

**AV225T**

**service manual**

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# Chapter One About Maintenance

## 1.1 Safety precautions

### 1.1.1 Power supply

When servicing audio power amplifier, the servicing personnel pay special attention to the power board with 220V AC, or else the improper operation will lead to body damage. The alternate current which outputs to power amplifier board through power board is also up to voltage with about 50V; when servicing, short-circuit and joint welding cannot occur, or else the elements will be burnt out and trouble range will be enlarged.

### 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 About placement position**

1. Audio power amplifier cannot be installed in places with high temperature and humidity.
2. Positions for placement should be stable and secure.

## **1.2 Maintenance method**

### **1.2.1 Visualized method**

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

### **1.2.2 Electric resistance method**

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

### **1.2.3 Voltage method**

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

### **1.2.4 Current method**

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

### **1.2.5 Cutting method**

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

### **1.2.6 Element substitution method**

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

### **1.2.7 Comparison method**

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

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

## **1.3 Required device for maintenance**

Audio Generator

Digital oscillograph ( 100MHE)

SMD rework station

Multimeter

Soldering iron

Pointed-month pincers

Cutting nippers

Forceps

Electric screw driver

Terminals connecting cord

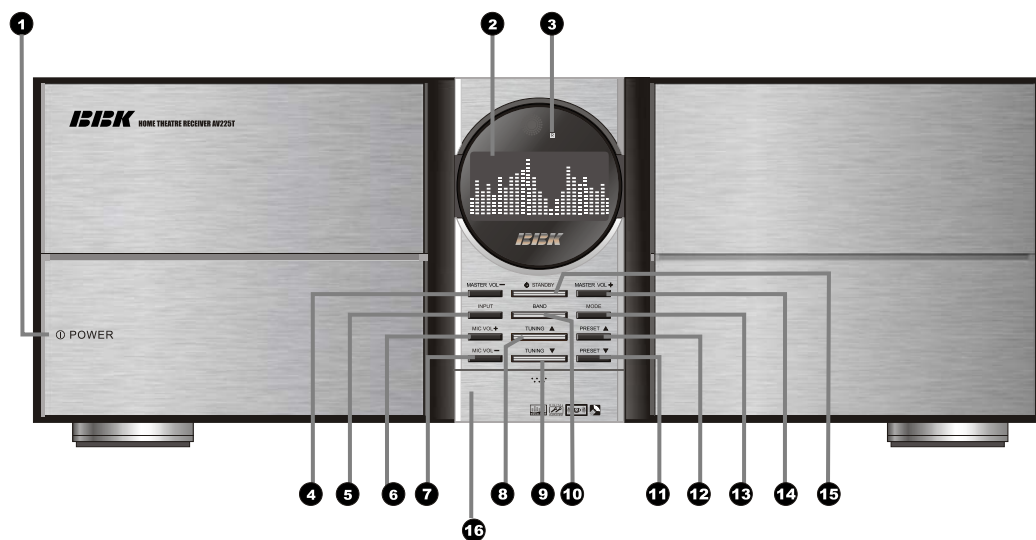
Headphone

Microphone

# Chapter Two Operation Instructions

## 2.1 CONTROL BUTTON LOCATIONS AND EXPLANATIONS

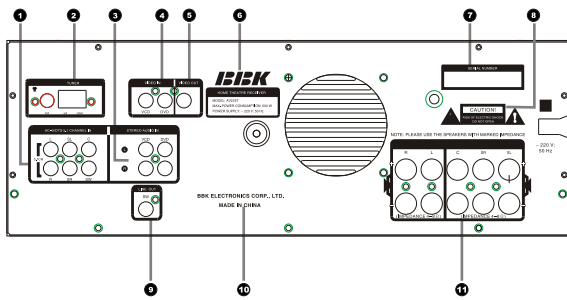
### 2.1.1 FRONT PANEL ILLUSTRATIONS



- |  |   |
|--|---|
| <p>❶ POWER SWITCH<br/>Power on/off this unit</p> <p>❷ LCD Screen<br/>Buttons operation indication and spectrum display when working</p> <p>❸ IR sensor<br/>Receive the infrared signals transmitted from the remote control</p> <p>❹ MASTER VOLUME-<br/>Press this button to synchronously lower all 6CH volumes</p> <p>❺ INPUT<br/>Sound source input button</p> <p>❻ MIC VOLUME+<br/>Press this button to increase the volume of MIC</p> <p>❼ MIC VOLUME-<br/>Press this button to lower the volume of MIC</p> <p>❽ TUNING ▲<br/>Select other frequency radio stations upwards</p> | <p>❾ Tuning ▼<br/>Select other frequency radio stations downwards</p> <p>❿ BAND<br/>Select FM/AM tuner BAND</p> <p>⓫ PRESET ▼<br/>Select the latter preset radio station</p> <p>⓬ PRESET ▲<br/>Select the previous preset radio station</p> <p>⓭ MODE<br/>Select tuner mode:manual/auto</p> <p>⓮ MASTER VOLUME+<br/>Press this button to synchronously increase all 6CH volumes</p> <p>⓯ STANDBY<br/>Standby</p> <p>⓰ COVER OF PHONE JACK AND MICROPHONE JACK</p> |
|--|---|



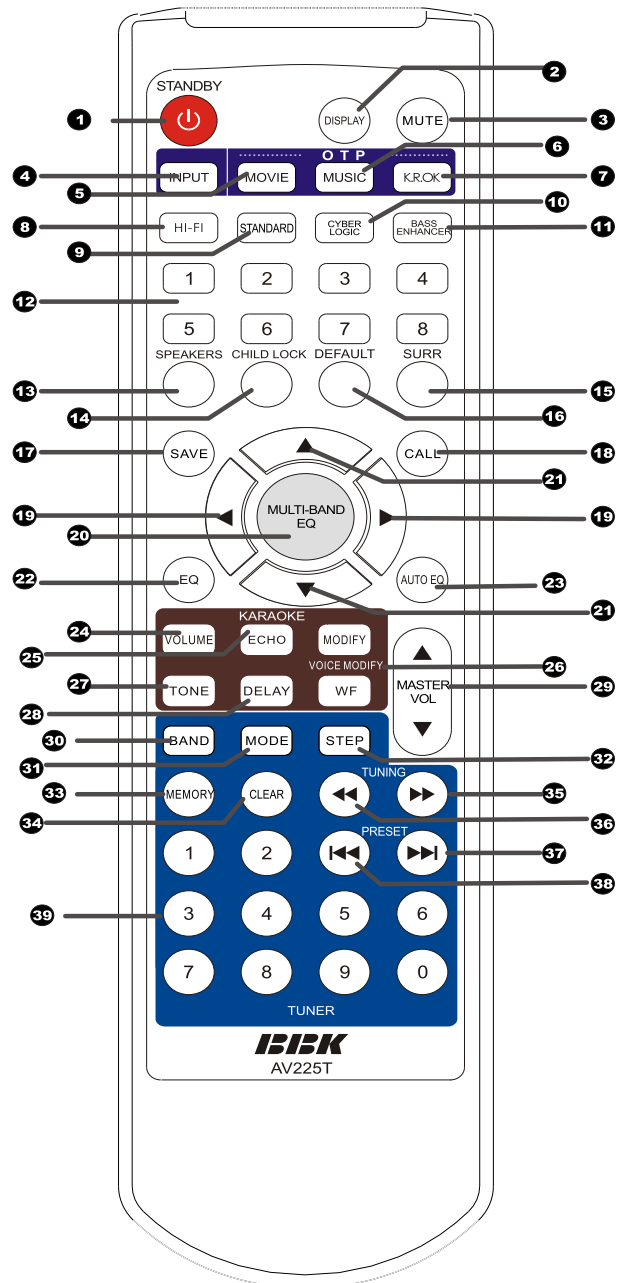
## 2.1.2 REAR PANEL ILLUSTRATION



- ❶ **AC-3/DTS 5.1CH INPUT**  
5.1CH audio signals input terminals that connect to DVD, AC-3/DTS
- ❷ **AM/FM antenna terminal**  
Connect AM/FM antenna outside
- ❸ **Stereo Audio jack**  
The terminals that connect with VCD, DVD stereo audio signals input
- ❹ **Video input**  
The terminals that connect with VCD, DVD Video signals input
- ❺ **Video output jack**  
The terminals that connect with TV Video signal output
- ❻ **Data**  
The data plate of this unit
- ❼ **SERIAL NO. Mark**  
The manufacturing records
- ❽ **CAUTION mark**  
Remind the user of dangerous voltage inside
- ❾ **Line-out**  
Subwoofer signals line-out jack
- ❿ **This unit's manufacturer**
- ⓫ **Terminals**  
Connect with SPEAKER terminals

## 2.1.3 ILLUSTRATIONS TO THE REMOTE CONTROL

- ❶ **STANDBY button:** Power on, STANDBY switch button
- ❷ **DISPLAY button:** Select audio spectrum display modes
- ❸ **MUTE button:** Mute On/Off button
- ❹ **INPUT button:** Select input signal sources manually
- ❺ **MOVIE button:** OTP button to set standard movie theater surround mode
- ❻ **MUSIC button:** OTP button to set standard concert mode
- ❼ **K.R.OK:** OTP button to set standard Karaoke mode
- ❽ **HI-FI button:** Select the Hi-Fi sound field
- ❾ **STANDARD button:** Select the standard sound field
- ❿ **CYBER LOGIC button:** Select the cyber logic sound field
- ⓫ **BASS ENHANCER button:** Select the bass enhancing effect



- ❿ **Number buttons 1~8:** Select 8 preset working modes with the help of SAVE/CALL button, capable of storing and calling the user-set working mode parameters
- ⓫ **SPEAKERS button:** Adjust the separate channel level with the help of ▲/▼ keys
- ⓬ **CHILD LOCK button:** Lock the functions of the front panel controls
- ⓭ **SURR. Button:** Select the surround sound field
- ⓮ **DEFAULT button:** Restore the factory default settings
- ⓯ **SAVE button:** Store the current working mode parameters with the help of number buttons 1~8
- ⓰ **CALL button:** Call the user-stored working mode parameters with the help of number buttons 1~8
- ⓱ **EQ select button:** Select the equalization frequency
- ⓲ **MULTI-BAND EQ button:** Adjust multi-band electronic equalization
- ⓳ **Adjust button:** Adjust level and multi-band EQ
- ⓴ **EQ button:** Circularly call the preset EQ modes
- ⓵ **AUTO EQ button:** Analyze the current signal spectrum, automatically set EQ parameters

- 24 **VOLUME button:** Adjust the karaoke level with ▲/▼ keys
- 25 **ECHO button:** Adjust the karaoke ECHO with ▲/▼ keys
- 26 **VOICE MODIFY:**  
**MODIFY button:** Select Karaoke voice modify
- WF button:** Karaoke wide sound field On/Off
- 27 **TONE button:** Adjust the karaoke BASS/Treble tone level with ▲/▼ keys
- 28 **DELAY button:** Adjust the karaoke delay time with ▲/▼ keys
- 29 **MASTER VOL button:** Synchronously increase/decrease 6 channels' volume
- 30 **BAND button:** Select FM/AM tuner band
- 31 **MODE button:** Select tuner mode: manual/auto
- 32 **STEP button:** Select AM tuning step: 9K/10K
- 33 **MEMORY button:** Memory the received radio station with the help of number buttons 0~9
- 34 **CLEAR button:** Clear the preset radio station with the help of number buttons 0~9
- 35 **TUNING ►►:** Scan other frequency radio station upwards
- 36 **TUNING ◄◄:** Scan other frequency radio station downwards
- 37 **PRESET ►►:** Select the latter preset radio station
- 38 **PRESET ◄◄:** Select the previous preset radio station
- 39 **NUMBER 0~9:** Save the received radio station programs or directly call the preset programs with the help of MEMORY button

## 2.2 BASIC OPERATIONS

### 2.2.1 TURN ON/OFF THIS UNIT

- ◆ Please check the connection cords before turning this unit on. If all connections are correct, you can connect this unit to power.
- ◆ Press the **POWER** button, this unit enters the standby mode .
- ◆ When this unit is in the standby mode, it detects the input signals automatically.
- ◆ When there is signal input, this unit turns on automatically.
- ◆ When the input signal is too small, this unit might not detect the signal and will not turn on automatically.
- ◆ When there is signal input and the unit cannot turn on automatically, press the **STANDBY** button on the front panel or remote control to operate manually and select input signals by using the **INPUT** button.
- ◆ When the unit is in the standby mode, press the **STANDBY** button on the front panel or remote control to turn on this unit.
- ◆ Press the **STANDBY** button on the front panel or remote control.
- ◆ After turning on this unit, it detects the input signal automatically. When there is signal input, it receives the input signal automatically. Otherwise, the unit will automatically search signals all the time.
- ◆ When there is signal input but it cannot receive

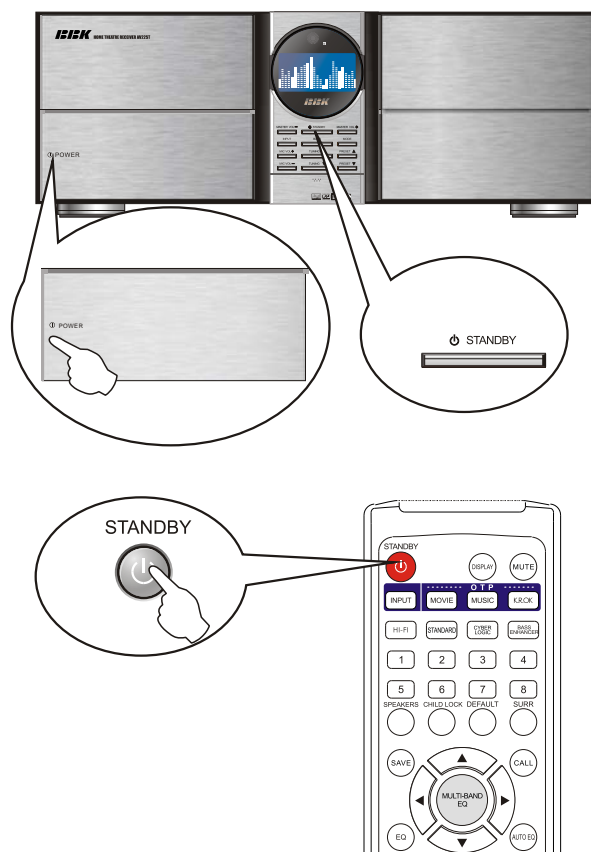
The signal automatically, press the **INPUT** button on the remote control to select the input signal.

- ◆ When the unit is in normal working mode, press the **STANDBY** button on the front panel or remote control if you want to enter standby mode.

◆ Please turn off the power when you are not going to use the unit for a long time.

◆ Please turn off the power every time after you use the unit.

◆ Press the "**POWER**" button on the front panel to power off this unit.



Turn On

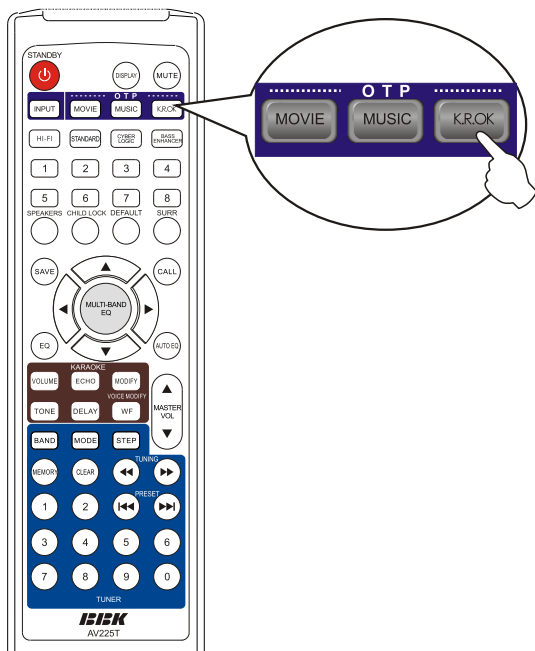
### 2.2.2 OTP function

- ◆ We have set the OTP function to simplify the operation of testing sound effects. If the played disc is movie or story, you just press the **MOVIE** button and the system will automatically set standard movie mode. If the played disc is music, you just press the **MUSIC** button and the system will automatically set standard music mode. If you want to sing Karaoke, you just press the

K.R.OK button after inserting microphone and The system will automatically set standard Karaoke mode.

- ◆ Press the MOVIE button to set standard theater surround mode.
- ◆ Automatically detect the input signal source. If many signal sources input, it will select the current signal input preferentially.
- ◆ Automatically set the parameters of surround. If 5.1CH input signal is detected, it will automatically adopt standard mode; if 2CH signal source is detected, it will automatically adopt Cyber Logic.
- ◆ Press the MUSIC button to set standard music mode. Automatically detect the input signal source. If many signal sources input, it will select the current signal preferentially.
- ◆ Automatically set the parameters when enjoying music. If 5.1CH input signal is detected, it will automatically adopt standard mode; if 2CH signal source is detected, it will automatically adopt Hi-Fi mode.
- ◆ Press the K.R.OK button to set standard Karaoke mode.
- ◆ Automatically detect the input signal source. If many signal sources input, it will select the current signal preferentially.
- ◆ Automatically set the parameters of Karaoke mode.

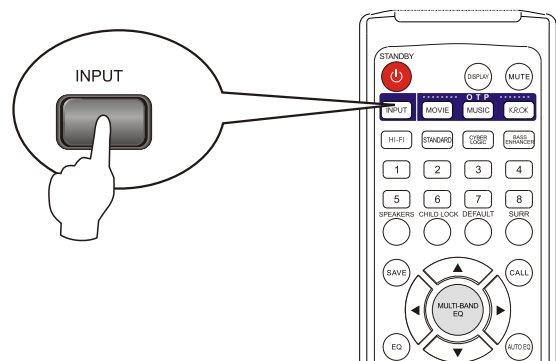
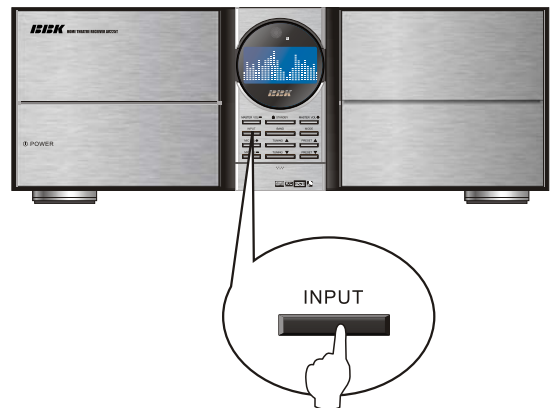
**NOTE:** If the signal is too weak or in the blank segment of music when operating, the system will probably appear wrong indications.



### 2.2.3 Select Input Sound Source

This unit utilizes two input lines of stereo audio sources: VCD, DVD; one line 5.1 channel signal input. Select the input signal source manually through the remote control.

- ◆ Press the INPUT button on the remote control, and "INPUT TUNER" splays, which means TUNER has been selected.
- ◆ Press the INPUT button on the remote control, and "INPUT VCD" displays, which means VCD 2CH input jack has been selected.
- ◆ Press the INPUT button on the remote control, and "INPUT DVD" displays, which means DVD 2CH input jack has been selected.
- ◆ Press the INPUT button on the remote control, and "INPUT 5.1CH" displays, which means 5.1CH input jack has been selected.



Input

### 2.2.4 Bass Enhancer

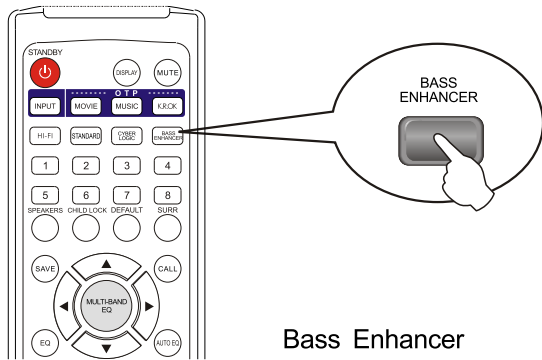
In order to strengthen the low frequency of music, you may start up Bass Enhancer function.

- ◆ Press the "BASS ENHANCER" button on the front panel or remote control, "BASS driver 0", "BASS driver 1", "BASS driver 2" or "BASS driver 3" will display.

- ◆ The display "BASS driver 1-3" means the first, second and third Bass Enhancer; the subwoofer signal adds into the master channelsignal; turn off the subwoofer line output.

- ◆ The display "BASS driver 0 " means turn off Bass Enhancer; normal subwoofer line output.

- ◆ Bass Enhancer function cannot be started up in Hi-Fi mode.



### 2.2.5 Select Sound Field

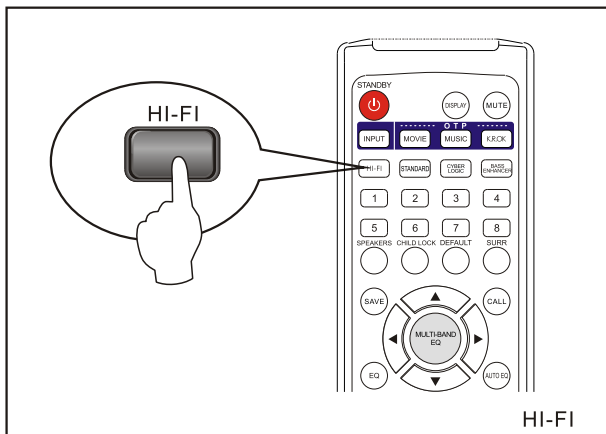
#### 1、HI-FI

In 2CH signal input, you may select the Hi-Fi mode to keep the originally musical features.

- ◆ Press the HI-FI button on the remote control and "HI-FI" will displays, which means the system enters the Hi-Fi mode; if "NVALID" displays, it means the system cannot enter the Hi-Fi mode.

- ◆ Bass Enhancer function and operations related to EQ are invalid in Hi-Fi mode.

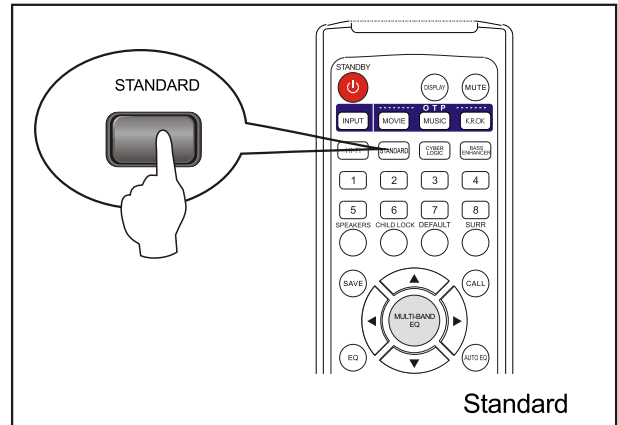
- ◆ Pressing the HI-FI button is invalid in 5.1channel input.



#### 2、Standard

In order to keep the correspondence with input signals and adjust output timbre according to personal habit, you may select the standard sound field.

- ◆ Press the STANDARD button on the remote control and "STANDARD" will display, which means the system enters standard sound field.

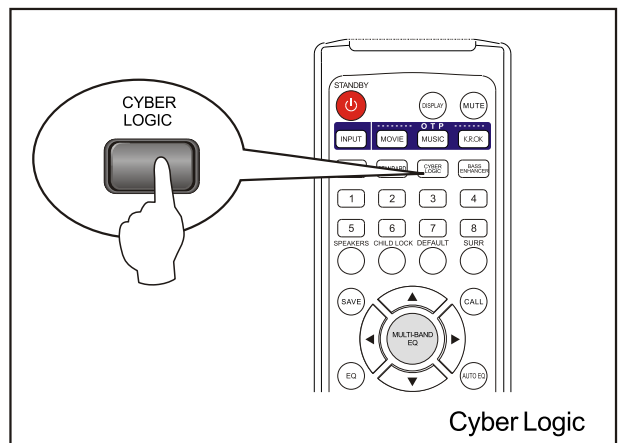


#### 3、Cyber Logic

In order to make 2 channel input signals have multi-channel sound field effect, you may select Cyber Logic sound field.

- ◆ Press the CYBER LOGIC button on the remote control and "CYBER LOGIC" will display, which means the system enters Cyber Logic sound field: if "INVALID" displays, it means the system cannot enter Cyber Logic

- ◆ Cyber Logic mode is invalid in 5.1 channel signal input.



#### 4、Surround

In order to cater for different listening Environments and meet different sound effect requirements of customers, you may select different surround modes in 5.1 channel signal input status.

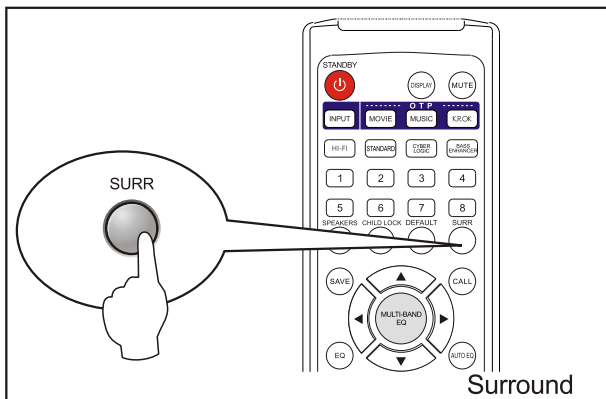
- ◆ Press the SURR button on the remote control in 5.1 channel signal source input, the surround will display.

- ◆ Press the SURR button on the remote control Repeatedly; you may select the environment

Modes between Affectional movie, Swordsman movie, Gunfight movie, Sci-fi movie and music.

◆The environment surround is invalid in 2-channel signal input status.

◆The environment surround is invalid if microphone is inserted.



### 2.2.6 Adjust Volume

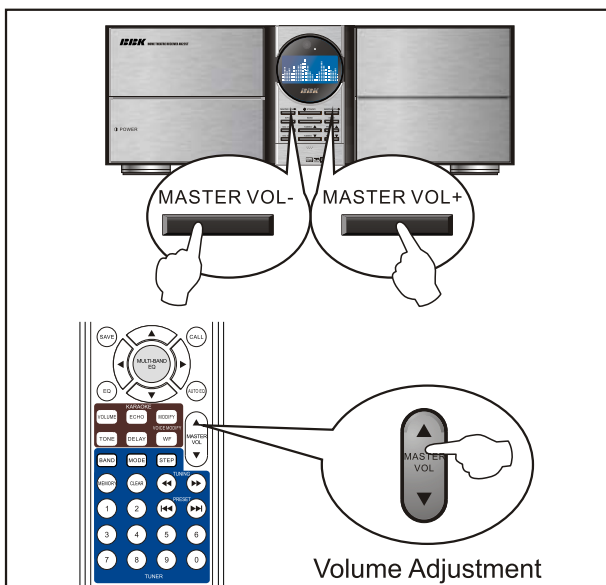
#### 1、 Master Volume

When the current sound is too high, too low or unsuitable, you may press the MASTER VOL on the front panel or remote control to adjust the volume of all channels.

◆Press the "+" button of master volume on the front panel or remote control to increase all channels' volume simultaneously; the max volume is 60.

◆Press the "-" button of master volume on the front panel or remote control to decrease all channels' volume simultaneously; the min volume is 0.

◆The master volume displays as the example: "VOL: 20"



### 2.2.7 Adjust Level

#### 1、 Left channel level

◆When sound of left and right channels is imbalance, you may adjust R channel level to make it in balance with L channel.

◆Press the SPEAKERS button on the remote control and "L: 00" will display. Operate as follows:

◆Press the "▲" button on the remote control to increase the volume of L channel. The max level is +60. Press the "▼" button on the remote control to decrease the volume of L channel. The min level is -60.

#### 2、 Right channel level

◆When sound of left and right channels is imbalance, you may adjust L channel level to make it in balance with R channel.

◆Press the SPEAKERS button on the remote control and "L: 00" will display. Operate as follows:

◆Press the "▲" button on the remote control to increase the volume of L channel. The max level is +60. Press the "▼" button on the remote control to decrease the volume of L channel. The min level is -60.

#### 3、 Center level

◆When sound of left and right channels is imbalance, you may adjust R channel level to make it in balance with L channel.

◆Press the SPEAKERS button on the remote control and "R: 00" will display. Operate as follows:

◆Press the "▲" button on the remote control to increase the volume of R channel. The max level is +60. Press the "▼" button on the remote control to decrease the volume of R channel. The min level is -60.

#### 4、 Surround Left level

◆When sound of center channel is unsuitable, you may adjust center level to make it suitable to the sound field.

◆Press the SPEAKERS button on the remote control and "C: 00" will display. Operate as follows:

◆Press the "▲" button on the remote control to increase the volume of C channel. The max level is +60. Press the "▼" button on the remote control to decrease the volume of C channel. The min level is -60.

**NOTE:** The center level cannot be adjusted only when left and right channels have output.

#### 5、 Surround Right level

◆When sound of surround left is unsuitable, you

may adjust surround left level to make it suitable to the sound field.

◆ Press the SPEAKERS button on the remote control and "SL: 00" will display. Operate as follows:

◆ Press the "▲" button on the remote control to increase the volume of surround left. The max level is +60. Press the "▼" button on the remote control to decrease the volume of surround left. The min level is -60.

**NOTE:** The surround left level cannot be adjusted only when left and right channels have output.

◆ When sound of surround right is unsuitable, you may adjust surround right level to make it suitable to the sound field.

◆ Press the SPEAKERS button on the remote control and "SR: 00" will display. Operate as follows:

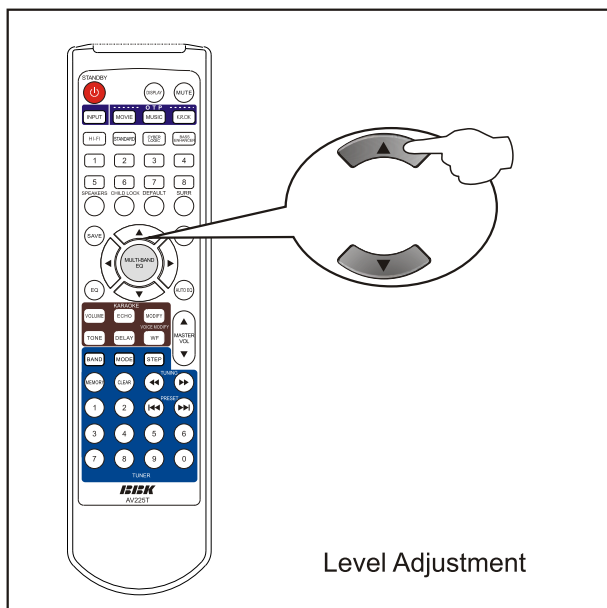
◆ Press the "▲" button on the remote control to increase the volume of surround right. The max level is +60. Press the "▼" button on the remote control to decrease the volume of surround right. The min level is -60.

**NOTE:** The surround right level cannot be adjusted only when left and right channels have output.

## 6、Subwoofer level

◆ When sound of subwoofer is unsuitable, you may adjust the volume of subwoofer speaker and the level of subwoofer channel to make it balanced to the sound field.

◆ Press the SPEAKERS button on the remote control and "SW: 00" will display. Operate as follows:



◆ Press the "▲" button on the remote control to increase the volume of subwoofer. The max level is +60.

Press the "▼" button on the remote control to decrease the volume of subwoofer. The min level is -60.

**NOTE:** The subwoofer level cannot be adjusted only in Hi-Fi and Bass Enhancer conditions.

## 2.2.8 EQ function

Due to the personal like to music, you may adjust EQ to meet your own needs. If the music tempo is not enough or full, adjust bass; if the voice is unclear, adjust middle frequency; if the musical details are not rich, adjust treble.

### 1、Pre-set EQ

◆ When the sound of master volume is too weak or unclear, you may directly use pre-set EQ mode to make it accordant with the current music.

This unit utilizes 8 EQ modes: Rock, Jazz, Classical, Pop, Disco, Rap and Blues.

◆ Press the EQ button on the remote control to display the EQ curve.

◆ Press the EQ button repeatedly to select the EQ mode accordant with the current music.

◆ EQ mode cannot be adjusted in Hi-Fi mode.

### 2、Multi-band EQ

◆ When the sound of master volume is too weak or unclear, you may set EQ mode yourself to meet you own taste.

◆ Press the "AUTO EQ" button on the remote control to display the current EQ curve. There is a cursor flashing in the current frequency.

◆ Press the "▶" button on the remote control to select the high

frequency. The flashing cursor moves rightwards until the rightmost.

◆ Press the "◀" button on the remote control to select the low frequency. The flashing cursor moves leftwards until the leftmost.

◆ Press the "▲" button on the remote control and the current frequency level increases until the maximum.

◆ Press the "▼" button on the remote control and the current frequency level decreases until the minimum.

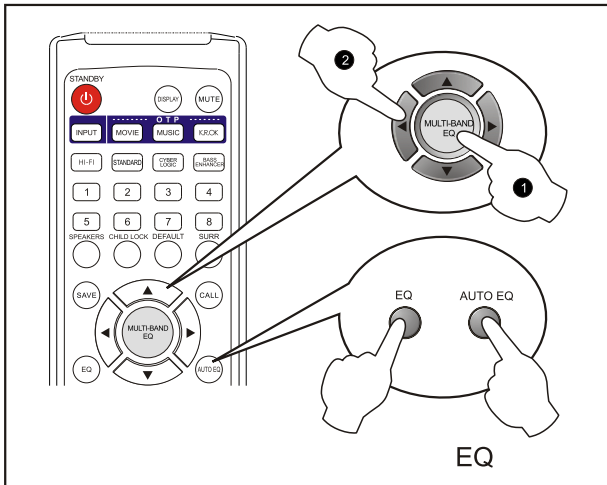
◆ EQ mode cannot be adjusted in Hi-Fi mode.

### 3、Auto EQ

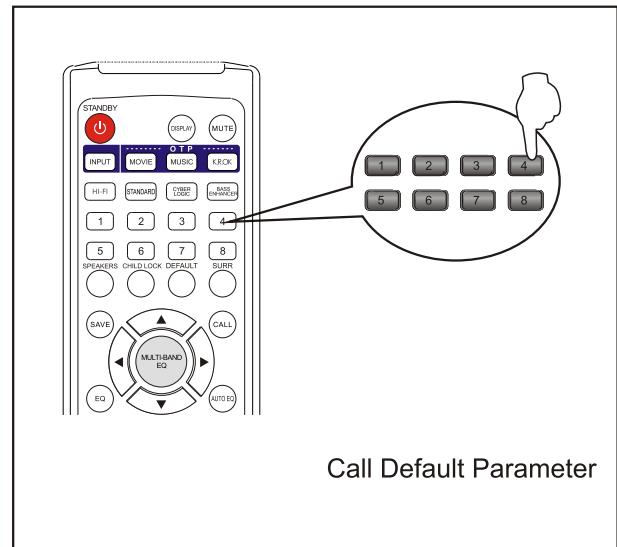
◆ When the sound of master volume is unsuitable to you listening, you may select auto EQ.

◆ The unit will automatically analyze the current spectrum to set the current EQ according to the current music.

- ◆ Press the AUTO EQ button on the remote control to display the analyzing curve.
- ◆ Auto EQ setup is invalid in Hi-Fi mode.



channel level is too high or too low, the system will adjust automatically



### 2.2.9 Parameter Processing

To memory the current parameter for later use, or use the default parameter, the Memory and Call functions will be used. The current parameters to be adjusted include: Channel Level, EQ, Bass Enhancer, Sound Field, Environment Surround, MIC Volume, MIC Treble, MIC Bass, MIC Delay, MIC Echo and Voice Modification.

#### 1、 Call Default parameter

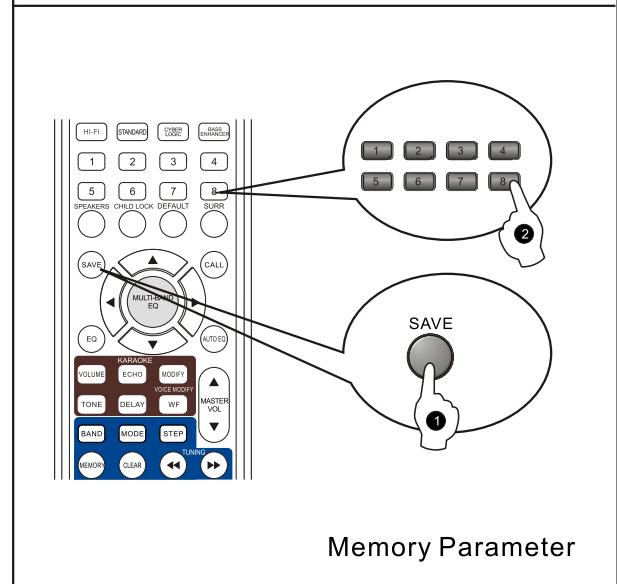
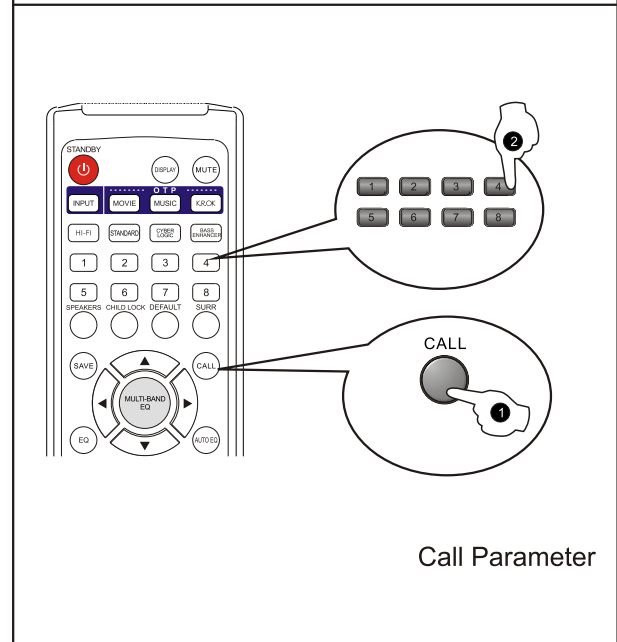
- ◆ Press the number buttons 1-8 on the remote control and "CALL 1-8" displays.
- ◆ Setup will be processed automatically according to the default parameters.

