | B_OSD_IN    | I | B-ch. OSD input pin                             |
| 17 | YS          | I | Character picking up pulse input pin            |
| 18 | BLACK       | I | Side black control signal input pin             |
| 19 | BOUT        | O | B-ch. output pin                                |
| 20 | BOTT_DET    |   | B-ch. output DC feedback detection pin          |
| 21 | GOUT        | O | G-ch. output pin                                |
| 22 | GOUT_DET    |   | G-ch. output DC feedback detection pin          |
| 23 | GND         | P | GND 1                                           |
| 24 | DRV_DET     | I | Drive output reference voltage input pin        |
| 25 | VCC2_7.5V   | P | Drive system power supply (VCC2 = 7.5 V)        |
| 26 | R_OUT       | O | R-ch. output pin                                |
| 27 | ROUT_DET    |   | R-ch. output DC feedback detection pin          |
| 28 | VCOM_OUT    | O | Common reverse signal output pin                |
| 29 | VCC3_3.3V   | P | Pulse output system power supply (VCC3 = 3.0 V) |
| 30 | PWN         | O | PWM output pin                                  |
| 31 | VD          | O | Vertical synchronous signal output pin          |
| 32 | HD          | O | Horizontal synchronous signal output pin        |
| 33 | SCP_OUT     | O | Sand castle pulse output pin                    |
| 34 | C_SYNC      | O | Composite synchronous signal output pin         |

|    |           |   |                                                           |
|----|-----------|---|-----------------------------------------------------------|
| 35 | VD_IN     | I | Vertical synchronous signal input pin                     |
| 36 | EXT_POL   | I | 1H reverse signal input pin                               |
| 37 | VSS       | P | Clock-system GND (VSS)                                    |
| 38 | N_RGB     | I | Analog imposing control signal input pin                  |
| 39 | L_DET     |   | Horizontal clock detection pin                            |
| 40 | VDD       | P | Clock-system power supply (3.0 V)                         |
| 41 | GND       | P | GND 2                                                     |
| 42 | AFC_DET   |   | AFC loop filter connecting pin                            |
| 43 | VC0_ADJ   |   | VCO frequency adjustment pin                              |
| 44 | VCC4_5V   | P | Synchronous system power supply (VCC1 = 5.0 V)            |
| 45 | NAV1_SYNC | I | NAVI signal synchronous signal input pin                  |
| 46 | SYNC_IN   | I | Synchronous signal input pin                              |
| 47 | SCL       | I | Serial data shift clock input pin                         |
| 48 | SDA       | I | Serial data input pin                                     |
| 49 | PDNR      | P | Power-on reset detection pin                              |
| 50 | COM_DC    | O | Common DC adjustment voltage output pin                   |
| 51 | BLK_ADJ   | O | DAC output pin                                            |
| 52 | Y_IN      | I | Luminance signal input pin                                |
| 53 | TRAP_OUT  | O | Chrominance signal trap filter connection pin 1           |
| 54 | TRAP_IN   | I | Chrominance signal trap filter connection pin 2           |
| 55 | Y_DET     |   | Y-system clamp detection pin                              |
| 56 | ACC_DET   |   | ACC detection pin                                         |
| 57 | C_IN      | I | Chrominance signal input pin                              |
| 58 | VCC5_5V   | P | Chrominance processing system power supply (VCC1 = 5.0 V) |
| 59 | GND       | P | GND 3                                                     |
| 60 | KILL_DET  |   | Chrominance killer detection pin                          |
| 61 | APC_DET   |   | APC detection pin                                         |
| 62 | SC_OUT    | O | Subcarrier output pin                                     |
| 63 | XL_NTSC   | I | Crystal oscillator connecting pin 1 (NTSC)                |
| 64 | XL_PAL    | I | Crystal oscillator connecting pin 2 (PAL/PAL-M)           |

## 3.5.19 function introduction to MN5814

### 1. DESCRIPTION

The MN5814 is a TFT LCD panel timing controller IC.

### 2. FEATURES

Supports both composite sync and separate sync signal video inputs.

Horizontal and vertical position adjustment function

Horizontal: 5 bits (Adjustment range: 9.38 ms)

Vertical: 4 bits (Adjustment range: 14 H)

Supports multiple panel types

From 2.5-type to 7-type wide-screen panels

For wide-screen panels:

Display with black side bands (3 modes)

Just-fit display

Zoom (2 modes)

Switching between PAL and NTSC (PAL: decimation only)

Underside on-screen display (UONS)

An optimal zooming mode is possible according to the display panel through 2-zooming mode of ZOOM1 and ZOOM2.

UONS display at arbitrary positions is possible by the black side control pins.

Also provides full-screen black side display.

### 3. PIN DESCRIPTION

| PIN No. | Symbol         | I/O | Description                                                                                                                                           |
|---------|----------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | SYNCIN         | I   | Composite sync input                                                                                                                                  |
| 2       | HSYNCIN        | I   | Horizontal sync input (separate)                                                                                                                      |
| 3       | CPHSEL (SIDE2) | I   | In 1,440 or 1,200-stripe mode: Black side and just-fit control<br>In 960-stripe mode: Disabled<br>In 480 or 960-delta mode: CPH pulse phase switching |
| 4       | QHSEL (SIDE1)  | I   | In 1,440 or 1,200-stripe mode: Black side and just-fit control<br>In 960-stripe mode: Disabled<br>In 480 or 960-delta mode: QH pulse phase switching  |
| 5       | VDBIN          | I   | Vertical sync input (separate)                                                                                                                        |
| 6       | HOUT           | O   | Horizontal sync output                                                                                                                                |
| 7       | VOUT           | O   | Vertical sync output                                                                                                                                  |
| 8       | BLACK          | O   | Black signal output                                                                                                                                   |

|    |              |   |                                                                                                                                                   |
|----|--------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 9  | VPOS3        | I | Vertical display position switching (STV1 and STV2 position switching)                                                                            |
| 10 | VPOS2        | I |                                                                                                                                                   |
| 11 | VPOS1        | I |                                                                                                                                                   |
| 12 | LTBOX (ZOOM) | I | High: Zoom or letterbox display In 1,440 or 1,200-mode: Zoom display control In 480 or 960-delta or 960-stripe mode: Letterbox display control    |
| 13 | UD           | 1 | Up/down scan direction switching (STV1 and STV2 output switching)                                                                                 |
| 14 | POL          | O | Video, opposite electrode reversal signal                                                                                                         |
| 15 | INTEXT       | I | Composite/separate input switching                                                                                                                |
| 16 | CPV          | O | Gate driver IC clock                                                                                                                              |
| 17 | OEV3         | O | Gate driver IC output stage enable pulse signals                                                                                                  |
| 18 | OEV2         | O |                                                                                                                                                   |
| 19 | OEV1         | O |                                                                                                                                                   |
| 20 | STV1         | O | Gate driver IC start pulse 1                                                                                                                      |
| 21 | OEH          | O | Source driver IC output stage enable pulse signal                                                                                                 |
| 22 | QH (ZOOMC)   | O | In 480 or 960-delta mode: Color arrangement switching pulse In 1,200 or 1,440-mode: Zoom control pulse In 960 stripe mode: Fixed low-level output |
| 23 | STH1         | O | Source driver IC start pulse 1                                                                                                                    |
| 24 | STH2         | O | Source driver IC start pulse 2                                                                                                                    |
| 25 | CPH3         | O | Source driver IC clock 3                                                                                                                          |
| 26 | STV2         | O | Source driver IC start pulse 2                                                                                                                    |
| 27 | CPH2         | O | Source driver IC clock 2                                                                                                                          |
| 28 | RL           | I | Left/right scan direction switching (STH1 and STH2 output switching)                                                                              |
| 29 | CPH1         | O | Source driver IC clock 1                                                                                                                          |
| 30 | HDOT2        | I | Display pixel count mode switch 2                                                                                                                 |
| 31 | JUST         | I | In 1,200 or 1,440-mode: Just-fit display switching In 960-mode: Stripe/delta control                                                              |
| 32 | POSSET       | I | Horizontal/vertical display position offset switching                                                                                             |
| 33 | PD           | O | Phase comparator output                                                                                                                           |
| 34 | QVDZMSEL     | I | In 480 or 960-delta or stripe mode: QVD input In 1,200 or 1,400-mode: Zoom 1/zoom 2 display switching OEV pulse                                   |

|    |           |   |                                                                                                                          |
|----|-----------|---|--------------------------------------------------------------------------------------------------------------------------|
|    |           |   | control in zoom mode                                                                                                     |
| 35 | VDD       | I | Power supply (VDD)                                                                                                       |
| 36 | VCOI      | I | VCO input (system clock input)                                                                                           |
| 37 | VCOO      | O | VCO output                                                                                                               |
| 38 | VSS       | I | Ground (GND)                                                                                                             |
| 39 | RESET     | I | System reset                                                                                                             |
| 40 | HDOT1     | I | Display pixel count mode switching 1                                                                                     |
| 41 | WH (UONS) | I | In 1,200 or 1,440-mode: "Under on-screen" display control<br>In 480 or 960-delta or stripe mode: WH (write/hold) control |
| 42 | HPOS4     | I | Horizontal display position switching signals                                                                            |
| 43 | HPOS3     | I | (STH1 and STH2 position switching)                                                                                       |
| 44 | HPOS2     | I |                                                                                                                          |
| 45 | HPOS1     | I |                                                                                                                          |
| 46 | NP1       | I | NTSC/PAL switching                                                                                                       |
| 47 | VDD       | I | Power supply (VDD)                                                                                                       |
| 48 | VSS       | I | Ground (GND)                                                                                                             |

## 3.5.20 function introduction to TDA4665T

### 1. DESCRIPTION

The TDA4665 is an integrated base band delay line circuit with one line delay. It is suitable for decoders with colour-difference signal outputs  $\pm(R-Y)$  and  $\pm(B-Y)$ .

### 2. FEATURES

Two comb filters, using the switched-capacitor technique, for one line delay time (64  $\mu$ s)

Adjustment-free application

No cross talk between SECAM color carriers (diaphoty)

Handles negative or positive color-difference input signals

Clamping of AC-coupled input signals ( $\pm(R-Y)$  and  $\pm(B-Y)$ )

VCO without external components

3 MHz internal clock signal derived from a 6 MHz CCO, line-locked by the sandcastle pulse (64  $\mu$ s line)

Sample-and-hold circuits and low-pass filters to suppress the 3 MHz clock signal

Addition of delayed and non-delayed output signals

Output buffer amplifiers

Comb filtering functions for NTSC color-difference signals to suppress cross-color.

### 3. PIN DESCRIPTION

| PIN No. | Symbol  | I/O | Description                          |
|---------|---------|-----|--------------------------------------|
| 1       | VP2     | P   | +5 V supply voltage for digital part |
| 2       | n.c.    |     | not connected                        |
| 3       | GND2    | P   | ground for digital part (0 V)        |
| 4       | i.c.    |     | internally connected                 |
| 5       | SAND    | I   | sandcastle pulse input               |
| 6       | n.c.    |     | not connected                        |
| 7       | i.c.    |     | internally connected                 |
| 8       | i.c.    |     | internally connected                 |
| 9       | VP1     | P   | +5 V supply voltage for analog part  |
| 10      | GND1    | P   | ground for analog part (0 V)         |
| 11      | Vo(R-Y) | O   | ± (R-Y) output signal                |
| 12      | Vo(B-Y) | O   | ± (B-Y) output signal                |
| 13      | n.c.    |     | not connected                        |
| 14      | Vi(B-Y) | I   | ± (B-Y) input signal                 |
| 15      | n.c.    |     | not connected                        |
| 16      | Vi(R-Y) | I   | ± (R-Y) input signal                 |

### 3.5.21 function introduction to NJM2082

#### 1. DESCRIPTION

The NJM2082 is JFET input dual operational amplifiers. The NJM2082 features low input offset and bias current, high input impedance. The NJM2082 ideally suits for fast integrator, DA converter, sample & hold and audio applications. The NJM2082 is improved version of the NJM082.

#### 2. FEATURES

Operating Voltage (  $\pm 4\text{V} \sim \pm 18\text{V}$  )

High Input Resistance (  $10^{12}\Omega$  typ. )

High Slew Rate (  $20\text{V}/\mu\text{s}$  typ. )

Package Outline DIP8,DMP8,SIP8,SSOP8

Bipolar Technology

### 3.5.22 function introduction to 74HC4066

#### 1. DESCRIPTION

The 74HC/HCT4066 are high-speed Si-gate CMOS devices and are pin compatible with the “4066” of the “4000B” series. They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT4066 have four independent analog switches. Each switch has two input/output terminals (nY, nZ) and an active HIGH enable input (nE). When nE is LOW the belonging analog switch is turned off.

## 2. FEATURES

Very low “ON” resistance:

50 Ω (typ.) at VCC = 4.5 V

45 Ω (typ.) at VCC = 6.0 V

35 Ω (typ.) at VCC = 9.0 V

Output capability: non-standard

ICC category: SSI.

## 3. PIN DESCRIPTION

| PIN No.      | Symbol   | I/O | Description                 |
|--------------|----------|-----|-----------------------------|
| 1, 4, 8, 11  | 1Y to 4Y | I/O | independent inputs/outputs  |
| 2, 3, 9, 10  | 1Z to 4Z | I/O | independent inputs/outputs  |
| 7            | GND      | P   | ground (0 V)                |
| 13, 5, 6, 12 | 1E to 4E | I   | enable inputs (active HIGH) |
| 14           | VCC      | P   | positive supply voltage     |

## 3.5.23 function introduction to S3F9454

### 1. DESCRIPTION

Samsung's SAM88RCRI family of 8-bit single-chip CMOS micro controllers offers a fast and efficient CPU, a wide range of integrated peripherals, and various mask-programmable ROM sizes.

A address/data bus architecture and a large number of bit-configurable I/O ports provide a flexible programming environment for applications with varied memory and I/O requirements. Timer/counters with selectable operating modes are included to support real-time operations.

### 2. FEATURES

#### CPU

- SAM88RCRI CPU core
- The SAM88RCRI core is low-end version of the current SAM87 core.

#### Memory

- 2/4-Kbyte internal program memory

- 208-byte general purpose register area

#### **Instruction Set**

- 41 instructions
- The SAM88RCRI core provides all the SAM87 core instruction except the word-oriented instruction,

multiplication, division, and some one-byte instruction.

#### **Instruction Execution Time**

- 400 ns at 10 MHz fOSC (minimum)

#### **Interrupts**

- 4 interrupt sources with one vector
- One interrupt level

#### **General I/O**

- Three I/O ports (Max 18 pins)
- Bit programmable ports

#### **8-bit High-speed PWM**

- 8-bit PWM 1-ch (Max: 156 kHz)
- 6-bit base + 2-bit extension

#### **Built-in reset Circuit**

- Low voltage detector for safe reset

#### **Timer/Counters**

- One 8-bit basic timer for watchdog function
- One 8-bit timer/counter with time interval modes

#### **A/D Converter**

- Nine analog input pins
- 10-bit conversion resolution

#### **Oscillation Frequency**

- 1 MHz to 10 MHz external crystal oscillator
- Maximum 10 MHz CPU clock
- Internal RC: 3.2 MHz (typ.), 0.5 MHz (typ.) in  
V<sub>DD</sub> = 5 V

#### **Operating Temperature Range**

- – 40° C to + 85° C

#### **Operating Voltage Range**

- 2.0 V (LVR Level) to 5.5 V

#### **Smart Option**

#### **Package Types**

- S3C9452/C9454:  
– 20-DIP-300A

- 20-SOP-375
- 16-DIP-300A
- S3C9442/C9444
- 8-DIP-300
- 8-SOP-225

### 3. PIN DESCRIPTION

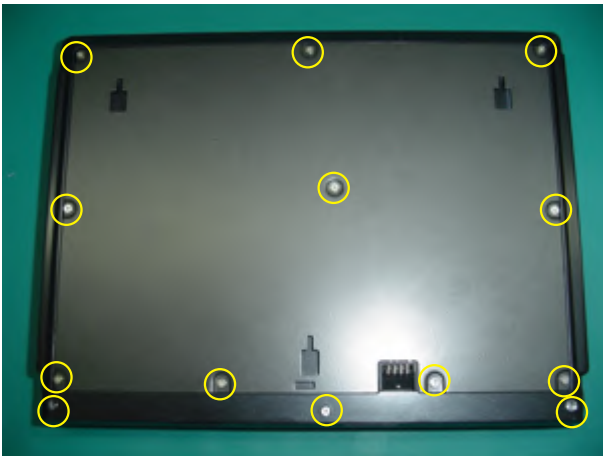
| Pin Name  | In/Out | Pin Description                                                                                                                                                                                                    | Pin Type | Share Pins                    |
|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------------|
| P0.0–P0.7 | I/O    | Bit-programmable I/O port for Schmitt trigger input or push-pull output. Pull-up resistors are assignable by software. Port0 pins can also be used as A/D converter input, PWM output or external interrupt input. | E-1      | ADC0–ADC7<br>INT0/INT1<br>PWM |
| P1.0–P1.1 | I/O    | Bit-programmable I/O port for Schmitt trigger input or push-pull, open-drain output. Pull-up resistors or pull-down resistors are assignable by software.                                                          | E-2      | XIN, XOUT                     |
| P1.2      | I      | Schmitt trigger input port                                                                                                                                                                                         | B        | RESET                         |
| P2.0–P2.6 | I/O    | Bit-programmable I/O port for Schmitt trigger input or push-pull, open-drain output. Pull-up resistors are assignable by software.                                                                                 | E E-1    | – ADC8/CLO<br>T0              |
| XIN, XOUT | –      | Crystal/Ceramic, or RC oscillator signal for system clock.                                                                                                                                                         |          | P1.0–P1.1                     |
| RESET     | I      | Internal LVR or External RESET                                                                                                                                                                                     | B        | P1.2                          |
| VDD, VSS  | –      | Voltage input pin and ground                                                                                                                                                                                       |          | –                             |
| CLO       | O      | System clock output port                                                                                                                                                                                           | E-1      | P2.6                          |
| INT0–INT1 | I      | External interrupt input port                                                                                                                                                                                      | E-1      | P0.0, P0.1                    |
| PWM       | O      | 8-Bit high speed PWM output                                                                                                                                                                                        | E-1      | P0.6                          |
| T0        | O      | Timer0 match output                                                                                                                                                                                                | E-1      | P2.0                          |
| ADC0–ADC8 | I      | A/D converter input                                                                                                                                                                                                | E-1 E    | P0.0–P0.7<br>P2.6             |

# Chapter Four

## Disassembly and Assembly Process

In order to know the structure of DVD player DL385SI easily, visibly and quickly, now each key link of the disassembly and assembly process of the player is presented in means of pictures to prevent users from incorrect operating and damaging elements. This player is divided into: the unit, loader, loader components, control panel components, decode control components, power board components, AV board components, MIC board components and remote controller. You are suggested to operate according to illustrations strictly.

### 4.1 Disassembly process for the player



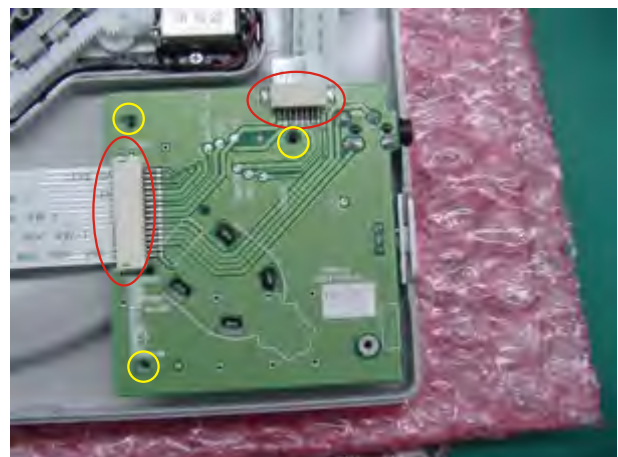
1. Remove battery and use electric screwdriver to remove 13 screws of bottom casing.



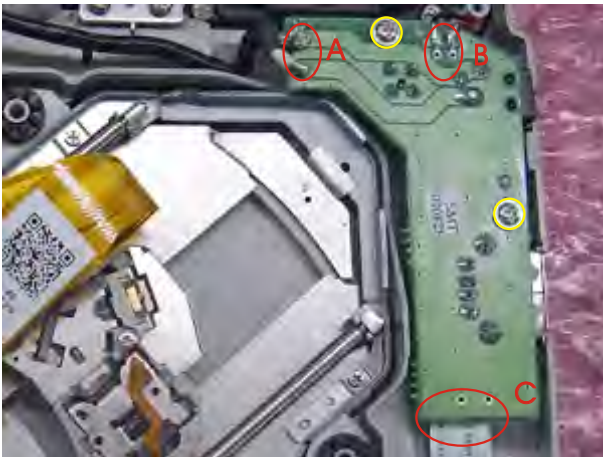
2. Take down bottom casing.



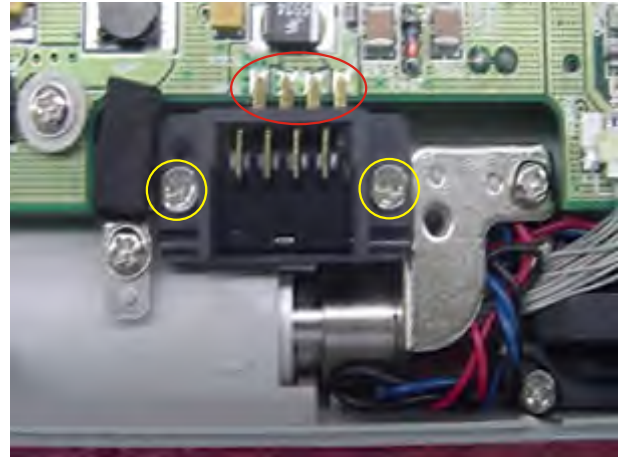
3. Remove loader: unplug flat cable in two position marked red in the figure and do not damage the clasp on flat cable. Then open the door and remove loader.



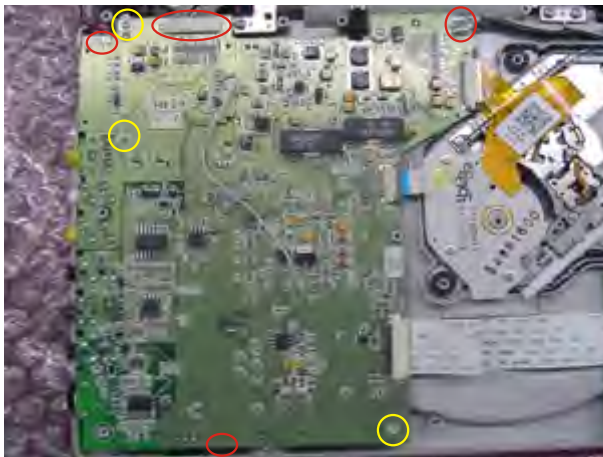
4. Remove detect switch board: unplug flat cable in two position marked red in the figure, use electric screwdriver to take down 3 screws marked yellow and take down detect switch board.



5. Remove subsidiary power board: use electric screwdriver to remove two screws marked yellow in the figure and take down subsidiary power board. Use iron to remove flat cable A, B, overturn the subsidiary board and unplug flat cable in position C.



6. Remove battery connector: use electric screwdriver to remove 2 screws marked yellow in the figure, use iron to remove 4 welding points marked red and then remove battery connector.



7. Remove decode board: take down the screw and flat cable marked in the figure and then remove decode board.



8. Remove speaker: remove 4 screws of speaker and then remove speakers on two sides.



9. Remove button board: use electric screwdriver to remove screws marked in the figure and then remove the button board.



10. Remove display screen rear cover: use electric screwdriver to remove 4 screws marked in the figure and then use nail to remove display screen rear cover from the slot.



11. Remove drive board: use electric screwdriver to remove screws marked in the figure, remove the flat cable marked in the figure and then remove the drive board.



12. Remove boost board: use electric screwdriver to remove screws marked in the figure, remove the flat cable marked in the figure and then remove the boost board.

## 4.2 Assembly process for the player

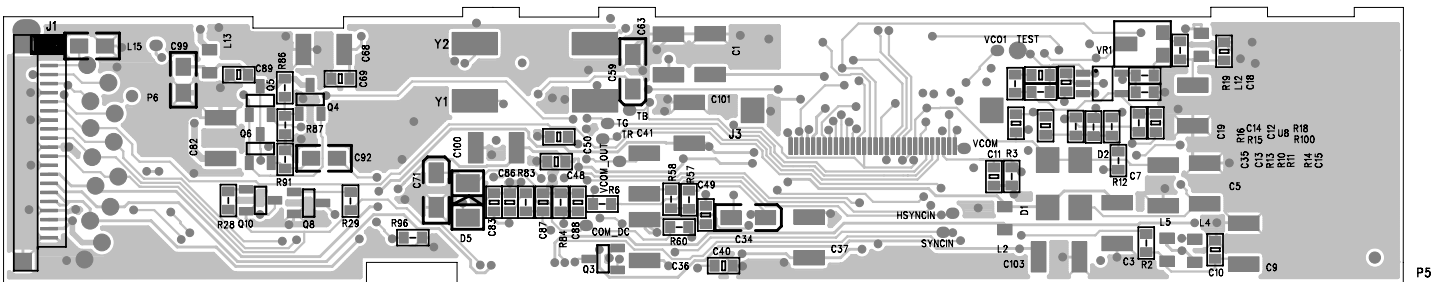
The assembly process is similar to the disassembly process, only the sequence is reverse. When installing detect switch board and subsidiary power board, switch Sw501, Sw601, Sw602 should be aimed to the corresponding hole to avoid damaging the switch.