#### 2、 Memory Parameters

- ◆ Press the "SAVE" button on the remote control first to display "SAVE ..."
- ◆ Press the number buttons 1-8 on the remote control again under the display "SAVE ..."
- ◆ The current parameter is memorized into the corresponding number buttons and "SAVE 1-8" displays.

#### 3、 Call parameters

- ◆ Press the "CALL" button on the remote control first to display "CALL..."
- ◆ Press the number buttons 1-8 on the remote control again under the display "CALL..."
- ◆ The parameters memorized in the number buttons before will be adopted currently and "CALL 1-8" displays. NOTE: Due to some unexpected reasons, the user-memorized parameters will probably be lost, so please adjust again and then memorize. The system will automatically check the parameter saved at time when switching on this unit. When the



## 2.2.10 Adjust Karaoke

### 1、Microphone Volume

When inserting microphones to sing Karaoke, press the MIC VOL button to adjust the volume of microphone when the microphone voice is too high, too low or unsuitable.

◆ Press the "▲" button of MIC VOL on the front panel to increase the volume of microphone. The maximum volume is 30.

◆ Press the "▼" button of MIC VOL on the front panel to decrease the volume of microphone. The minimum volume is 0.

◆ Press the "VOLUME" on remote control, then press "▲" "▼" to adjust karaoke volume.

◆ The microphone volume displays as "MIC VOL 20".

◆ The microphone volume cannot be adjusted when not inserting microphones.

### 2、Bass

When inserting microphone to sing Karaoke, you may adjust microphone bass when the sound tempo is not full or rich.

◆ Press the "TONE" button on the remote control once then press "▲" or "▼" to adjust the bass of microphone. The adjustable range is  $\pm 6$ .

◆ The microphone bass displays as "MIC BASS +2".

◆ The microphone bass cannot be adjusted when not inserting microphone.

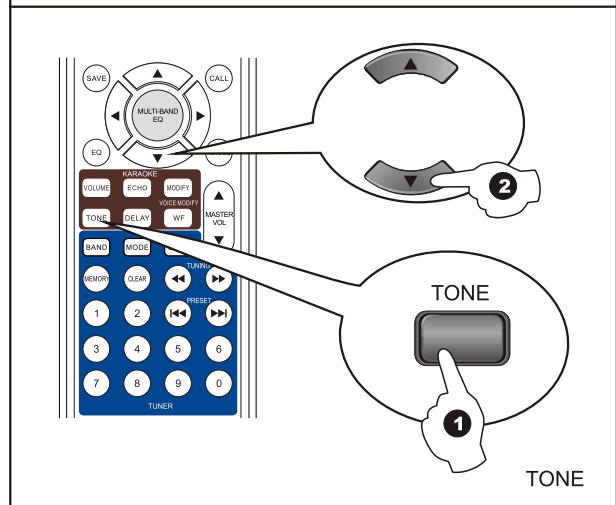
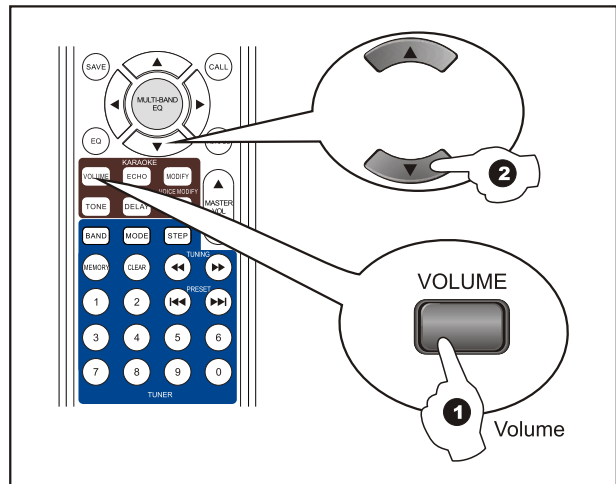
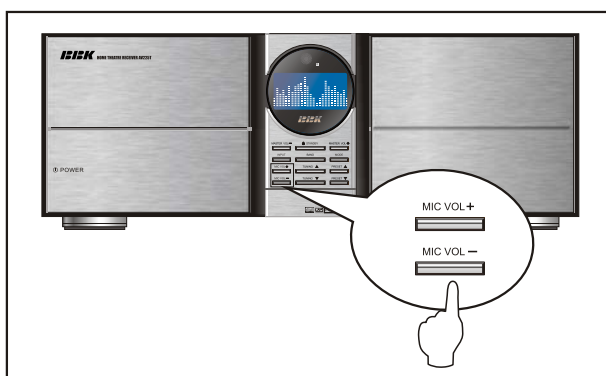
### 3、Treble

When inserting microphone to sing Karaoke, you may adjust microphone treble when the sound is unclear.

◆ Press the "TONE" button on the remote control twice, then press "▲" or "▼" to adjust the treble of microphone. The adjustable range is  $\pm 6$ .

◆ The microphone treble displays as "MIC TREBL+2".

◆ The microphone treble cannot be adjusted when not inserting microphone.



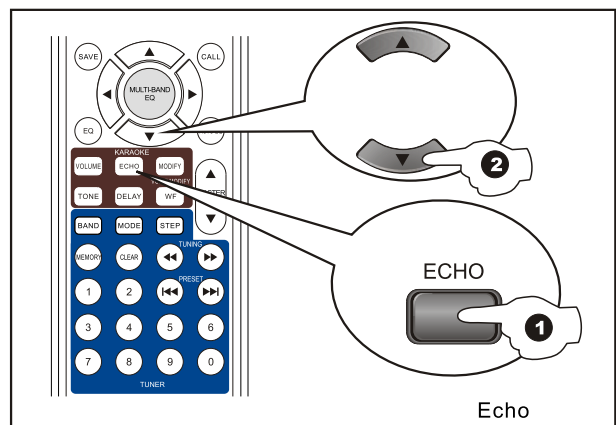
### 4、Echo

When inserting microphone to sing Karaoke, you may adjust microphone echo when the sound is weak or not full.

◆ Press the "ECHO" button on the remote control then press "▲" or "▼" to adjust the echo of microphone. The adjustable range is 0~7.

◆ The microphone echo displays as "MIC ECHO 2".

◆ The microphone echo cannot be adjusted when not inserting microphone.





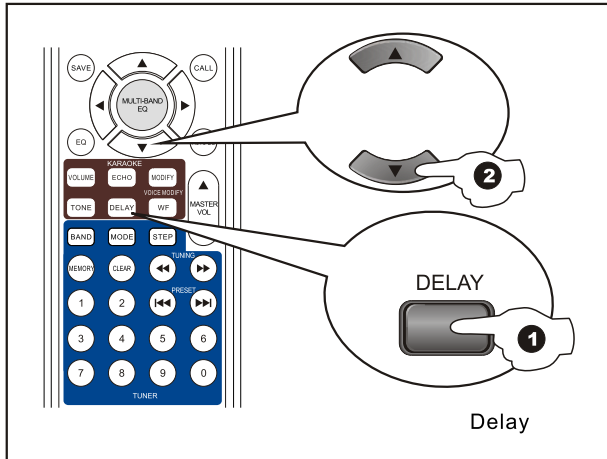
### 5. Delay

When inserting microphone to sing Karaoke, you may adjust microphone delay when the sound is not full.

◆ Press the "DELAY" button on the remote control then press "▲" or "▼" to adjust the delay of microphone. The adjustable range is 0~7..

◆ The microphone delay displays as "MIC DELAY 2"

◆ The microphone delay cannot be adjusted when not inserting microphone.

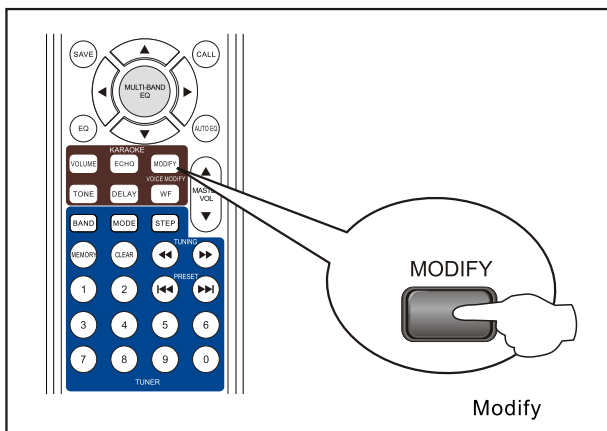


### 6. Modify

When inserting microphone to sing Karaoke, you may select microphone euphonize mode when the sound is unsuitable.

◆ Pressing the "MODIFY" button on the remote control can circularly select the euphonized voice "NATURAL", "Full", "Fruity", "Bright" and "Ringing".

◆ The MODIFY button cannot be selected when not inserting microphone.



### 7. Wide Field

When inserting microphone to sing Karaoke, you may select to switch on/off Karaoke wide field when the sound field is not wide.

### 7. Wide Field

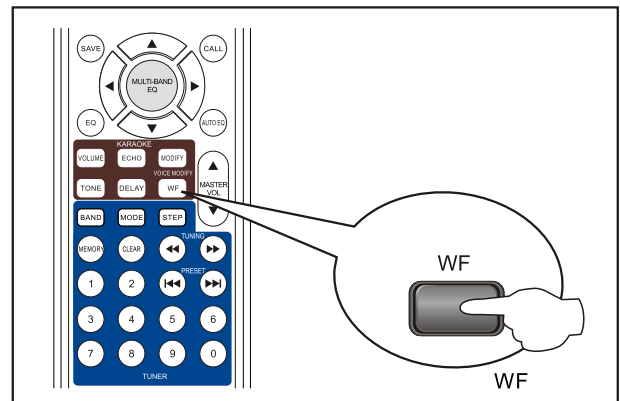
When inserting microphone to sing Karaoke, you may select to switch on/off Karaoke wide field when the sound field is not wide.

◆ Press the "WF" button on the remote control to display "MIC WIDE ON", which means Karaoke Wide Sound Field is switched on.

◆ Press the "WF" button on the remote control again to display "MIC WIDE OFF", which means Karaoke Wide Sound Field is switched off.

◆ The karaoke WF button cannot be selected when not inserting microphone.

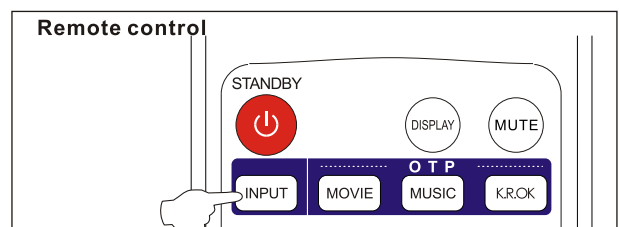
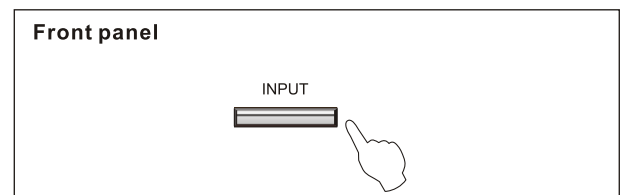
**NOTE:** If noise appears when adjusting Karaoke, please refer to TROUBLESHOOTING for details.



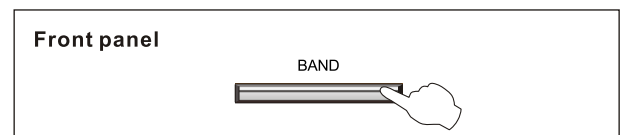
## 2.2.11 Tuning Function

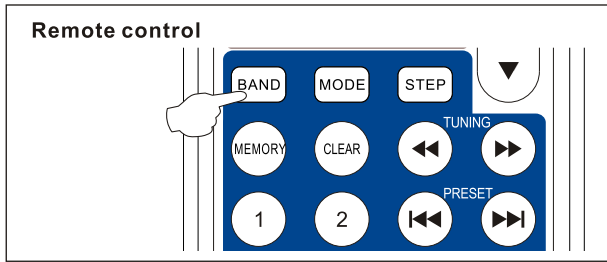
### Auto Tuning One:

1、 Press INPUT button on the front panel or remote control to select TUNER as the input sound source.

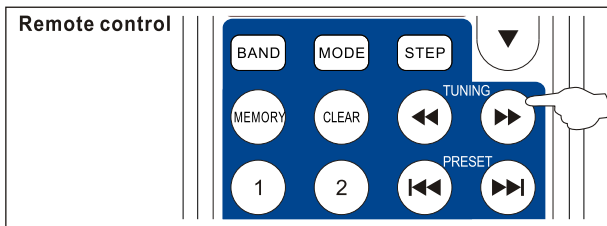
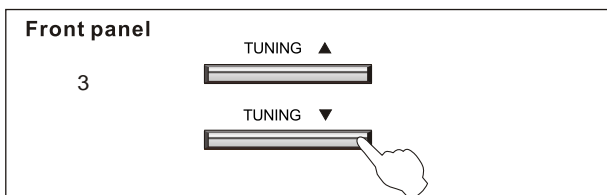


2、 Press BAND button on the front panel or remote control to select receiving wave band.





3、 Press TUNING▲/▼button on the front panel or remote control for above 5 seconds to automatically tune upwards/downwards until your needed radio station programs. When programs are searched, it will stop searching automatically.



◆If the tuning searching stops in imperfect radio station or radio wave interferes, please continue operating.

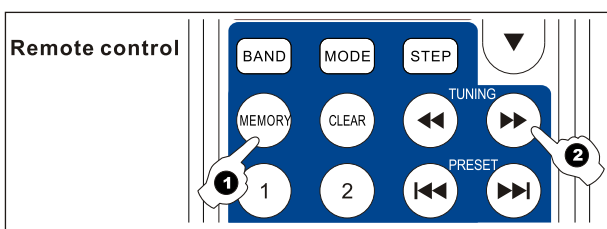
◆If the tuning searching stops in imperfect radio station (because of weak radio station signals), please change into manual tuning method.

4、 The following save and call operations are the same with manual tuning operations.

**Auto Tuning Two:**

1、 Firstly select TUNER as the current input sound source according to the operations of "Manual Tuning", and then select the wave band to be received.

2、 Press MEMORY button on the front panel or remote control, and then press TUNING▲/▼ button for above 0.5 seconds during the course of displaying MEMORY to enter the radio station auto searching status.



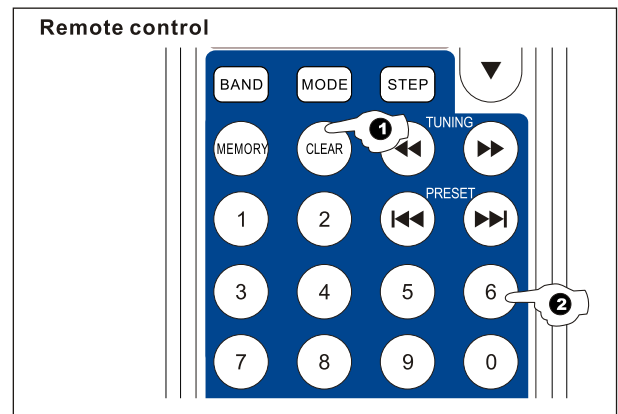
NOTE: 1. This operation will search and save automatically, so the user-preset programs will be covered.

2. Pressing TUNING▲/▼button may stop the function in the course of this operation.  
◆If the tuning searching stops in imperfect radio station (because of weak radio station signals or radio wave interferes), please change into manual tuning method.

**Clear Radio Station**

If you do not need the preset radio station, you may clear it by using CLEAR button on the remote control with the help of number buttons 0~9.

- 1、 Press CLEAR button on the remote control.
- 2、 Press the serial number of the radio station that you want to clear in the course of the screen's displaying "CLEAR..." to finish this operation.



NOTE: 1. This operation is beyond retrieve, so please take care to operate.

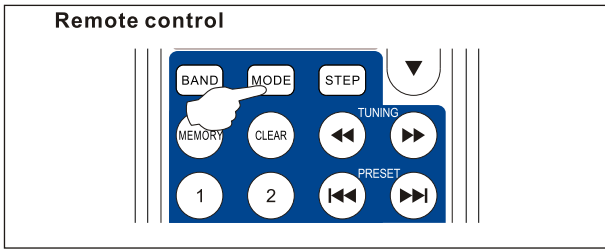
2. If you clear the radio station incautiously, you may save again according to the select operation.

**The Explanation of MODE button**

This unit has two working modes in the receiving status: AUTO/MANUAL

1、 In AUTO working mode, if you select FM wave band, this unit will automatically recognize the radio station program is mono signal or stereo signal and keep the mono or stereo receiving status.

2、 If the received radio station program has louder noise or cacophony in stereo status, you may switch to MANUAL working mode. In this way, the unit is in mono receiving status to decrease noise and cacophony generally. You may switch the two working modes through MODE button on the remote control.

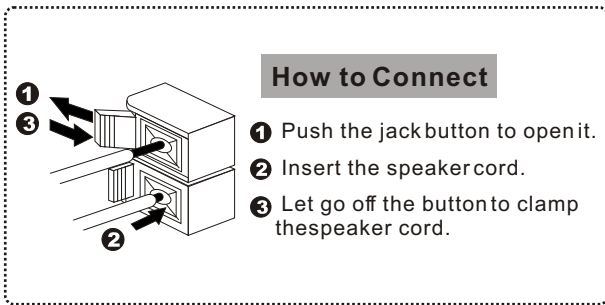


**Antenna Connection**

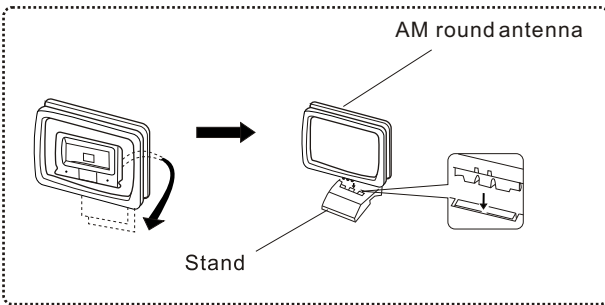
You may use our accessional AM and FM indoor antenna when in bad receiving effect. Generally speaking, these antennae can supply enough signal strength.

**Connect to AM Round Antenna**

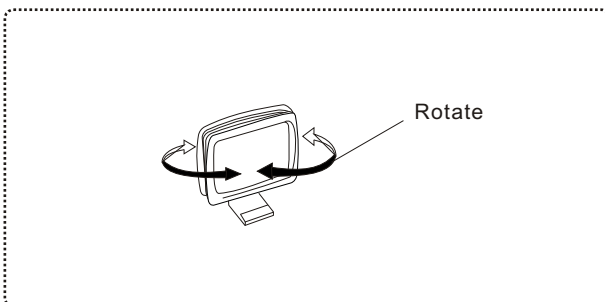
- 1、 Push the jack button to open it. Push the jack button to open it.
- 2、 Connect the AM round antenna cord to AM ANT and GND terminals.
- 3、 Let go of the button to clamp the speaker cord. Pull the cord lightly to check the connection is right or not.



- 4、 Connect the AM round antenna to the stand.



- 5、 Adjust the direction of AM round antenna to get the best receiving effect.

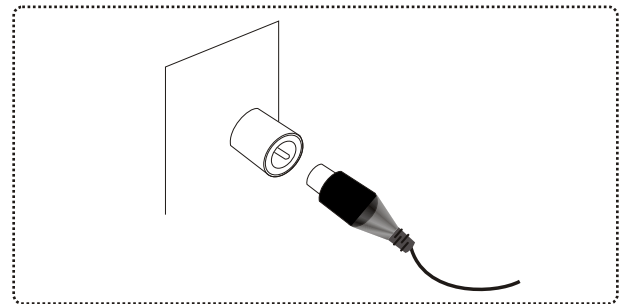


NOTE: 1. AM round antenna should be placed far away from the equipment. You may put up on the wall or on the bookshelf.

2. AM round antenna and outdoor antenna can be used at the same time.

**Connect to FM Antenna**

Connect to the indoor FM antenna  
Connect the accessional indoor FM antenna to 75 Ω UNBAL.FM ANT terminal.



NOTE: Do not use the outdoor and indoor FM antennae at the same time.

**GND (Grounding) terminal**

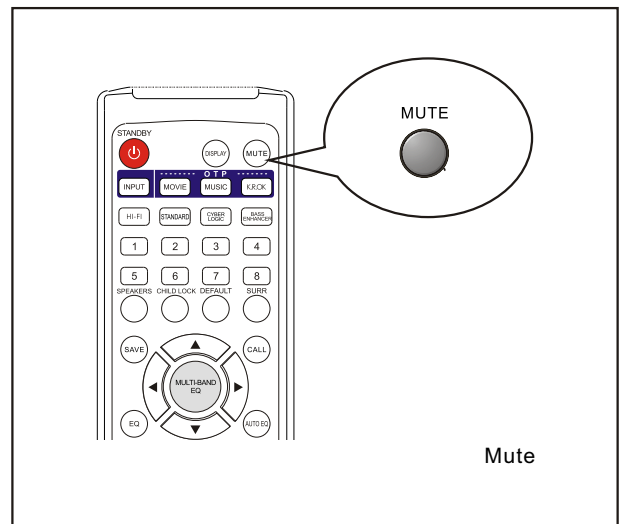
In order to ensure the safety and decrease the interference, please well connect the GND terminal. The better grounding method is insert the metal pole into wet ground.

**2.2.12 Other Operations**

1、 Mute

Mute the sound to make your conversation or answering telephone not be affected by music.

◆ Press the MUTE button on the remote control to mute the sound and the display "MUTE" flickers.

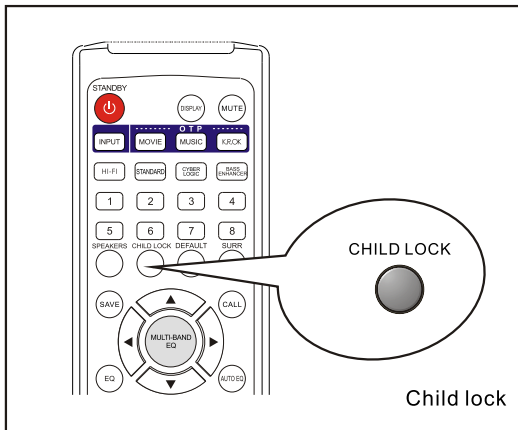


## 2、Child Lock

To prevent the children wrongly pressing the front panel buttons, you may lock the buttons on the front panel.

◆ Press the CHILD LOCK button on the remote control to display "LOCK". The buttons on the front panel are invalid and now "LOCKED" displays.

◆ Press the CHILD LOCK button on the remote control again to display "UNLOCK" and the front panel buttons can be normally used.



## 3、Display

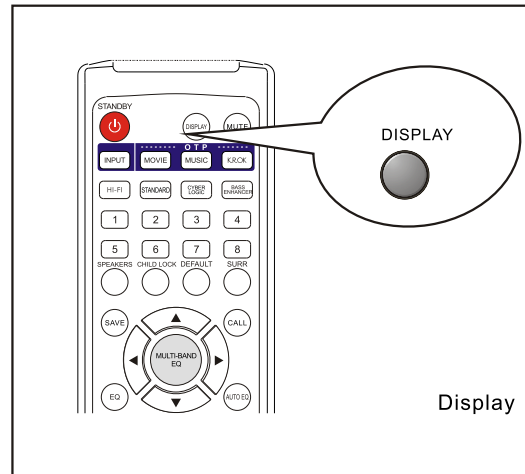
To make the display spectrum colorful, we have set many kinds of spectrum display means. You may press the DISPLAY button to select.

◆ After switching on the unit, it will automatically select a kind of spectrum display mode every third moment or so.

◆ Pressing the DISPLAY button on the remote control can cancel auto switch and select your favorite display mode.

◆ Pressing the DISPLAY button on the remote control repeatedly can select many kinds of spectrum display effects until auto switch.

◆ The DISPLAY button cannot be selected when no signals input.

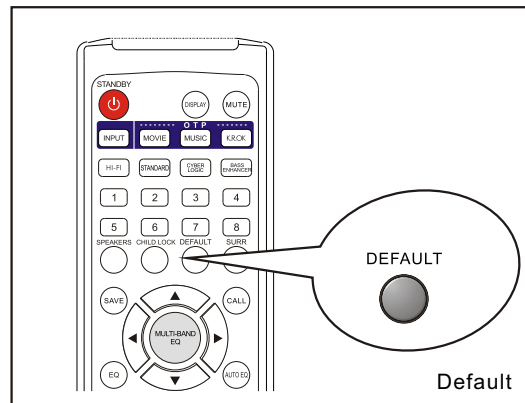


## 4、Default

When the system parameters adjusted disorderly, you may restore the default settings.

◆ Press the DEFAULT button on the remote control to display "DEFAULT".

◆ The unit automatically sets the default parameters.



# Chapter Three Principle and Servicing

## Section One Principle of the Player

AV225T (RU) is an advanced power amplifier with complete functions. Based on the former power amplifiers, it adopts LCD screen, with sky blue background matched with 16 different kinds of spectrum display styles, in addition, this player is with tuning function and it is an excellent selection for users who love listening to radio.

### 3.1.1 Composition of the player

1. Volume board: select input signal source, Cyber Logic and bass enhancer control.
2. Signal processing board: Karaoke signal processing and 5.1CH signal amplifying.
3. MCU board: player control, frequency point gating, and auto search circuit.
4. Control panel: LCD display, remote keyboard and background light display.
5. Power board: supply the working voltage required by each unit circuit and perform player protection function.
6. Power amplifier board: perform power amplifying to 5.1CH analog signal.
7. Digital tuner: receive radio signal and then send to power amplifier for signal processing.
8. MIC, headphone board: MIC signal input, headphone amplifying output circuit.
9. Video input and output board: fulfil the switch of VCD, DVD channel.

### 3.1.2 Function and features

Built-in 5CH power amplifying, applicable to AC-3/DTS and stereo music replay. Main channel 80W, central/surround 15W with strong power.

AC-3/DTS, VCD, DVD input jack and subwoofer output jack.

6CH volume control and separate level control, with 7-band electronic equalization.

Bass enhancer system, Cyber logic function and Hi-Fi playback function.

Q-play function of movie, music and Karaoke.

Multiple EQ modes, applicable to different music styles.

Auto spectrum analysis compensation function performs compensation to signals automatically.

Complete Karaoke function, including separate MIC volume control, high/low tone adjustment, voice compensation, delay and echo adjustment, Karaoke wide sound field function.

### 3.1.3 Player block diagram

The player block diagram is shown as the following figure 3.1.3.1:

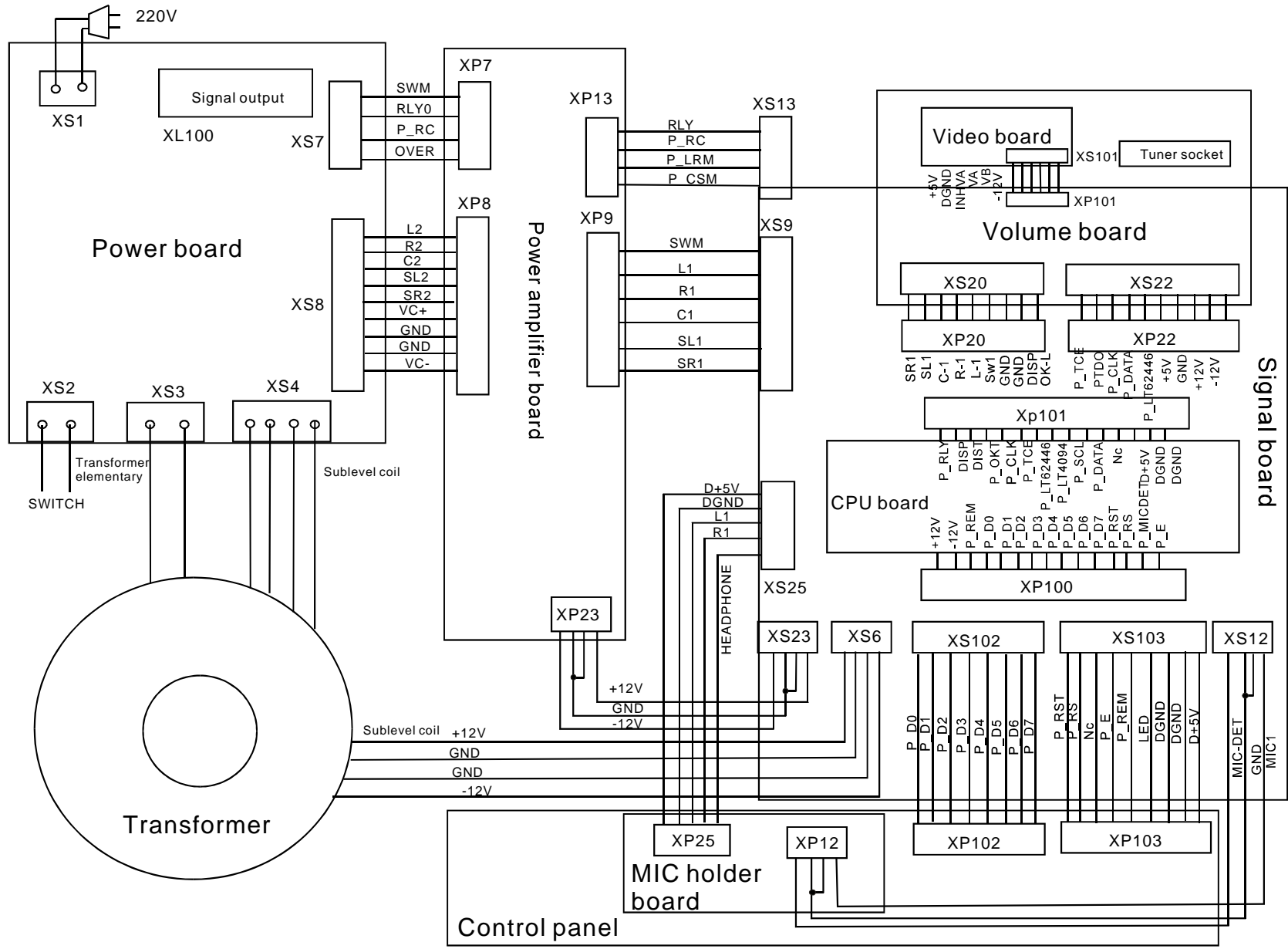


Figure 3.1.3.1 Player block diagram

### 3.1.4 The player signal flow chart

The player signal flow chart is shown as the following figure 3.1.4.1:

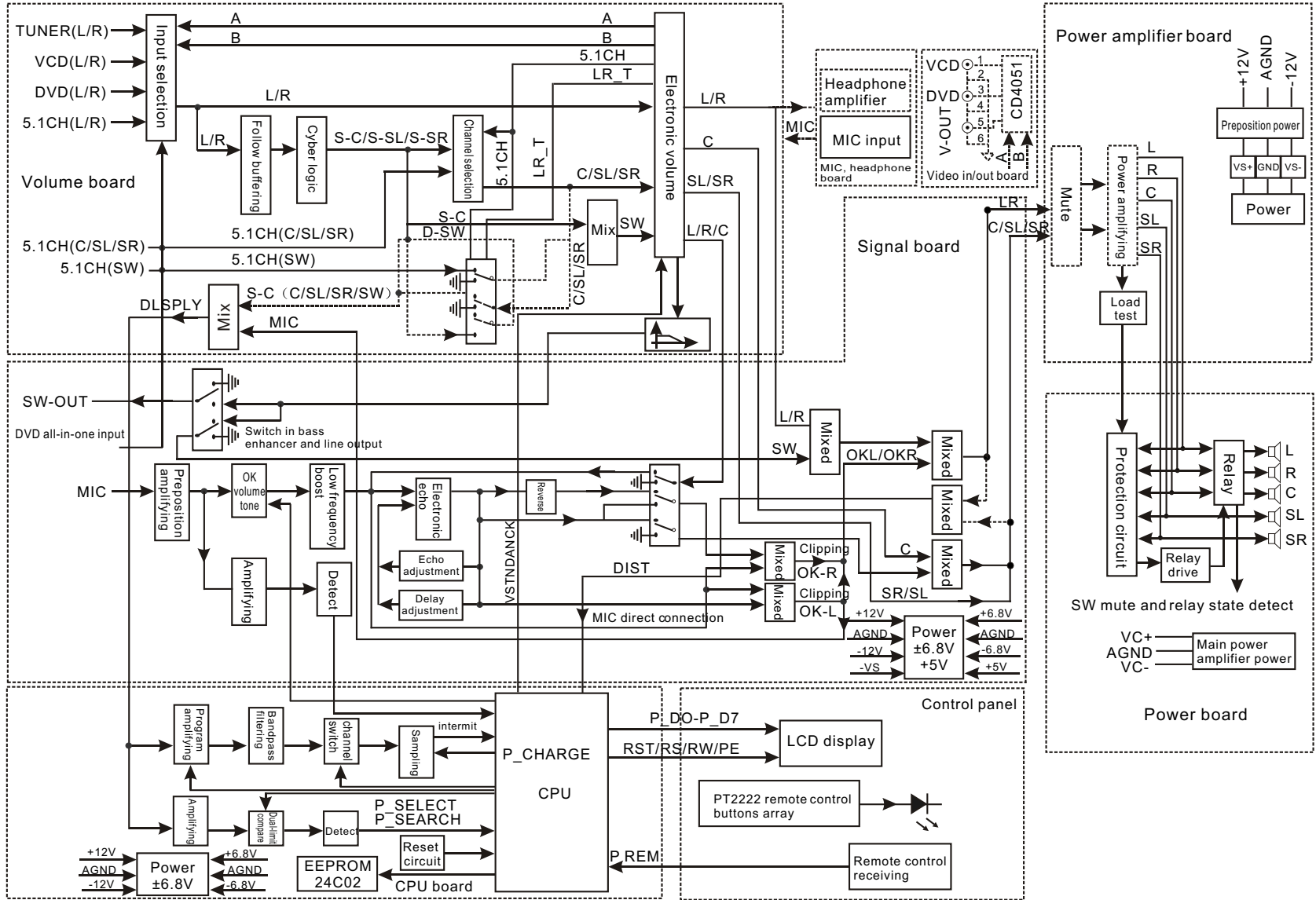


Figure 3.1.4.1 The player signal flow chart

## Section Two Unit Circuit Principle

### 3.2.1 Volume board circuit

AV225T (RU) has 4 kinds of input means in all: tuning input, VCD, DVD stereo input and 5.1CH input. The Cyber logic function of AV225T (RU) is to achieve C, SR, SL and SW signal through buffer and processing of adder and subtracter after sampling from L, R channels. In this circuit, electronic simulation switch is adopted to fulfil the switch in all kinds of state. Signal flow is shown as the following figure 3.2.1.1:

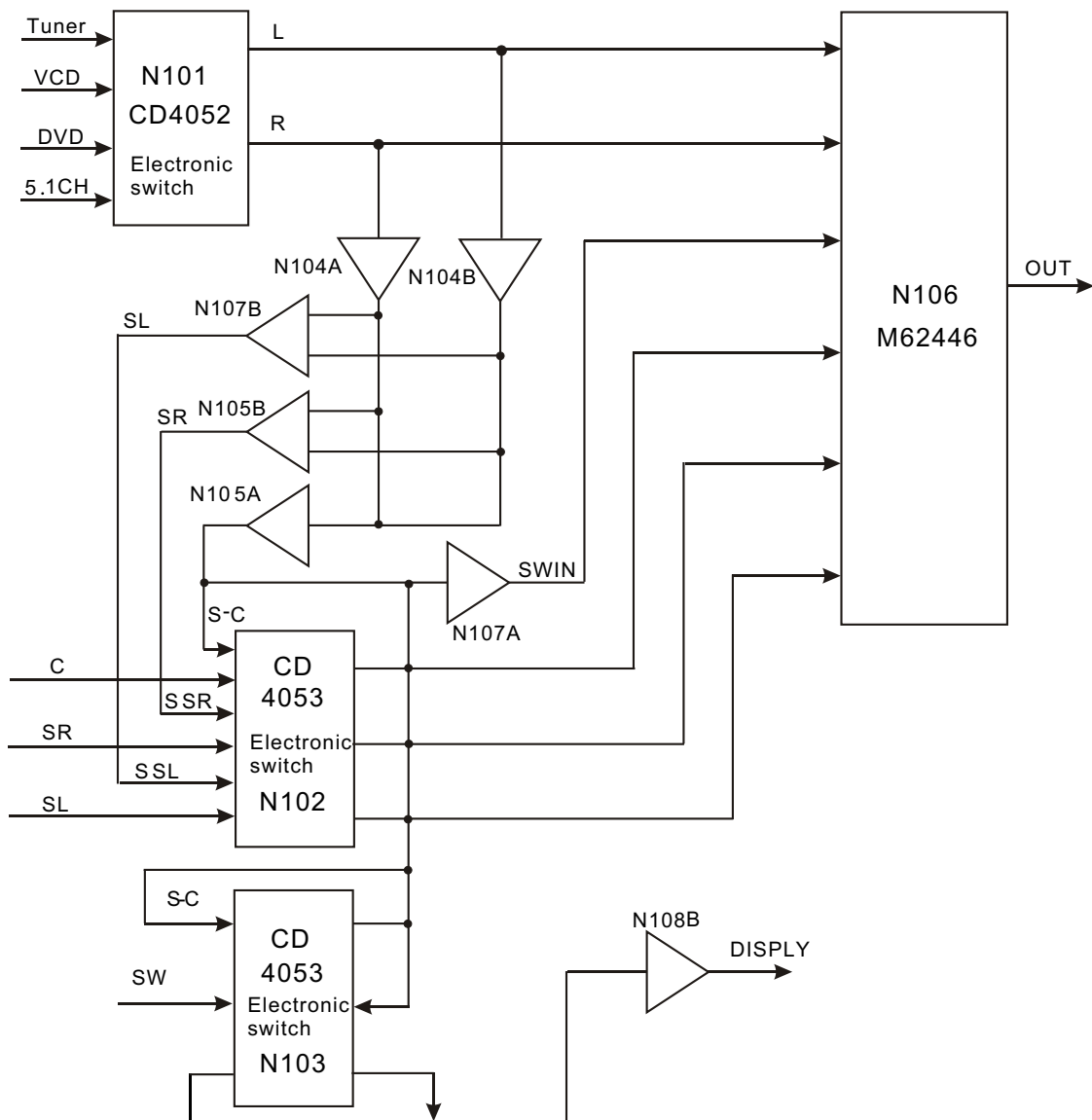


Figure 3.2.1.1 Volume board signalflow chart



1. Input selection and sound field processing mode

The input selection of AV225T (RU) is fulfilled through electronic switch CD4052 and CD4053, and the truth value table is shown as follows:

CD4052 Truth value table

Pin \ Mode	Tuner	VCD	DVD	5.1
A	0	1	0	1
B	0	0	1	1

CD4053 truth value table

A	X	B	Y	C	Z
0	X0	0	Y0	0	Z0
1	X1	1	Y1	1	Z1

(1) 5.1CH input state: now A, B, 5.1CH of M62446 are in high level, L and R channel signals of 5.1CH input terminal are outputted from pin 3, 13 of N101 respectively and then sent to IC N106 for volume and tone adjustment; meanwhile C, SR, SL signals of 5.1CH input terminal are outputted from pin 14, 15, 4 of N102 and then sent to IC N106 for separate volume adjustment; in addition, SW signal of 5.1CH is outputted through pin 4 of N103, amplified by N107A and then sent to M62446.