# Chapter Cinque

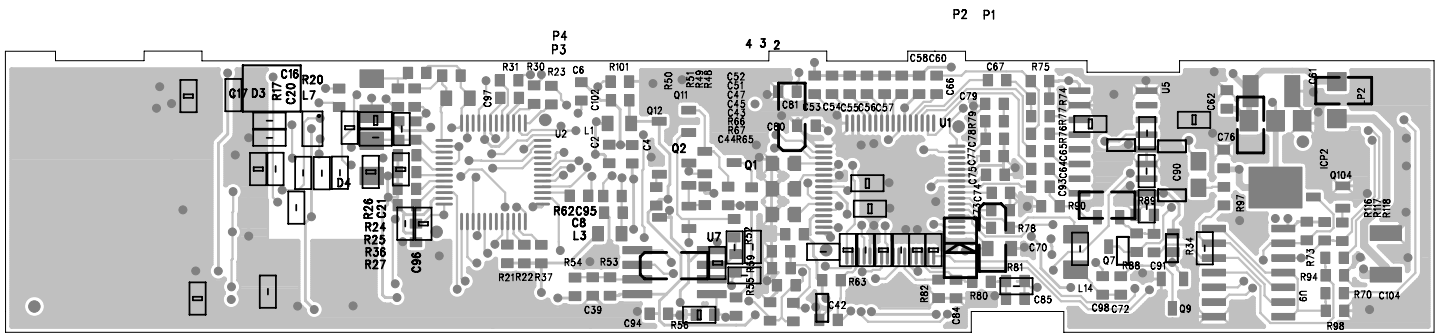
## PCB board & Circuit diagram

### Section One PCB board

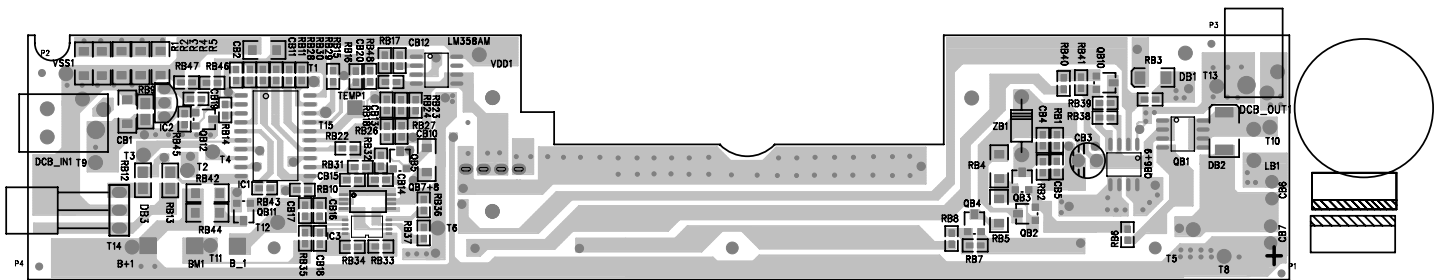
#### 5.1.1 Surface layer of Drive Board



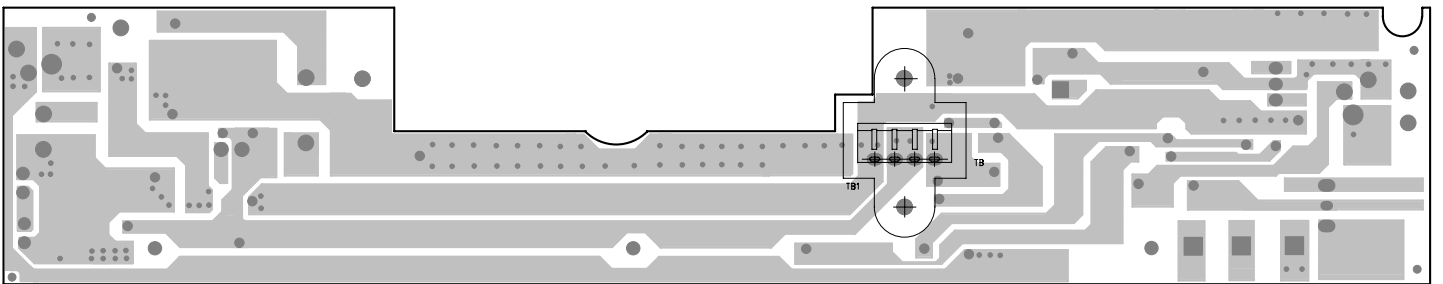
### 5.1.2 Bottom layer of Drive Board



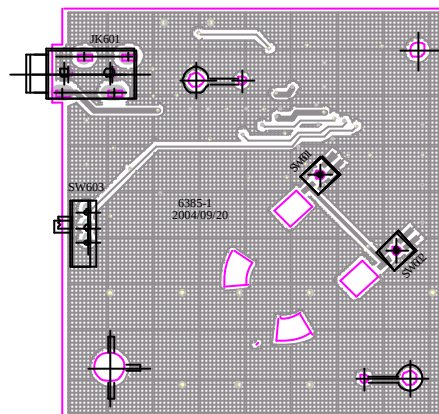
### 5.1.3 Surface layer of charge manage Board



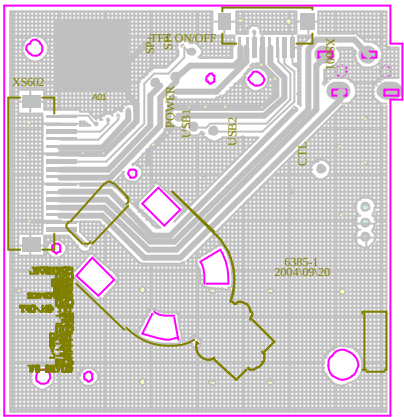
### 5.1.4 Bottom layer of charge manage Board



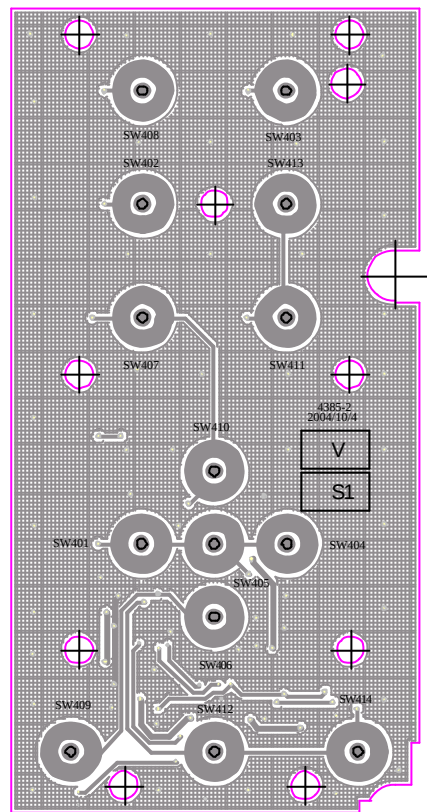
### 5.1.5 Surface layer of Detect switch Board



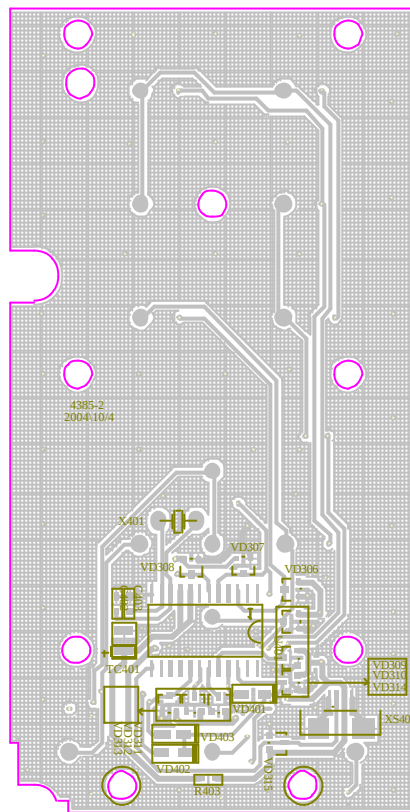
5.1.6 Bottom layer of Detect switch Board



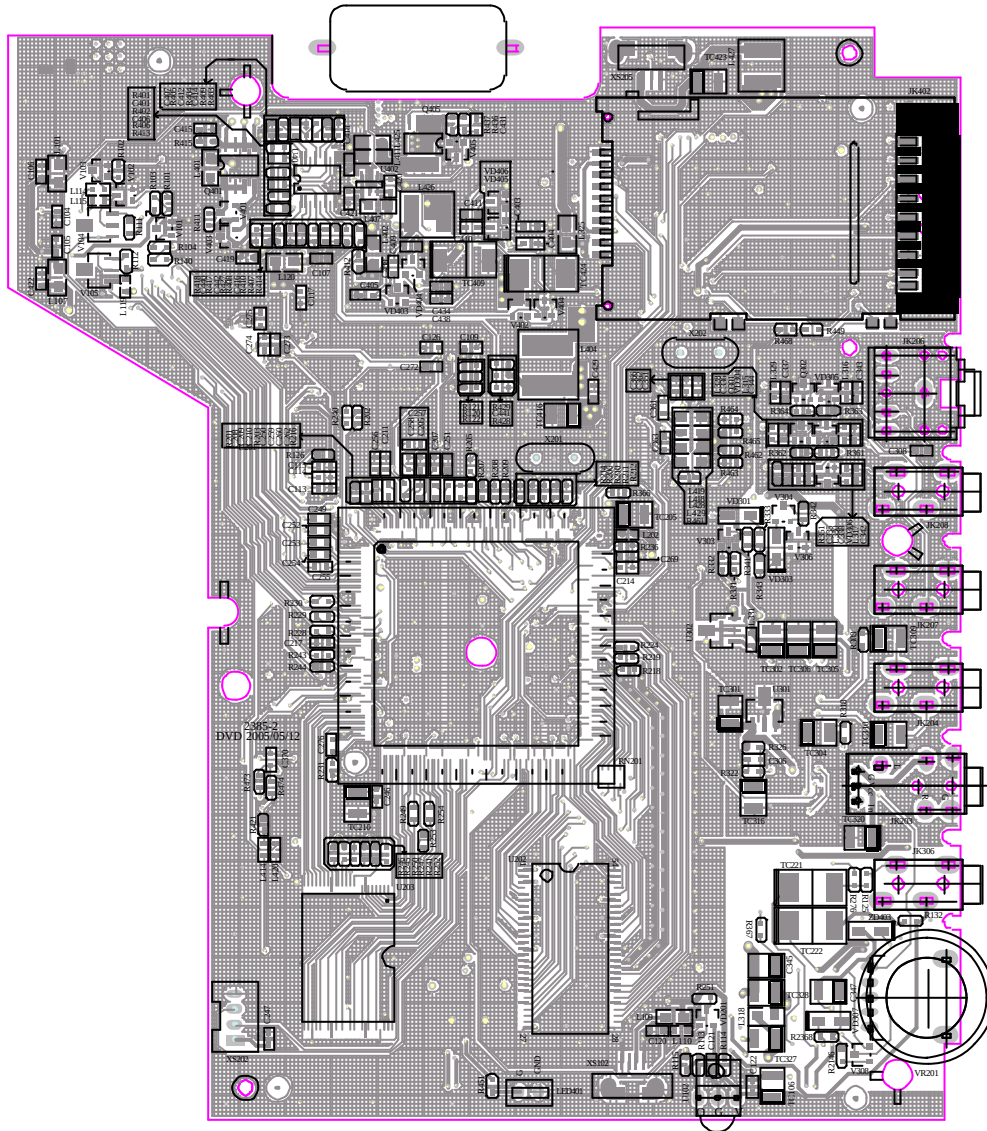
### 5.1.7 Surface layer of Button Board



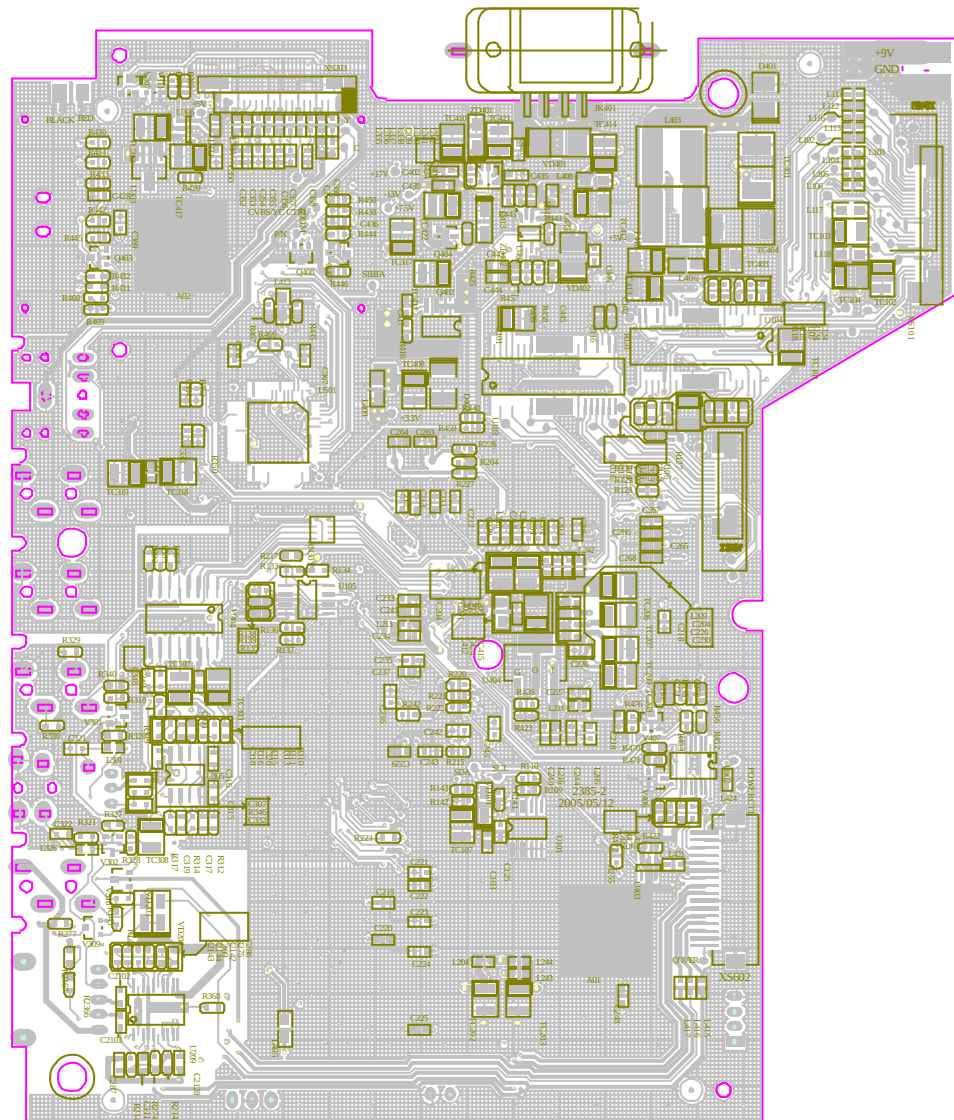
### 5.1.8 Bottom layer of Button Board



### 5.1.9 Surface layer of Decode Board

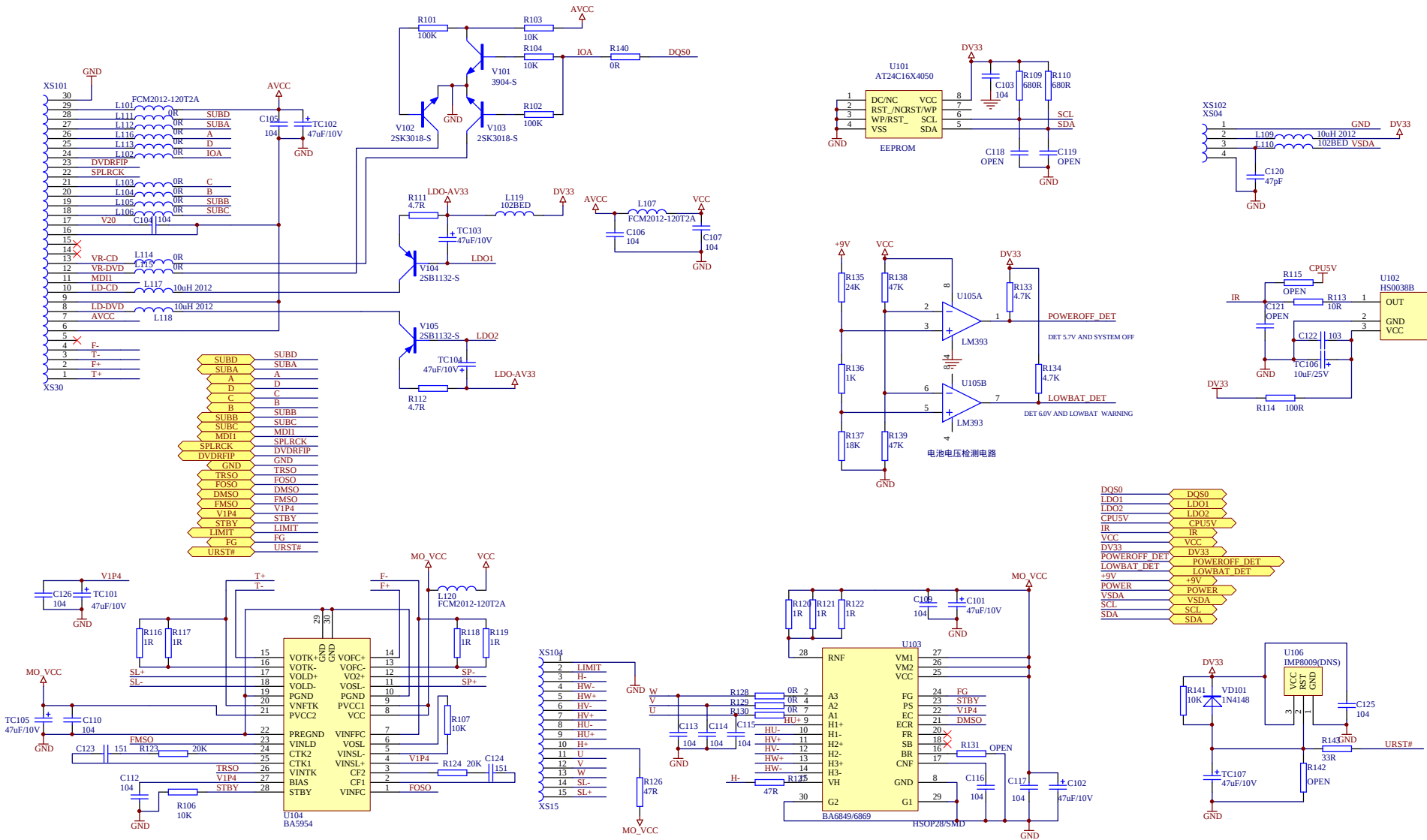


### 5.1.10 Bottom layer of Decode Board

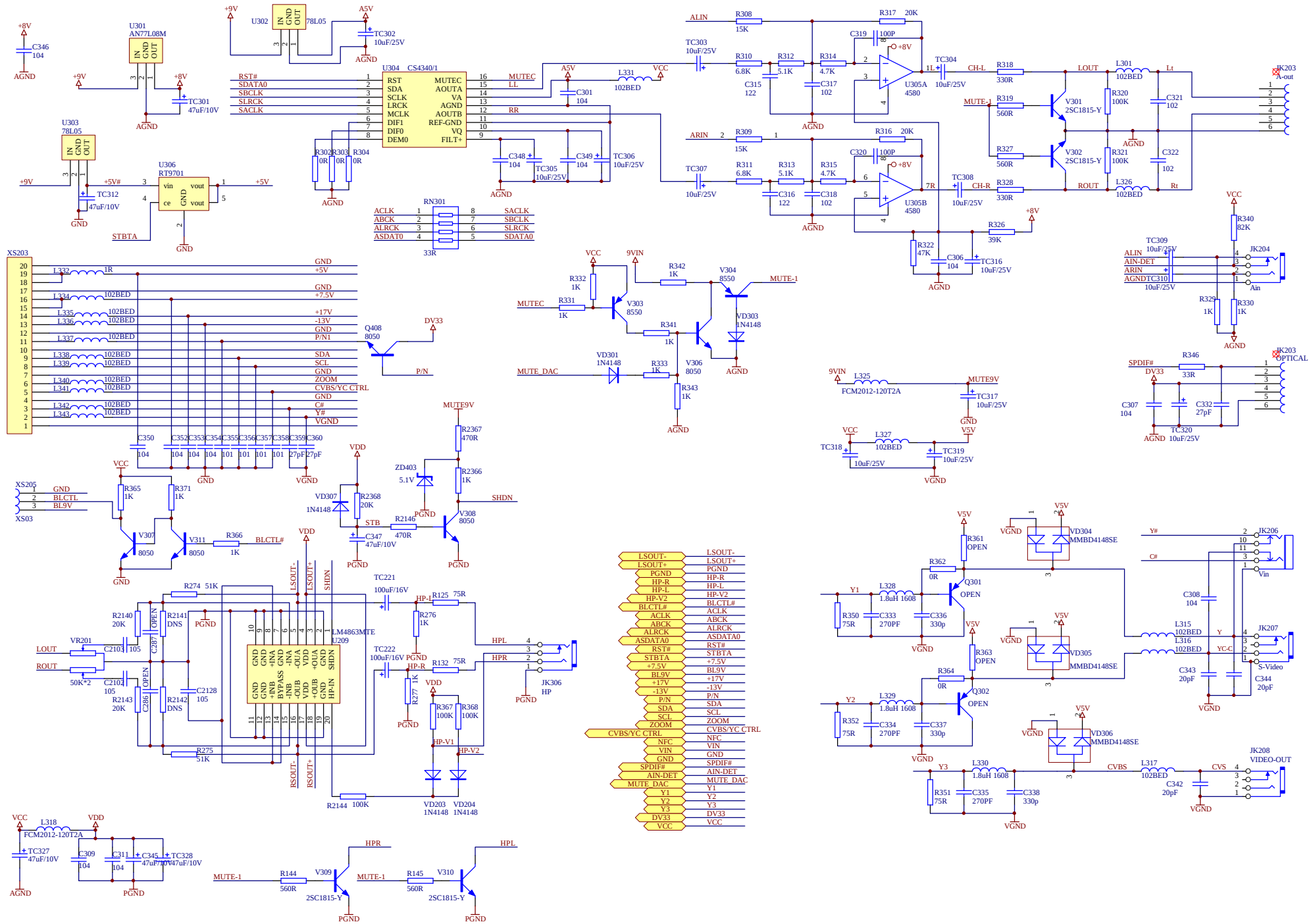


# Section Two Circuit diagram

## 5.2.1 Decode Board

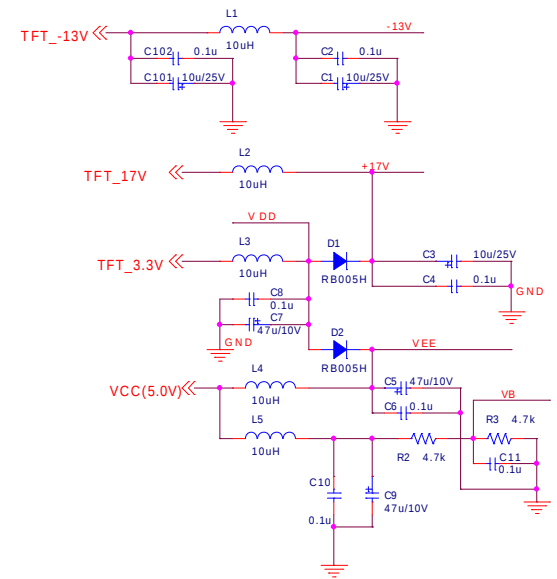
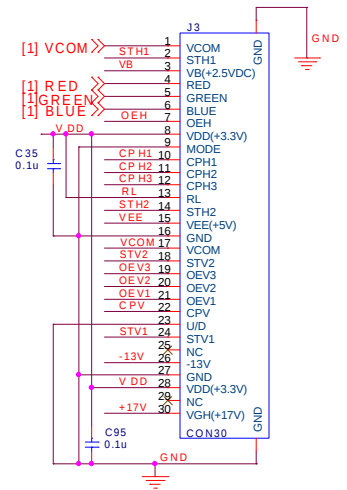
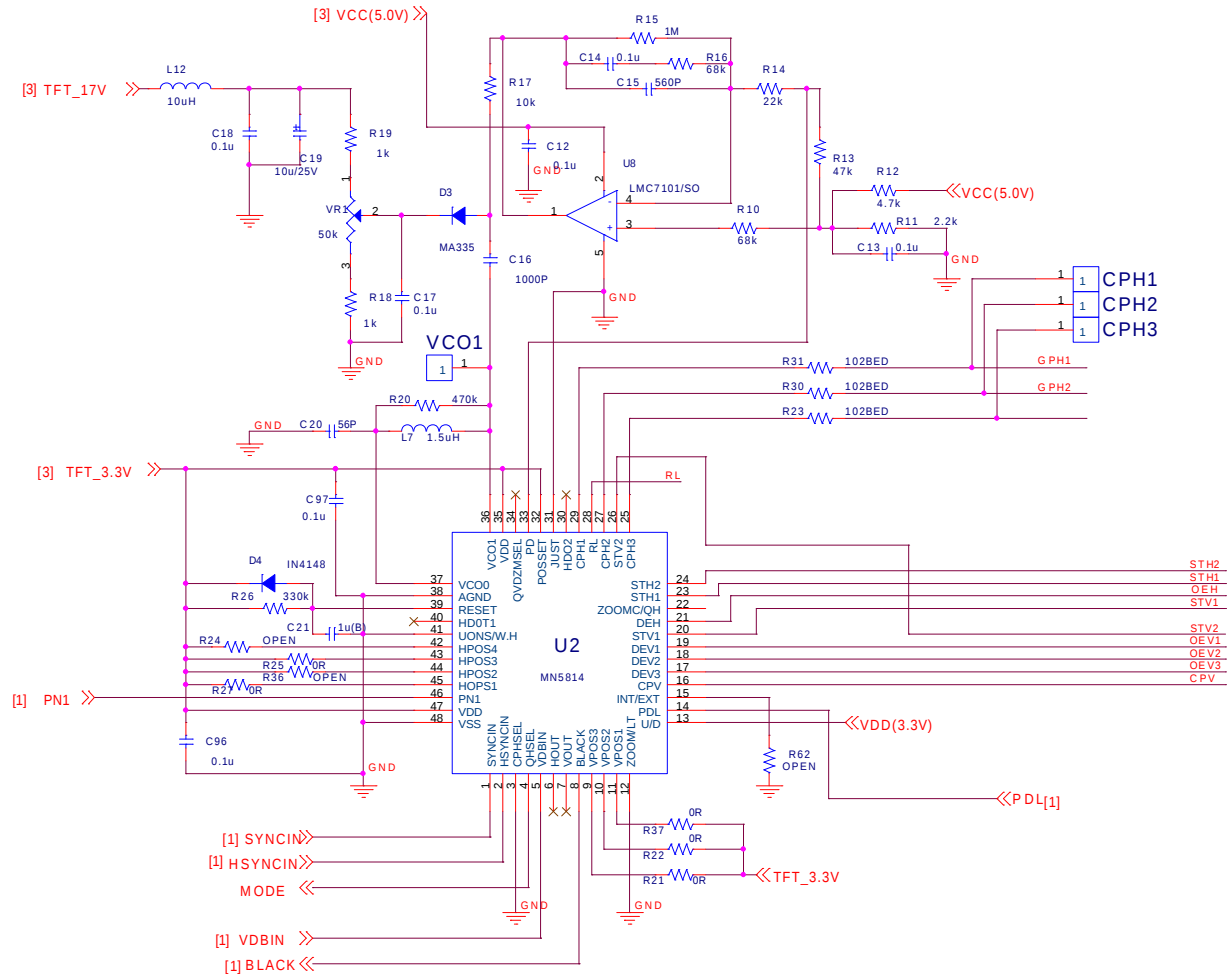