(2) 3 kinds of analog input modes: AV225T (RU) has 3 kinds of analog input modes: tuning signal, VCD and DVD are controlled through signals A, B separately. Please refer to CD53 truth value table for reference.

(3) AV225T (RU) has 3 kinds of sound field modes in all: standard, Cyber logic and Hi-Fi.

A. Standard: under the control of the player MCU, when bass enhancer is off, left channel, right channel and subwoofer have output; when bass enhancer is on, only left and right channels have output.

B. Hi-Fi: under the control of MCU, only left and right channels of M62446 have output; when bass enhancer is off, volume adjustment is off.

C. Cyber logic: pin 9, 10 of electronic switch N101 (CD4052) select a group of analog left and right channel input signals according to the truth value table, the left and right channel signals are outputted from pin 3, 13 through the electronic switch inside N101 and divided into 2 ways: one way is sent to pin 13, 15 of M62446 for electronic volume and tone adjustment, and the other way gets SW, S-SR, S-SL and S-C signals through buffer and adder and subtracter, in which S-C, S-SR and S-SL signals are sent to pin 12, 2, 5 of N102, under the control of 5.1CH signal, N102 selects Cyber logic signal input (see Cd4053 truth value table) from Cyber logic and 5.1CH signal, central, right surround and left surround signals are outputted from pin 14, 15 and 4 respectively and then sent to pin 11, 8 and 9 of M62446 for volume adjustment. Another SW signal is outputted from N107A and then sent to pin 6 of M62446. 5.1CH signal sent to M62446 outputs from pin 31, 36 after volume adjustment, and then is outputted by XS20 flat cable holder to signal board.

(4) The relationship between the switch in all kinds of sound sources and sound handling mode in input circuit is show as the following figure 3.2.1.2:

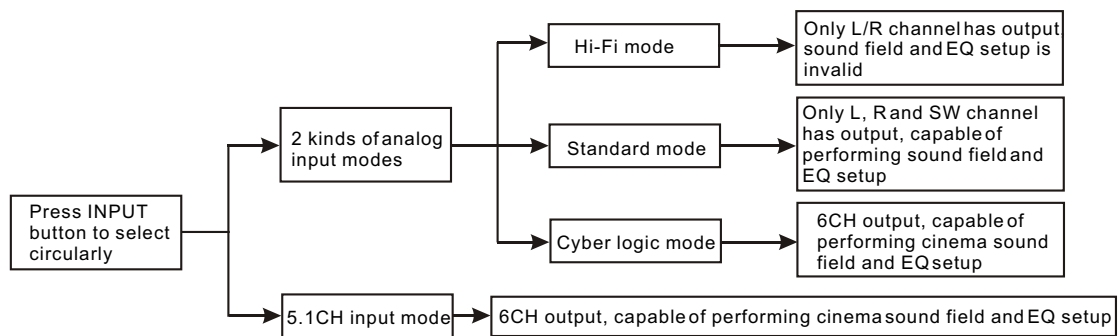


Figure 3.2.1.2 Illustration between input circuit

## 2. Control circuit

The latched, data and clock signals outputted by MCU (N100) pin are sent to pin 39, 40, 41 of M62446, pin 1, 2, 3, 4 of M62446 output control level to select the input signal and spectrum sampling signal. Other functions, such as volume and tone adjustment, are also controlled by the three control signals. The display of display screen is controlled by CPU directly.

## 3. Spectrum sampling circuit

The spectrum sampling in AV225T (RU) is sent from pin 13 of N103 to N108B for amplification, and then sent to spectrum gating circuit. 5.1CH of M62446 selects sampling signal. When selecting Cyber Logic, 5.1CH control signal is low level, now pin 9, 11 of N103 is low level, and it is known from the truth value table that the output is X0 and Z0 and this two sampling signals are grounded. It is known from Cyber logic principle, centre, surround and subwoofer channels are all produced by left and right channel signals, but in S-C signal, complete left and right channel signals are included, so it is ok to sample from S-C only. Therefore, S-C signal is outputted through R195 (pin 13 of N103) to N108B and added with OK-R signal for the amplification of spectrum sampling signal, and then sent through XS20 to frequency point gating and auto search circuit; the same, when selecting 5.1CH input, 5.1CH control signal is high level, pin 14, 15, 4 of N102 select pin 14, 4 of X1, Y1, Z1 of N103 and connect to X1, Z1, thus, the 6-channel signals are outputted through pin 13 of N103 to N108B and added with OK-R signal for the amplification of spectrum sampling signal, and then sent to frequency point gating and auto search circuit through XS20.

## 4. Tuning function

This player has tuning function, which provides a good selection for users. It directly controls digital tuner through MCU to receive audio signal, and then output after amplification by power amplifier. The clock and data line of digital tuner is commonly used together with M62446, the other two control lines are directly connected to MCU, L, R signals after being handled by digital tuner are directly sent to pin 1 and 12 of N101 CD4052 for gating input.

### 3.2.2 Signal processing board circuit

The signal board performs mixed amplification to 5.1CH signal sent from volume board, voice signal sent from microphone, headphone board and Karaoke echo signal.

#### 1. AV225T (RU) Karaoke circuit

(1) Function: this circuit is to reset by loudspeaker after handling voice and being amplified by power amplifier. It includes voice beautification circuit, wide sound field processing circuit and Karaoke's echo and delay adjustment circuit.

(2) Function of IC of Karaoke circuit is shown as the following table:

IC SN	IC name	IC function	IC SN	IC name	IC function
N201	4558	Operational amplifier performs preamplification to voice signals	N207	CD4051	Karaoke delay adjustment
N200	PT2315	Karaoke volume adjustment, including tone adjustment	N208	CD4051	Karaoke echo adjustment
N205	CD4053	Electric switch	N204	4558	Inverter
N209	PT2399	Karaoke echo settlement			

#### (3) Karaoke signal flow chart

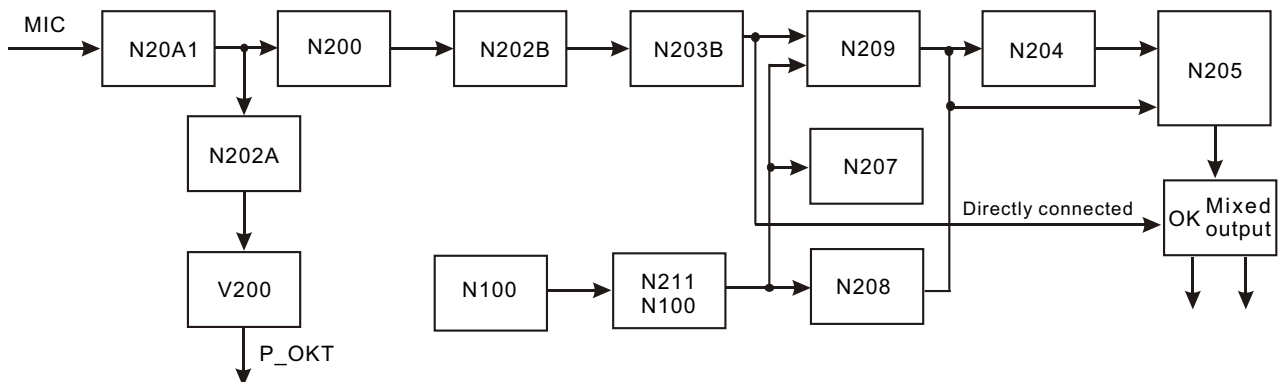


Figure 3.2.2.1 Karaoke signal flow chart

Shown as in the figure 3.2.2.1, when microphone is inserted, MIC signal is sent to N201A operational amplifying circuit for amplification. One path of MIC signal after being amplified gives MCU a microphone input identification signal P\_OKT through VD201 rectification filtering control triode V200 after being amplified by N202A; when there is signal input, P\_OKT is low level, MCU makes N210 CD4094 send out KM low level signal to make triode V103, V105, V104 cutoff and then to make MIC signal can output; the other path is coupled by C219 to pin 6 of PT2315, and then output from pin 16 after internal volume adjustment to N202B and N203B for amplification. The signal after being amplified of N203B is divided into two paths, one path outputs directly, and the other path is coupled by R222, C247 to PT2399 inside for delay and echo adjustment and then outputs from pin 14, and then mix output

Together with direct connection OK signal through N204B, while OK-R is outputted from pin 14 after being gated by N205 and then overlapped to left and right channels.

In this circuit, the low frequency exalt network composed by triode V201 connected to the reverse end of N202B is mainly to exalt 75HZ low frequency signal.

When performing delay adjustment to PT2399, firstly give control signal to MCU, and MCU controls N207 after being extended by N211 IC CD4094, then selects different resistance value to connect into pin 6 of PT2399 to reach the purpose of delay adjustment.

Similarly, through changing the resistance value in R229 to change the echo level overlapped to direct connection signal, the echo adjustment is realized.

The wide sound field control signal of Karaoke is sent by N211 to pin 11 of N205, when it is high level, pin 14 of N205 is connected to X1, now the phase of OK-R signal is reverse from that of OK-L, sound field is widened and Karaoke is in wide sound filed state. On the contrary, the phase of OK-R signal is the same with that of OK-L, Karaoke is in the narrow sound field state.

In addition, microphone plug has a detect signal P\_MICDET, and it composes the detection to microphone inserting together with the circuit composed of V202. When microphone is not inserted, it is low level, V202 cutoff; when microphone is inserted, it is high level, V202 is on, now turn off scene surround mode and forbid tuning.

Otherwise, there is OK auto mute function. When P-KT cannot detect any signal in a continuous period, MCU will send out a control signal to make KM be high level, triode V103, V105, V104 is on to mute OK signal to advance SNR of the player and better listening effect.

#### (4) Scene mode signal flow

AV225T (RU) has a special function, that is, it may realize switch in 5 kinds of scene mode when there is no Karaoke, which is fulfilled by Karaoke part. Signal flow chart is shown as in the figure 3.2.2.2:

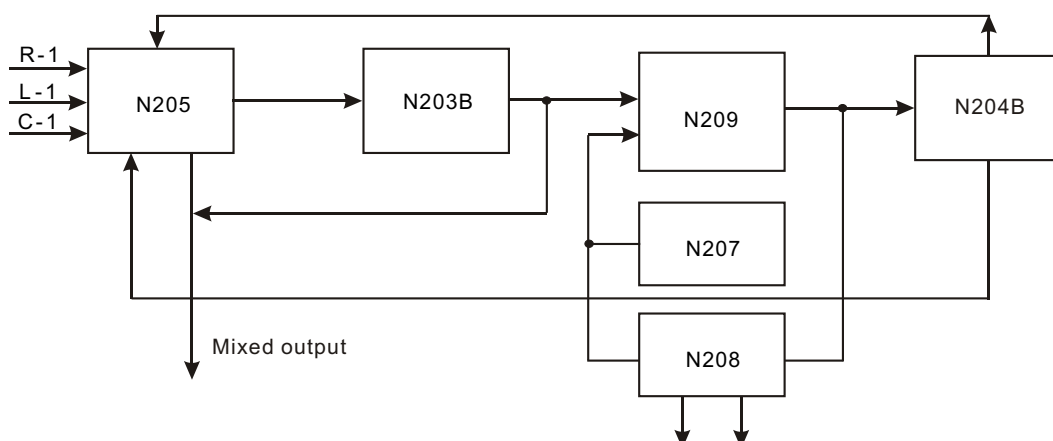


Figure 3.2.2.2 Scene mode signal flow chart

When pin 9 and 10 of N205 is in high level, the sampled L, R, C signals are outputted by pin 3 through N205 gating, after being amplified by N203B, one path is sent to PT2399 inside for echo and delay adjustment (controlled by IC CD4094), the effect after adjustment is overlapped to L, R, C channel

To form various scene modes. Seen from this, its principle is the same with that of Karaoke. In scene mode, it functions only when microphone is not inserted and in 5.1CH mode at the same time.

## 2. Bass enhancer circuit

BURST sent out by N210 is bass enhancer on/off signal. When it is high level, it is added to base electrode of V102, V102 is on, base electrode outputs low level, V107, V100 are cutoff, SW signal outputs to external terminal normally, at the same time, BURST high level signal is added to emitting electrode of V108, V108 is on, collector electrode output high level is added to the base electrode of V101, V101 is on to make SW signal grounding and it will not be overlapped to left and right channel signals.

Reversely, when BURST is low level, V100 is on, SWM signal cannot output from external terminal, at the same time V101 is cutoff, SW signal is overlapped to left and right channel signal.

Bass enhancer of AV225T (RU) is divided into 3 levels, the principle is to change the high/low of bass enhancer level through changing SW output volume of M62446.

Meanwhile, SWM signal is added to relay through XS9, when relay is disconnected, SWM signal is grounded to make subwoofer terminal have no output to avoid the concussion to speakers at the moment of power-on.

## 3. 5.1 signal and Karaoke signal mixed amplification circuit

Left and right channel signals of 5.1 signal, after being mixed with SW signal and being amplified by N101B, N100B, are sent to the reverse end of N101A, N100A, at the same time, OK-R, OK-L signals are respectively added to the reverse end of N101A, N100A and then output from pin 1 of N100A, N101A to power amplifying circuit for amplification after the mixed amplification of N100A, N101A.

Meanwhile, the centre C-1 signal sent from volume board is added to the pin 6 reverse end of N102B, and then added to the reverse end of N102A after amplification. Now the C1-1 signal after processed by echo (scene surround mode) is also required to add to the reverse end of N102A and mixed amplifying with it, then sent to centre channel power amplification circuit.

Surround SR-1, SL-1 signal of the other path volume board is directly sent to surround channel power amplification circuit.

One path of 5.1 signal after mixed amplification is sent to power amplification circuit through XS9, the other path forms DIST signal (distortion detect signal) to MCU board through R111, R112, R142, R145, VD100-VD104 to perform auto gain adjustment to control the volume output.

## 3.2.3 MCU board circuit

MCU board is composed of player control circuit, auto search input signal and spectrum analysis circuit.

## 1. The player MCU control

N100 is the control centre of the player, various control instructions are outputted by it to each controlled circuit to fulfil each control function. +5V power supply is adopted, and pin 40 is its power supply pin. Pin 18, 19 externally connects with 12M crystal oscillator to provide itself with working clock frequency. Pin 9 is its reset pin, when power on, +5V charges C106 through R100. The voltage on the two ends of capacitor cannot change suddenly, so B-pole of triode V100 is low level, that is, V100 is not on, a high level reset signal is given to MCU. When capacitor C106 charging finishes, V100 is on, now reset finishes. Form of this kind of reset circuit is high level reset, and low level is kept.

When the player is working, information of power-on picture and Chinese characters when operating displayed on display screen are all saved in the static memorizer inside MCU. N101 is a state memorizer and it can save the working state of the player at the time of power-off and then call these states until power-on next time to avoid the adjustment of users again. All kinds of user-set sound field modes are also saved in it and can be called when necessary.

## 2. Input signal detecting, search circuit automatically

DISPLAY signal from volume board is sent to N103A for amplification, after being coupled by capacitor C110, sent to the reverse end of voltage comparator N103B, outputted from pin 7 of N103B, then sent to pin 16 of the player MCU through VD103, V101, R109, R107. When N103B outputs a high level, Vd103 is in reverse cutoff state, B-electrode of switch pipe V101 is high level, now switch pipe V101 is in on state, and then a +5V P\_SEARCH high level is achieved through VD101 voltage regulating to MCU, which means there is no signal input, and the search continues. When output terminal of N103B outputs a low level, VD103 is in positive direction on state, B-electrode of switch pipe V101 is low level, now switch pipe is in cutoff state, MCU detects that P\_SEARCH is low level, which means there is signal input, at the same time, the search stops. The working principle is as follows:

(1) After power-on, under the control of MCU internal program, data signal is outputted to M62446, then M62446 sends out high/low level to perform scanning to N101, N102, N103 each input port of volume board, at the same time, P\_SELECT is high level, V102 is on, now the in-phase end voltage of comparator N103B is about 0.1V. When these input ports have no signal output, voltage of pin 6 of N103B is less than 0.1V, pin 7 outputs +12V, Vd103 is in reverse cutoff state. It is known from the above analysis, P\_SEARCH is high level, which means there is no signal input. After all ports being searched once, it enters standby state automatically; when a certain port has signal input, this signal is compared with pin 5 of N103B through N108B of volume board and MCU board N103A amplification, if voltage of pin 6 of N103B is more than 0.1V, pin 7 outputs -12V, Vd103 is in positive direction on state, now, P\_SEARCH is low level, which means there is signal input, through controlling IC M62446, MCU locks this port that has signal input to enter normal playback.

(2) When pressing "GOTO" button on remote controller, through remote control receiver on the panel, the switch from light signal to electric signal is performed, thus, pin 11 of MCU sends out a high

Level to make V102 in on state, and search also according to the above program.

### 3. Spectrum analysis circuit

(1) Spectrum analysis circuit is composed of auto spectrum gain adjustment circuit, frequency point gating circuit, A/D conversion circuit and display output circuit, shown as in the following figure 3.2.3.1:

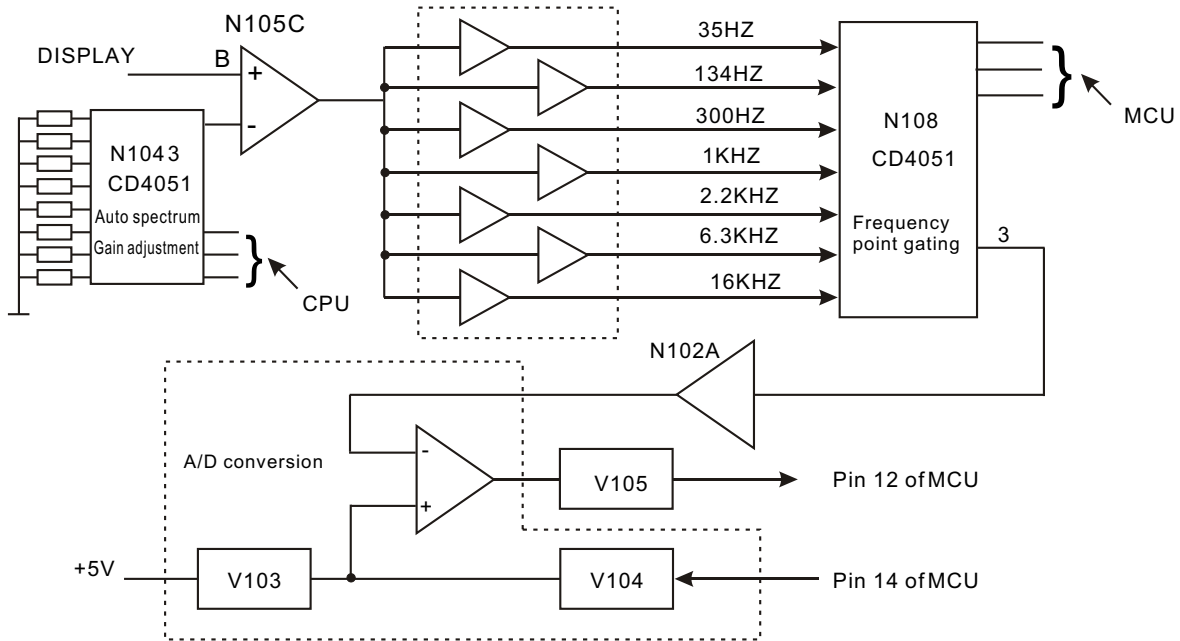


Figure 3.2.3.1 Spectrum analysis circuit

(2) Auto spectrum gain adjustment circuit: in order to avoid the two conditions that when input signal is too weak, screen display range is too low, or when input signal is too strong, full screen will appear, AV225T (RU) has set auto spectrum gain adjustment circuit and adopted a single-channel 1-selected-from-8 electronic analog switch N104 CD4051, with its truth value table shown as follows:

	X0	X1	X2	X3	X4	X5	X6	X7
A	0	1	0	1	0	1	0	1
B	0	0	1	1	0	0	1	1
C	0	0	0	0	1	1	1	1

Through changing the resistance value of the reverse end grounding resistor of operation amplifier N104, gain of the operation amplifier is changed. See the details of the working of the entire circuit. The spectrum analysis signal source (DISPLAY), mentioned above, is sent to the in-phase input terminal of operational amplifier N105C for amplification, and its amplified multiple depends on the ratio of the resistor connected by feedback resistor R130 and N104 electronic switch. When main volume is too high, through the control of MCU, N104 increases the resistance value of grounding resistor automatically and

Decreases the amplified multiple; when main volume is too small, N104 decreases the resistance value of grounding resistor automatically and increases the amplifies multiple.

(3) Frequency point gating circuit: the signals after being amplified by N105C, through C115 coupling, are sent to the 7 bandpass filters composed by operational amplifier, the corresponding frequency range can be confirmed through setting the capacity of its feedback capacitor. On the output end of each filter, a half-wave rectification circuit is connected, through rectification filtering to the AC signal after being amplified DC voltage is achieved. This circuit is mainly to realize frequency point sampling function, which can represent the range of each frequency point in a complete sound signal.

If the low frequency part in sound signal is strong, the DC voltage on the output terminal of 35HZ, 100HZ filter will be higher, similarly, when high frequency part is strong, the DC voltage on 10K, 16K filter will be higher. The output terminal of this 7 filters is connected to 7 input terminals of electronic switch N108 (Cd4051) to make this electronic switch quickly and circularly gating in each frequency point. On the output terminal of pin 3 of N108 will output a series voltage values that stand for each frequency point signal range, shown as in the following figure 3.2.3.2:

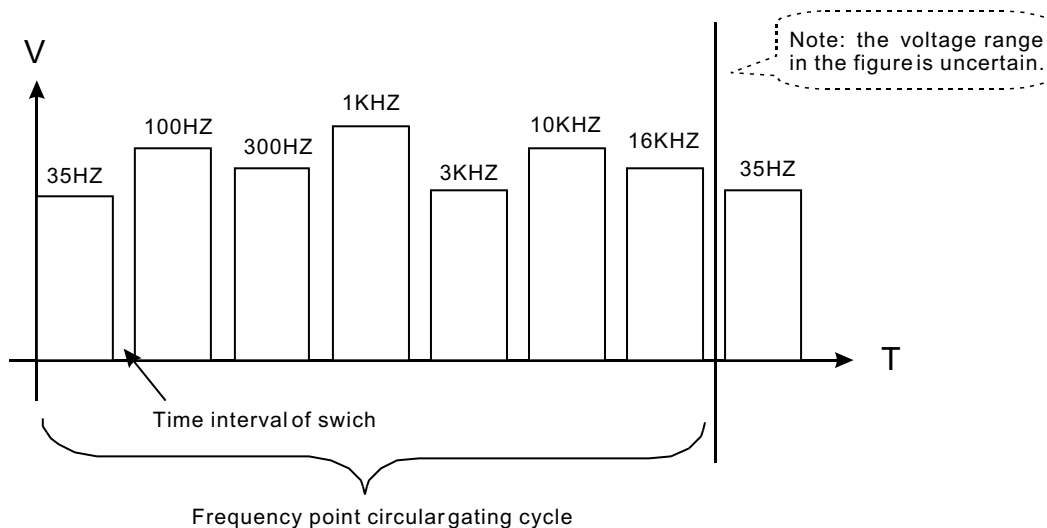


Figure 3.2.3.2 Frequency point signal range voltage value

#### (4) A/D conversion, display output circuit (two cases divided)

1) When there is no signal input, MCU sends a P\_CHARGE high level signal to B-electrode of V104, the positive direction end of comparator N102B is low voltage, for the reverse end of N102B gets the partial pressure of R169, R172, thus it will make N102B output voltage with -12V about to make triode V105 cutoff; C-electrode of V105 will give a high level P\_ADINT0 to pin 12 of MCU to inform MCU of not performing A/D conversion. (Pin 9, 10 of N108 has no action and keep in high level)

2) When machine detects signal, MCU sends a P\_CHARGE low level signal to B-electrode of V104, +5V voltage charges C137 through V103; when the voltage value of reverse end is reached, comparator turns over, pin 7 of N102B outputs +12V voltage to make V105 on, C electrode is low level, after MCU



Receives low level signal, 35Hz level gating is immediately finished, and then switches to next frequency Point 100Hz. During the course of conversion, P\_CHARGE outputs an instant high level to make V104 on, releases the voltage on C137, and makes the in-phase end of N102B begin the process of 100Hz charging from 0 level. When 100Hz charging finishes, switch into the charge/discharge process of the next frequency point, and this kind of process circles continuously under the control of MCU. This period of charge, from 0 level to the point that turn over happens, stands for the signal range of the current frequency point. The range is larger, time is longer and range displayed on screen is higher; the range is smaller, time is shorter and range displayed on screen is lower. The digital pulse outputted from the output terminal of N102B adds to pin 12 of MCU through V105 phase, MCU handles it and outputs to panel and makes dynamic spectrum display on display screen. Originally speaking the display of each frequency point performs one by one according to the sequency, for the above circulation process is fast, on the screen we will see the process of a whole spectrum displays. Shown as in the figure 3.2.3.3, the charge time parameter is frequency point signal range voltage value cyclic parameter in the figure 3.2.3.2:

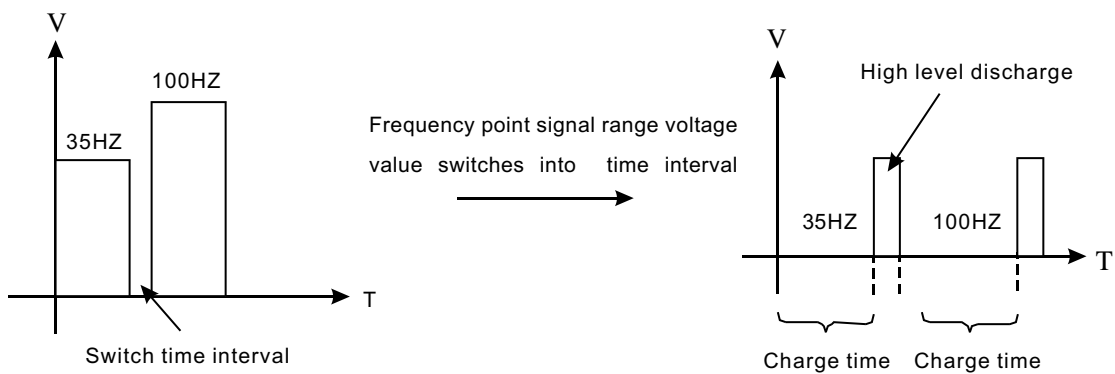


Figure 3.2.3.3 Illustration of "Frequency point signal range voltage value switches into time interval"

### 3.2.4 Control panel circuit

Front panel control circuit is the window of man-machine conversation of the player, and it can transmit various operation instructions to MCU to fulfil various operation. At the same time, it is also a window of the player. Users control the working state of the player through it and it is also an important composition of the appearance. Control panel circuit block diagram is shown as in the figure 3.2.4.1:

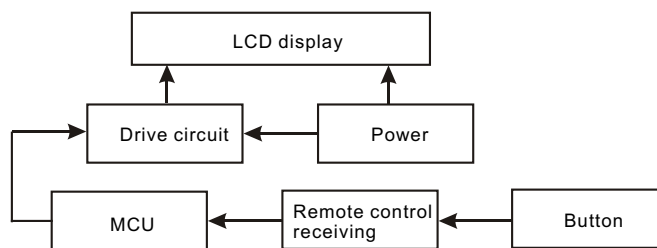


Figure 3.2.4.1 Control panel circuit block diagram

### 1. Power supply circuit

Control panel power supply of AV225T (RU) has two groups voltage of +3.3V and +5V. The +5V voltage from signal board after voltage regulating supplies power for N102, N103 (74VHC245) and N101 PT2222 respectively through the voltage reduction of three diode VD105, VD106 and VD107.

### 2. LCD display drive and buttons circuit

This circuit is composed of N101, N102, N103 and LCD. The display is directly controlled by P0 port of MCU, LCD is banded with IC inside. For working voltage of display screen is +3.3V, but the control line level sent out by MCU is +5V, between MCU and LCD display screen, two IC 74VHC245 are used to perform level conversion to change the +5V control level from MCU into +3.3V control level to control the display of display screen.

Buttons circuit of this player is equal to a remote controller. Signal of buttons matrix is received by PT 2222 and then makes infrared light emitting diode VD100 send out signal through the control of triode gating by pin 7 , then send to MCU for processing after being received by remote control receiver.

## 3.2.5 Power board circuit

Power board provides each unit circuit of the player with required various working voltage. Shown as in the figure 3.2.5.1, AV225T (RU) adopts a large power round transformer to supply power for main channel, central and surround channel power amplifier.

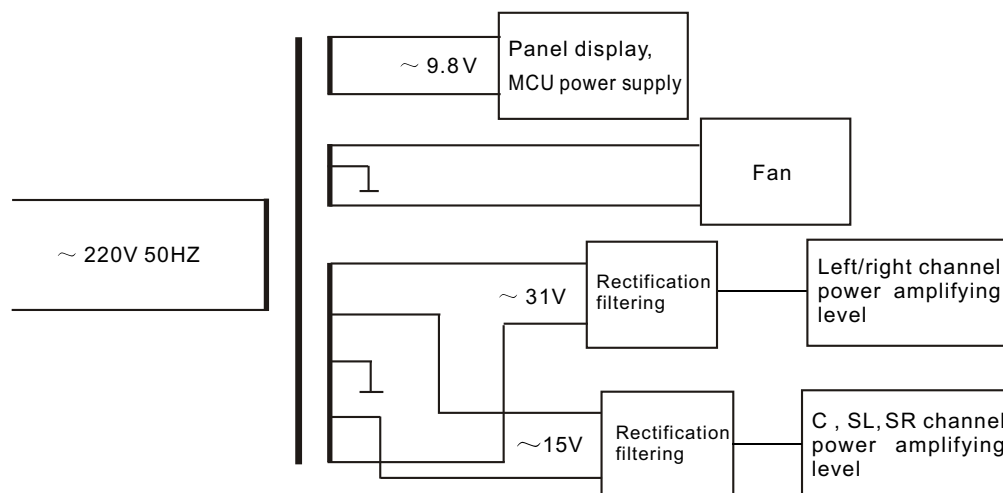


Figure 3.2.5.1 Power board power supply block diagram

1. The two groups AC 31V outputted by the first time grade of transformer, through rectification filtering of 8 In5404 and 2 large electrolytic capacitor (15000uF/68V), gets +/-43V voltage to supply power for left and right channels.

2. The two groups AC 15V voltage outputted by the second time grade of transformer, through rectification filtering of 4 In5404 and 2 electrolytic capacitor (4700uF/35V), gets +/- 21V voltage to

Supply power for SL/SR/C channels. In addition, for other IC and operational amplifiers, power is achieved also through voltage regulation of 3-end voltage regulator L7812, L7912 by it to supply power for other IC.

### 3.2.6 Power amplifier board and protection circuit

#### 1. L/R channel power amplifying circuit

L, R channel power amplifying circuit of AV225T (RU) is composed of discrete components. The composed block diagram is shown as in the figure 3.2.6.1: (take L channel as instance)

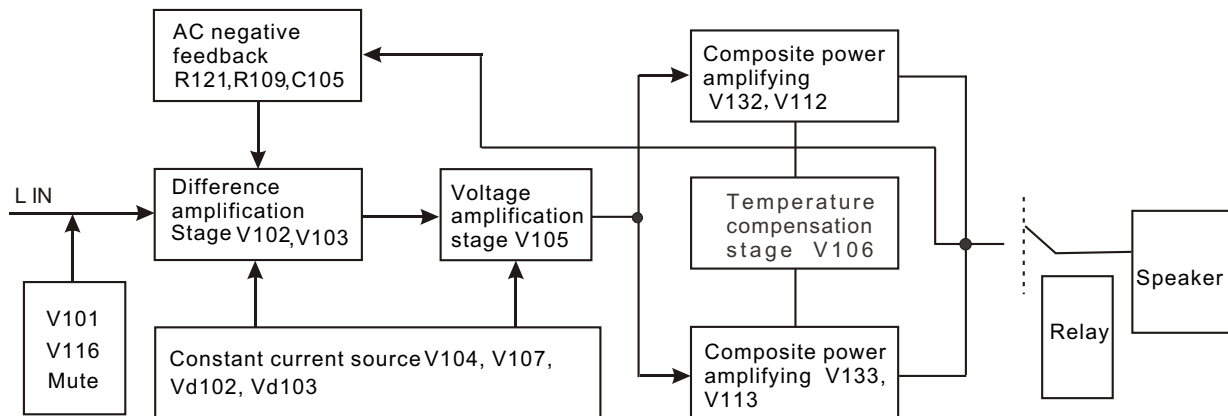


Figure 3.2.6.1 L input block diagram

L channel signal, through R101, R103, C101 coupling, is sent to B electrode of V102; V102 and V103 are composed difference amplifying circuit of single ended input and single ended output. Sound signal outputs from C electrode of V102 to B electrode of voltage amplifying stage, and then outputs to composite power amplifying stage after voltage amplification. V104, V107, VD102 and VD103 compose constant current source circuit. VD102 and VD103 provide constant base electrode current for V104 and V107. The emitter electrode resistor of V104 decides working current of difference amplifying stage, the emitter electrode resistor of V107 decides working current of voltage amplifying stage. V132 and V112 compose multiple unit tube amplifying to make the final stage of power amplifier have strong current amplification capacity and they compose waveform positive half cycle amplification. V133 and V113 compose the negative half cycle amplifying of waveform and its circuit structure is the same with that of upper tube. The function of temperature compensation tube V106 in the circuit has two: firstly, it is the base electrode bias of upper/lower multiple unit tube and its working state decides the static working current of composite power amplifying stage, that is, we can set the static working point through adjusting the on degree of V106, and the usual method is to change the base electrode resistor of V106; secondly, it can automatically adjust the working state of composite power amplifying stage when temperature increases, and the adjustment process is as follows:

Total current of output stage = working current + leakage current

When temperature increases, the increase of leakage current leads to the drift of static working point (unfavourable), at the same time, the leakage current of V106 increases, Uce decreases to make the bias current of output stage decrease to make working state change and working current of back stage decrease to reach the purpose of temperature compensation.

Introduce voltage negative feedback to power amplifying circuit of AV225T (RU) and it is composed of R121, R109 and C105, which can stabilize static working point of difference stage. AV225T (RU) adopts direct output means, R111, C116 (on power board) connected with output end compose Zobel Network to prevent the high frequency self-excitation caused by the AC inductive reactance of speaker voice coil.

## 2. Mute circuit

When pressing MUTE button on remote controller, after the photoelectric conversion performed by infrared receiver, a mute signal is achieved to send to MCU, which sends out P\_LR high level and P\_CSM high level mute instruction at the same time. P\_LRM high level makes 2N5401 (V115), S8050 (V101), S8050 (V116) on, left/right channel signal is short circuited to ground to fulfil the mute control function of left/right channel; P\_CSM high level makes 9014 (V150) on, 2N5401 (V130) and S8050 (V131) on, centre channel signal is short circuited to ground and centre channel mute control function is fulfilled; at the same time, the on of 9014 (V150) makes 9014 (V151) cutoff, voltage of pin 5 of TDA7265 is positive power voltage, TDA7265 internal mute circuit works to reach surround mute function. When headphone is inserted, HEADPHONE controls LRM and SCM through 过 VD203 and VD204 to make main channel, centre and surround channel mute.

## 3. C, SR, SL power amplifying circuit

Compared with the former models, the three channels of AV225T (RU) adopt power amplifying IC CD1875CZ (N104) and TDA7265 (N106) special for audio. As for TDA7265 (N106), it has 11 pins in all, pin 3, 1 and 6 are its positive and negative power pins respectively; pin 10, 8 are its reverse input end, the rated output power of each channel of this power IC may be up to 15W and it is with function of auto mute when power on; it has 5 pins in all, and it is a good-performance power amplifying IC, the application circuit is simple and has 15W power output in rated state. Pin 5 and 3 are positive/negative power pins.

## 4. Protection circuit

Protection circuit of AV225T (RU) power amplifier is on power board. Protection means of L, R, C channel is through disconnecting relay Y100 when protection starts up to disconnect its output. SR, SL channel fulfils the protection function through mute. AV225T (RU) is with power-on delay protection, central point over-voltage and over-current protection, standby protection.

(1) Power-on delay attracting protection circuit: when power on, working of circuit is stable, and the produced current has great damage to speaker and power amplifier, so delay attracting protection circuit is set. Power-on delay attracting protection circuit is divided into 2 steps: 1. C, L, R channel working process: the AC outputted from transformer, through rectification filtering of Vd113, C110, gets +22V voltage to make VD111 reverse broken-down through charge to C115 by R108 to make Vd111 reverse broken down to make V105, V104 positive direction on to make relay Y100 attracting to realize delay attracting effect. SR, SL channels performs concussion protection when power-on/off through the following means: after machine system resets, MCU outputs a P\_CMS high level signal to make V150 on and make V151 cutoff; pin 5 of TDA7265 is power voltage, TDA7265 outputs mute. After delay start-up of machine succeeds, the output signal P\_CMS of MCU switches into low level immediately, V150 is cutoff to make V151 on, voltage of pin 5 of TDA7265 is about 5V lower than power voltage, SL/SR channel resumes normal output.