## 5.2.2 LCD Drive board





## Chapter six BOM List

| MATERIAL CODE            | MATERIAL NAME                            | SPECIFICATIONS                                                 | LOCATION                                                                                           |
|--------------------------|------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| DL385SI(RU) SILVER 1389B |                                          |                                                                |                                                                                                    |
| BATTERY CASE: 5471837    |                                          |                                                                |                                                                                                    |
| 3025617                  | GLIDE PIECE OF BATTERY CASE              | 333                                                            |                                                                                                    |
| 3025618                  | CLASP OF BATTERY CASE                    | 333                                                            |                                                                                                    |
| 3810023                  | GLIDE PIECE SPRING OF BATTERY CASE       | 333                                                            |                                                                                                    |
| 3810024                  | CLASP SPRING OF BATTERY CASE             | 333                                                            |                                                                                                    |
| 3029776                  | BATTEMETAL OXIDE FILM RESISTOR KEY-PRESS | I70(ALF) SILVER WHITE                                          |                                                                                                    |
| 3073214                  | TOP COVER O BATTERY CASE                 | 385SI(RU)SILVER                                                |                                                                                                    |
| 3029777                  | BOTTOM COVER OF BATTERY CASE             | 80S(ALF) SILVER WHITE                                          |                                                                                                    |
| 5231675                  | SOFT SPONGE SPACER                       | 150×40×1 SINGLE-FACED,SOFT                                     | 2PCS FOR BATTERY CASE UPPER COVER                                                                  |
| 5232022                  | FOOT SPACER                              | ? 10×1 RUBBER ( 3M GLUE )                                      |                                                                                                    |
| 5142620                  | SN LABEL                                 | PORFABLE D BATTEMETAL OXIDE FILM RESISTOR WITH BAR CODE NUMBER |                                                                                                    |
| 4000481                  | SELTAPPING SCREW                         | CB 1.7×6H NICKEL                                               | 1PCS FOR PCB AND BATTERY CASE LOWER COVER, 2PCS FOR BATTERY CONNECTOR AND BATTERY CASE LOWER COVER |
| 4000522                  | SELTAPPING SCREW                         | CB 2×6H WHITE NICKEL                                           | 2PCS FOR BATTERY SLIDE PLATE AND BATTERY BUTTON                                                    |
| 4000363                  | SELTAPPING SCREW                         | CB 2.6×6H NICKEL                                               | 8PCS FOR COVERING CASING                                                                           |
| 1510081                  | RECHARGEABLE BATTERY                     | 6150mAh 7.2V LITHIUM 168×48×8.8                                |                                                                                                    |
| 5156814                  | RECHARGE BATTERY STICKER                 | 385SI(RU)                                                      |                                                                                                    |
| 5445436                  | PCB SEMI-FINISHED PRODUCT                | B383-2 383D                                                    |                                                                                                    |
| DL385SI(RU) SILVER 1389B |                                          |                                                                |                                                                                                    |
| BATTERY CHARGER 5445436  |                                          |                                                                |                                                                                                    |
| 0090019                  | SMD RESISTOR                             | 1/16W 4.7K±5% 0603                                             | RB41                                                                                               |
| 0090536                  | SMD RESISTOR                             | 1/8W 0.27O±5% 1206                                             | R1,R2,R3,R4,R5                                                                                     |
| 0090003                  | SMD RESISTOR                             | 1/16W 100±5% 0603                                              | RB6                                                                                                |
| 0090135                  | SMD RESISTOR                             | 1/8W 100O±5% 1206                                              | RB42,RB44                                                                                          |
| 0090011                  | SMD RESISTOR                             | 1/16W 470O±5% 0603                                             | RB16,RB48                                                                                          |
| 0090488                  | SMD RESISTOR                             | 1/8W 470O±5% 1206                                              | RB12,RB13,RB5                                                                                      |
| 0090014                  | SMD RESISTOR                             | 1/16W 1K±5% 0603                                               | RB10,RB33,RB34,RB35,RB36,RB45                                                                      |

| MATERIAL CODE | MATERIAL NAME              | SPECIFICATIONS           | LOCATION                                            |
|---------------|----------------------------|--------------------------|-----------------------------------------------------|
| 0090171       | SMD RESISTOR               | 1/8W 1K±5% 1206          | RB4,RB9                                             |
| 0090017       | SMD RESISTOR               | 1/16W 2.2K±5% 0603       | RB43                                                |
| 0090236       | SMD RESISTOR               | 1/16W 1.8K±5% 0603       | RB18                                                |
| 0090018       | SMD RESISTOR               | 1/16W 3.3K±5% 0603       | RB8,RB7                                             |
| 0090304       | PRECISION SMD RESISTOR     | 1/16W 10K±1% 0603        | RB46,RB47                                           |
| 0090023       | SMD RESISTOR               | 1/16W 10K±5% 0603        | RB1,RB2,RB3,RB14,RB22,RB28,RB29,RB30,RB38,RB39,RB40 |
| 0090029       | SMD RESISTOR               | 1/16W 47K±5% 0603        | RB15                                                |
| 0090201       | SMD RESISTOR               | 1/16W 220K±5% 0603       | RB11                                                |
| 0090025       | SMD RESISTOR               | 1/16W 20K±5% 0603        | RB17                                                |
| 0090490       | PRECISION SMD RESISTOR     | 1/16W 22K±1% 0603        | RB23,RB26                                           |
| 0090233       | SMD RESISTOR               | 1/16W 4.7MO±5% 0603      | RB37                                                |
| 0310594       | SMD CAPACITOR              | 25V 104±10% 0603         | CB11,CB13,CB19,CB20,CB17,CB18                       |
| 0310505       | SMD CAPACITOR              | 25V 224 +80%-20% 0603    | CB12,CB14,CB15                                      |
| 0310230       | SMD CAPACITOR              | 50V 474 +80%-20% 0603    | CB4,CB5,CB16                                        |
| 0310217       | SMD CAPACITOR              | 16V 225 +80%-20% 1206    | CB1,CB2,CB10                                        |
| 0260181       | CD                         | CD11 16V220U±20%6×12 C5  | CB3,CB6,CB7                                         |
| 0410139       | CHOKE COIL                 | VERTICAL 30UH 3A 15mm    | LB1                                                 |
| 0780041       | SMD TRIODE                 | 3906(100-300) SO23       | QB3                                                 |
| 0780276       | SMD TRIODE                 | GS9013 SO23              | QB2,QB4,QB10,QB11,QB12                              |
| 0680050       | SMD SCHOTTKY DIODE         | MBRS140                  | DB1                                                 |
| 0680028       | SMD SCHOTTKY DIODE         | MBRS340                  | DB2                                                 |
| 0580034       | VOLTAGE REGULATOR DIODE    | 10V 1W                   | ZB1                                                 |
| 0790021       | FIELD EFFECT TRANSISTOR    | IR7416 SOP               | QB1                                                 |
| 0790040       | FIELD EFFECT TRANSISTOR    | UP1870 SSOP              | QB7+8                                               |
| 0790039       | FIELD EFFECT TRANSISTOR    | IR7316 S08               | QB6+9                                               |
| 0882184       | IC                         | S39454 SOP(383)          | IC1                                                 |
| 0881941       | IC                         | S8232AUFT TSSOP          | IC3                                                 |
| 0880176       | IC                         | L358M SOP                | LM358AM                                             |
| 0882089       | IC                         | TL431 TO-92              | IC2                                                 |
| 3027181       | PAD                        | 373                      | BETWEEN POWER ADAPTER AND PCB                       |
| 0620032       | DUAL COLOR RADIATION DIODE | 2RG 59SW RED GREEN 2×5×7 | DB3                                                 |
| 1870021       | POWER SOCKET               | DC-023                   | DCB_IN1                                             |

| MATERIAL CODE              | MATERIAL NAME                          | SPECIFICATIONS               | LOCATION                                        |
|----------------------------|----------------------------------------|------------------------------|-------------------------------------------------|
| 1860044                    | BATTEMETAL OXIDE FILM RESISTOR ADAPTOR | 4P2.5MM LI0402-040-100       | TB1                                             |
| 1632485                    | PCB                                    | B383-3                       |                                                 |
|                            |                                        |                              | RB24/RB27 PARAMETER IS ADJUSTED ON SPOT 1M~4.7M |
| DL385SI(RU) SILVER 1389B   |                                        |                              |                                                 |
| CAR POWER LINKER : 5470661 |                                        |                              |                                                 |
| 0010303                    | METAL OXIDE FILM RESISTOR              | 1/20.1O±5% SHAPED VERTICAL 5 | R1,R7                                           |
| 0090286                    | SMD RESISTOR                           | 1/16W 62O±5% 0603            | R10                                             |
| 0090181                    | SMD RESISTOR                           | 1/16W 100O±5% 0603           | R11                                             |
| 0090017                    | SMD RESISTOR                           | 1/16W 2.2K±5% 0603           | R14                                             |
| 0010304                    | METAL OXIDE FILM RESISTOR              | 1330O±5% SHAPED VERTICAL 5   | R8                                              |
| 0090014                    | SMD RESISTOR                           | 1/16W 1K±5% 0603             | R12,R15,R16                                     |
| 0090050                    | SMD RESISTOR                           | 1/10W 1K±5% 0805             | R4,R6                                           |
| 0090016                    | SMD RESISTOR                           | 1/16W 1.5K±5% 0603           | R9                                              |
| 0090178                    | SMD RESISTOR                           | 1/10W 3.6K±5% 0805           | R5                                              |
| 0090022                    | SMD RESISTOR                           | 1/16W 8.2K±5%                | R13                                             |
| 0090480                    | PRECISION SMD RESISTOR                 | 1/10W 24K±1% 0805            | R3                                              |
| 0310029                    | SMD CAPACITOR                          | 50V 102±10% 7R 0805          | C9                                              |
| 0310144                    | SMD CAPACITOR                          | 50V 104±10% 7R 0805          | C4,C5,C8,C10                                    |
| 0310102                    | SMD CAPACITOR                          | 50V 471±10% 7R 0805          | C6                                              |
| 0310234                    | SMD CAPACITOR                          | 16V 105 +80%-20% Y5V 0603    | C13                                             |
| 0310654                    | SMD CERAMIC CAPACITOR                  | 25V 106 +80%-20% Y5V 1206    | C12,C14                                         |
| 0260370                    | CD                                     | CD11C 35V100U±20%6.3×11 2.5  | C1,C2                                           |
| 0260168                    | CD                                     | CD11 25V1000U±20%10×20 5     | C3                                              |
| 0780085                    | SMD TRIODE                             | 8050D                        | V1                                              |
| 0780129                    | SMD TRIODE                             | 8550D                        | V2                                              |
| 0881701                    | IC                                     | MC34063A SOP                 | U1                                              |
| 0881867                    | IC                                     | FDS9435A SOP                 | U2                                              |
| 0882105                    | IC                                     | L393 SO8                     | U3                                              |
| 0620025                    | RADIATION DIODE                        | 3R 4SD RED                   | VD2                                             |
| 0390251                    | VERTICAL INDUCTOR                      | 3UH±15% 12×8.5 5mm           | L1                                              |
| 0410131                    | INDUCTOR COIL                          | 85UH±10% F 18×8F 0.8         | L2                                              |
| 0700007                    | SMD DIODE                              | 14148                        | VD4,VD5                                         |

| MATERIAL CODE                   | MATERIAL NAME                                                | SPECIFICATIONS                            | LOCATION                                                                                                                 |
|---------------------------------|--------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 0680041                         | SCHOTTKY DIODE                                               | SB560 SHAPED VERTICAL 5 CATHODE BEAT FLEX | VD1                                                                                                                      |
| 0700004                         | SMD VOLTAGE REGULATOR DIODE                                  | 5.1V±5% 1/2W                              | VD3                                                                                                                      |
| 1632170                         | PCB                                                          | D333-2                                    |                                                                                                                          |
| 5070678                         | SELSEALEDPLASTIC BAG FOR ENVIRONMENTAL PROTECTION(WITH HOLE) | 120×260×0.05 PE                           |                                                                                                                          |
| 2140323                         | POWER SUPPLY WIRE                                            | 2P 2m WITH F 4.0DC PIN                    | P+,P-                                                                                                                    |
| 5232167                         | FIBRE SLEEVE                                                 | F 1 WHITE                                 |                                                                                                                          |
| 3031156                         | UPPER COVER OFCAR POWER CONNECTING CASE                      | 008 BLACK                                 |                                                                                                                          |
| 3040843                         | LOWER COVER OF CAR POWER CONNECTING CASE                     | 008 BLACK                                 |                                                                                                                          |
| 3870754                         | SPACER                                                       | 8                                         |                                                                                                                          |
| 3870755                         | TOUCH HEAD                                                   | 8                                         |                                                                                                                          |
| 3630186                         | SHRAPNEL                                                     | 8                                         |                                                                                                                          |
| 3810034                         | SPRING                                                       | 8                                         |                                                                                                                          |
| 3870756                         | FUSE HOLDER                                                  | 8                                         |                                                                                                                          |
| 3060299                         | TOUCH HEAD COVER                                             | 008 BLACK                                 |                                                                                                                          |
| 2110002                         | LEAD                                                         | 24# 30mm RED                              |                                                                                                                          |
| 2110004                         | LEAD                                                         | 24# 40mm BLACK                            |                                                                                                                          |
| 2300018                         | FUSE                                                         | 3.15AL 250V ( VDE/UL )                    |                                                                                                                          |
| 5232168                         | DUST-PROOF NET                                               | 008 BLACK                                 |                                                                                                                          |
| DL385SI(RU) SILVER 1389B        |                                                              |                                           |                                                                                                                          |
| DECODE BOARD: 2385-2 2.2/Ver2.0 |                                                              |                                           |                                                                                                                          |
| 0090001                         | SMD RESISTOR                                                 | 1/16W 00±5% 0603                          | R128~R130,R140,R226,R227,R230,R231,R249 ,R302~R304,R364,R441,R443,R449,R450,L102~L106,L111~L116,L414~L417,R362,R464,R475 |
| 0090272                         | SMD RESISTOR                                                 | 1/16W 10±5% 0603                          | R116~R122,L332                                                                                                           |
| 0090106                         | SMD RESISTOR                                                 | 1/16W 4.7O±5% 0603                        | R111,R112                                                                                                                |
| 0090314                         | SMD RESISTOR                                                 | 1/16W 5.1O±5% 0603                        | R415,R416                                                                                                                |
| 0090599                         | SMD RESISTOR                                                 | 1/16W 6.2O±5% 0603                        | R445,R446                                                                                                                |
| 0090003                         | SMD RESISTOR                                                 | 1/16W 100±5% 0603                         | R113                                                                                                                     |
| 0090005                         | SMD RESISTOR                                                 | 1/16W 33O±5% 0603                         | R217~R219,R223,R224,R252~R254,R346,R452,R453,R143                                                                        |
| 0090230                         | SMD RESISTOR                                                 | 1/16W 47O±5% 0603                         | R126,R127                                                                                                                |
| 0090006                         | SMD RESISTOR                                                 | 1/16W 75O±5% 0603                         | R351,R125,R132,R350,R352                                                                                                 |

| MATERIAL CODE | MATERIAL NAME          | SPECIFICATIONS       | LOCATION                                                                                                  |
|---------------|------------------------|----------------------|-----------------------------------------------------------------------------------------------------------|
| 0090181       | SMD RESISTOR           | 1/16W 100O±5% 0603   | R114,R413,R414,R457                                                                                       |
| 0090009       | SMD RESISTOR           | 1/16W 330O±5% 0603   | R318,R328,R451                                                                                            |
| 0090011       | SMD RESISTOR           | 1/16W 470O±5% 0603   | R2146,R2367                                                                                               |
| 0090012       | SMD RESISTOR           | 1/16W 560O±5% 0603   | R144,R145,R319,R327,R476                                                                                  |
| 0090249       | SMD RESISTOR           | 1/16W 510O±5% 0603   | R236                                                                                                      |
| 0090013       | SMD RESISTOR           | 1/16W 680O±5% 0603   | R109,R110                                                                                                 |
| 0090014       | SMD RESISTOR           | 1/16W 1K±5% 0603     | R214,R215,R276,R277,R329,R330,R333,R341~R343,R366,R411,R412,R423~R425,R2366,R136,R371,R365,R420,R471,R472 |
| 0090236       | SMD RESISTOR           | 1/16W 1.8K±5% 0603   | R426                                                                                                      |
| 0090019       | SMD RESISTOR           | 1/16W 4.7K±5% 0603   | R133,R134,R245,R246,R247,R251,R255,R314,R315,R473                                                         |
| 0090020       | SMD RESISTOR           | 1/16W 5.1K±5% 0603   | R312,R313,R409,R410                                                                                       |
| 0090021       | SMD RESISTOR           | 1/16W 6.8K±5% 0603   | R310,R311                                                                                                 |
| 0090109       | SMD RESISTOR           | 1/16W 1MO±5% 0603    | R466                                                                                                      |
| 0090023       | SMD RESISTOR           | 1/16W 10K±5% 0603    | R103,R104,R106,R107,R220~R222,R240~R242,R418,R421,R430~R439,R440,R459,R461,R463,R467,R141,R331,R332       |
| 0090016       | SMD RESISTOR           | 1/16W 1.5K±5% 0603   | R456                                                                                                      |
| 0090187       | SMD RESISTOR           | 1/16W 12K±5% 0603    | R427,R428                                                                                                 |
| 0090024       | SMD RESISTOR           | 1/16W 15K±5% 0603    | R201,R202,R308,R309                                                                                       |
| 0090188       | SMD RESISTOR           | 1/16W 18K±5% 0603    | R137,R243                                                                                                 |
| 0090025       | SMD RESISTOR           | 1/16W 20K±5% 0603    | R123,R124,R244,R316,R317,R429,R2140,R2143,R2368                                                           |
| 0090255       | SMD RESISTOR           | 1/16W 24K±5% 0603    | R135                                                                                                      |
| 0090481       | PRECISION SMD RESISTOR | 1/16W 30K±1% 0603    | R417                                                                                                      |
| 0090028       | SMD RESISTOR           | 1/16W 33K±5% 0603    | R401,R402,R454,R455                                                                                       |
| 0090191       | SMD RESISTOR           | 1/16W 39K±5% 0603    | R326                                                                                                      |
| 0090029       | SMD RESISTOR           | 1/16W 47K±5% 0603    | R138,R139,R322,R403~R408                                                                                  |
| 0090192       | SMD RESISTOR           | 1/16W 51K±5% 0603    | R458,R274,R275                                                                                            |
| 0090193       | SMD RESISTOR           | 1/16W 82K±5% 0603    | R340                                                                                                      |
| 0090034       | SMD RESISTOR           | 1/16W 100K±5% 0603   | R101,R102,R203,R204,R320,R321,R367,R368,R2144                                                             |
| 0090212       | SMD RESISTOR           | 1/16W 750K±5% 0603   | R216                                                                                                      |
| 0100019       | SMD RESISTOR NETWORKS  | 1/16W 33O±5% 8P      | RN201,RN301                                                                                               |
| 0160157       | ROTATED POTENTIOMETER  | WHE101GB-2B5016      | VR201                                                                                                     |
| 0310549       | SMD CERAMIC CAPACITOR  | 25V 106+80%-20% 1210 | TC106,TC201~TC203,TC207~TC210,TC302~TC310,TC316~TC320,TC403,TC408,TC410,TC411,TC421~TC423                 |

| MATERIAL CODE | MATERIAL NAME         | SPECIFICATIONS            | LOCATION                                                                                                                                                                                           |
|---------------|-----------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0310376       | SMD TANTALUMCAPACITOR | NRS10V47U±20%3528(B2)     | C101,C102,C345,C347,TC101~TC105,TC204~TC206,TC312,TC327,TC328,TC412~TC417,TC301,TC107                                                                                                              |
| 0310374       | SMD TANTALUMCAPACITOR | 16V47UF±20% 6032(C)       | TC401,TC424                                                                                                                                                                                        |
| 0310375       | SMD TANTALUMCAPACITOR | 16V100UF±20% 7343(D)      | TC221,TC222,TC404,TC409                                                                                                                                                                            |
| 0310646       | SMD CAPACITOR         | 25V 15P±5% NPO 0603       | C265~C268                                                                                                                                                                                          |
| 0310647       | SMD CAPACITOR         | 25V 20P±5% NPO 0603       | C258,C342~C344                                                                                                                                                                                     |
| 0310190       | SMD CAPACITOR         | 50V 27P±5% NPO 0603       | C332,C359,C360,C443,C367,C368                                                                                                                                                                      |
| 0310044       | SMD CAPACITOR         | 50V 33P±5% NPO 0603       | C263,C264                                                                                                                                                                                          |
| 0310045       | SMD CAPACITOR         | 50V 47P±5% NPO 0603       | C120                                                                                                                                                                                               |
| 0310047       | SMD CAPACITOR         | 50V 101±5% NPO 0603       | C319,C320,C355~C358,C445                                                                                                                                                                           |
| 0310048       | SMD CAPACITOR         | 50V 151±5% NPO 0603       | C123,C124                                                                                                                                                                                          |
| 0310645       | SMD CAPACITOR         | 25V 221±5% NPO 0603       | C440,C441                                                                                                                                                                                          |
| 0310050       | SMD CAPACITOR         | 50V 271±5% NPO 0603       | C333~C335                                                                                                                                                                                          |
| 0310051       | SMD CAPACITOR         | 50V 331±5% NPO 0603       | C274,C275,C336~C338                                                                                                                                                                                |
| 0310648       | SMD CAPACITOR         | 25V 471±5% NPO 0603       | C442                                                                                                                                                                                               |
| 0310649       | SMD CAPACITOR         | 25V 102±5% NPO 0603       | C257,C262,C317,C318,C321,C322,C414~C417,C446                                                                                                                                                       |
| 0310650       | SMD CAPACITOR         | 25V 122±5% NPO 0603       | C315,C316                                                                                                                                                                                          |
| 0310651       | SMD CAPACITOR         | 25V 152±5% NPO 0603       | C276                                                                                                                                                                                               |
| 0310652       | SMD CAPACITOR         | 25V 472±5% NPO 0603       | C444                                                                                                                                                                                               |
| 0310072       | SMD CAPACITOR         | 50V 103±10% 7R 0603       | C122,C273                                                                                                                                                                                          |
| 0310201       | SMD CAPACITOR         | 50V 153±10% 7R 0603       | C272                                                                                                                                                                                               |
| 0310055       | SMD CAPACITOR         | 16V 333±10% 7R 0603       | C256                                                                                                                                                                                               |
| 0310056       | SMD CAPACITOR         | 16V 473±10% 7R 0603       | C259,C260                                                                                                                                                                                          |
| 0310594       | SMD CAPACITOR         | 25V 104±10% 0603          | C103~C107,C109,C110,C112~C117,C125,C126,C201~C215,C217~C248,C269,C301,C306~C309,C311,C346,C348~C350,C352~C354,C419~C422,C424,C425,C428,C429,C431,C433~C436,C438,C439,C370,C351,C362,C366,C361,C363 |
| 0310112       | SMD CAPACITOR         | 16V 224±10% 0603          | C412,C413                                                                                                                                                                                          |
| 0310542       | SMD CAPACITOR         | 16V 474±10% 0603          | C261,C406~C411                                                                                                                                                                                     |
| 0310234       | SMD CAPACITOR         | 16V 105 +80%-20% Y5V 0603 | C249~C255,C401~C405,C418,C2102,C2103,C2128                                                                                                                                                         |
| 0390096       | SMD INDUCTOR          | 1.8UH±10% 1608            | L328~L330                                                                                                                                                                                          |
| 0390044       | SMD INDUCTOR          | 10UH±10% 2012             | L109,L117,L118                                                                                                                                                                                     |
| 0390328       | SMD CORES INDUCTOR    | 2.2UH±30% CDH5B18         | L426                                                                                                                                                                                               |

| MATERIAL CODE | MATERIAL NAME               | SPECIFICATIONS                                         | LOCATION                                                                                       |
|---------------|-----------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 0390241       | SMD CORES INDUCTOR          | 10uH±20%CDRH5D18                                       | L403,L404,L410,L427                                                                            |
| 0390302       | SMD MAGNETIC BEADS          | MGHB1608S102                                           | L110,L119,L202,L204~L211,L213,L216,L242,L244,L301,L315~L317,L326,L327,L331,L334~L343,L420~L424 |
| 0390259       | SMD MAGNETIC BEADS          | FC2012-1202A                                           | L101,L107,L120,L318,L325,L401,L402,L405,L406,L408,L409,L411~L413,L425                          |
| 0390025       | SMD MAGNETIC BEADS          | BGH2012B601L                                           | L418,L419,L428,L429                                                                            |
| 0700007       | SMD DIODE                   | 14148                                                  | VD203,VD204,VD301,VD303,VD307,VD101                                                            |
| 0700001       | SMD DIODE                   | LS4148                                                 | VD203,VD204,VD301,VD303,VD307,VD101                                                            |
| 0700002       | SMD DIODE                   | LL4148                                                 | VD203,VD204,VD301,VD303,VD307,VD101                                                            |
| 0700056       | SMD DOUBLE DIODE            | MMBD4148SE SO23                                        | VD304~VD306                                                                                    |
| 0700063       | SMD DUAL DIODE              | MMBD4148CA SO23                                        | VD201                                                                                          |
| 0680027       | SMD SCHOTTKY DIODE          | SS34                                                   | VD401,D401,D402                                                                                |
| 0680028       | SMD SCHOTTKY DIODE          | MBRS340                                                | VD402                                                                                          |
| 0680024       | SMD SCHOTTKY DIODE          | 15819 ( MADE IN ONE'S COUNTMETAL OXIDE FILM RESISTOR ) | VD402                                                                                          |
| 0680042       | SMD SCHOTTKY DIODE          | B54S SO23                                              | VD403~VD406                                                                                    |
| 0700139       | SMD VOLTAGE REGULATOR DIODE | 17V±5% 1/2W MINIMELF                                   | ZD401                                                                                          |
| 0700140       | SMD VOLTAGE REGULATOR DIODE | 13V±5% 1/2W MINIMELF                                   | ZD402                                                                                          |
| 0700004       | SMD VOLTAGE REGULATOR DIODE | 5.1V±5% 1/2W                                           | ZD403                                                                                          |
| 0780085       | SMD TRIODE                  | 8050D                                                  | V306,V307,V308,Q408,Q406,V311,V406,V407                                                        |
| 0780129       | SMD TRIODE                  | 8550D                                                  | Q404,V303,V304,V405                                                                            |
| 0780197       | SMD TRIODE                  | C1815                                                  | V301,V302,V309,V310                                                                            |
| 0780041       | SMD TRIODE                  | 3906(100-300) SO23                                     | V403,V404                                                                                      |
| 0780193       | SMD TRIODE                  | 2S3018                                                 | V102,V103                                                                                      |
| 0780115       | SMD TRIODE                  | 2SB1132                                                | V104,V105                                                                                      |
| 0780040       | SMD TRIODE                  | 3904(100-300) SO23                                     | V101,V401,V402                                                                                 |
| 0790021       | FIELD EFFECT TRANSISTOR     | IR7416 SOP                                             | Q401,Q402,Q405                                                                                 |
| 0790041       | SMD FIELD EFFECT TRANSISTOR | SI2305DS SO23                                          | Q403,Q407                                                                                      |
| 1990027       | 3-I1CARD HOLDER             | SD/MS/MMC 23P H=4.2 TOP                                | JK402                                                                                          |
| 0880185       | IC                          | NJ4558M SOP                                            | U305                                                                                           |
| 0880562       | IC                          | 4580 SOP                                               | U305                                                                                           |
| 0880361       | IC                          | 4558 SOP                                               | U305                                                                                           |
| 0881415       | IC                          | HY57V641620HG7 TSOP                                    | U202                                                                                           |