(2) Over-voltage protection: on each channel's output end, a over-voltage sampling resistor is connected, L channel is R116, R channel is R117, C is R118, SR and SL are R120 and R119 respectively. When just one channel's central point voltage is more than +3.5V or less than -3.5V, V101 or V102 is on to make their C electrode voltage decrease, B electrode of V103 is pulled down to make V103 on, relay is disconnected finally and over-voltage protection is fulfilled. Working process is shown as the following figure 3.2.6.2:

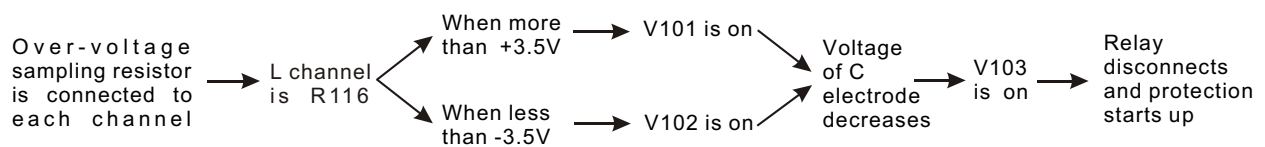


Figure 3.2.6.2 Over-voltage protection flow chart

(3) Over-current and short-circuit protection: on the output load resistor of L, R channel, a over-current sampling triode is connected. Sampling triode of L channel is V114 (on power amplifier board), load resistor is R126, R127 (on power amplifier board). C, SR, SL channel power amplifying IC is with over-current protection function inside. Only over-current appears in L channel, the voltage decrease that produces on R126, R127 will increase. Once the voltage decrease of R129 (on power amplifier board) is more than 0.7V, V114 will be on, V103 is also on, and relay is disconnected finally and short-circuit protection is finished. Working process is shown as the following figure 3.2.6.3:

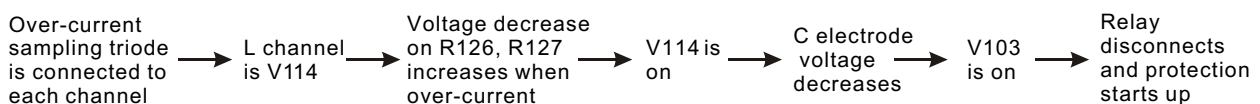


Figure 3.2.6.3 Over-current and short-circuit protection flow chart

Similarly, when over-current appears in R channel, (on power amplifier board) voltage on R159 will be more than 0.7V to make (on power amplifier board) V129 on, and also make V103 on, relay is disconnected finally to reach the purpose of protecting speaker.

### 3.2.7 MIC, headphone board

MIC signal is directly sent to signal processing board through flat cable XP12, the principle has been specified in section 3, so it is omitted here. The main element of headphone part is headphone amplifier N100 PT2308. It is a dual-channel operational amplifier, has 8 pins in all and adopts signal power (+5V) to supply power. Pin 1 and 7 are two channels' signal output ends; pin 2 and 6 are two channels' reverse input ends; pin 3 and 5 are two channels' in-phase input ends; pin 8 and 4 are positive and negative power pins.

When no headphone is inserted, headphone detect signal PH\_SW is low level, now the mute control signals P\_LRM and P\_CSM of main channel, centre and surround channels are low level, these 5 channels all have normal output; when headphone is inserted, PH\_SW is high level, now diode VD203 and VD204 on signal board make the mute control signals P\_LRM and P\_CSM of main channel, centre and surround channels be high level, and make main channel, centre and surround channels have no output on account of mute. Please refer to mute circuit part for the principle. At the same time, triode V111 is made on through the resistor R166 on signal board, so V110 and V109 are cutoff to cut the power supply loop of fan; when volume is more than 45dB, fan tuning is forbidden to facilitate to listen with headphone.

Please be noted here that headphone detect signal PH\_SW is not connected with MCU, but is set by machinery structure of headphone jack.

### 3.2.8 Video in/out board circuit

AV225T (RU) is with two-channel composite video input (VCD, DVD or 5.1CH) and one-channel composite video output (VCD, DVD or 5.1CH).

Input/video switch of video signal is realized through a electronic switch CD4051 (N101), the truth value table is shown as follows:

	X0	X1	X2	X3	X4	X5	X6	X7
A	0	1	0	1	0	1	0	1
B	0	0	1	1	0	0	1	1
C	0	0	0	0	1	1	1	1

When select VCD channel, pin 1 and 2 of N106 (M62446) of volume board sends out two control signals of A and B, and one INH control signal. A=1, B=0, INH=0, known from Cd4051 truth value table that output pin of CD4051 (pin 3) selects X1, ie, VCD channel, now, in terms of volume board working principle in section 2, A and B also control gating of audio part CD4052, that is, audio channel also selects VCD channel, thus, the synchronous switch of audio and video of VCD channel is realized.

Similarly, for the synchronous switch of audio and video of DVD channel, pin 1 and 2 of N106 (M62446) of volume board send out 0, 1 and INH=0 control signal of A and B to fulfil the corresponding switch. When 5.1CH is selected, A=1, B=1, INH=0, the audio/video switch in 5.1CH is fulfilled.

At last, composite video signal outputs through triode V101 (1015) .

When INH=1, CD4051 gas no output.

## Section Three Servicing Cases

### 3.3.1 Servicing instances

【Instance 1】 Trouble symptom: power-on protection

Description: relay not attracting and display “System abnormal, auto protection”.

Analysis and troubleshooting: system protection after power-on, relay not attracting; shown as in the figure 3.3.1.1, test whether L, R, C, SL, SR of power board flat cable holder XP8 has DC output, pin 1 of power board flat cable holder XS7 is tested high level, pin 2 is low level, C electrode of triode V101 is high level, known from the above test that protection is not caused by over-current and over-voltage (you may also unplug XP7 and XP8 flat cable holder and check whether it also has protection). The anode voltage of diode VD112 is tested 0, so relay is judged abnormal. It is normal after changing relay and trouble is removed.

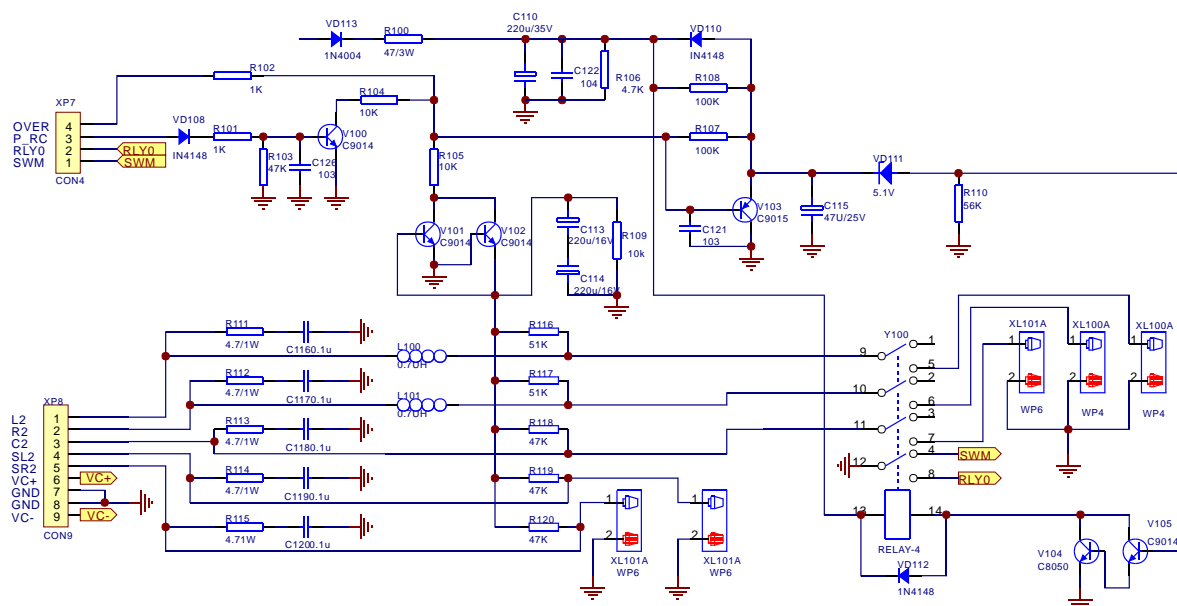


Figure 3.3.1.1 Protection circuit diagram

Note: 1. After relay being used for a period, working state may be unstable and some abnormalities will appear. For instance, relay not attracting after power-on sometimes; each contact point not fully contacted after relay attracting; CPU not detect RLY0 signal (this signal is low level after relay attracting); auto protection.



2. Power-on protection causes: over-current protection, over-current protection and CPU not detect RLY0 signal: test whether each output channel has DC output; when power-on protection trouble appears, make clear which kind of reason caused this. The common protection is that abnormal centre or surround power IC causes that output signal has DC.

**【Instance 2】 Symptom: no sound output**

Description: system not detect signal after power on, no output when switching various sound sources

Analysis and troubleshooting: select VCD channel after power on, input sine wave signal, shown as in the figure 3.3.1.2; test volume board capacitor C133, C134, no signal; test volume board capacitor C122, C121, also no signal; pin 5 and 14 of N101 have signal; test power voltage of pin 7 and 8 of N101, normal; it is known primarily that N101 has input but no output, change N101 and N101 still has no output after changing, so it is judged that N101 has no problem, it is that A, B signal of N106 have trouble when this channel has not been selected; change N106, output is normal after changing and trouble is removed.

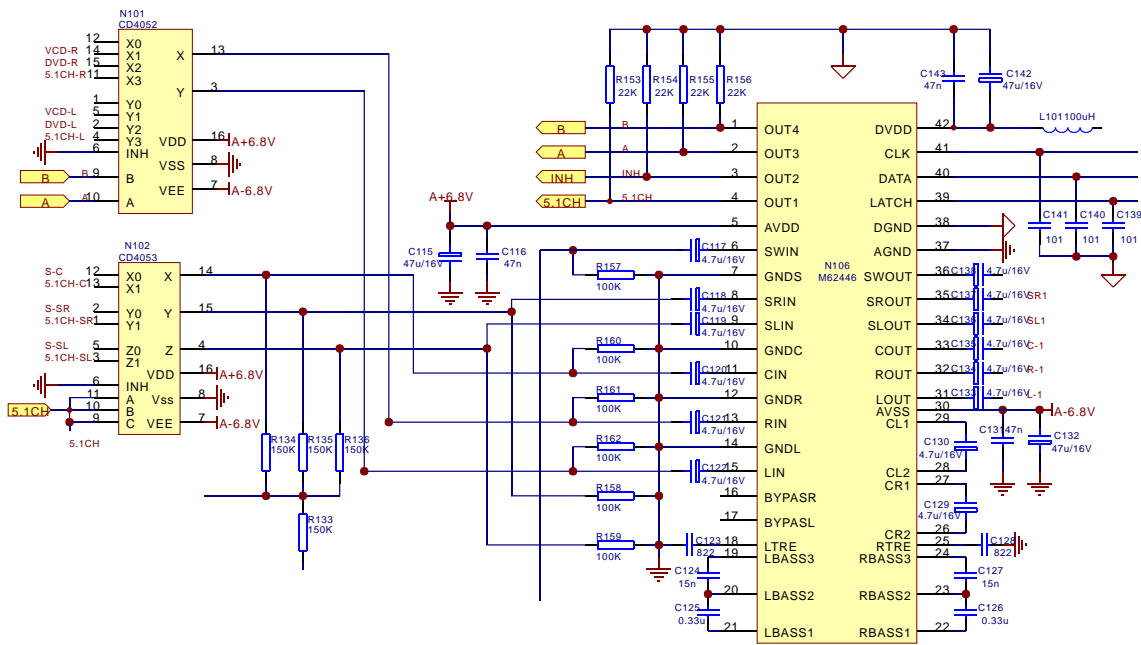


Figure 3.3.1.2 Volume circuit diagram

Note: when there is no output, firstly make sure whether signal input can be detected; if signal input can be correctly detected, it means that signal source conversion circuit has no problem, then make sure whether it is a certain channel has no output or all have no output; if all have no output, it is probably that power supply of certain part is abnormal, also it is mute signal that abnormal, etc. For Cd4052 and Cd4053 belong to the electronic switch with high conversion frequency, they are easy to be damaged; after being damaged, +6.8V and -6.8V voltage may probably be pulled down, or gating signal A, B of 62446 will be pulled down, and then troubles, such as signal not detected and no output, will appear.

**【Instance 3】 Symptom: no output**

Description: after power on, connect to 5.1CH, main channel has no output, central and surround have output, power board FL101, FL102 fuse is burnt down.

Analysis and troubleshooting: change fuse of FL101, FL102 and power on again. Fuse is burnt down, power off, test resistance to ground of power board Vc+, Vc- and find that resistance is 0 ohm; unplug power board flat cable holder XS8, shown as in the figure 3.3.1.3; test resistance to ground of power amplifier board Vc+, Vc-, it is also 0 ohm, the trouble lies in power amplifier board by primary judgment, test resistance in each pin of power amplifier board power tube V112, they are all 0 ohm, resistance in each pin of power tube is 0 ohm, V112 and V113 have been broken down, change V112, V113, change fuse, output is normal after power on again, and trouble is removed.

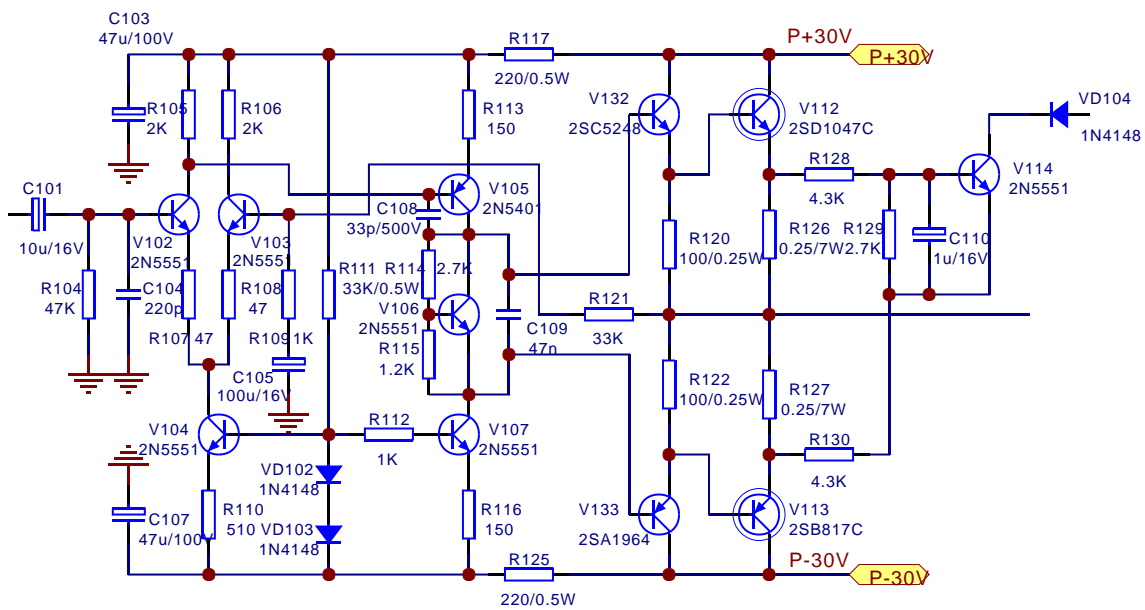


Figure 3.3.1.3 Power amplifier output circuit diagram

Note: when a certain channel has no output, firstly confirm whether voltage of power amplifying circuit of each channel is normal. We often test stage by stage from the final stage of signal output and then analyse. Vibration exists in the course of moving machines, the line of PCB board of signal board will probably be broken off, or copper surface of element pin will fall off, so you should consider when analysing problems.

**【Instance 4】 Symptom: microphone has no output**

Description: insert microphone after power on, that MIC input has been detected displays, but microphone has no output.

Analysis and troubleshooting: after power on, insert microphone, microphone inputs sine wave signal, shown as in the figure 3.3.1.4; test base electrode of signal board triode V105, it is low level, MIC mute signal is normal, test signal board capacitor C245, C246, they both have no signal, test pin 7 of signal board N202, there is no signal, considering that MIC input can be detected, test signal board

Capacitor C219, there is signal, power supply voltage of N200 is normal, the trouble lies in N200 PT2315 by primary judgment; change PT2315 and trouble is removed.

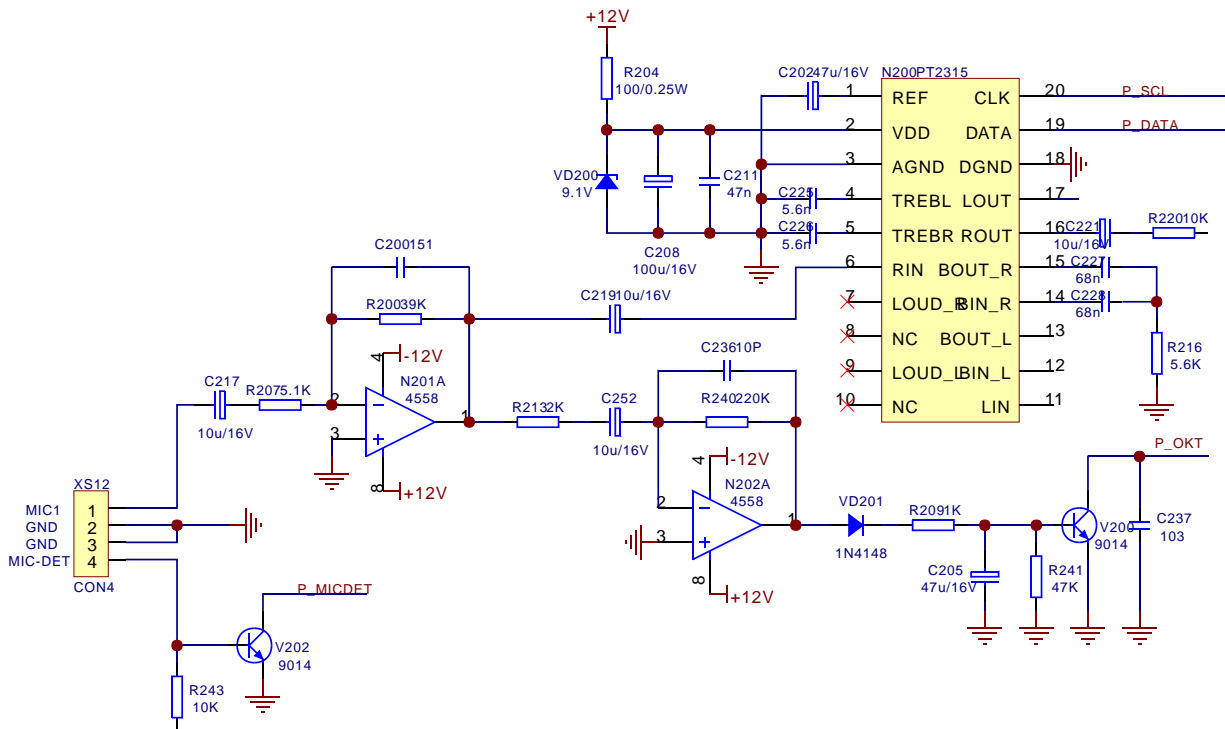


Figure 3.3.1.4 MIC circuit diagram

Note: when changing PT2315, microphone still has no output sometimes. Considering that PT2315 and N101 24C02 of CPU board commonly use P\_DATA and clock line P\_SCL, when 24C02 is abnormal, the communication between CPU and PT2315 may probably be affected to cause no output for microphone, so 24C02 is required to change sometimes.

**【Instance 5】 Symptom: no sound output**

Description: signal input may be detected after power on, but no signal output, no output when switching various sound sources.

Analysis and troubleshooting: after power on, VCD channel inputs sine wave signal, check power amplifier board Vc+, Vc-, Vs+ and Vs-, power supply is normal, test volume board capacitor C133.C134, there is signal, test pin 4 and 5 of volume board flat cable holder XS20, there is signal, so it is sure that volume board working is normal; test pin2 and 3 of signal board socket XS9, there is no signal, trouble lies in signal board by primary judgment; test power supply voltage +12V and -12V of pin 4 and 8 of N100, normal, left channel output is normal after changing N100, right channel output is normal after changing N101, centre has no output when adjusting to Cyber logic state, test pin 3 of volume board flat cable holder XS20, there is signal, test pin 4 of signal board socket XS9, there is no signal, test N102, power supply is normal, change N102 and output is normal, so trouble is removed.

Note: because of unstable voltage, 4558 of some part will be burnt down, +12V, -12V is pulled down, then whole system working is abnormal, so several 4558 are required to change sometimes.

**【Instance 6】 Symptom: no OSD (on screen display)**

Description: after power on, relay attracting, output signal is normal, LCD has no display, background light of display screen is lighted when pressing buttons.

Analysis and troubleshooting: because background light is bright, it is confirmed that +5V voltage of control panel is normal. When using remote controller, remote control function is normal, which means that control panel +3.3V is normal; change LCD screen, display is normal and trouble is removed.

Note: when no OSD appears, firstly make sure whether display screen voltage is normal, whether data buffer output is normal; because display screen is easy to damage, in most conditions, it is display screen that is damaged.

**【Instance 7】 Symptom: power not on**

Description: not any reaction after power on, relay not attracting, no OSD

Analysis and troubleshooting: power on and observe that each fuse is normal, secondary stage voltage of transformer is tested 0, primary stage voltage of transformer is tested normal, primary stage resistance is tested infinite, so it is judged that transformer has been burnt down; change transformer and trouble is removed.

Note: when power not on, firstly confirm that whether it is power not on or no OSD, whether part of voltage or all voltage is abnormal; if it is that power not on, test step by step from power socket until the trouble is found.

**【Instance 8】 Symptom: remote controller has no function**

Description: after power on, panel buttons have no function, remote controller has no function.

Analysis and troubleshooting: after power on, remote controller has no function, change its battery and it also has no function, test pin 3 P\_REM signal of CPU board socket XP100, when remote controlling, this signal has no pulse waveform, test voltage of control panel resistor R102, it is +5V, when checking the welding point of N100 remote control receiver, we found that pin has rosin joint, after adding tin, remote control is normal and trouble is removed.

Note: buttons function and remote control function are all fulfilled by infrared receiver, when buttons and remote control have no function, trouble may lie in remote control receiver.

**【Instance 9】 Symptom: Microphone has no delay and echo**

Description: after power on, insert microphone, set echo and delay in maximum, beat microphone and there is no echo and no delay.

Analysis and troubleshooting: test pin 7 of signal board N204, there is no signal, test power supply of N209 PT2399, it is normal; change PT2399, trouble is not removed; test resistance of signal board capacitor C242, C243, C238, we find that resistance of C243 only has 2.5K; change capacitor C243 and trouble is removed.

Note: no echo and delay for microphone is caused by abnormal working of Pt2399; one case is that PT2399 is abnormal itself; the other is that PT2399 peripheral circuit has trouble. Porcelain capacitor in peripheral circuit is easy to damage.

### 3.3.2 Troubleshooting process

#### 1. Symptom: Karaoke has no sound

Analysis: for this kind of trouble, you may usually adopt signal injection method to check stage by stage. If a certain stage does not give out disturbance sound, this stage has problem; this method is generally preformed from back stage to front stage. Another is signal control method. Check stage by stage from front stage to back stage. If a certain stage has no sound, it means that this stage has trouble. The troubleshooting process is shown as the following figure 3.3.2.1:

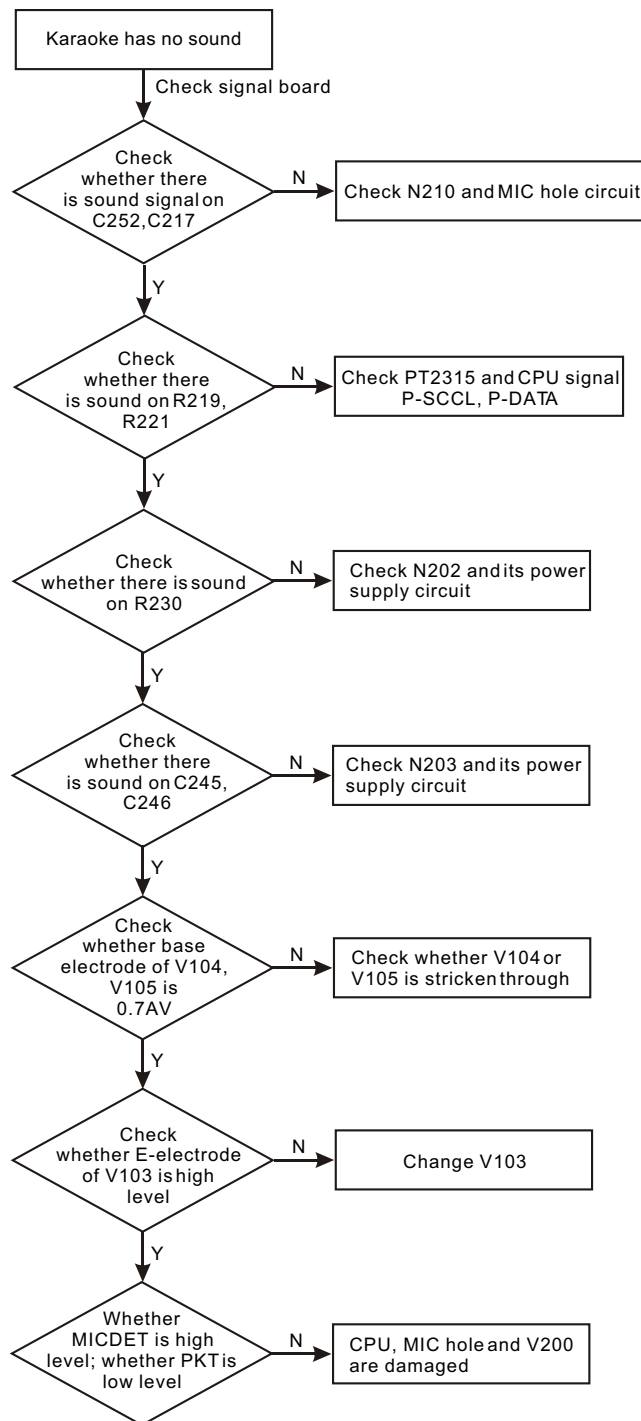


Figure 3.3.2.1 Troubleshooting process for "Karaoke has no sound"

2. Troubleshooting process for "No spectrum display" is shown as the following figure 3.3.2.2;

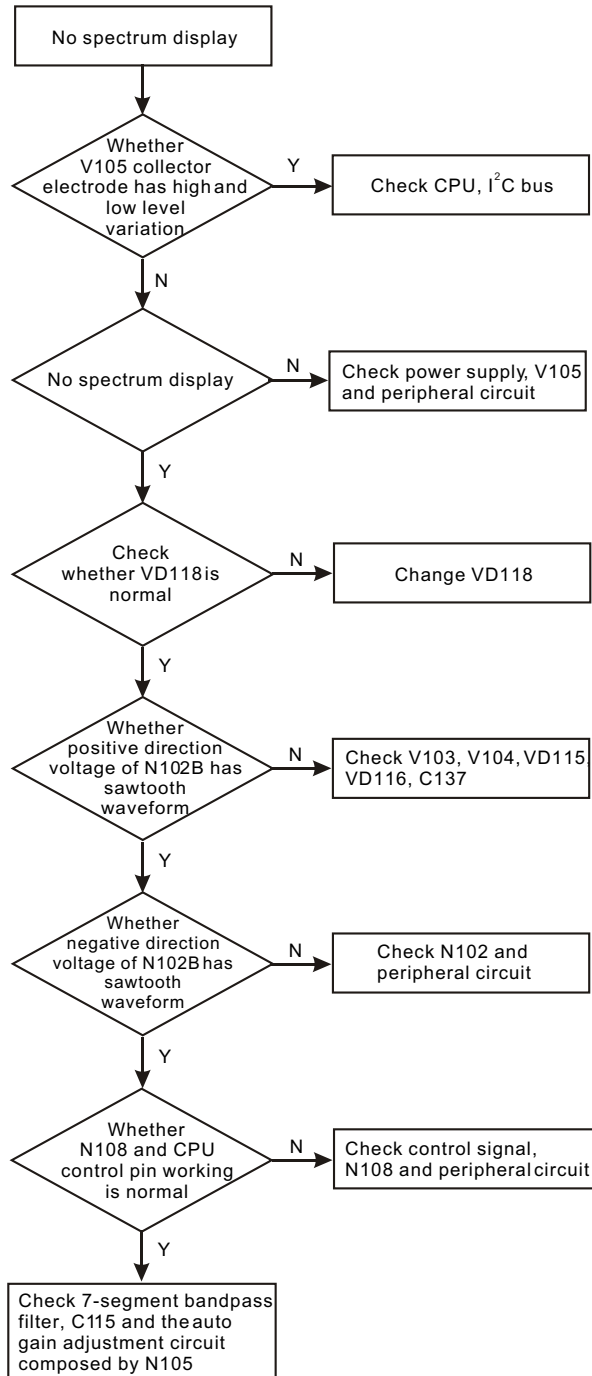


Figure 3.3.2.2 Troubleshooting flow chart for "No spectrum display"

3. Troubleshooting process for "Power-on protection" is shown as the following figure 3.3.2.3:

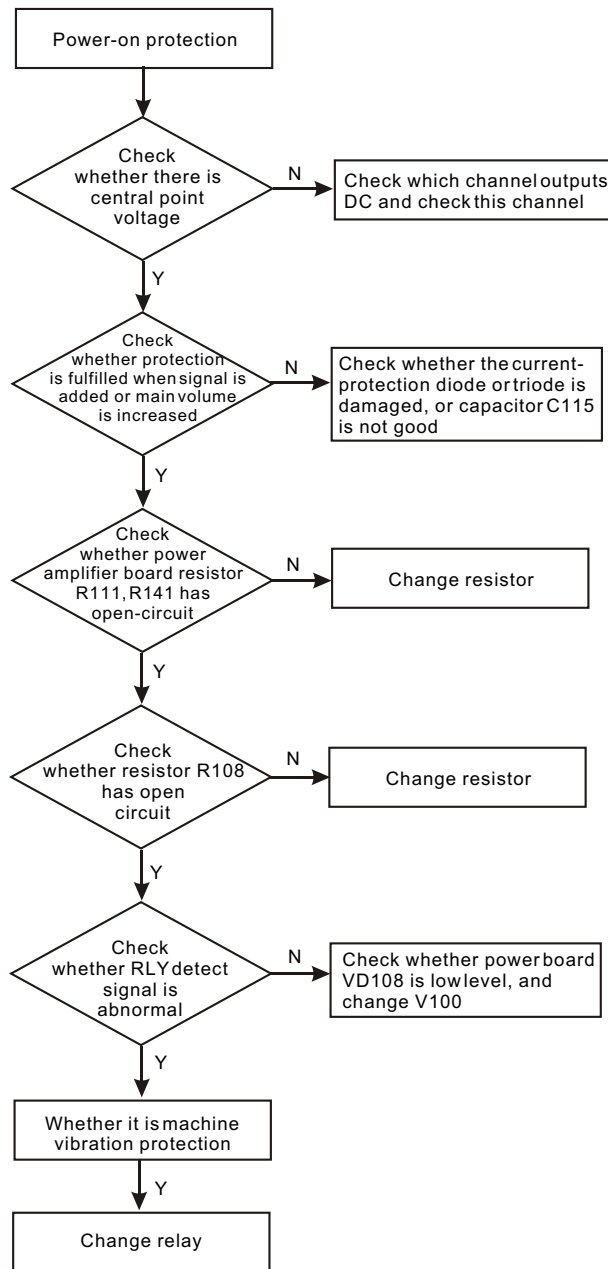


Figure 3.3.2.3 Troubleshooting flow chart for "Power-on protection"

4. Troubleshooting process for "Cannot search automatically" is shown as the following figure

3.3.2.4:

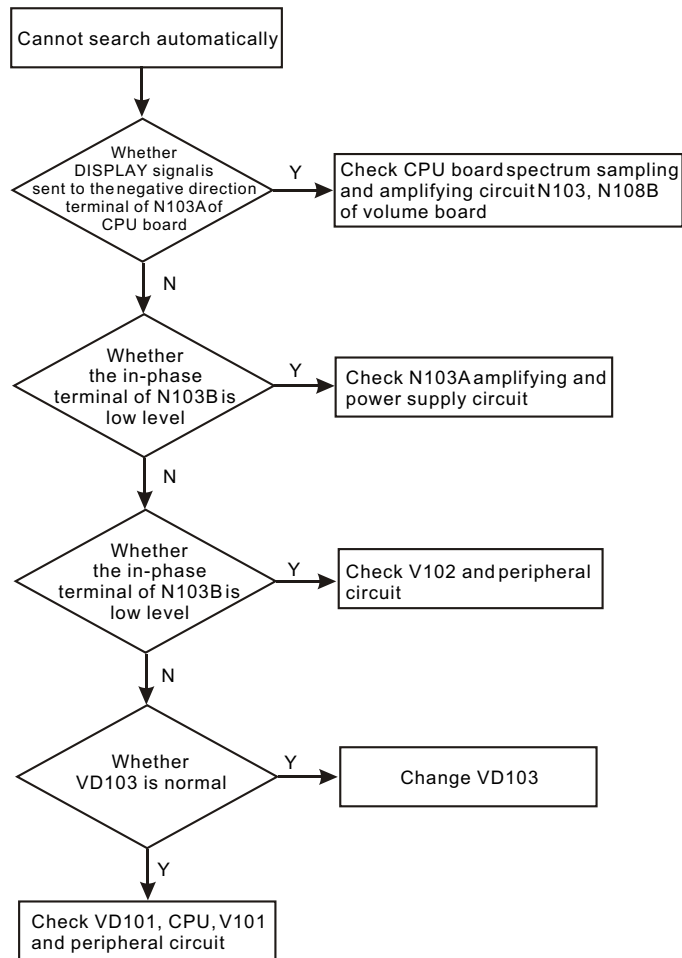


Figure 3.3.2.4 Troubleshooting flow chart for "Cannot search automatically"



5. Troubleshooting process for "No output (2-channel)" is shown as the following figure 3.3.2.5:

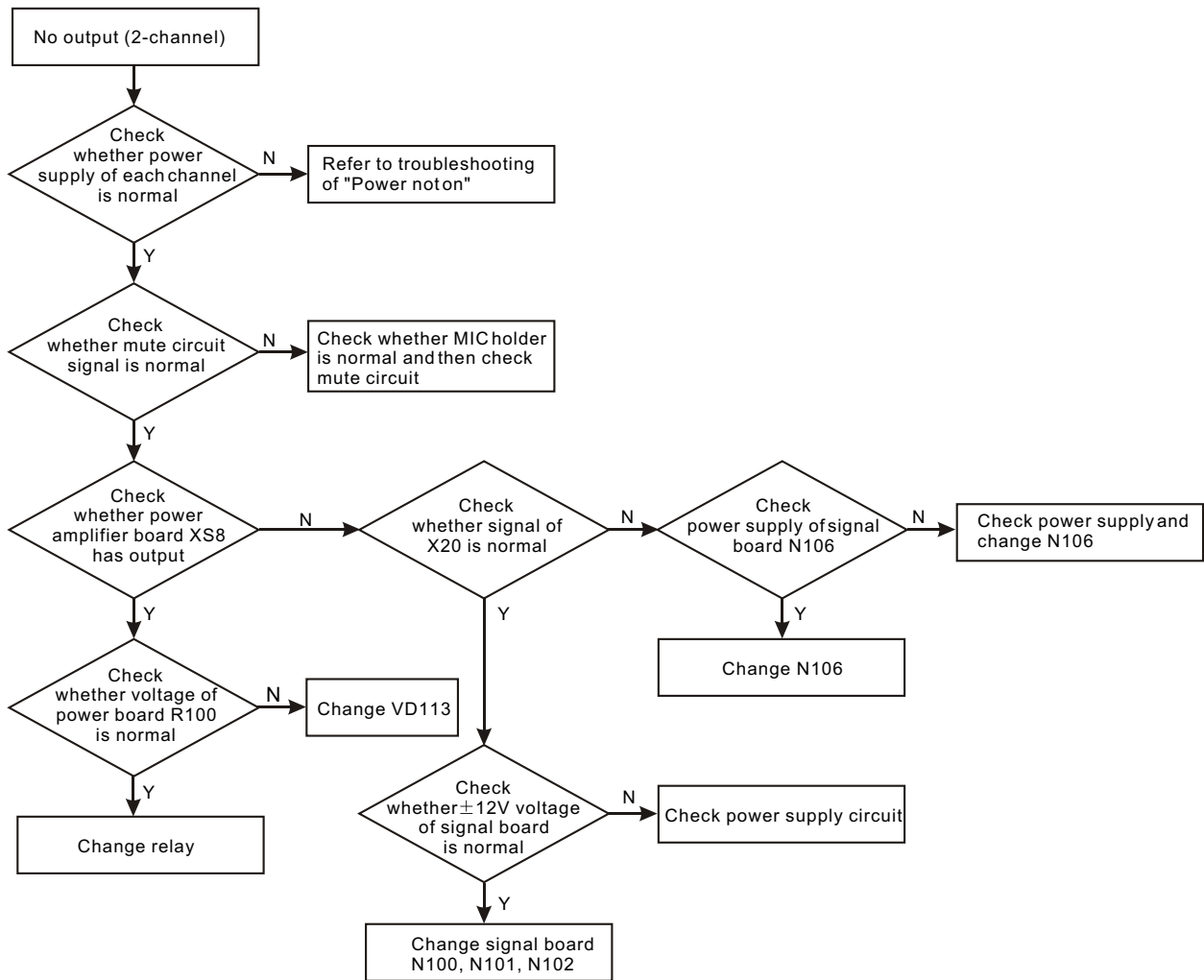


Figure 3.3.2.5 Troubleshooting flow chart for "No output (2-channel)"

6. Troubleshooting process for "5.1CH has no output" is shown as the following figure 3.3.2.6:

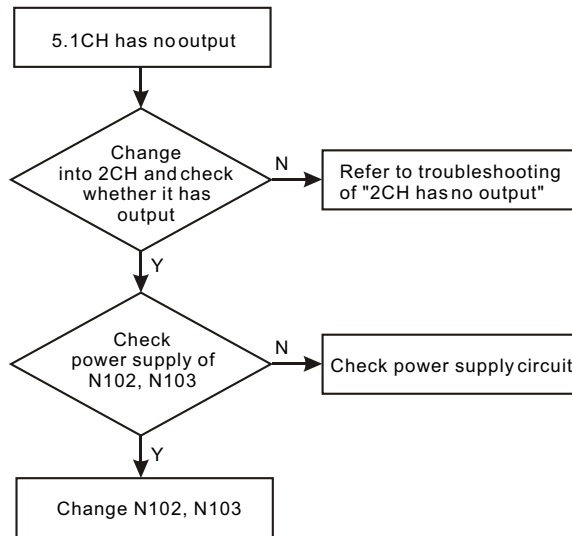


Figure 3.3.2.6 Troubleshooting flow chart for "5.1CH has no output"

7. Troubleshooting process for "Left channel has no output" is shown as the following figure 3.3.2.7:

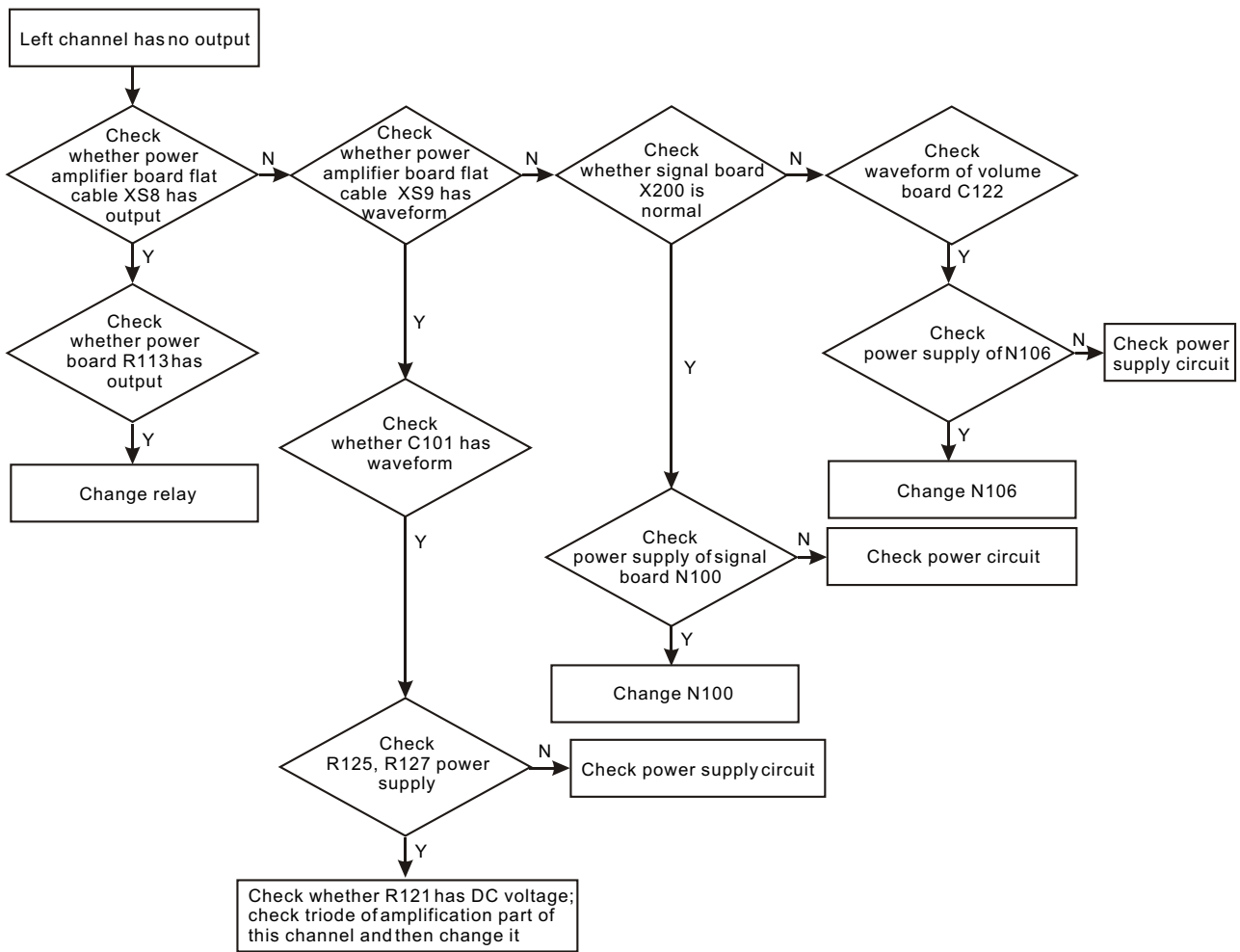


Figure 3.3.2.7 Troubleshooting flow chart for "Left channel has no output"

8. Troubleshooting process for "Power not on" is shown as the following figure 3.3.2.8:

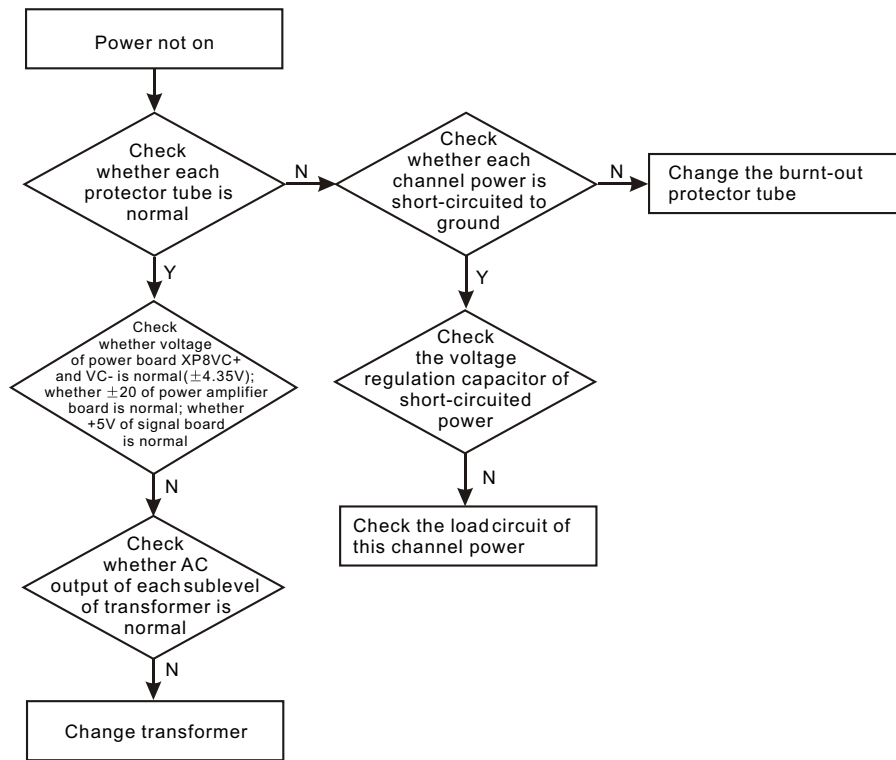


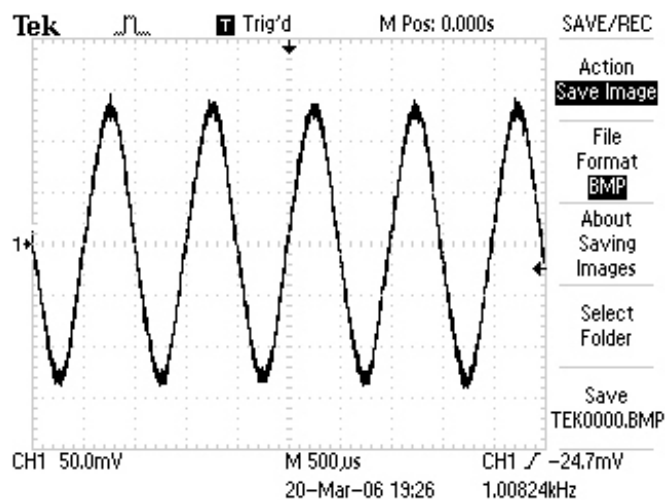
Figure 3.3.2.8 Troubleshooting flow chart for :Power not on"

## Section Four Servicing Parameters

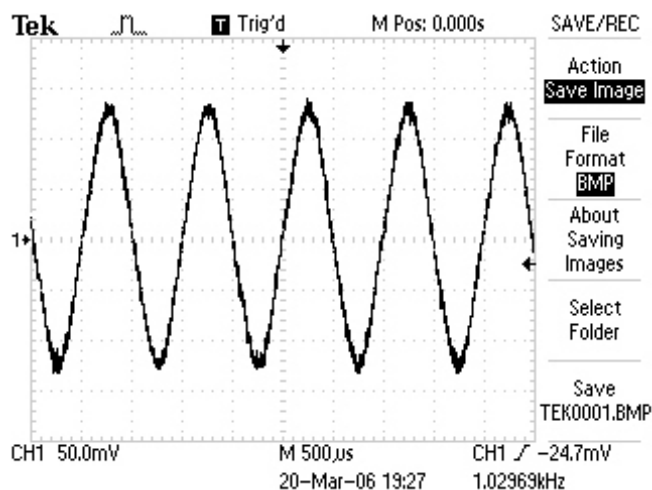
### 3.4.1 Signal waveform diagram

This section collects signal waveform diagram of audio, video and each unit circuit with the purpose of helping servicing personnel to judge where the trouble lies accurately and quickly to promote their servicing skills. Because of the difference of oscillograph brand, model and tuning, the servicing personnel should pay more attention to check in daily work for some difference may exist.

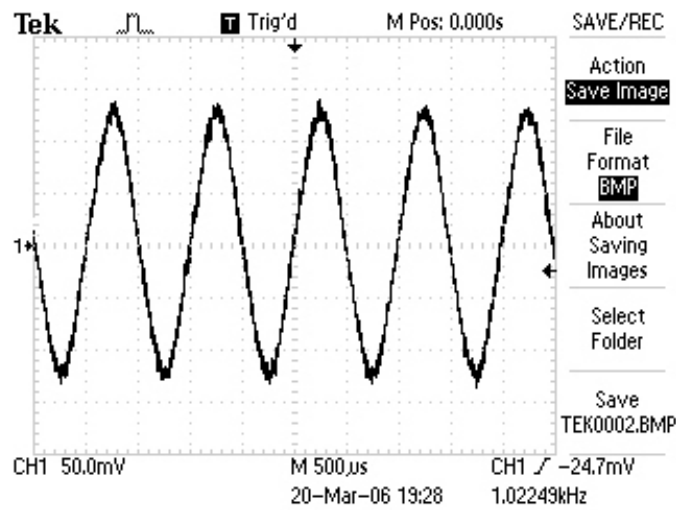
1. Input signal (2-channel input) waveform diagram:



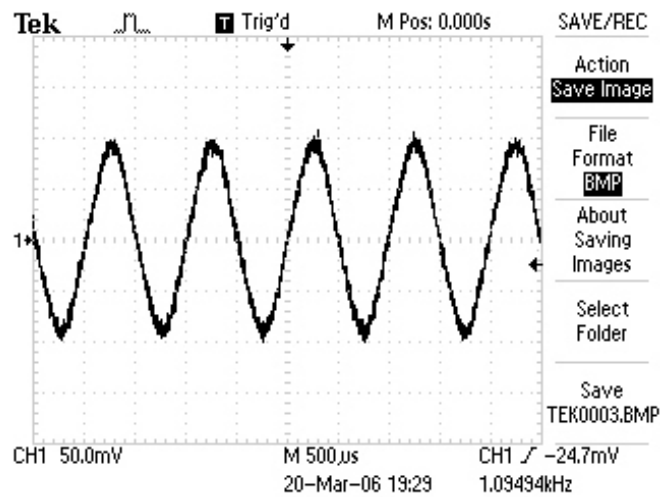
2. Volume board capacitor C122 (L) waveform diagram:



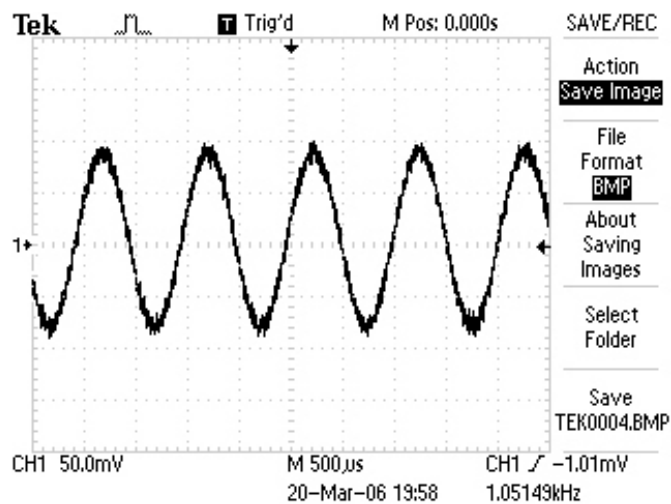
3. Volume board capacitor C121 (R) waveform diagram:



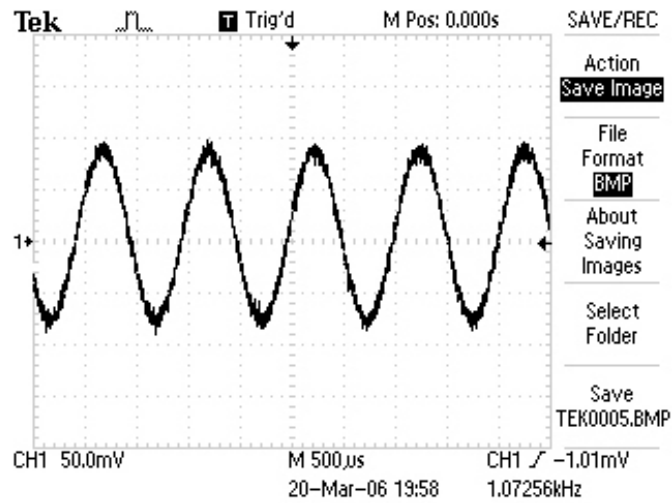
4. Volume board capacitor C120 (C) waveform diagram:



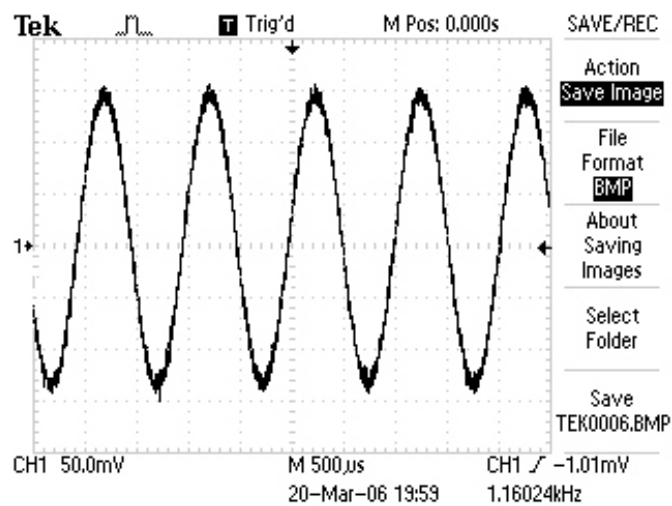
5. Volume board capacitor C119 (SL) waveform diagram:



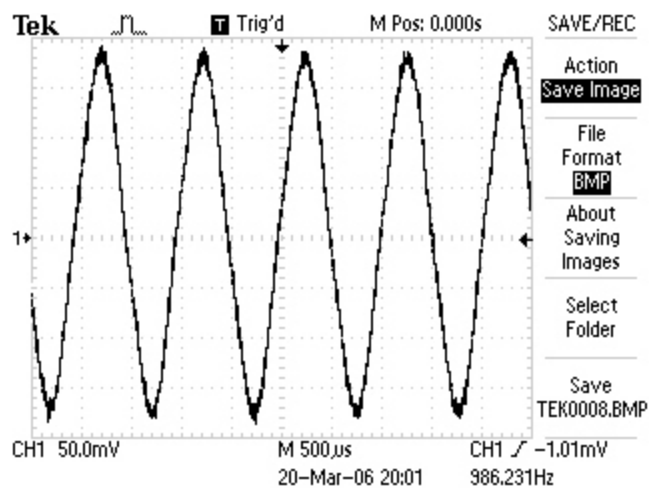
6. Volume board capacitor C118 (SR) waveform diagram:



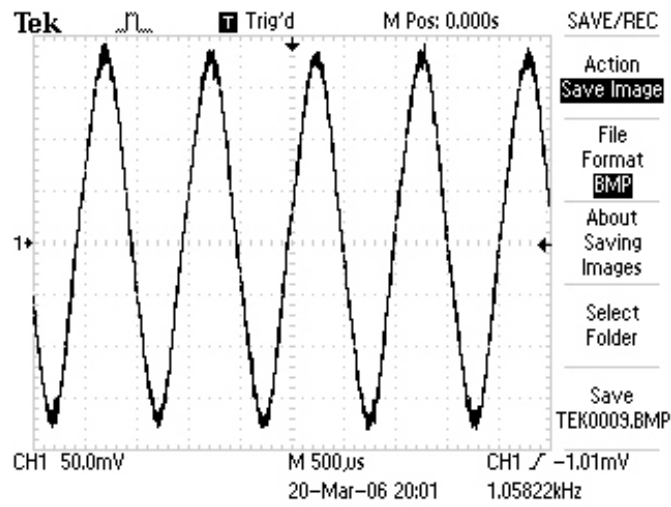
7. Volume board capacitor C117 (SW) waveform diagram:



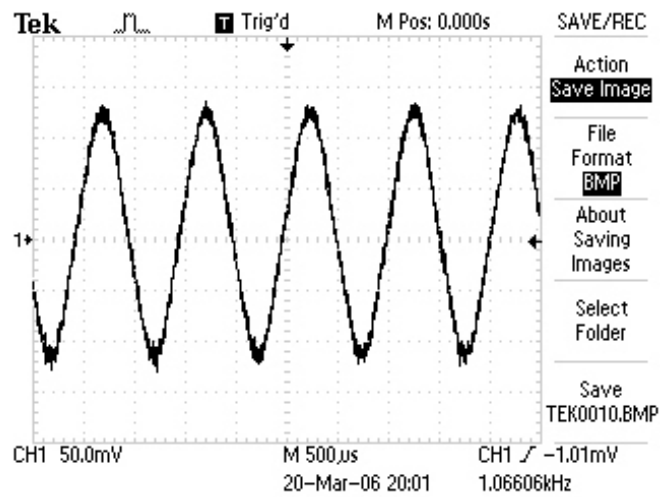
8. Waveform diagram of outputting C133 (L) after volume adjustment:



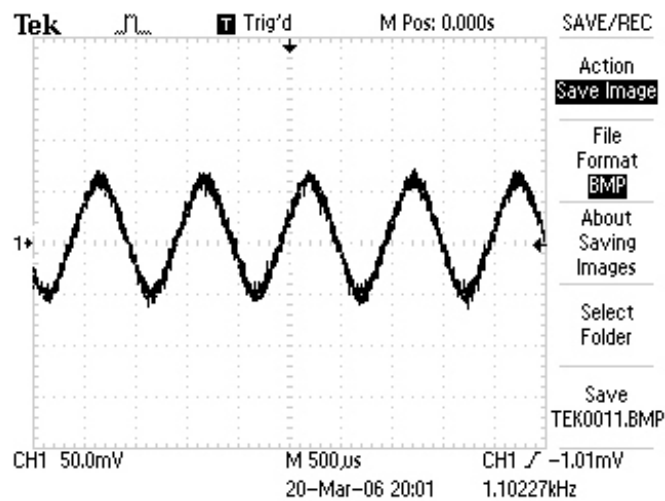
9. Waveform diagram of outputting C134 (R) after volume adjustment:



10. C135 (C) waveform diagram in Cyber Logic state:

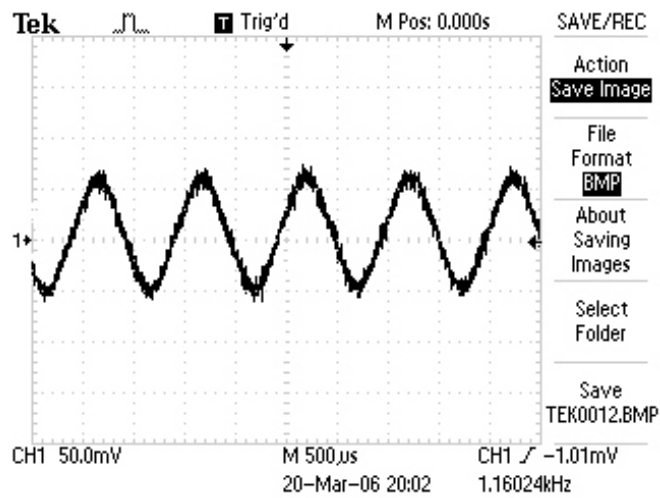


11. C136 (SL) waveform diagram in Cyber Logic state:

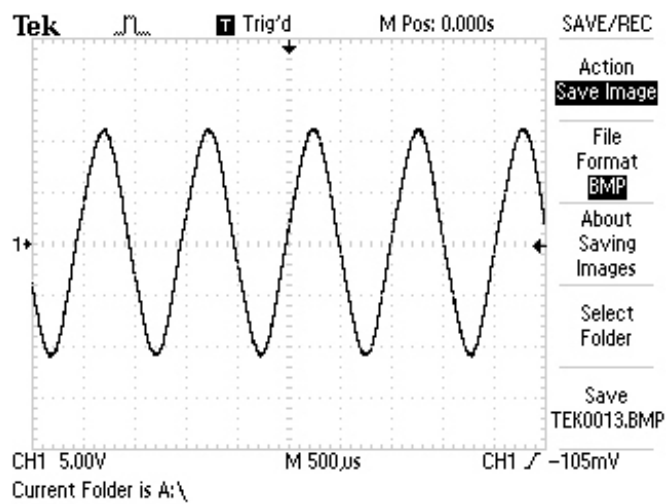




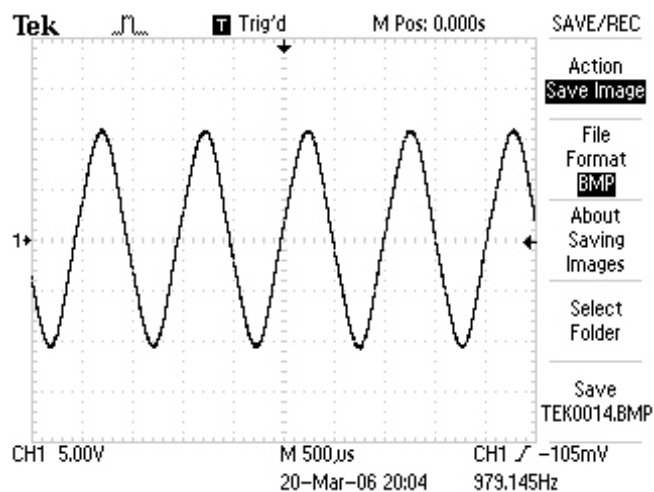
12. C137 (SR) waveform diagram in Cyber Logic state:



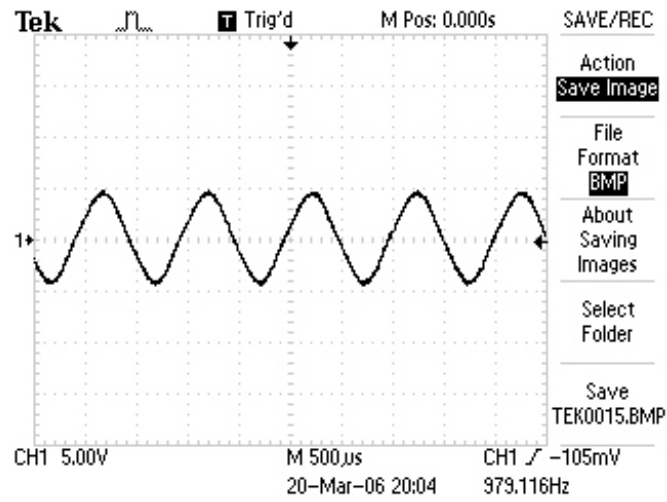
13. Output to flat cable XS8 after power amplification, pin 1 (L) waveform diagram:



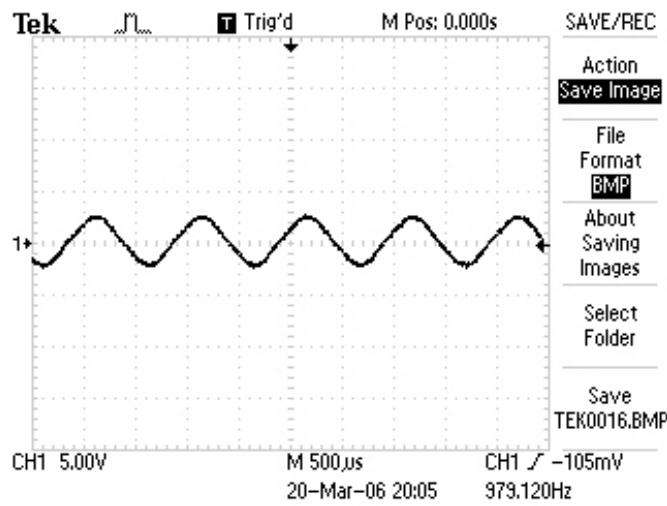
14. Output to flat cable holder Xs8 after power amplification, pin 2 (R) waveform diagram:



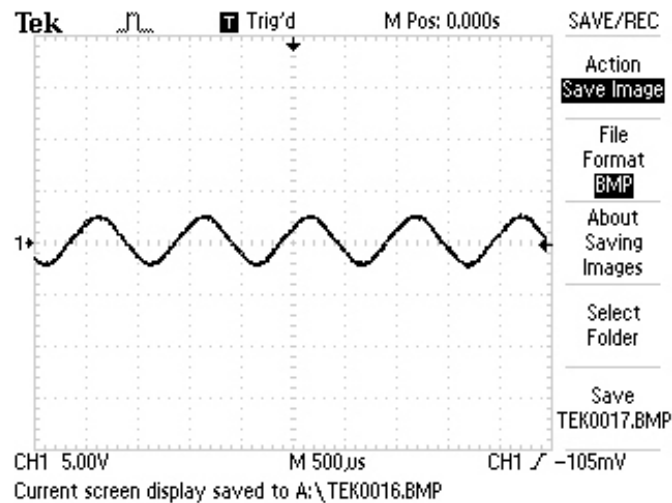
15. Output to flat cable holder XS8 after power amplification, pin 3 (C) waveform diagram:



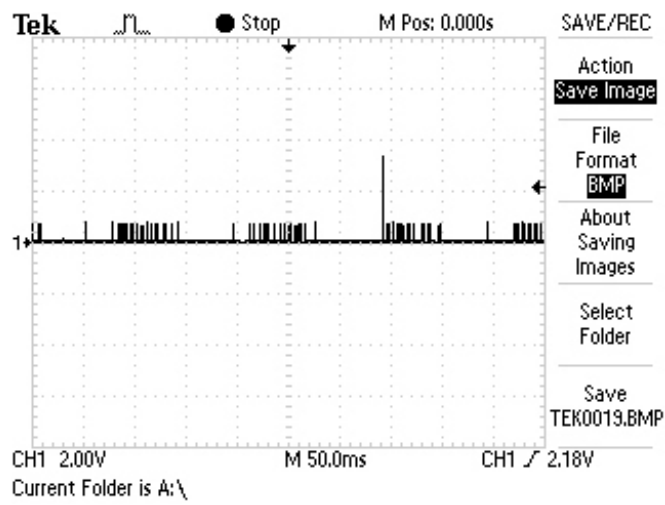
16. Output to flat cable holder XS8 after power amplification, pin 4 (SL) waveform diagram:



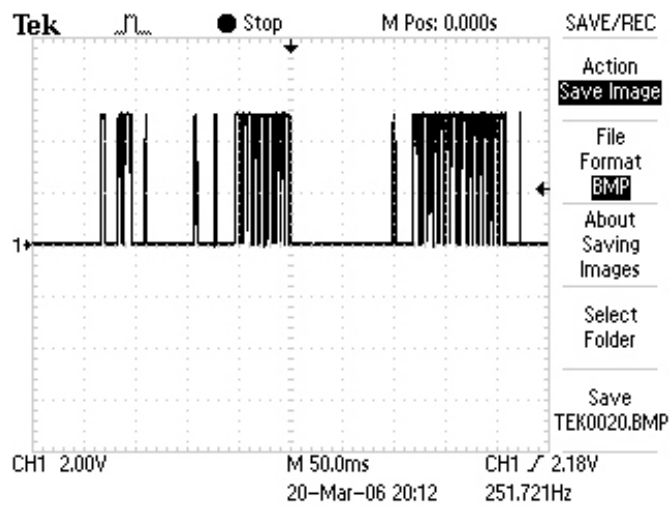
17. Output to flat cable holder XS8 after power amplification, pin 5 (SR) waveform diagram:



18. P\_CHARGE waveform diagram after signal being detected:



19. P\_ADINTO waveform diagram after signal being detected:



Note: C138 (SW) has waveform only when bass enhancer is in off state.

### 3.4.2 Key point voltage

#### 1. Power board:

- ◆ VC+=43.5V
- ◆ VC--43.5V
- ◆ VD113 cathode terminal 12.8V (19.3V when in standby)
- ◆ Vd111 cathode terminal 6.3V (DV when in standby)
- ◆ P-RC=0V (4.8V when in standby)

#### 2. Power amplifier board:

- ◆ L7812 pin 3 +12V
- ◆ TDA7265 pin 3 +20V
- ◆ over 5.3V (0V when in standby)
- ◆ L7912 pin 2 12V
- ◆ Pin 6 20V
- ◆ S-MVTE 0V (19.5V when in mute)

#### 3. CPU board:

When in standby: ◆ V103 pin 5 2.0V (0.1V after signal being detected)

- ◆ VD101 cathode terminal 3.45V (0.6V after signal being detected)
- ◆ R175 (P\_CHARGE) 0.65V (waveform after signal being detected)
- ◆ R179 (P\_ADINTO) 5.0V (waveform after signal being detected)

# Section Five Function Introduction to IC

## 3.5.1 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

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

### 3.5.2 function introduction to PT2399

#### 1. DESCRIPTION

PT2399 is an echo audio processor IC utilizing CMOS Technology which is equipped with ADC and DAC, high sampling frequency and an internal memory of 44K digital processing is used to generate the delay time, it also feature an internal VCO circuit in the system clock, thereby , making the frequency easily adjustable. PT2399 boast of very low distortion (THD<0.5%) and very low noise (No<-90dBV), thus producing high quality audio output .The pin assignments and application circuit are optimized for easy PCB layout and cost saving advantage.

#### 2. FEATURES

CMOS Technology

Least External component

Auto Reset Function

Low Noise, No<-90dBV Typical

Low Distortion, THD<0.5% Typical

External Adjustable VCO

Available in 16 pins DIP or SOP package

#### 3. PIN CONFIGURATION

PIN No.	Symbol	I/O	Description
1	VCC	I	Positive Power Supply
2	REF	I	Reference Power Supply
3	AGND	I	Simulative Ground
4	DGND	I	Digital Ground
5	CLK_O	O	NC
6	VCO	O	Voltage Controlled Oscillator
7	CC1	O	External capacitor

PIN No.	Symbol	I/O	Description
8	CC0	O	External capacitor
9	OP1-OUT	O	External capacitor 1 output
10	OP1-IN	I	External capacitor 1 input
11	OP2-OUT	O	External capacitor 2 output
12	OP2-IN	I	External capacitor 2 input
13	LPF2-IN	I	Low pass filter 2 input
14	LPF2-OUT	O	Low pass filter 2 output
15	LPF1-OUT	O	Low pass filter 1 input
16	LPF1-IN	I	Low pass filter 1 output

### 3.5.3 function introduction to CD4051

#### 1. DESCRIPTION

The CD4051 is a single 8-channel multiplexer with three binary control inputs and inhibit input.

The three binary control input signals select 1 of 8 channels to be turned on and connect it to the single out.

The operating voltage is as 3 to 18V and quiescent current is as low as 5  $\mu$ A max. (at  $V_{pp}=5V$  ).

#### 2. PIN CONFIGURATION

PIN No.	Symbol	I/O	Description
1	X4	I/O	Channel selection port 4
2	X6	I/O	Channel selection port 6
3	X	I/O	Channel selection output
4	X7	I/O	Channel selection port 7
5	X5	I/O	Channel selection port 5
6	INH	I	Inhibit
7	VEE	I/O	Negative Power Supply
8	GND	I	GND
9	C	I	Channel selection binary bit C
10	B	I	Channel selection binary bit B
11	A	I	Channel selection binary bit A
12	X3	I/O	Channel selection port
13	X0	I/O	Channel selection port 0

PIN No.	Symbol	I/O	Description
14	X1	I/O	Channel selection port 1
15	X2	I/O	Channel selection port 2
16	VCC	I	Positive Power Supply

### 3. TRUTH TABLE

INH	C	B	A	ON SWITCH
0	0	0	0	X0
0	0	0	1	X1
0	0	1	0	X2
0	0	1	1	X3
0	1	0	0	X4
0	1	0	1	X5
0	1	1	0	X6
0	1	1	1	X7
1	X	X	X	NONE

## 3.5.4 function introduction to CD4052

### 1. DESCRIPTION

The CD4052 is a dual 4-channel multiplexer with two binary control inputs and inhibit input.

The two binary control input signals select 1 of 4 pairs of channels to be turned on and connect it to the two outputs.

The operating voltage is as 3 to 18V and quiescent current is as low as 5  $\mu$ A max. (at  $V_{pp}=5V$  ).

### 2. PIN CONFIGURATION

PIN No	Symbol	I/O	Description
1	Y0	I/O	Y channel selection port 0
2	Y2	I/O	Y channel selection port 2
3	Y	I/O	Y channel selection output
4	Y3	I/O	Y channel selection port 3
5	Y1	I/O	Y channel selection port 1
6	INH	I	Inhibit
7	VEE	I/O	Negative Power Supply



PIN No	Symbol	I/O	Description
8	GND	I	GND
9	A	I	Channel selection binary bit A
10	B	I	Channel selection binary bit B
11	X3	I	X channel selection port 3
12	X0	I/O	X channel selection port 0
13	X	I/O	X channel selection output
14	X1	I/O	X channel selection port 1
15	X2	I/O	X channel selection port 2
16	VCC	I	Positive Power Supply

### 3. TRUTH TABLE

INH	B	A	ON SWITCH	
0	0	0	X0	Y0
0	0	1	X1	Y1
0	1	0	X2	Y2
0	1	1	X3	Y3
1	X	X	NONE	

## 3.5.5 function introduction to CD4053

### 1. DESCRIPTION

The CD4053 is a triple 2-channel multiplexer having three separate digital control inputs, A, B, and C and an inhibit input. Each control input selects one of a pair of channels which are connected in a single-pole double-throw configuration

The three binary control input signals select 1 of 2 pairs of channels to be turned on and connect it to the three outputs.

### 2. Features

The operating voltage is as 3 to 18V and quiescent current is as low as 5  $\mu$ A max. (at  $V_{pp}=5V$  ).

### 3. PIN CONFIGURATION

PIN No.	Symbol	I/O	Description
1	by	I	Y1
2	bx	I	Y0

PIN No.	Symbol	I/O	Description
3	cy	I	Z1
4	c	O	Z
5	cx	I	Z0
6	INH	I	Enable
7	Vee	I	Negative Power Supply
8	Vss	I	GND
9	C	I	Select C
10	B	I	Select B
11	A	I	Select A
12	ax	I	X0
13	ay	I	X1
14	a	O	X
15	b	O	Y
16	Vdd	I	Positive Power Supply

#### 4. TRUTH TABLE

INH	B	A	ON SWITH	
0	0	0	X0	Y0
0	0	1	X1	Y1
0	1	0	X2	Y2
0	1	1	X3	Y3
1	X	X	NONE	

### 3.5.6 function introduction to SM79164

#### 1. Description

The SM79164 series product is an 8 - bit single chip microcontroller with 64KB on-chip flash and 4K byte RAM embedded. It is a derivative of the 8052 micro controller family. It has 8-channel PWM build-in. User can access on-chip expanded RAM with easier and faster way by its 'bank mapping direct addressing mode' scheme. With its hardware features and powerful instruction set, it's straight forward to make it a versatile and cost effective controller for those applications which demand up to 32 I/O pins for PDIP package or up to 36 I/O pins for PLCC/QFP package, or applications which need up to 64K byte flash memory for program data.

To program the on-chip flash memory, a commercial writer is available to do it in parallel programming method.