| MATERIAL CODE | MATERIAL NAME                                | SPECIFICATIONS                                    | LOCATION                                                                        |
|---------------|----------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------|
| 0881189       | IC                                           | 48LC4162-7 SOP                                    | U202                                                                            |
| 0881672       | IC                                           | L4863MTE TSSOP                                    | U209                                                                            |
| 0882022       | IC                                           | 4340A SOP                                         | U304                                                                            |
| 0881031       | IC                                           | 24C02N SOP                                        | U101                                                                            |
| 0881855       | IC                                           | XC602P502PR SO89                                  | U303                                                                            |
| 0881631       | IC                                           | XC6201P502PR SO89                                 | U303                                                                            |
| 0881914       | IC                                           | R9701CB SO25                                      | U306,U402,U403                                                                  |
| 0881892       | IC                                           | XC6202P802PR SO89                                 | U301                                                                            |
| 0881513       | IC                                           | B6849FM HSOP                                      | U103                                                                            |
| 0881682       | IC                                           | B6849FP HSOP                                      | U103                                                                            |
| 0881994       | IC                                           | 1389FE QFP                                        | U201                                                                            |
| 0881405       | IC                                           | B5954FM HSOP                                      | U104                                                                            |
| 0882269       | IC                                           | 13432 TSSOP                                       | U401                                                                            |
| 0882268       | IC                                           | 1102M MSOP                                        | U405                                                                            |
| 0882105       | IC                                           | L393 SO8                                          | U105                                                                            |
| 0881182       | IC                                           | L1117ADJ SO223                                    | U404                                                                            |
| 0882202       | IC                                           | AU936221-MCL QFP                                  | U501                                                                            |
| 0882425       | IC                                           | ADG713 TSSOP                                      | U502                                                                            |
| 2360016       | IR SENSOR                                    | HS0038B3V                                         | U102                                                                            |
| 0960020       | CMETAL OXIDE FILM<br>RESISTORSTAL OSCILLATOR | 27.00MHz 49-S                                     | X201                                                                            |
| 0960019       | CMETAL OXIDE FILM<br>RESISTORSTAL OSCILLATOR | 12.00MHz 49-S                                     | X202                                                                            |
| 1631945       | PCB                                          | 2385-2                                            |                                                                                 |
| 1940227       | SOCKET                                       | 3P 1.25mm SMD                                     | XS205                                                                           |
| 1940150       | SOCKET                                       | 4P1.0mm SMD                                       | XS102                                                                           |
| 1940237       | SOCKET                                       | 20P 0.8mm SMD                                     | XS203                                                                           |
| 1940208       | CABLE SOCKET                                 | 30P 0.5mm SMD WITH CLASP                          | XS101                                                                           |
| 1940229       | CABLE SOCKET                                 | 15P 0.5mm SMD,NEXT MEET WITH<br>CLASP             | XS104                                                                           |
| 1940235       | CABLE SOCKET                                 | 16P 1.0mm DUAL RANK TOUCH<br>POINT,SMD,HORIZONTAL | XS602                                                                           |
| 0620031       | RADIATION DIODE                              | 2G 53HD GREEN 2x5x7                               | LED401                                                                          |
| 0570068       | SMD TVS DIODE                                | P12 ( 12V) SO323                                  | (+)9V POWER INPUT PORT OF DECODE<br>BOARD IS CONNECTED TO GROUND IN<br>PARALLEL |
| 1090049       | ELECTRO-OPTIC<br>TRANSFORMER                 | GP1FD310TP                                        | JK203                                                                           |

| MATERIAL CODE            | MATERIAL NAME             | SPECIFICATIONS      | LOCATION                             |
|--------------------------|---------------------------|---------------------|--------------------------------------|
| 1910101                  | AV SOCKET                 | P327 BLACK          | JK204,JK306                          |
| 1910104                  | AV SOCKET                 | P327 YELLOW         | JK208                                |
| 1910105                  | AV SOCKET                 | S202050-100 YELLOW  | JK207                                |
| 1980051                  | HEADPHONE SOCKET          | S202050-100 YELLOW  | JK206                                |
| DL385SI(RU) SILVER 1389B |                           |                     |                                      |
| DRIVE BOARD 5445510      |                           |                     |                                      |
| 0090001                  | SMD RESISTOR              | 1/16W 00±5% 0603    | R100,R25,R21,R70,R73,R22,R37,R27,R62 |
| 0090003                  | SMD RESISTOR              | 1/16W 100±5% 0603   | R97                                  |
| 0090006                  | SMD RESISTOR              | 1/16W 750±5% 0603   | R94,R98                              |
| 0090181                  | SMD RESISTOR              | 1/16W 1000±5% 0603  | R48,R50,R6                           |
| 0090009                  | SMD RESISTOR              | 1/16W 3300±5% 0603  | R80                                  |
| 0090014                  | SMD RESISTOR              | 1/16W 1K±5% 0603    | R18,R19,R90,R91,R96,R117             |
| 0090017                  | SMD RESISTOR              | 1/16W 2.2K±5% 0603  | R11,R78                              |
| 0090254                  | SMD RESISTOR              | 1/16W 9.1K±5% 0603  | R51                                  |
| 0090018                  | SMD RESISTOR              | 1/16W 3.3K±5% 0603  | R28,R29,R34,R83                      |
| 0090019                  | SMD RESISTOR              | 1/16W 4.7K±5% 0603  | R2,R3,R12                            |
| 0090225                  | SMD RESISTOR              | 1/16W 5.6K±5% 0603  | R74,R75,R76,R77                      |
| 0090023                  | SMD RESISTOR              | 1/16W 10K±5% 0603   | R17,R58,R60,R82,R79,R116,R118        |
| 0090024                  | SMD RESISTOR              | 1/16W 15K±5% 0603   | R52,R86,R88                          |
| 0090026                  | SMD RESISTOR              | 1/16W 22K±5% 0603   | R14,R59,R49                          |
| 0090028                  | SMD RESISTOR              | 1/16W 33K±5% 0603   | R87,R89,R57                          |
| 0090029                  | SMD RESISTOR              | 1/16W 47K±5% 0603   | R13,R56                              |
| 0090030                  | SMD RESISTOR              | 1/16W 56K±5% 0603   | R53,R54                              |
| 0090032                  | SMD RESISTOR              | 1/16W 68K±5% 0603   | R10,R16,R81                          |
| 0090034                  | SMD RESISTOR              | 1/16W 100K±5% 0603  | R63,R67                              |
| 0090199                  | SMD RESISTOR              | 1/16W 180K±5% 0603  | R55,R66                              |
| 0090205                  | SMD RESISTOR              | 1/16W 330K±5% 0603  | R65,R26                              |
| 0090208                  | SMD RESISTOR              | 1/16W 470K±5% 0603  | R20                                  |
| 0090109                  | SMD RESISTOR              | 1/16W 1M0±5% 0603   | R15,R84                              |
| 0160156                  | SMD ROTATED POTENTIOMETER | 203-50K±20%         | VR1                                  |
| 0310042                  | SMD CAPACITOR             | 50V 15P±5% NPO 0603 | C80                                  |
| 0310188                  | SMD CAPACITOR             | 50V 10P±5% NPO 0603 | C81                                  |

| MATERIAL CODE | MATERIAL NAME                  | SPECIFICATIONS           | LOCATION                                                                                                                                     |
|---------------|--------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 0310190       | SMD CAPACITOR                  | 50V 27P±5% NPO 0603      | C98                                                                                                                                          |
| 0310086       | SMD CAPACITOR                  | 50V 39P±5% NPO 0603      | C72                                                                                                                                          |
| 0310192       | SMD CAPACITOR                  | 50V 56P±5% NPO 0603      | C20                                                                                                                                          |
| 0310049       | SMD CAPACITOR                  | 50V 221±5% NPO 0603      | C43                                                                                                                                          |
| 0310053       | SMD CAPACITOR                  | 50V 471±5% NPO 0603      | C44                                                                                                                                          |
| 0310471       | SMD CAPACITOR                  | 50V 561±5% NPO 0603      | C15                                                                                                                                          |
| 0310066       | SMD CAPACITOR                  | 50V 102±10% 7R 0603      | C16,C42,C84                                                                                                                                  |
| 0310072       | SMD CAPACITOR                  | 50V 103±10% 7R 0603      | C40,C50                                                                                                                                      |
| 0310202       | SMD CAPACITOR                  | 50V 223±10% 0603         | C78,C87                                                                                                                                      |
| 0310205       | SMD CAPACITOR                  | 50V 473±10% 0603         | C88                                                                                                                                          |
| 0310594       | SMD CAPACITOR                  | 25V 104±10% 0603         | C2,C4,C6,C8,C10,C11,C12,C13,C14,C17,C18,C45,C48,C49,C56,C57,C58,C60,C66,C67,C69,C73,C74,C75,C77,C95,C83,C89,C93,C94,C96,C97,C35,C102,C62,C76 |
| 0310362       | SMD CAPACITOR                  | 16V474 +80%-20% Y5V 0603 | C86                                                                                                                                          |
| 0310216       | SMD CAPACITOR                  | 10V 105 +80%-20% 0603    | C21,C39,C53,C54,C55,C64,C65,C79,C85,C91                                                                                                      |
| 0310364       | SMD CAPACITOR                  | 10V 225 +80%-20% 0805    | C47,C51,C52,C70                                                                                                                              |
| 0310461       | SMD CAPACITOR                  | 10V 475+80%-20% 0805     | C90,C92                                                                                                                                      |
| 0310219       | SMD CAPACITOR                  | 16V 106 +80%-20% 1206    | C34,C41,C99                                                                                                                                  |
| 0310549       | SMD CERAMIC CAPACITOR          | 25V 106+80%-20% 1210     | C1,C3,C19,C36,C101                                                                                                                           |
| 0310577       | SMD CERAMIC CAPACITOR          | 10V 226 +80%-20% 1206    | C59,C71                                                                                                                                      |
| 0310376       | SMD TANTALUMCAPACITOR          | NRS10V47U±20%3528(B2)    | C5,C7,C9,C37,C63,C68,C100,C103,C61,C82                                                                                                       |
| 0390296       | SMD INDUCTOR                   | 1.5UH±10% 3216           | L7                                                                                                                                           |
| 0390044       | SMD INDUCTOR                   | 10UH±10% 2012            | L1,L2,L3,L4,L5,L12,L13                                                                                                                       |
| 0090036       | SMD RESISTOR                   | 1/10W 00±5% 0805         | L15                                                                                                                                          |
| 0390215       | SMD RESISTOR                   | 33uH±10% 3225            | LP2,L14                                                                                                                                      |
| 0680028       | SMD SCHOTTKY DIODE             | MBRS340                  | D1,D2                                                                                                                                        |
| 0700007       | SMD DIODE                      | 14148                    | D4                                                                                                                                           |
| 0700052       | SMD DIODE                      | 335                      | D3                                                                                                                                           |
| 0700116       | SMD VARIABLE-CAPACITANCE DIODE | 3V 1/2W 5mA SOD80C       | D5                                                                                                                                           |
| 0780040       | SMD TRIODE                     | 3904(100-300) SO23       | Q3,Q4,Q5,Q6,Q7,Q8,Q9,Q10,Q104                                                                                                                |
| 0780129       | SMD TRIODE                     | 8550D                    | Q2,Q12                                                                                                                                       |
| 0780085       | SMD TRIODE                     | 8050D                    | Q1,Q11                                                                                                                                       |
| 0881826       | IC                             | AN2546FH QFP             | U1                                                                                                                                           |