## 2. Features

2.4V ~ 3.0V For V Version

Working voltage: 3.0V ~ 3.6V For L Version

4.5V ~ 5.5V For C Version

General 8052 family compatible

12 clocks per machine cycle

64K byte on chip program flash

4096 byte on-chip data RAM

Three 16 bit Timers/Counters

One Watch Dog Timer

Four 8-bit I/O ports for PDIP package

Four 8-bit I/O ports + one 4-bit I/O ports for PLCC or QFP package

Full duplex serial channel

Bit operation instruction

Industrial Level

8-bit Unsigned Division

8-bit Unsigned Multiply

BCD arithmetic

Direct Addressing

Indirect Addressing

Nested Interrupt

Two priority level interrupt

A serial I/O port

Power save modes: Idle mode and Power down mode

Code protection function

Low EMI (inhibit ALE)

Bank mapping direct addressing mode for access on-chip RAM

8 channel PWM function with P1.0 ~ P1.7

## 3. PIN CONFIGURATION

DIP	Symbol	I/O	Define Name	Function
1	P1.0/T2	O	P_RST	Liquid crystal reset
2	P1.1/T2	O	P_RS	Liquid crystal data
3	P1.2	I	P_MICDET	Microphone detecting input
4	P1.3	O	P_E	Liquid crystal read control bit
5	P1.4	O	P_ADSELA	Selection spectrum sampling control A

DIP	Symbol	I/O	Define Name	Function
6	P1.5	O	P_ADSELB	Selection spectrum sampling control B
7	P1.6	O	P_ADSELC	Selection spectrum sampling control C
8	P1.7	O	P_GNB	Spectrum gain control B
9	RST	I	RESET	System reset
10	P3.0	O	P_GNC	Selection spectrum sampling control C
11	P3.1	I	P_SELECT	Mute/input detecting selection
12	P3.2	I	P_ADINT0	Spectrum sampling interruption
13	P3.3	I	P_REM	Remote control detecting
14	P3.4	O	P_CHARGE	Spectrum sampling discharge control
15	P3.5	I	P_DIST	Distortion detecting
16	P3.6	I	P_SEARCH	Mute/input detecting
17	P3.7	O	P_OKT	OK sampling
18	XTAL2	O	Crystal out	Crystal out
19	XTAL1	I	Crystal in	Crystal in
20	GND	I	GND	GND
21	P2.0	O	P_SDA	I2C data line
22	P2.1	O	P_SCL	I2C clock line
23	P2.2	O	P_LT62446	LT62446 latched
24	P2.3	O	P_LT4094	LT4094 latched
25	P2.4	O	P_SCART	SCART detecting
26	P2.5	O	P_CLK	Click line
27	P2.6	I	P_RLY	Relay state input
28	P2.7	O	P_GNA	Selection spectrum sampling control A
29	/PSEN	I		Blank
30	ALE	I		Blank
31	/EA/Vpp	I	Vpp	+5V pull up
32	P0.7	O	P_D7	Liquid crystal data D7 bit
33	P0.6	O	P_D6	Liquid crystal data D6 bit
34	P0.5	O	P_D5	Liquid crystal data D5 bit
35	P0.4	O	P_D4	Liquid crystal data D4 bit
36	P0.3	O	P_D3	Liquid crystal data D3 bit
37	P0.2	O	P_D2	Liquid crystal data D2 bit

DIP	Symbol	I/O	Define Name	Function
38	P0.1	O	P_D1	Liquid crystal data D1 bit
39	P0.0	O	P_D0	Liquid crystal data D0 bit
40	Vcc	I	Vcc	Vcc

### 3.5.7 function introduction to PT2308

#### 1. DESCRIPTION

PT2308L is a Class AB stereo headphone driver chip utilizing CMOS Technology specially designed for portable digital audio applications. It is housed in an 8-pin DIP or SO package and is functionally compatible with TDA1308. Pin assignments and application circuit are optimized for lower cost effectiveness and easy PCB Layout

#### 2. FEATURES

- CMOS Technology
- Low Power Consumption
- Wide Temperature Range
- Excellent Power Supply Ripple Rejection
- High Signal-to-Noise Ratio, S/N=110dB
- Low Harmonic Distortion, THD= 0.001%
- Large Output Voltage Swing
- Low Supply Voltage Available (VDD=2V)

#### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	OUT1	O	Output Pin R
2	IN1-	I	Inverting Input Pin R
3	IN1+	I	Non-Inverting Input Pin R
4	Vss	I	Negative Power Supply
5	IN2-	I	Inverting Input Pin L
6	IN2+	I	Non-Inverting Input Pin L
7	OUT2	O	Output Pin L
8	Vdd	I	Positive Power Supply

### 3.5.8 function introduction to PT2222

#### 1. DESCRIPTION

The PT2222 is remote control transmitters utilizing CMOS Technology specially designed for use on infrared remote control applications. It is pin-to-pin compatible with NEC  $\mu$ PD6122 respectively. PT2222 is housed in 24 pins so and capable of controlling 64 function keys and 3 double keys. PT2222 may be paired with PT2225 to construct a powerful remote control system.

#### 2. FEATURES

CMOS Technology

Low Power Consumption (V<sub>dd</sub>=2.0~5.5V)

Pin-to-Pin Consumption with  $\mu$ PD6122

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

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

#### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	K12	I	Nc
2	K13	I	Nc
3	K14	I	Nc
4	K15	I	Nc
5	K16	I	Nc
6	K17	I	Nc
7	REM	O	Serial data output
8	VDD	I	Positive Power Supply
9	SEL	I	GND
10	OSCO	O	Crystal out
11	OSCI	I	Crystal in
12	VSS	I	VSS
13	LMP		Emission output indication
14	KI/O7	O	Keyboard matrix line control
15	KI/O6	O	Keyboard matrix line control
16	KI/O5	O	Keyboard matrix line control
17	KI/O4	O	Keyboard matrix line control
18	KI/O3	O	Keyboard matrix line control
19	KI/O2	O	Keyboard matrix line control

PIN No.	Symbol	I/O	Description
20	KI/O1	O	Keyboard matrix line control
21	KI/O0		Keyboard matrix line control
22	CCS	I	Address code control
23	K10	I	Keyboard matrix row control
24	K11	I	Keyboard matrix row control

### 3.5.9 function introduction to LM1875

#### 1. Description

The LM1875 is a monolithic power amplifier offering very low distortion and high quality performance for consumer audio applications.

The LM1875 delivers 20 watts into a 4 $\Omega$  or 8 $\Omega$  load on  $\pm 25V$  supplies. Using an 8 $\Omega$  load and  $\pm 30V$  supplies, over 30 watts of power may be delivered. The amplifier is designed to operate with a minimum of external components. Device overload protection consists of both internal current limit and thermal shutdown.

The LM1875 design takes advantage of advanced circuit techniques and processing to achieve extremely low distortion levels even at high output power levels. Other outstanding features include high gain, fast slew rate and a wide power bandwidth, large output voltage swing, high current capability, and a very wide supply range. The amplifier is internally compensated and stable for gains of 10 or greater.

#### 2. Features

Up to 30 watts output power

AVO typically 90 dB

Low distortion: 0.015%, 1 kHz, 20 W

Wide power bandwidth: 70 kHz

Protection for AC and DC short circuits to ground

Thermal protection with parole circuit

High current capability: 4A

Wide supply range 16V-60V

Internal output protection diodes

94 dB ripple rejection

Plastic power package TO-220

#### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	+IN	I	Non-Inverting Input Pin C

PIN No.	Symbol	I/O	Description
2	-IN	I	Inverting Input Pin C
3	-VEE	I	Negative Power Supply
4	OUTPUT	O	Signal out C
5	VCC	I	Positive Power Supply

### 3.5.10 function introduction to TDA7265

#### 1. DESCRIPTION

The TDA7265 is class AB dual Audio power amplifier assembled in the Multiwatt package, specially designed for high quality sound application as Hi-Fi music centers and stereo TV sets.

#### 2. Features

WIDE SUPPLY VOLTAGE RANGE (UP TO ? 25V ABS MAX.)

SPLIT SUPPLY

HIGH OUTPUT POWER 25 + 25W @THD =10%, RL = 8? , VS = +20V

NO POPAT TURN-ON/OFF

MUTE (POP FREE)

STAND-BY FEATURE (LOW Iq)

SHORT CIRCUIT PROTECTION

THERMAL OVERLOAD PROTECTION

#### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	-Vs	I	Negative Power Supply
2	OUT1	O	Signal out SL
3	+Vs	I	Positive Power Supply
4	OUT2	O	Signal out SR
5	MUTE	I	Mute control
6	-Vs	I	Negative Power Supply
7	IN2+	I	Non-Inverting Input Pin SR
8	IN2-	I	Inverting Input Pin SR
9	GND	I	GND
10	IN1+	I	Non-Inverting Input Pin SL
11	IN1-	I	Inverting Input Pin SL



### 3.5.11 function introduction to M62446

#### 1. DESCRIPTION

The M62446FP is 6 channels electric volume controlled 3-wire serial data.

The IC is suitable for use in home-use audio systems and TV sets.

#### 2. Features

Electric volume: Volume level 0dB ~ -79dB, - ? dB (1dB / step)

Tone control: Bass / Treble, 0dB ~ ±10dB(2dB / step)

4 Output ports: Built-in microcomputer interface circuit controlled by 16-bit serial data.

#### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	Out 4	O	Source select control 4
2	Out3	O	Source select control 3
3	Out2	O	Source select control 2
4	Out1	O	Source select control 1
5	AVdd	I	Positive Power Supply
6	SWin	I	SW Input
7	GNDS	I	SW GND
8	SRin	I	SR Input
9	SLin	I	SL Input
10	GNDC	I	C GND
11	Cin	I	C Input
12	GNDR	I	R GND
13	Rin	I	R Input
14	GNDL	I	L GND
15	Lin	I	L Input
16	BYPASSR	O	R bypass capacitance
17	BYPASSL	O	L bypass capacitance
18	LTRE	O	L treble capacitance
19	LBASS3	O	L bass capacitance
20	LBASS2	O	L bass capacitance
21	LBASS1	O	L bass capacitance
22	RBASS1	O	R bass capacitance

PIN No.	Symbol	I/O	Description
23	RBASS2	O	R bass capacitance
24	RBASS3	O	R bass capacitance
25	RTRE	O	R treble capacitance
26	CR2	O	R capacitance
27	CR1	I	R capacitance
28	CL2	O	L capacitance
29	CL1	I	L capacitance
30	AVSS	I	Negative Power Supply
31	Lout	O	L out
32	Rout	O	R out
33	Cout	O	C out
34	SLout	O	SL out
35	SRout	O	SR out
36	SWout	O	SW out
37	AGND	I	AGND
38	DGND	I	DGND
39	LATCH	I	Select control
40	DATA	I	Serial Data input
41	CLK	I	Serial CLK input
42	DVDD	I	Digital Power Supply

### 3.5.12 function introduction to AT24C02

#### 1. Description

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

8-lead MAP, 8 lead TSSOP and 8-ball dBGGA2 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 dBGAA2™ Packages

### 3. PIN DESCRIPTION

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

## 3.5.13 function introduction to L7805

### 1. Description

LM7805 is 5V voltage regulator, locates on power board in this player and is used to generate 5V stable voltage.

### 2. Features

Suitable for CMOS ,TTL, the other digital IC's power supply

Internal thermal overload protection  
 Internal short circuit current limiting  
 Output current in excess of 1 A  
 Metal Fin is fully covered with Mold Resin

### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	Input	I	Input +18V
2	Common	I	Ground
3	Output	O	Output +12V

## 3.5.14 function introduction to 7812

### 1. Description

LM7812 is +12V voltage regulator, locates on power board in this player and is used to generate +12 stable voltage.

### 2. Features

Suitable for CMOS ,TTL, the other digital IC's power supply  
 Internal thermal overload protection  
 Internal short circuit current limiting  
 Output current in excess of 1 A  
 Metal Fin is fully covered with Mold Resin

### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	Input	I	Input +18V
2	Common	I	Ground
3	Output	O	Output +12V

## 3.5.15 function introduction to 7912

### 1. Description

LM7912 is +12V voltage regulator, locates on power board in this player and is used to generate +12 stable voltage.

## 2. Features

Suitable for CMOS ,TTL, the other digital IC's power supply

Internal thermal overload protection

Internal short circuit current limiting

Output current in excess of 1 A

Metal Fin is fully covered with Mold Resin

## 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	Input	I	Input -18V
2	Output	O	Output -12V
3	Common	I	Ground

### 3.5.16 function introduction to LM324

#### 1. Description

The LM124 series consists of four independent, high gain, internally frequency compensated operational amplifiers 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.

Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits which now can be more easily implemented in single power supply systems. For example, the LM124 series can be directly operated off of the standard a 5 V power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional g15V power supplies.

#### 2. Features

Internally frequency compensated for unity gain

Large DC voltage gain 100 dB

Wide bandwidth (unity gain) 1 MHz (temperature compensated)

Wide power supply range: Single supply 3V to 32V or dual supplies  $\pm 1.5V$  to  $\pm 16V$

Very low supply current drain (700  $\mu A$ )—essentially independent of supply voltage

Low input biasing current 45 n A (temperature compensated)

Low input offset voltage 2 mV and offset current 5 n A

Input common-mode voltage range includes ground

Differential input voltage range equal to the power supply voltage

Large output voltage swing 0V to  $\pm 1.5V$

### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	Output 1	O	Output 1 Pin
2	Input 1-	I	Inverting Input Pin
3	Input 1+	I	Non-Inverting Input Pin
4	V +	I	Positive Power Supply
5	Input 2+	I	Non-Inverting Input Pin
6	Input 2-	I	Inverting Input Pin
7	Output 2	O	Output 2 Pin
8	Output 3	O	Output 3 Pin
9	Input 3-	I	Inverting Input Pin
10	Input 3+	I	Non-Inverting Input Pin
11	GND	I	GND
12	Input 4+	I	Non-Inverting Input Pin
13	Input 4-	I	Inverting Input Pin
14	Output 4	O	Output 4 Pin

## 3.5.17 function introduction to PT2315

### 1. Description

PT2315 is a two-channel digital audio processor utilizing CMOS Technology . Volume, Bass, Treble and balance controls are incorporated into a single chip. Loudness Function is also provided to build a highly effective electronic audio processor having the highest performance and reliability with the least external components. All functions are programmable using the IIC Bus. The pin assignments and application circuit are optimized for easy PCB layout and cost saving advantage for audio application. Housed in a 20-pin DIP/SO Package, PT2315is pin-to-pin compatible with TDA7315 and is very similar in performance with performance with the later.

### 2. Features

CMOS Technology

Least External Components

Treble and Bass Control

Loudness Function

Input/Output External Noise Reduction System/Equalizer

2 Independent Speaker Controls for Balance Function

Independent Mute Function  
 Volume Control in 1.25 dB/step  
 Low Distortion  
 Low Noise and DC Stepping  
 Controlled by IIC BUS Micro-Processor Interface  
 Pin-to-Pin Compatible with TDA7315

### 3. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	REF	O	Reference Power Supply
2	VDD	I	Power Supply
3	AGND	I	AGND
4	TREB_L	O	L treble adjust capacitance
5	TREB_R	O	R treble adjust capacitance
6	RIN	I	R input
7	LOUD_R	O	R Loud adjust
8	NC		NC
9	LOUD_L	O	R Loud adjust
10	NC		NC
11	LIN	I	L input
12	BIN_L	I	L adjust capacitance input
13	BOUT_L	O	L adjust capacitance output
14	BIN_R	I	R adjust capacitance input
15	BOUT_R	O	R adjust capacitance output
16	ROUT	O	R output
17	LOUT	O	L output
18	DGND	I	DGND
19	DATA	I	Serial Data input
20	CLK	I	Serial CLK input

### 3.5.18 function introduction to 74VHC245

#### 1. Description

The VHC245 is an advanced high speed CMOS octal bus transceiver fabricated with silicon gate CMOS technology. It achieves high-speed operation similar to equivalent Bipolar Schottky TTL while maintaining the

CMOS low power dissipation. The VHC245 is intended for bi-directional asynchronous communication between data busses. The direction of data transmission is determined by the level of the T/R input. The enable input can be used to disable the device so that the busses are effectively isolated. All inputs are equipped with protection circuits against static discharge.

## 2. Features

High Speed:  $T_{pd} = 4.0 \text{ ns}$  (typ) at  $V_{cc} = 5V$

High Noise Immunity:  $V_{nih} = V_{nil} = 28\% V_{cc}$  (Min)

Power Down Protection is provided on all inputs

Low Noise:  $V_{olp} = 0.9V$  (typ)

Low Power Dissipation:

$I_{cc} = 4 \mu A$  (Max) @  $T_A = 25^\circ C$

Pin and Function Compatible with 74HC245

## 3. Truth table

Inputs		Outputs
-OE	T/-R	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	HIGH-Z State

H= HIGH Voltage Level L= LOW Voltage Level X= Immaterial Any unused bus terminals during HIGH-Z State must be held HIGH or LOW.

## 4. PIN DESCRIPTION

PIN No.	Symbol	I/O	Description
1	T/-R	I	Transmit/Receive Input
2	A0	I/O	Side B Inputs or 3-STATE Outputs
3	A1	I/O	
4	A2	I/O	
5	A3	I/O	
6	A4	I/O	
7	A5	I/O	
8	A6	I/O	
9	A7	I/O	
10	Nc		



PIN No.	Symbol	I/O	Description
11	B7	I/O	Side B Inputs or 3-STATE Outputs
12	B6	I/O	
13	B5	I/O	
14	B4	I/O	
15	B3	I/O	
16	B2	I/O	
17	B1	I/O	
18	B0	I/O	
19	-OE	I	Output Enable Input
20	Vcc	I	Power Supply

### 3.5.19 function introduction to CD4094

#### 1. Description

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

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

#### 2. Features

Wide supply voltage range: 3.0V to 18V

High noise immunity: 0.45 VDD (typ.)

Low power TTL compatibility: Fan out of 2 driving 74L or 1 driving 74LS 3-STATE outputs

#### 3. PIN DESCRIPTION

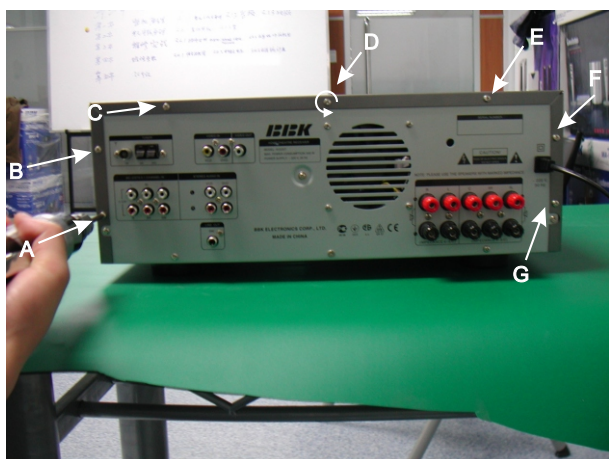
PIN No.	Symbol	I/O	Description
1	STROBE	I	Store control
2	DATA	I	Serial data
3	CLOCK	I	Serial clock
4	Q1	O	Bit 1 output
5	Q2	O	Bit 2 output
6	Q3	O	Bit 3 output

PIN No.	Symbol	I/O	Description
7	Q4	O	Bit 4 output
8	Vss	I	GND
9	Qs	O	Top Bit output
10	Qs'	O	Non-Qs
11	Q8	O	Bit 8 output
12	Q7	O	Bit 7 output
13	Q6	O	Bit 6 output
14	Q5	O	Bit 5 output
15	Output enable	I	Output enable
16	Vdd	I	Positive Power Supply

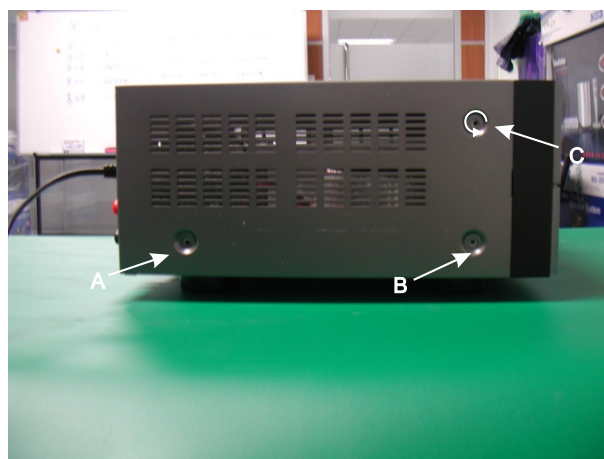
## Chapter Four Disassembly and Assembly Process

In order to know the structure of audio power amplifier AV225T 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 composed by control panel components, power amplifier board components, signal board components, volume board components, power board components and MIC board components. So please operate according to illustration strictly.

### 1. Disassembly and assembly process for the unit



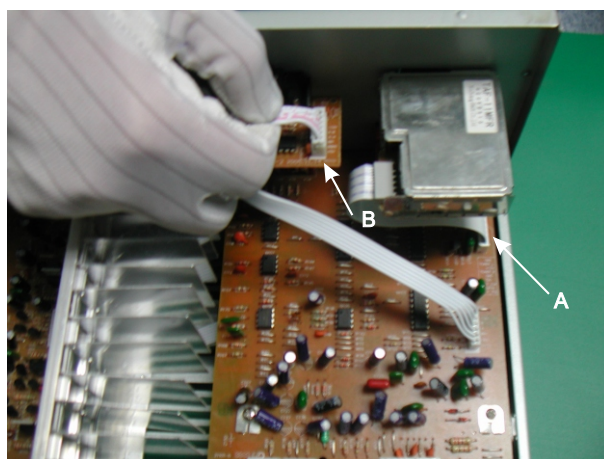
(1) Use electric screwdriver to unfix screws in the joint place of upper cover and rear cover.



(2) Use electric screwdriver to unfix left and right hand side upper cover screws A, B and C.



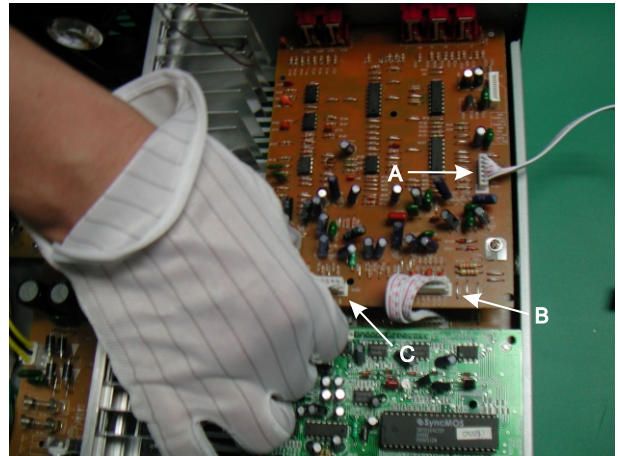
(3) Take down upper casing.



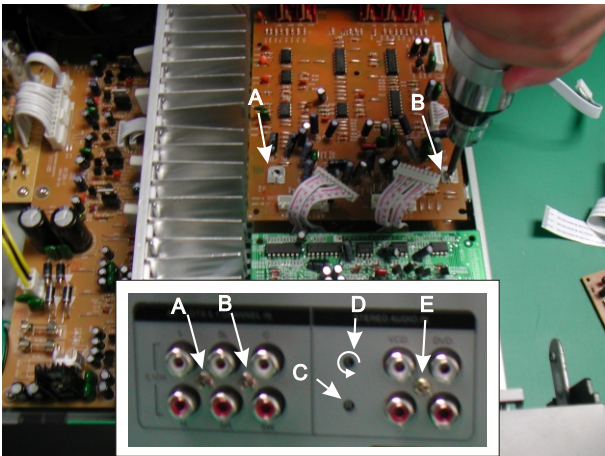
(4) Pull down tuner flat cable A and video flat cable B.



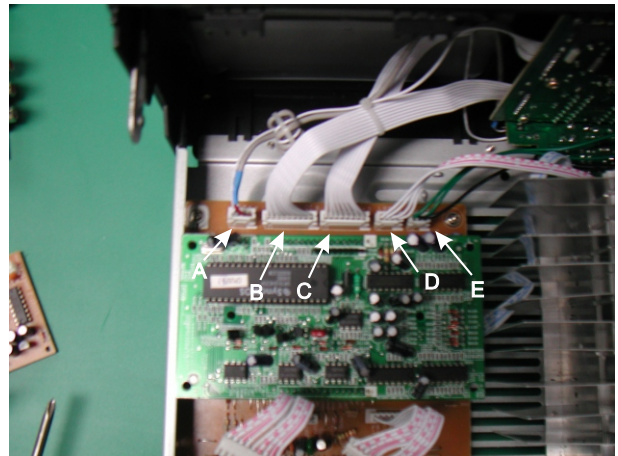
(5) Use electric screwdriver to unfix screws A and B in the joint position of tuner and rear cover, and then unfix screws C and D in the joint position of video board and rear cover, then take them down.



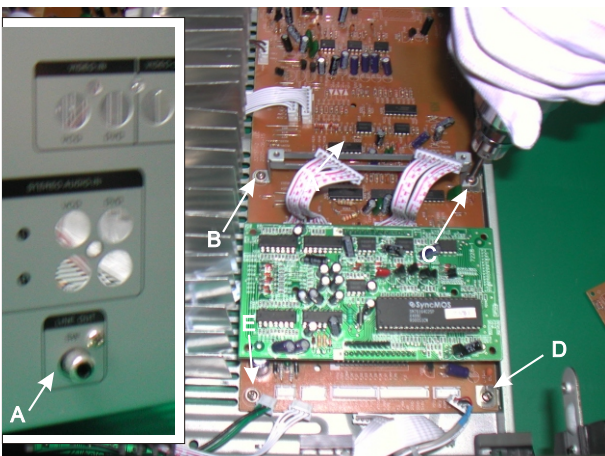
(6) Pull down flat cable A, B and C on volume board.



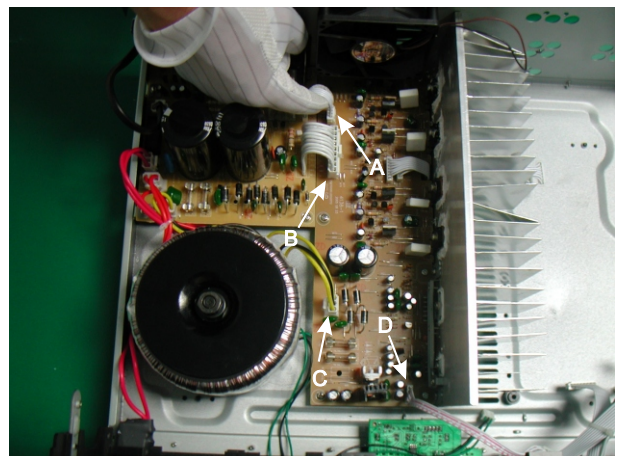
(7) Use electric screwdriver to unfix screws A~E and screws A, B in the joint position of volume board and rear cover, and then take down volume board.



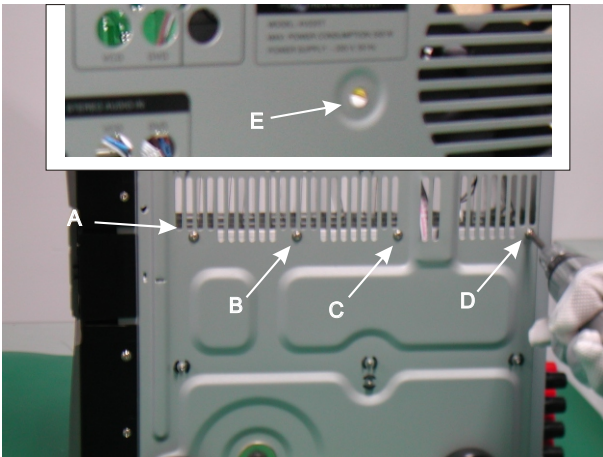
(8) Pull down flat cable A~E on signal board.



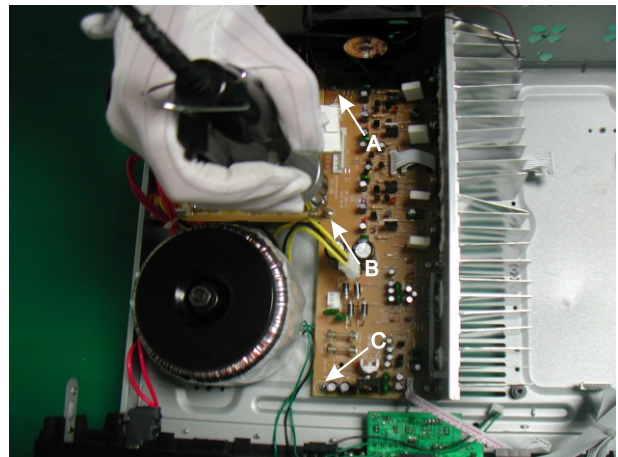
(9) Use electric screwdriver to unfix screws A, B, C, D and E in the joint position of signal board and rear cover, and then take down signal board.



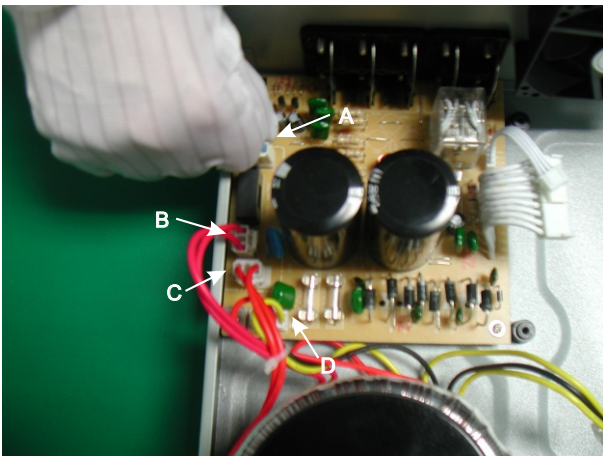
(10) Pull down flat cable A, B, C and D on power amplifier board.



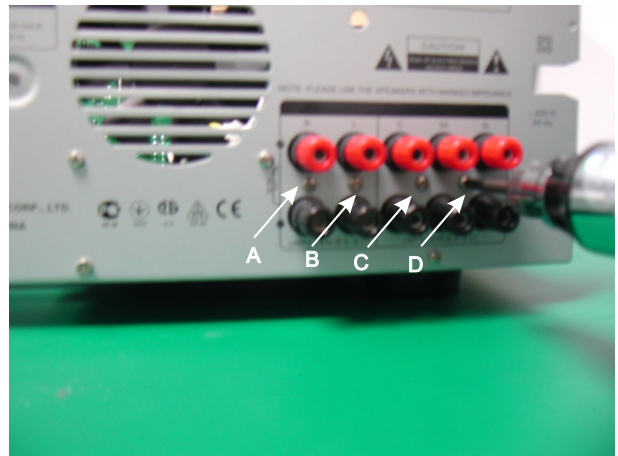
(11) Use electric screwdriver to unfix screws A~D in the point position of bottom casing and power amplifier board heat radiator and screw E in the joint place with rear cover.



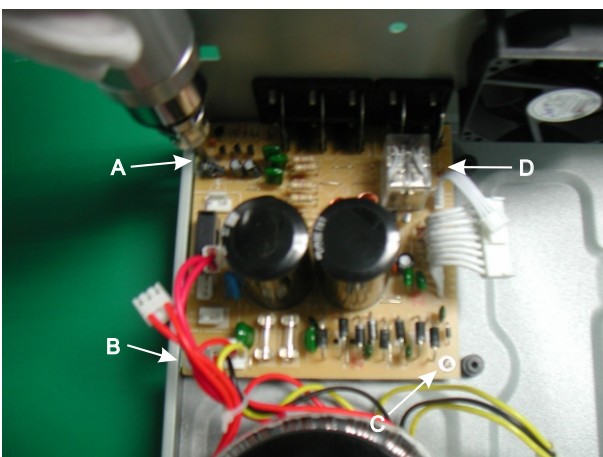
(12) Use electric screwdriver to unfix screws A, B and C of power amplifier board, and then take down power amplifier board.



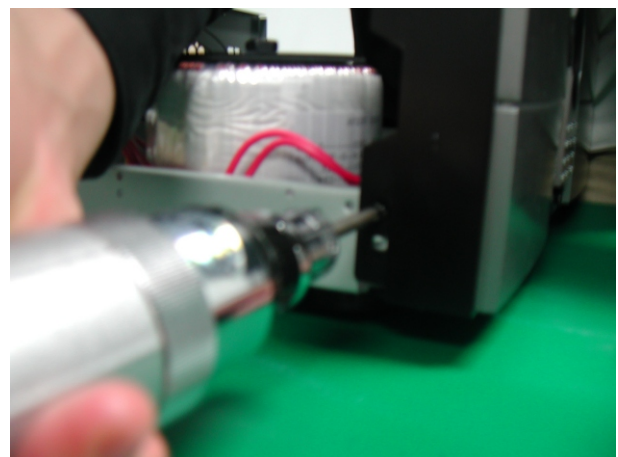
(13) Pull down flat cable A, B, C and D on power board.



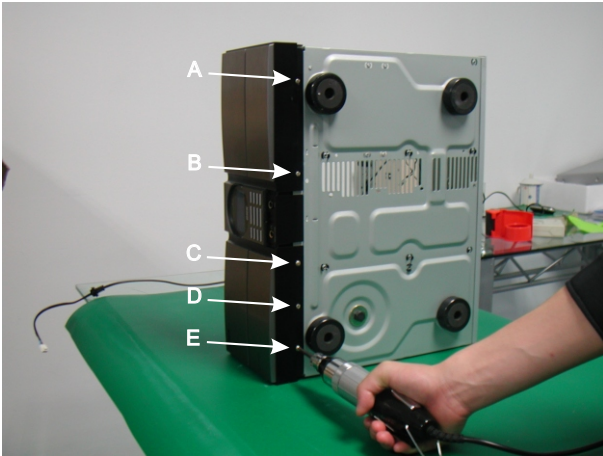
(14) Use electric screwdriver to unfix screws A~D in the joint place of rear cover and output terminal of power amplifier output board (power board and power amplifier output board are both in one).



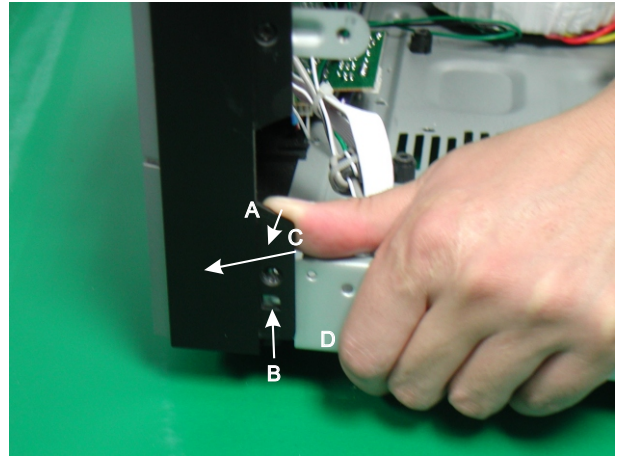
(15) Use electric screwdriver to unfix screws A~D of power board, and then take down power board.



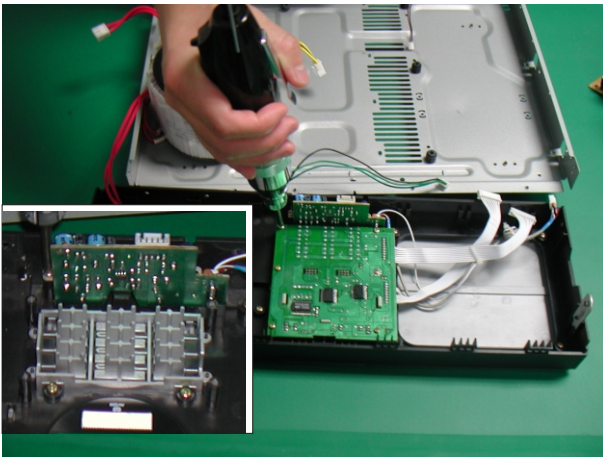
(16) Use electric screwdriver to unfix screws on two sides of panel.



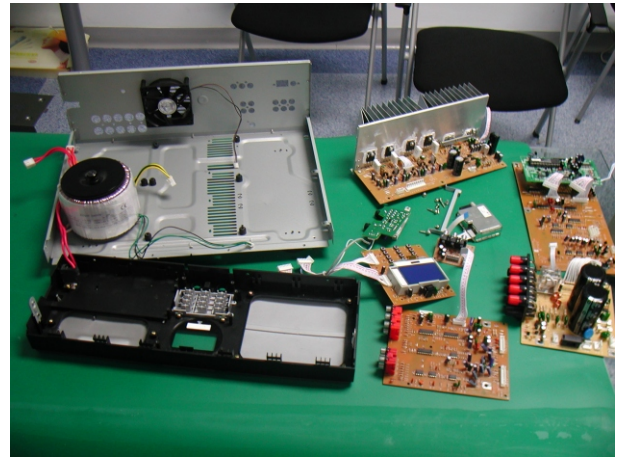
(17) Use electric screwdriver or "+"-shaped screwdriver to unfix screws A~E in the joint place of panel and bottom casing.



(18) Take hold of panel by right hand, fasten the bottom casing D with 4 fingers of left hand, hold the panel button bracket C with thumb and exert strength towards direction of arrow C until panel comes off from bottom casing clasp B, then exert strength towards direction of arrow C, left side panel falls off from bottom casing, and then right hand panel clasp falls off from bottom casing automatically.

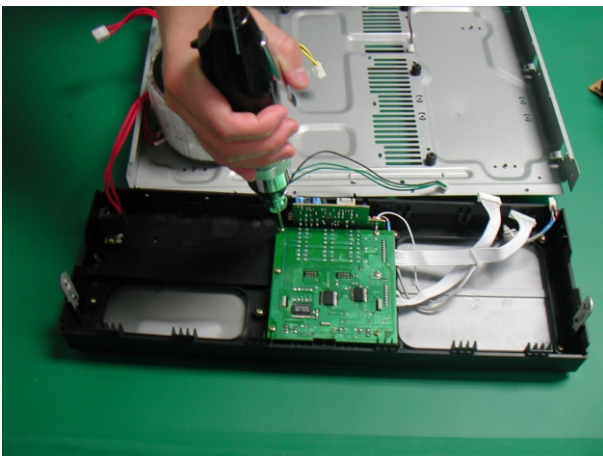


(19) Use electric screwdriver to unfix screws of panel and MIC board, and then take down PCB board.

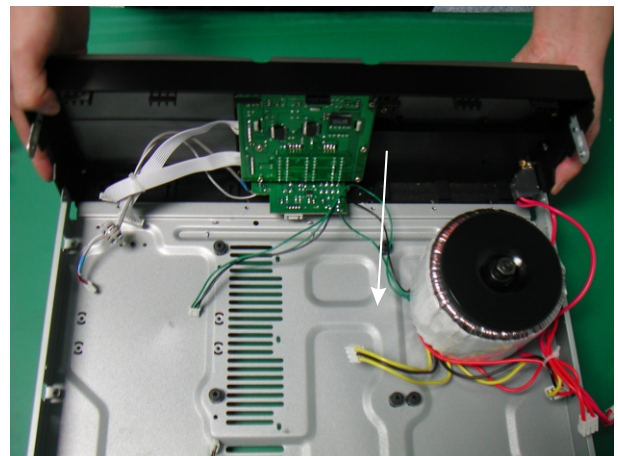


(20) PCB board has been taken away.