| MATERIAL CODE            | MATERIAL NAME          | SPECIFICATIONS           | LOCATION          |
|--------------------------|------------------------|--------------------------|-------------------|
| 0881827                  | IC                     | 5814-3 QFP               | U2                |
| 0880157                  | IC                     | 74HC4066 SOP             | U9                |
| 0882049                  | IC                     | 4665T SOP                | U5                |
| 0882050                  | IC                     | LMC7101 SO23-5           | U8                |
| 0882051                  | IC                     | NJ2082 SOP               | U7                |
| 0882114                  | IC                     | AMS1117-3.3 SO223        | ICP2              |
| 0960213                  | SMD CRYSTAL OSCILLATOR | 4.43MHz 49-S             | Y2                |
| 0960212                  | SMD CRYSTAL OSCILLATOR | 3.58MHz 49-S             | Y1                |
| 1940208                  | CABLE SOCKET           | 30P 0.5mm SMD WITH CLASP | J3                |
| 1940237                  | SOCKET                 | 20P 0.8mm SMD            | J1                |
| 0390302                  | SMD MAGNETIC BEADS     | MGHB1608S102             | R23,R30,R31       |
| 1632012                  | PCB                    | C385-2                   |                   |
| DL385SI(RU) SILVER 1389B |                        |                          |                   |
| MAIN PANEL 5445507       |                        |                          |                   |
| 0090001                  | SMD RESISTOR           | 1/16W 00±5% 0603         | R403              |
| 0310048                  | SMD CAPACITOR          | 50V 151±5% NPO 0603      | C402,C403         |
| 0310376                  | SMD TANTALUMCAPACITOR  | NRS10V47U±20%3528(B2)    | TC401             |
| 0700002                  | SMD DIODE              | LL4148                   | VD401,VD402,VD403 |
| 0700001                  | SMD DIODE              | LS4148                   | VD401,VD402,VD403 |
| 0700007                  | SMD DIODE              | 14148                    | VD401,VD402,VD403 |
| 0700056                  | SMD DOUBLE DIODE       | MMBD4148SE SO23          | VD306-VD315       |
| 0970003                  | CERAMIC RESONATOR      | 455E                     | X401              |
| 0881587                  | IC                     | P2222A SOP               | U401              |
| 1940150                  | SOCKET                 | 4P1.0mm SMD              | XS401             |
| 1631946                  | PCB                    | 4385-2                   |                   |
| DL385SI(RU) SILVER 1389B |                        |                          |                   |
| POWER BOARD 5444394      |                        |                          |                   |
| 0570005                  | DIODE                  | 1N4007                   | D3,D5,D6,D7       |
| 0090036                  | SMD RESISTOR           | 1/10W 00±5% 0805         | R8                |
| 2100003                  | LEAD                   | F 0.6 SHAPED 7.5mm       | RT1               |
| 0090050                  | SMD RESISTOR           | 1/10W 1K±5% 0805         | R17               |
| 0570006                  | DIODE                  | 1N4148                   | D4                |

| MATERIAL CODE | MATERIAL NAME             | SPECIFICATIONS            | LOCATION                                                                              |
|---------------|---------------------------|---------------------------|---------------------------------------------------------------------------------------|
| 0090055       | SMD RESISTOR              | 1/10W 3.3K±5% 0805        | R14                                                                                   |
| 0090038       | SMD RESISTOR              | 1/10W 6.8O±5% 0805        | R10                                                                                   |
| 0090177       | SMD RESISTOR              | 1/10W 16K±5% 0805         | R6                                                                                    |
| 5120012       | RED GLUEWATER             |                           | DROP RED GLUE IN THE CONTACT POSITION OF HEAT RADIATION PLATE FIXING NUT END AND POLE |
| 0010238       | METAL OXIDE FILM RESISTOR | 1W 22O±5%                 | R2                                                                                    |
| 0090125       | SMD RESISTOR              | 1/8W 22O±5% 1206          | R15,R19                                                                               |
| 0090099       | SMD RESISTOR              | 1/10W 150O±5% 0805        | R9                                                                                    |
| 0260029       | CD                        | CD11 16V470U±20%8×123.5   | C15                                                                                   |
| 0260163       | CD                        | CD11 50V47U±20%6×12 2.5   | C11                                                                                   |
| 0090148       | SMD RESISTOR              | 1/10W 510O±5% 0805        | R11                                                                                   |
| 0200277       | CERAMIC CAPACITOR         | 1000V222±20% SHAPED 7.5mm | C9                                                                                    |
| 0200336       | PORCELAIN CAPACITOR       | 1000V 472± 20% 5mm        | C4                                                                                    |
| 0200224       | PORCELAIN CAPACITOR       | 1000V 103 +80%-20% 7.5mm  | C16                                                                                   |
| 0310144       | SMD CAPACITOR             | 50V 104±10% 7R 0805       | C8,C10,C12,C17                                                                        |
| 0310037       | SMD CAPACITOR             | 50V 104±20% 0805          | C8,C10,C12,C17                                                                        |
| 0090496       | SMD RESISTOR              | 1/8W 1MO±5% 1206          | R4,R7                                                                                 |
| 0090497       | SMD RESISTOR              | 1/8W 4.3MO±5% 1206        | R3,R5                                                                                 |
| 0090274       | PRECISION SMD RESISTOR    | 1/10W 10K±1% 0805         | R13                                                                                   |
| 1870029       | POWER SUPPLY SOCKET       | S2S ( UL )                |                                                                                       |
| 0260247       | CD                        | GZ 16V1000U±20%10×20 5    | C13,C14                                                                               |
| 0460352       | SWITCH POWER TRANSFORMER  | BC2801730                 | T1                                                                                    |
| 0680048       | SCHOTTKY DIODE            | SR1060 TO-220             | D2                                                                                    |
| 0090494       | PRECISION SMD RESISTOR    | 1/10W 27K±1% 0805         | R12                                                                                   |
| 0570014       | DIODE                     | HER107                    | D1                                                                                    |
| 1080011       | PHOTOELECTRIC COUPLER     | HS817                     | IC2                                                                                   |
| 0620025       | RADIATION DIODE           | 3R 4SD RED                | LED                                                                                   |
| 0882462       | IC                        | AZ431AZ-A TO-92           | IC3                                                                                   |
| 2300021       | FUSE                      | 1.6AL 250V                | F1                                                                                    |
| 0090495       | PRECISION SMD RESISTOR    | 1/10W 510O±1% 0805        | R18                                                                                   |
| 0881870       | IC                        | TOP246Y TO-262-7C         | IC1                                                                                   |
| 0010241       | METAL OXIDE FILM RESISTOR | 268K±5%                   | R1                                                                                    |

| MATERIAL CODE                  | MATERIAL NAME                        | SPECIFICATIONS                                | LOCATION                                                     |
|--------------------------------|--------------------------------------|-----------------------------------------------|--------------------------------------------------------------|
| 1000025                        | POWER GRID FILTER                    | UU16 30mH +∞ -0% 10×13                        | L1                                                           |
| 0210066                        | TERYLENE CAPACITOR                   | 275V 104±20% 15mm                             | C3                                                           |
| 0200229                        | CERAMIC CAPACITOR                    | C81 250VAC471±10% 10mm                        | C1,C2,C7                                                     |
| 0390272                        | MAGNETISM STICK INDUCTOR             | 5.6uH±10% 3A ? 5×20 5mm                       | L2                                                           |
| 0390273                        | COMMON MODE INDUCTOR                 | 75uH±25%3A ? 9×? 5×3 4mm                      | L3                                                           |
| 0260535                        | CD                                   | GS 400V68U±20%16×30 7.5                       | C5                                                           |
| 1563081                        | PCB                                  | 5333A-2                                       |                                                              |
| 3580109                        | HEAT RADIATION BOARD ( LEFT )        | 86×22×2 009                                   | LEFT                                                         |
| 3580110                        | HEAT RADIATION BOARD ( RIGHT )       | 86×22×2 009                                   | RIGHT                                                        |
| 4230014                        | MACHINE-TAPPING SCREW                | FM 3×8 WHITE NICKEL                           | ONE FOR LEFT AND RIGHT HEAT RADIATION PLATE EACH             |
| 4400001                        | NUT                                  | 3                                             | ONE FOR LEFT AND RIGHT HEAT RADIATION PLATE EACH             |
| 5232339                        | INSULATION PLATISC BAND              | PZ-281 LENGTH:60m WIDTH:45mm DEEP YELLOW      | USAGE 0.0025                                                 |
| 5232126                        | INSULATION PLATISC BAND              | PZ-281 LENGTH:60m WIDTH:55mm DEEP YELLOW      | USAGE 0.0025                                                 |
| 2140350                        | POWER SUPPLY WIRE                    | 2P1.2m F 4.0DC FLEX INSERT                    | P- , P+                                                      |
| 4630650                        | SILICA GEL PIECE                     | 18×13×0.3 HOLE ? 3                            |                                                              |
| 5232343                        | INSULATED SPACER SET                 | 9                                             |                                                              |
| 5233441                        | INSULATION PLATISC BAND              | PZ-281 LENGTH:60m WIDTH:23mm DEEP YELLOW      | WIND 3 LAYERS IN THE CORRESPONDING POSITION OF HEAT RADIATOR |
| DL385SI(RU) SILVER 1389B       |                                      |                                               |                                                              |
| POWER ADAPTER 5470779          |                                      |                                               |                                                              |
| 3031546                        | UPPER COVER OF POWER CASE            | 003 BLACK 2#                                  |                                                              |
| 3041102                        | LOWER COVER OF POWER CASE            | 003 BLACK 2#                                  |                                                              |
| 3050357                        | INDICATOR LIGHT MANTLE OF POWER CASE | 001 TRANSPARENT                               |                                                              |
| 5231264                        | FOOT SPACER                          | f 7×1 RUBBER                                  |                                                              |
| 4000494                        | SELTAPPING SCREW                     | PB 3×8 BLACK ZINC                             |                                                              |
| 5444394                        | PCB SEMI-FINISHED PRODUCT            | 5333-1 333                                    |                                                              |
| DL385SI(RU) SILVER 1389B       |                                      |                                               |                                                              |
| POWER SUBSIDIARY BOARD 5445509 |                                      |                                               |                                                              |
| 1870021                        | POWER SOCKET                         | DC-023                                        | JK501                                                        |
| 1350062                        | TESTING SWITCH                       | DS-24                                         | SW501                                                        |
| 1940234                        | CABLE SOCKET                         | 8P 1.0mm DUAL RANK TOUCH POINT,SMD,HORIZONTAL | XS501                                                        |

| MATERIAL CODE                | MATERIAL NAME                       | SPECIFICATIONS      | LOCATION                             |
|------------------------------|-------------------------------------|---------------------|--------------------------------------|
| 1860047                      | USB SOCKET                          | CAB85-4Pin          | XS502                                |
| 2150152                      | SHIELDED WIRE                       | 22# 75mm 1P SHIELD  |                                      |
| 1632396                      | PCB                                 | 385-0               |                                      |
| DL385SI(RU) SILVER 1389B     |                                     |                     |                                      |
| REMOTE CONTROL 5471838       |                                     |                     |                                      |
| 0310048                      | SMD CAPACITOR                       | 50V 151±5% NPO 0603 | C802,C803                            |
| 0630009                      | EMISSION PIPE                       | TSAL4400            | LED801                               |
| 0700007                      | SMD DIODE                           | 14148               | D801~D803                            |
| 0700001                      | SMD DIODE                           | LS4148              | D801~D803                            |
| 0700002                      | SMD DIODE                           | LL4148              | D801~D803                            |
| 0780130                      | SMD TRIODE                          | STC3265             | Q801                                 |
| 0880220                      | IC                                  | P2222 SOP           | U801                                 |
| 0882379                      | IC                                  | S0102B SOP          | U801                                 |
| 0970003                      | CERAMIC RESONATOR                   | 455E                | X801                                 |
| 4000038                      | SELTAPPING SCREW                    | PB 2.3×6 COLOR ZINC | FOR CONNECTING UPPER AND LOWER COVER |
| 0090272                      | SMD RESISTOR                        | 1/16W 10±5% 0603    | R801                                 |
| 1564324                      | PCB                                 | 8516SI-3            |                                      |
| 3031924                      | SURFACE CASING O REMOTE CONTROL     | RC026-11R BLACK     |                                      |
| 3041399                      | BOTTOM CASING OF REMOTE CONTROL     | 026 BLACK 2#        |                                      |
| 3051319                      | BATTERY CASE DOOR OF REMOTE CONTROL | 026 BLACK 2#        |                                      |
| 3051273                      | GLASS OF REMOTE CONTROLLER          | 026 MING PURPLE     |                                      |
| 3850124                      | ANODE SPRING                        | RC026               |                                      |
| 3850125                      | CATHODE SPRING                      | RC026               |                                      |
| 3850126                      | ANODE/CATHODE SPRING                | RC026               |                                      |
| 4631081                      | CONDUCT GLUE O REMOTE CONTROL       | RC026-09R           |                                      |
| 5070070                      | PLASTIC BAG                         | 85×250              |                                      |
| DL385SI(RU) SILVER 1389B     |                                     |                     |                                      |
| TESTING SWITCH BOARD 5445508 |                                     |                     |                                      |
| 1910101                      | AV SOCKET                           | P327 BLACK          | JK601                                |
| 1350053                      | TESTING SWITCH                      | SPVE110600          | SW601,SW602                          |
| 1310083                      | STIR SWITCH                         | S12D06-D2           | SW603                                |

| MATERIAL CODE         | MATERIAL NAME | SPECIFICATIONS                                 | LOCATION |
|-----------------------|---------------|------------------------------------------------|----------|
| 1940234               | CABLE SOCKET  | 8P 1.0mm DUAL RANK TOUCH POINT,SMD,HORIZONTAL  | XS601    |
| 1940235               | CABLE SOCKET  | 16P 1.0mm DUAL RANK TOUCH POINT,SMD,HORIZONTAL | XS602    |
| 1631883               | PCB           | 6385-1                                         |          |
| PROGRAM FLASH 0911808 |               |                                                |          |
| 0881650               | IC            | 29LV160BE-70PFTN TSOP                          | U203     |
| 0881651               | IC            | 29160EB 706 TSOP                               | U203     |