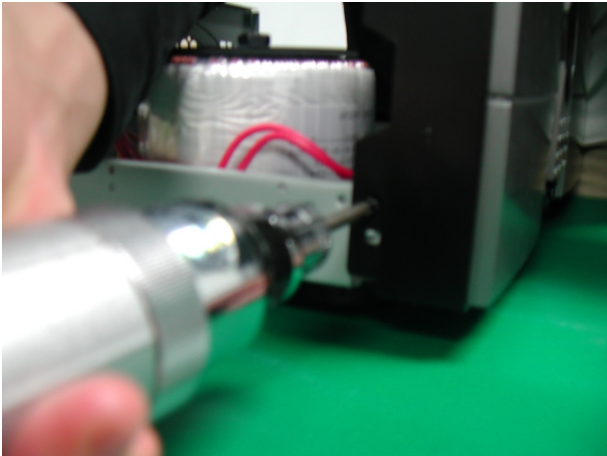
## 2. Assembly process for whole unit



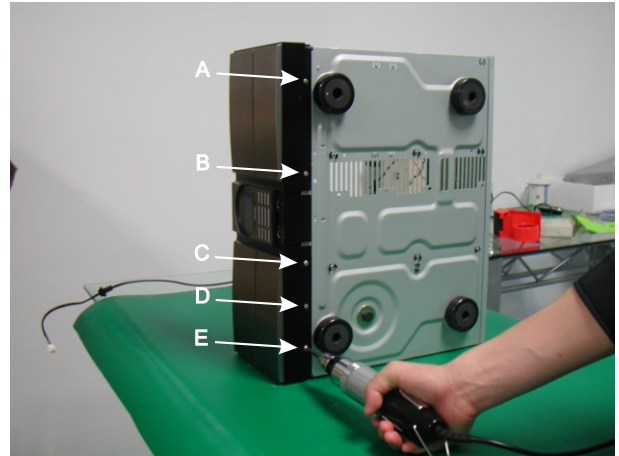
(1) Install panel, MIC board and use electric screwdriver to fix screws.



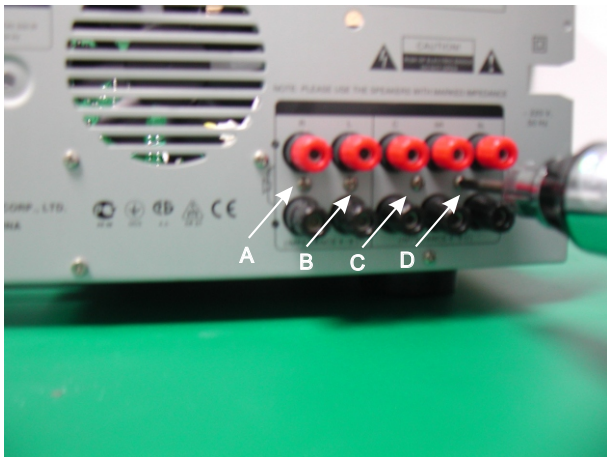
(2) Take hold of panel components and exert strength towards arrow direction (inward) until the clasp is fastened.



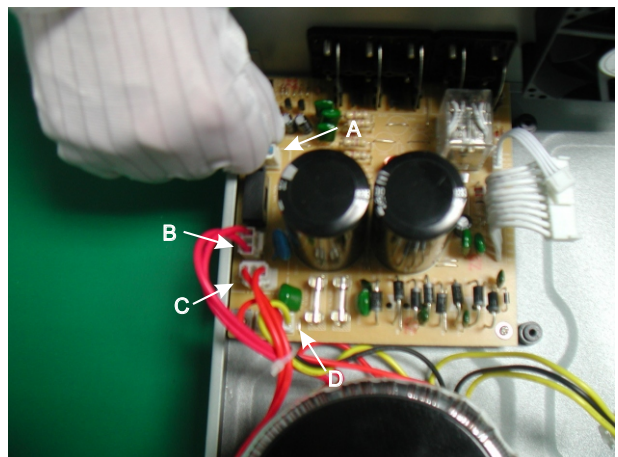
(3) Use electric screwdriver to fix screws in two sides of surface casing.



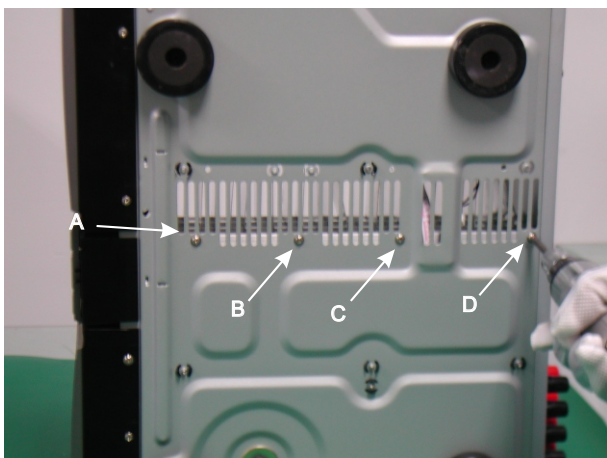
(4) Use electric screwdriver to fix screws A~E in the joint place of surface casing and bottom casing.



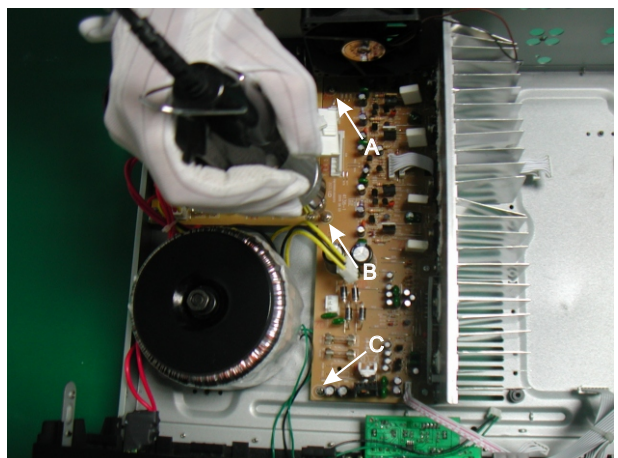
(5) Install power board and then Use electric screwdriver to fix screws A~D in the joint place of rear cover and output terminal of power amplifying output board (power board and power amplifying output board are both in one).



(6) Use electric screwdriver to fix screws of power board and insert flat cable A~D to proper position.



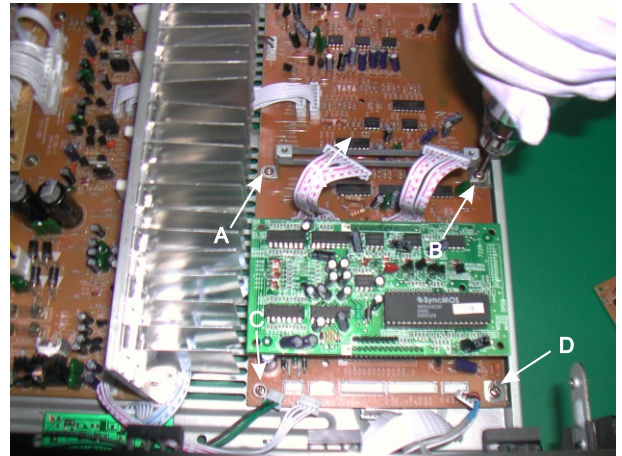
(7) Install power amplifier board, and use electric screwdriver to fix screws A~D in the joint place of bottom casing and power amplifier board heat radiator.



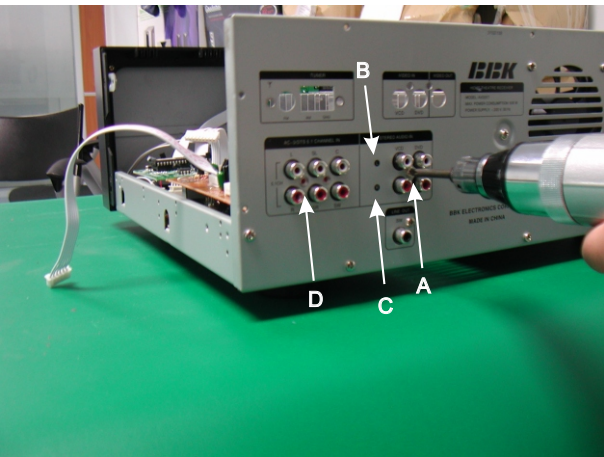
(8) Use electric screwdriver to fix screws A, B, C of power amplifier board and then insert flat cable to proper position.



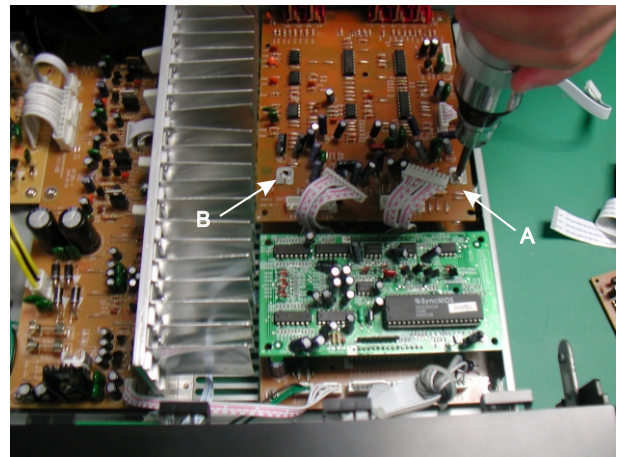
(9) Install signal board and use electric screwdriver to fix screw A of signal board.



(10) Use electric screwdriver to fix screws A, B, C, D of signal board and then insert flat cable to proper position.



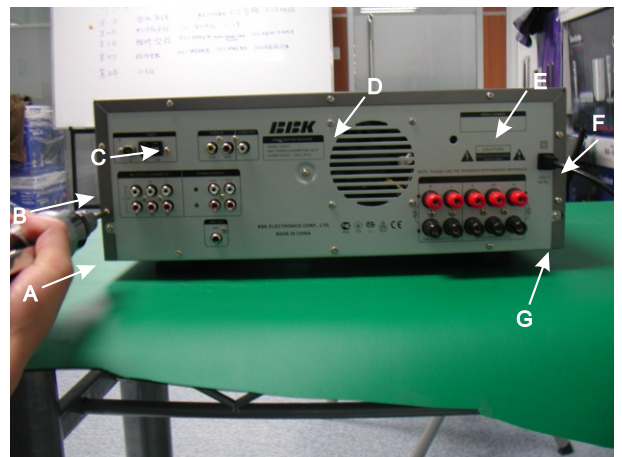
(11) Install volume board and use electric screwdriver to fix screws A~D in the joint place of rear cover.



(12) Use electric screwdriver to fix screws A, B of volume board and then insert flat cable to proper position.



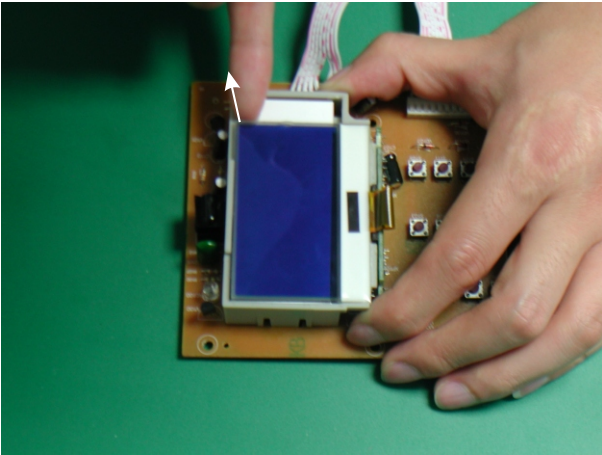
(13) Take hold of tuner by left hand, use electric screwdriver to fix screws A, B; take hold of video board by left hand, use electric screwdriver to fix screws C, D; insert flat cable respectively to proper position.



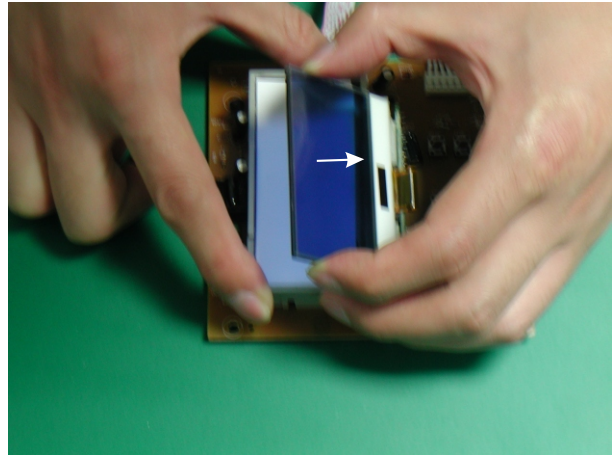
(14) Install upper cover, use electric screwdriver to fix screws of left, back and right sides; power on and test, and it is ok.



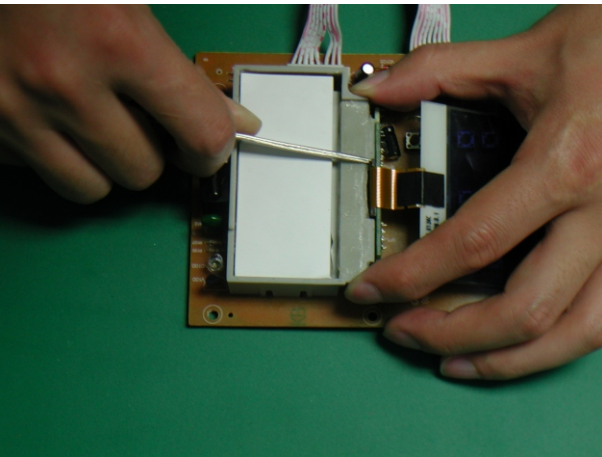
### 3. The process of changing LED back light source



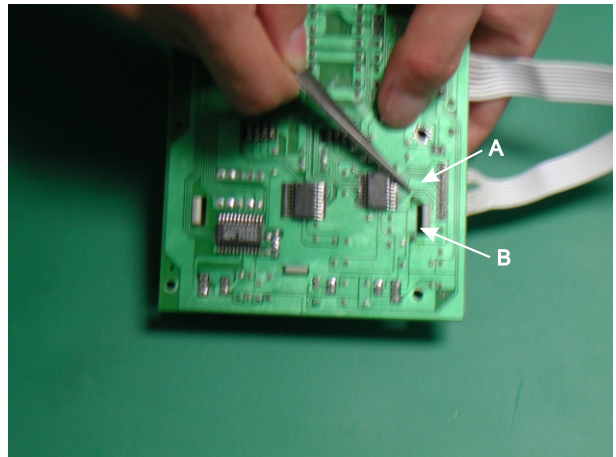
(1) Use nail to enter the gap between LCD screen and upper edge of LED back light source, and then exert strength to put it up.



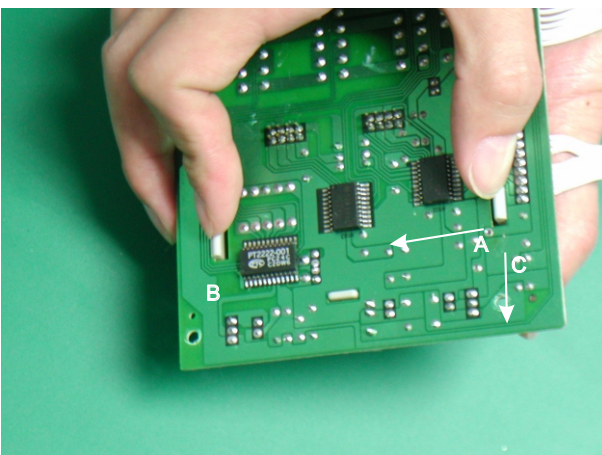
(2) Take LCD screen with thumb and forefinger of left hand, press the whole board by right hand, take hold of the upper edge of LCD screen and exert strength towards arrow direction (leftwards).



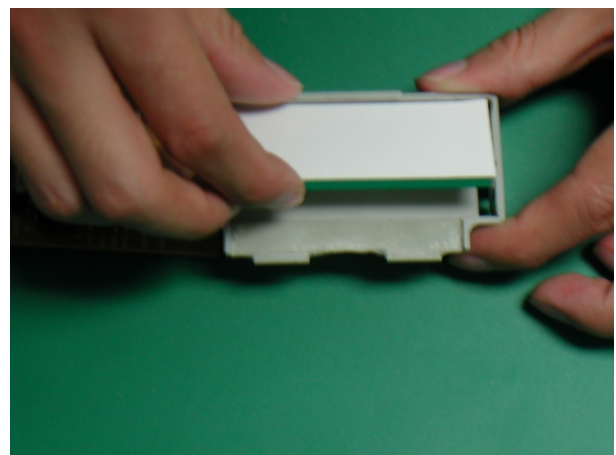
(3) After LCD screen falls off, take hold of forceps by right hand to move away flat cable holder of LCD screen, and the flat cable falls off automatically.



(4) Use brand iron to weld away pin A and B of LED back light source.

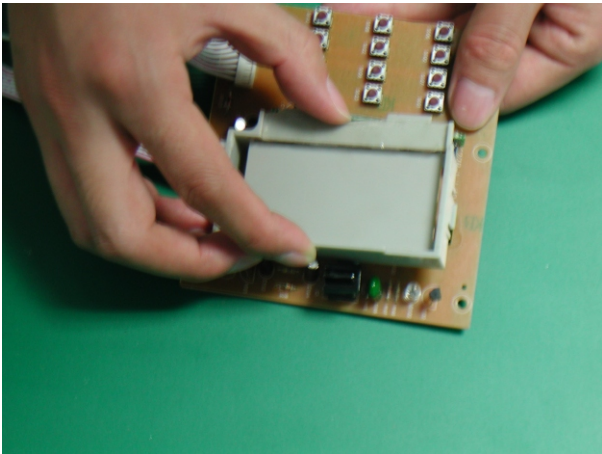


(5) Press down LCD screen bracket clasp A, B with thumb and forefinger of right hand, exert strength with thumb towards direction of arrow A; after clasp A is away from PCB board, press down towards direction of arrow C, clasp A falls off and then clasp B falls off automatically.

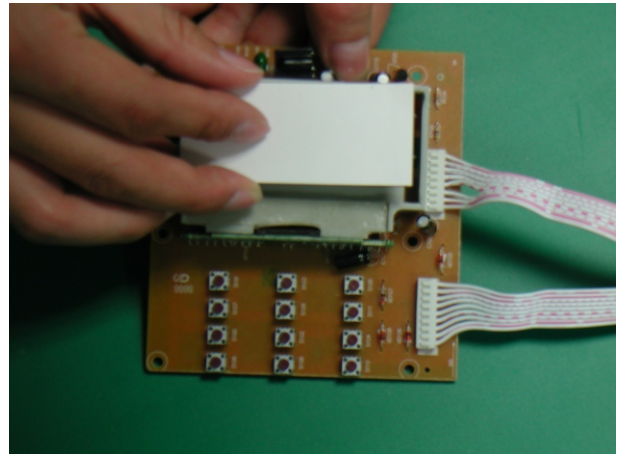


(6) Separate LED back light source and LCD screen bracket clasp.

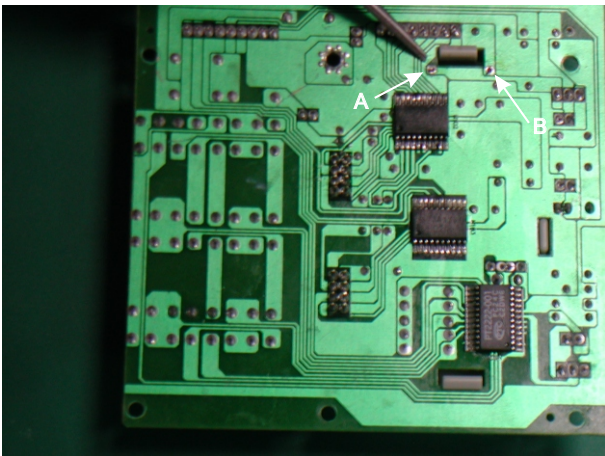
## 4. Process of assembling LED back light source



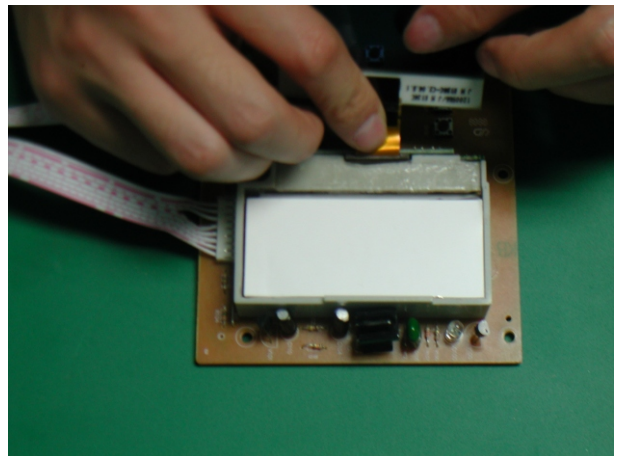
(1) Install LCD screen bracket clasp.



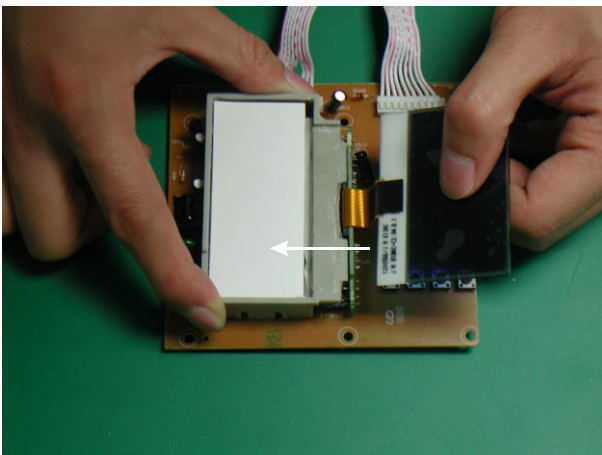
(2) Install LED back light source.



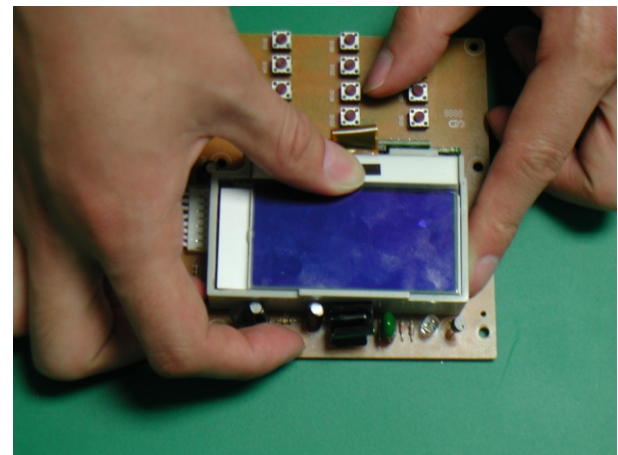
(3) Use brand iron to solder pin A and B of LED back light source.



(4) Take LCD screen flat cable between thumb and forefinger of right hand, insert it into flat cable holder, push up flat cable plug to proper position.



(5) Take hold of LCD screen by left hand and put down towards arrow direction.



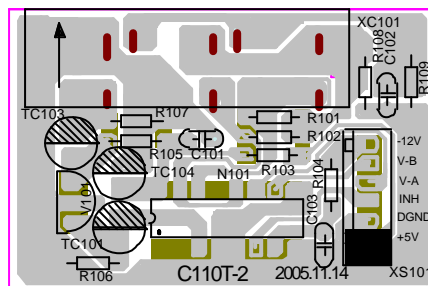
(6) Press the LCD screen tightly.

# Chapter Cinque

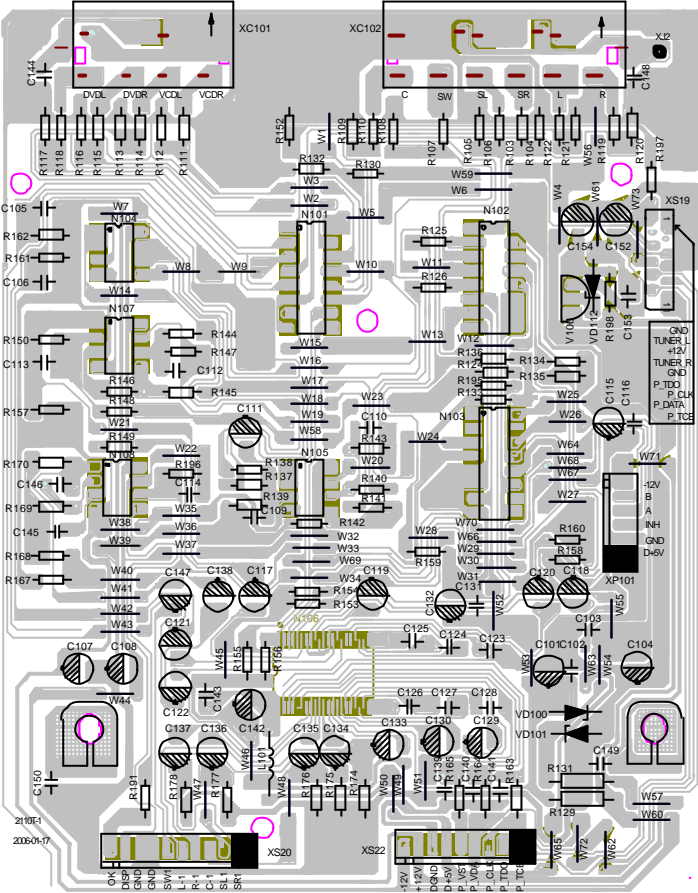
## PCB board & Circuit diagram

### Section One PCB board

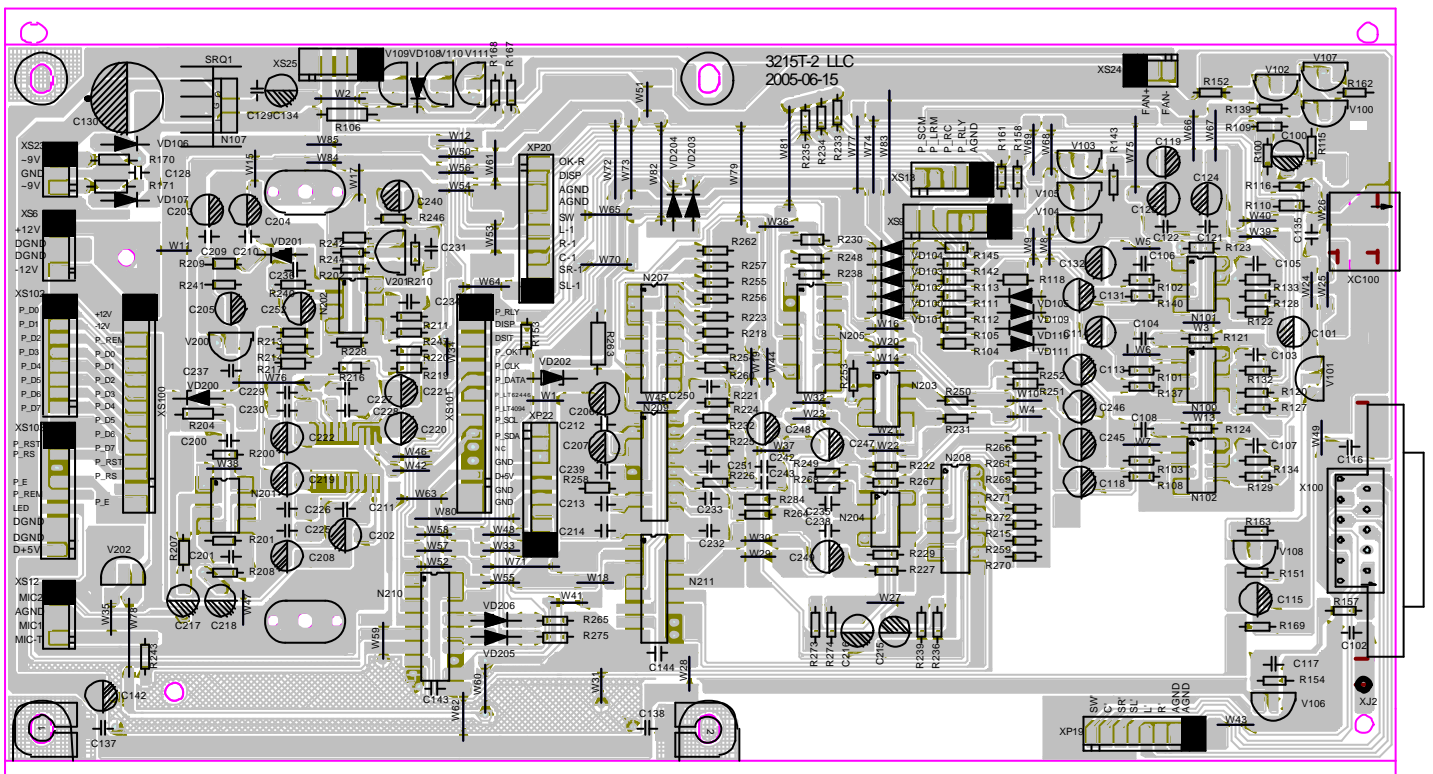
#### 5.1.1 Video Board



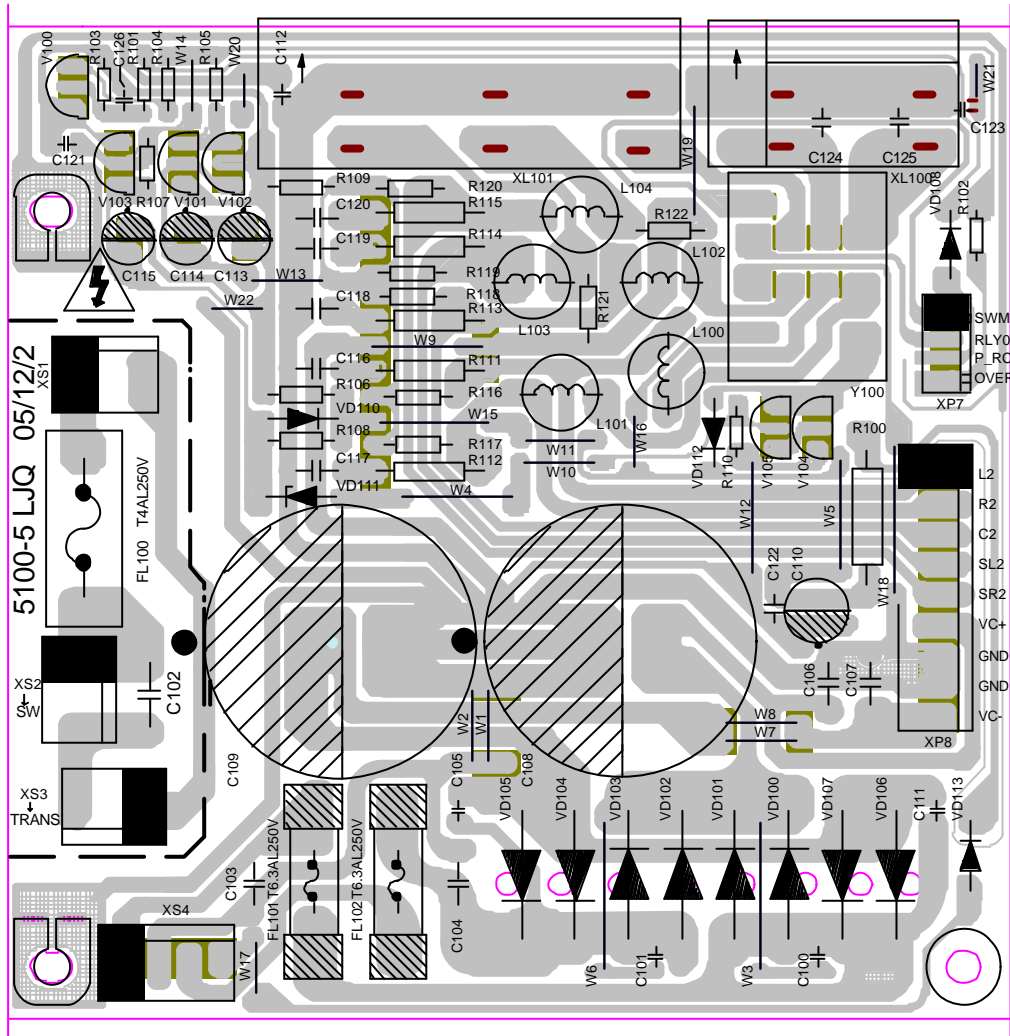
# 5.1.2 Volume Board



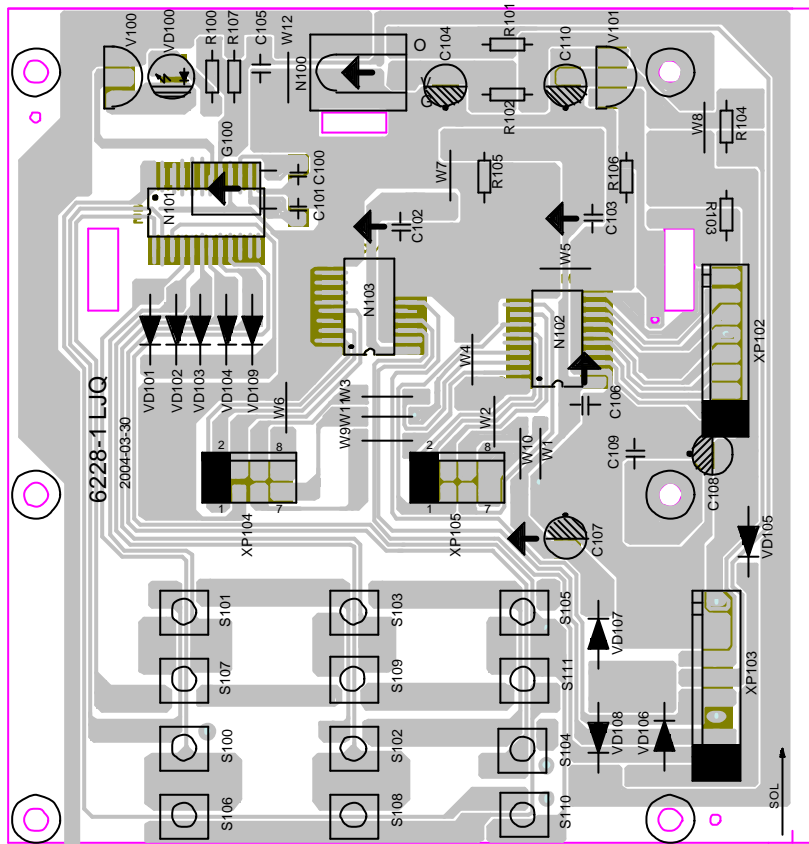
### 5.1.3 Signal Board



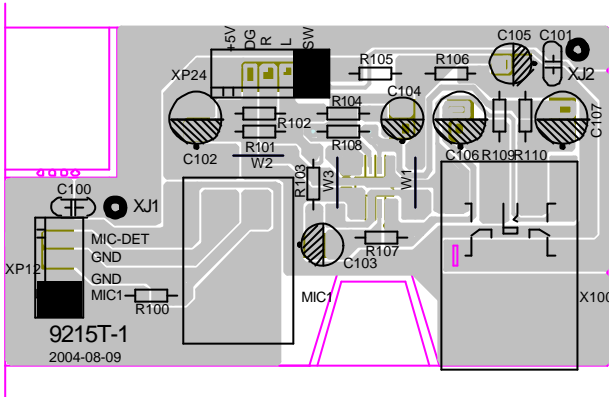
## 5.1.4 Power Board



## 5.1.5 Key Scan Board

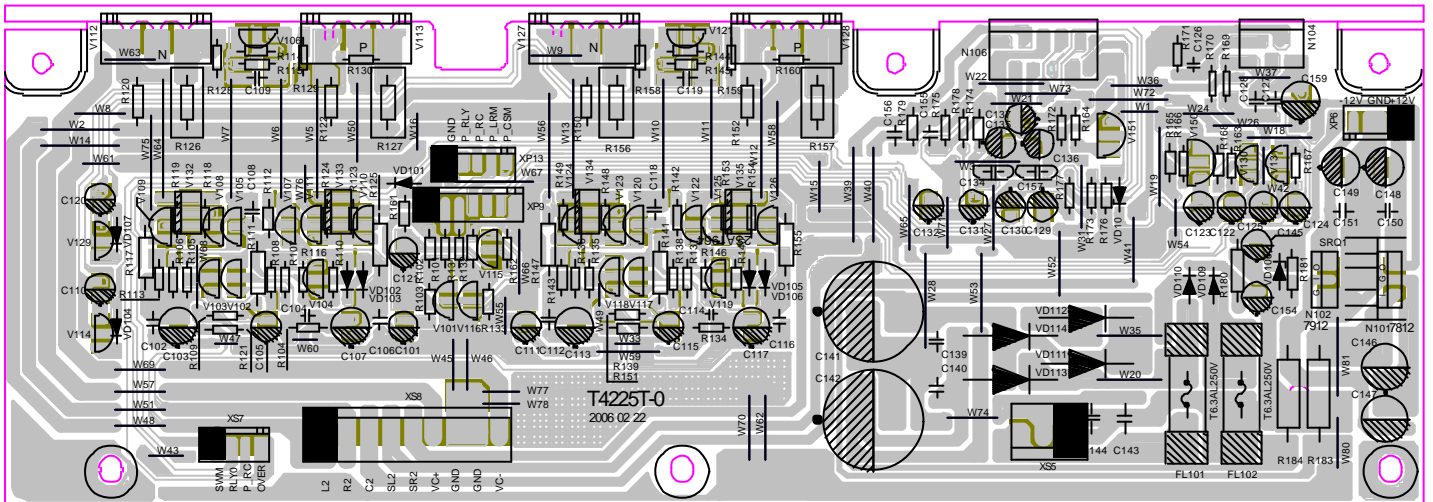


# 5.1.6 MIC Board

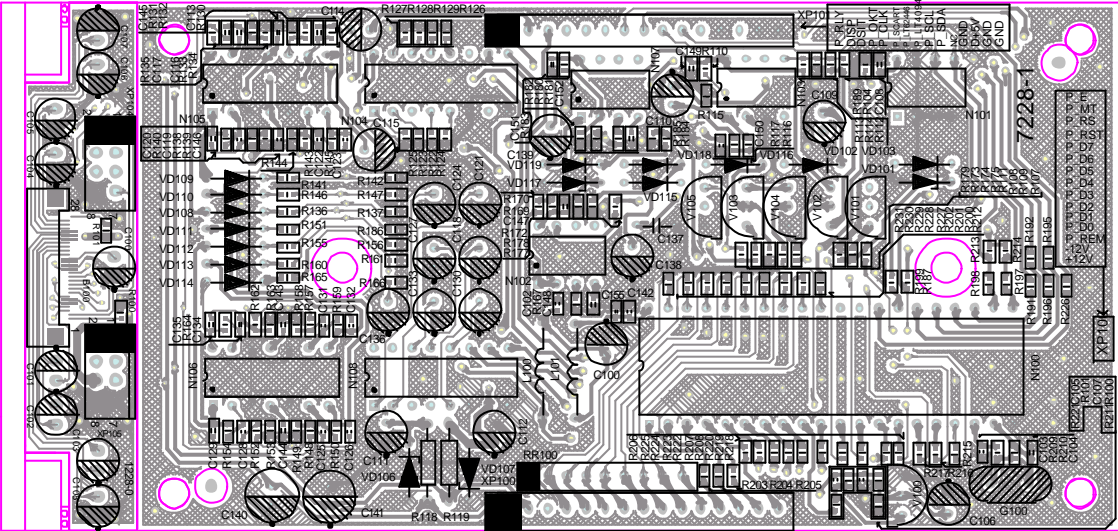




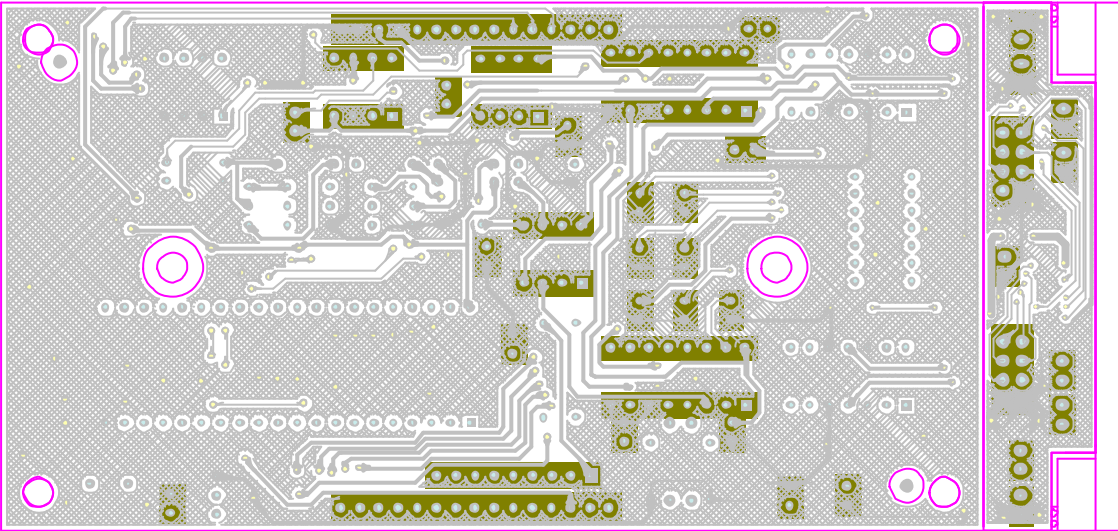
## 5.1.7 audio power amplifying Board



# 5.1.8 Surface layer of CPU Board

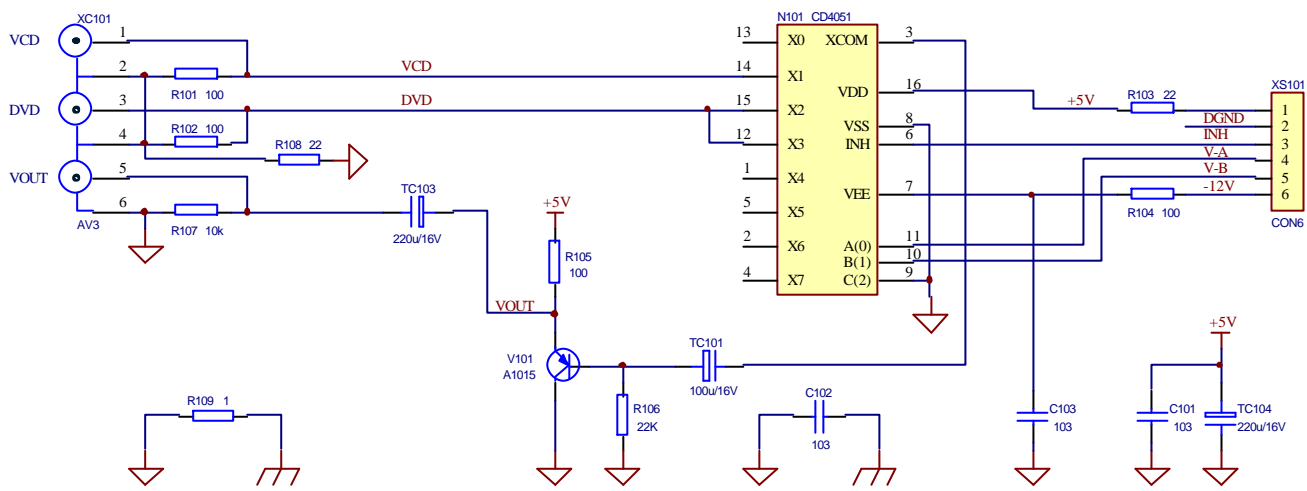


### 5.1.9 Bottom layer of CPU Board

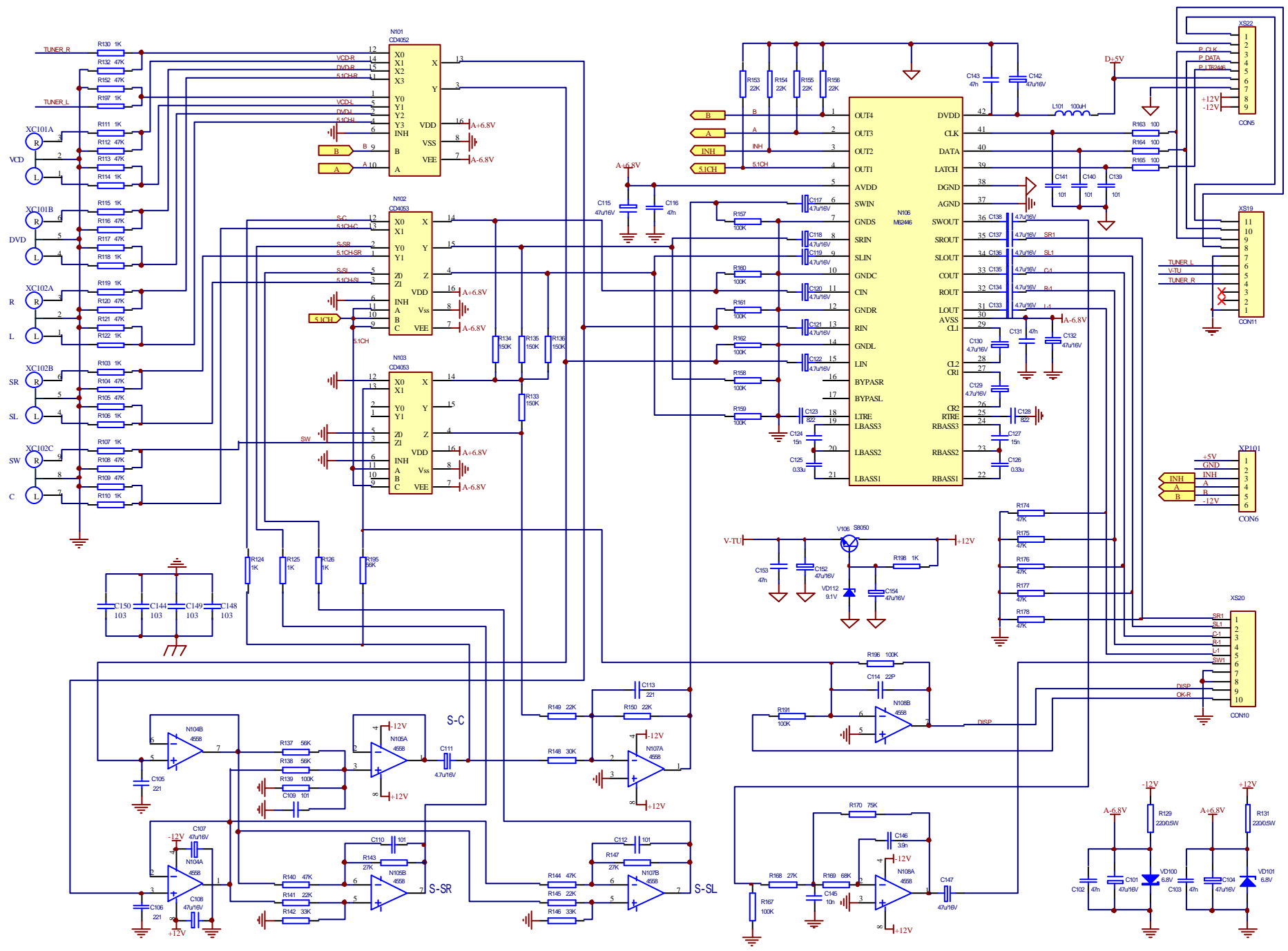


# Section Two circuit diagram

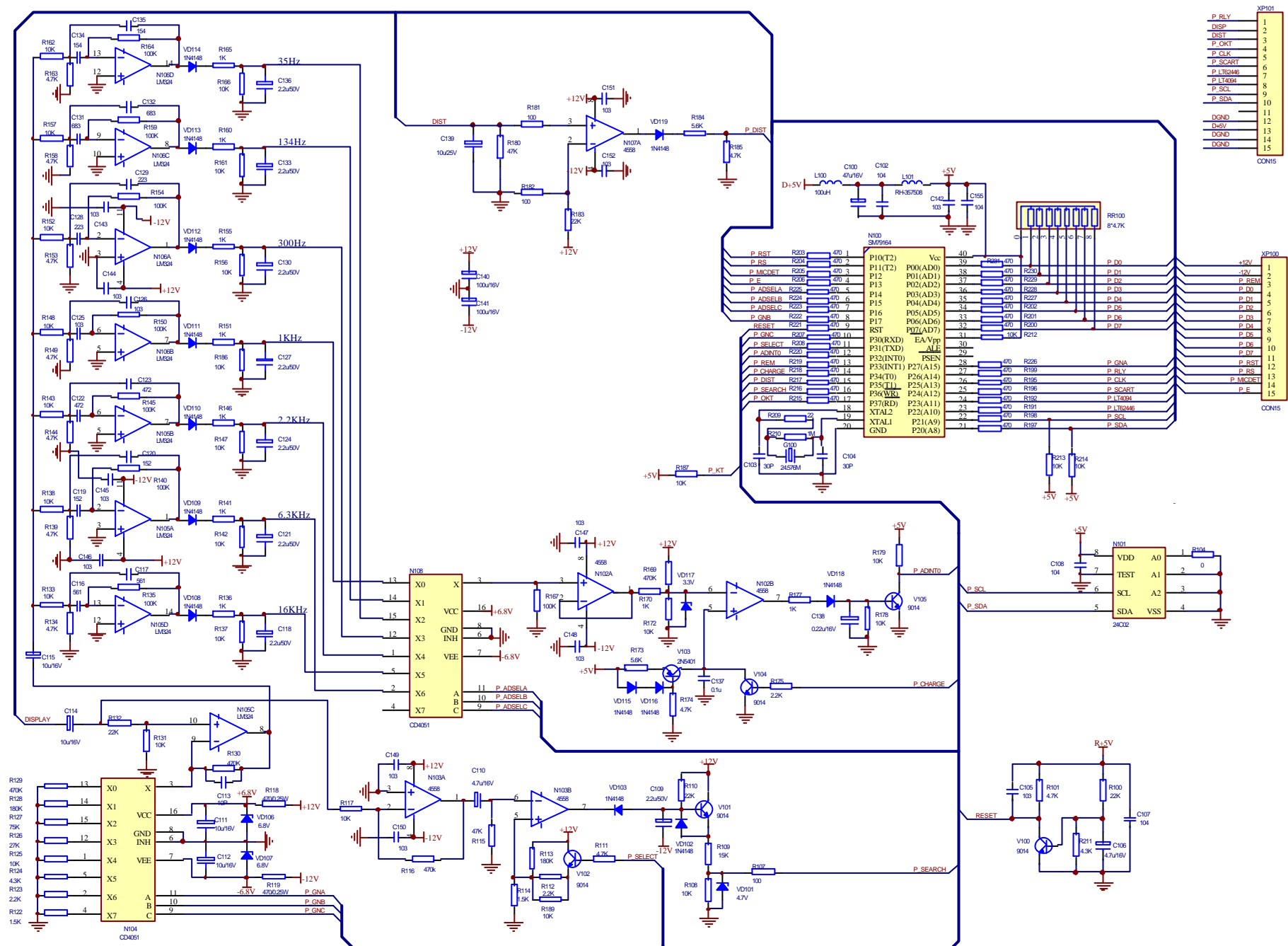
## 5.2.1 Video IN Board



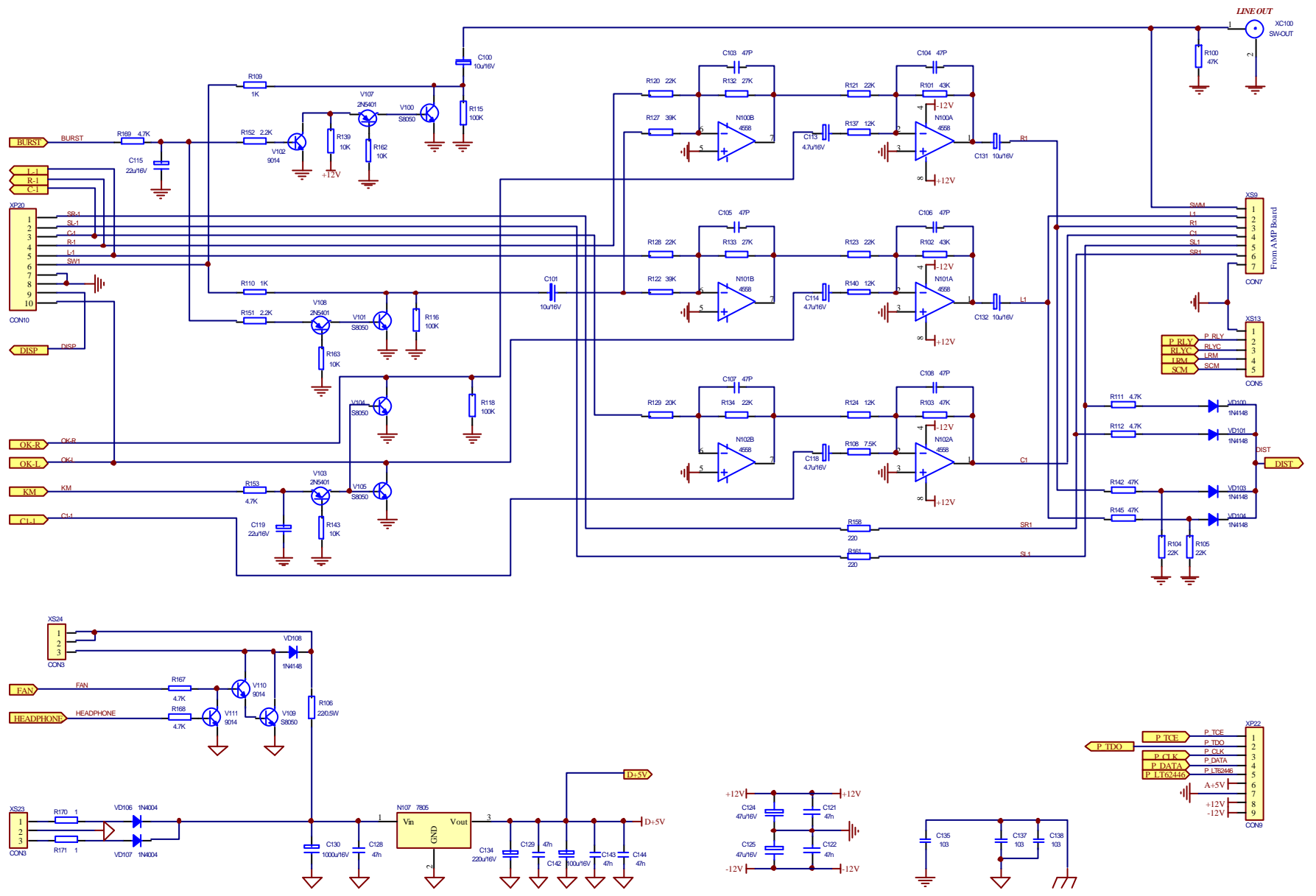
# 5.2.2 Volume Board



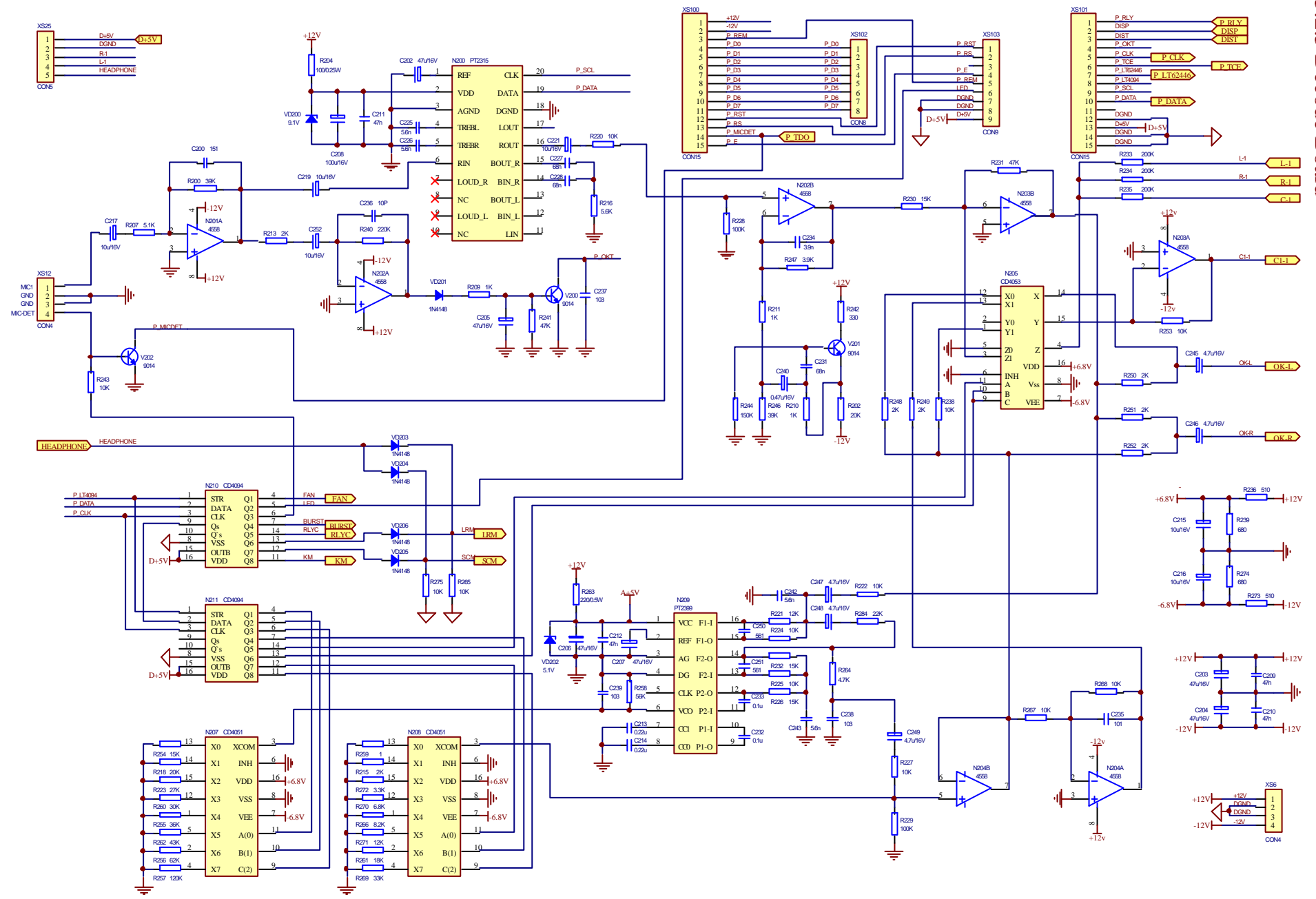
# 5.2.3 CPU Board



# 5.2.4 Signal Board

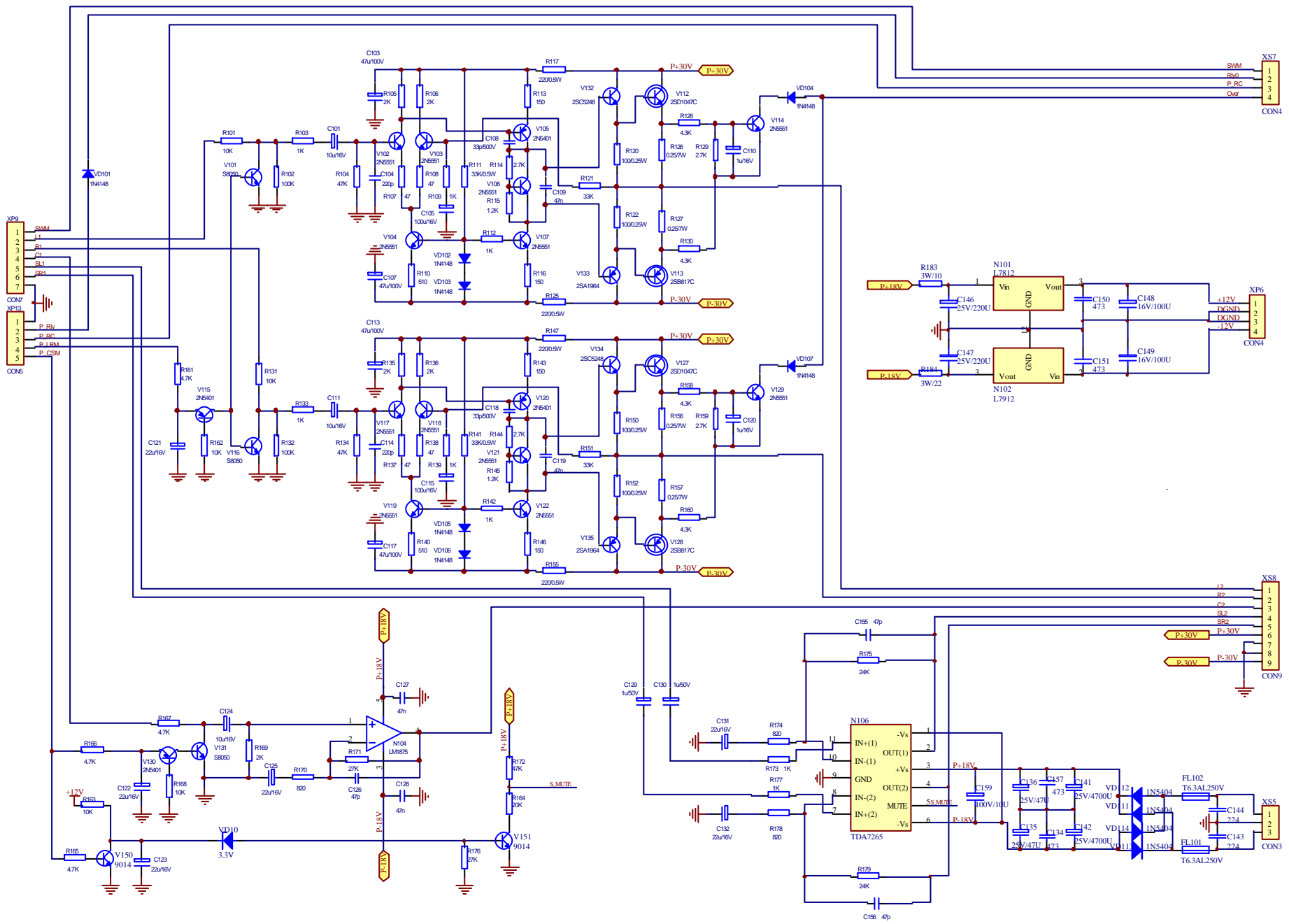


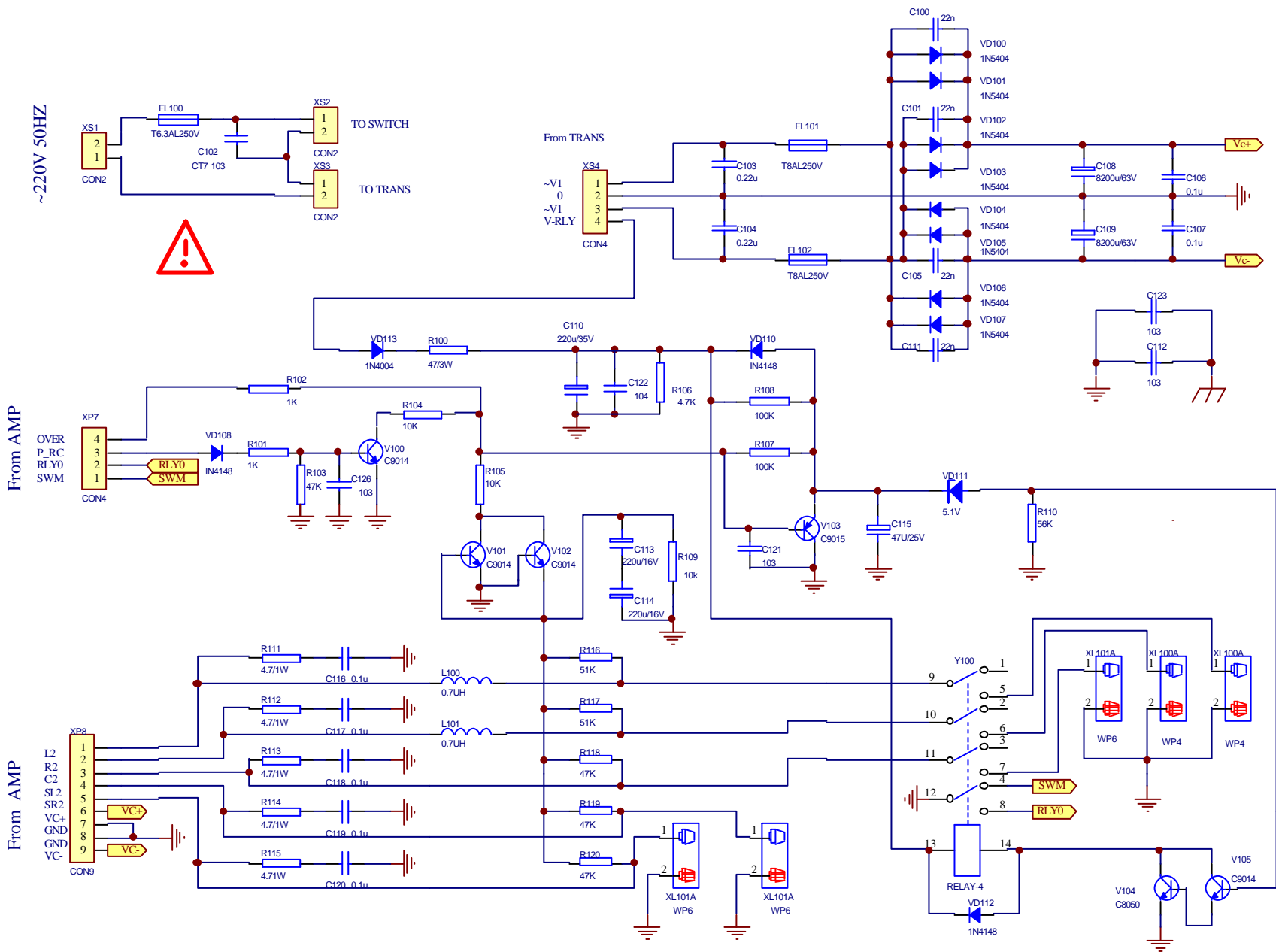
# 5.2.5 Decode Board



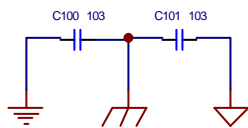
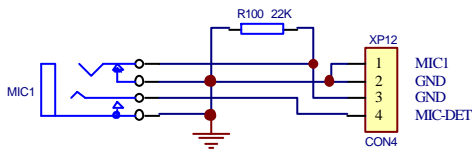
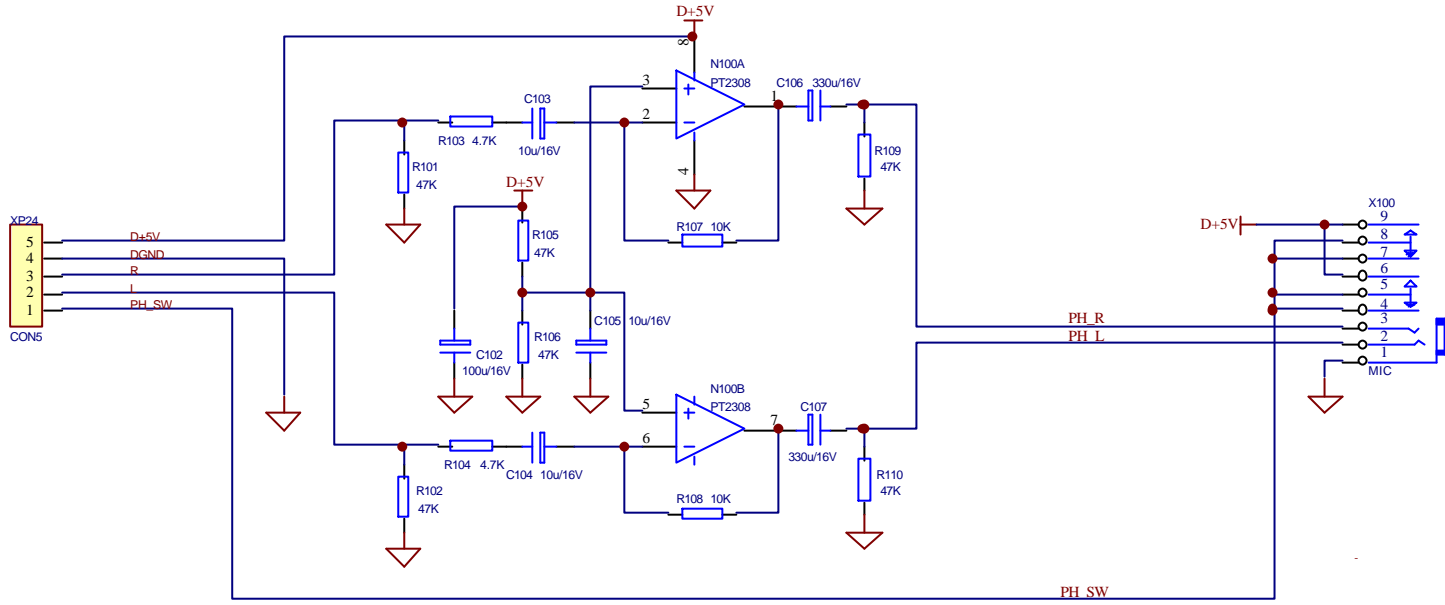


# 5.2.6 audio power amplifying Board

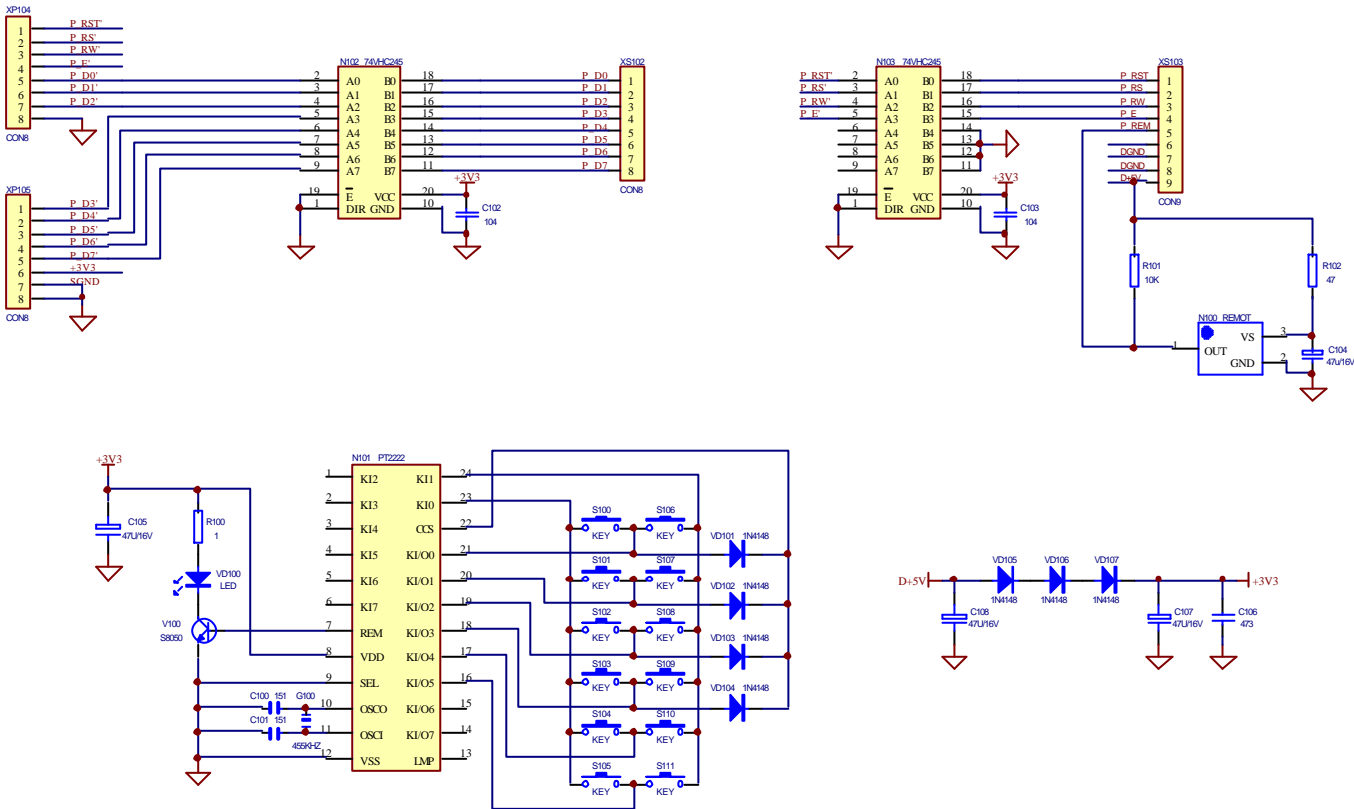




# 5.2.8 MIC Board



## 5.2.9 Key Scan Board



## Chart 6 BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
<b>6.1 VOLUME BOARD</b>			
AV225T(RU)		5447607	
0881743	IC	F4558 DIP	N108
0882161	IC	AZ4558 DIP	N108
0880445	IC	4558C DIP	N108
0880124	IC	NJM4558D DIP	N108
0881393	IC	IL4558N DIP	N108
0882223	IC	NE5532 DIP	N104,N105,N107
0880417	IC	CD4053BCN DIP	N103,N102
0881430	IC	CD4053BE DIP	N103,N102
0881429	IC	CD4052BE DIP	N101
0880443	IC	CD4052BCN DIP	N101
0881380	IC	M62446AFP SOP	N106
2120325	FLATCABLE	6P140 2.5 2 SOCKET WITH NEEDLE	XP101
3870591	GROUNDING PIECE	AV100	
0390425	INDUCTOR	100UH±10% 0307 SHAPED 12.5	L101
1940029	SOCKET	9P 2.5mm	XS22
1940030	SOCKET	10P 2.5mm	XS20
1910117	TERMINAL SOCKET	AV6-8.4-13/ES	XC102
1910118	TERMINAL SOCKET	AV4-8.4-13/ES	XC101
1940072	CABLE SOCKET	6/5P 1.25mm STRAIGHT DUAL LINE PLUG	XS19
5447608	PCB SEMI-FINISHED PRODUCT	2110T-0 AV110T(RU) AI SEGMENT	
<b>6.2 VOLUME BOARD AI SEGMENT</b>			
AV225T(RU)		5447608	
2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	W1~W73
00000099	CARBON FILM RESISTOR	1/6W100O±5% BELT	R163,R164,R165
00000229	CARBON FILM RESISTOR	1/6W1K±5% BELT	R103,R106,R107,R110,R111,R114,R115,R118,R119,R122,R124~R126,R197,R130,R198
00000469	CARBON FILM RESISTOR	1/6W22K±5% BELT	R141,R145,R149,R150,R153,R154,R155,R156
00000489	CARBON FILM RESISTOR	1/6W27K±5% BELT	R143,R147,R168

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
00000499	CARBON FILM RESISTOR	1/6W30K±5% BELT	R148
00000509	CARBON FILM RESISTOR	1/6W33K±5% BELT	R142,R146
00000529	CARBON FILM RESISTOR	1/6W47K±5% BELT	R104,R105,R108,R109,R112,R113,R116,R120,R117,R132,R121,R144,R140,R152,R174~R178
00000549	CARBON FILM RESISTOR	1/6W56K±5% BELT	R137,R138,R195
00000569	CARBON FILM RESISTOR	1/6W68K±5% BELT	R169
00000579	CARBON FILM RESISTOR	1/6W75K±5% BELT	R170
00000599	CARBON FILM RESISTOR	1/6W100K±5% BELT	R139,R157~R162,R167,R191,R196
00000629	CARBON FILM RESISTOR	1/6W150K±5% BELT	R133,R134,R135,R136
00006239	CARBON FILM RESISTOR	1/2W220O±5% BELT	R129,R131
02003059	POLYPROPYLENECAPACITOR	50V 22P±10% SHAPED 5mm BELT	C114
02003079	POLYPROPYLENECAPACITOR	50V 101±10% SHAPED 5mm BELT	C109,C110,C112,C139,C140,C141
02003089	POLYPROPYLENECAPACITOR	50V 221±10% SHAPED 5mm BELT	C105,C106,C113
02003109	POLYPROPYLENECAPACITOR	50V 103±10% SHAPED 5mm BELT	C144,C148
02003149	POLYPROPYLENECAPACITOR	50V 822±10% SHAPED 5mm BELT	C123,C128
02101439	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V392±10% C5 BELT	C146
02101449	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 153±10% C5 BELT	C124,C127
02101489	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 473±10% SHAPED 5mm BELT	C102, C103,C116,C131,C143,C153
02102209	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 473±5% SHAPED 5mm BELT	C102, C103,C116,C131,C143,C153
02101599	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 103±10% SHAPED 5mm BELT	C145
02102239	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 103±5% SHAPED 5mm BELT	C145
02101419	METAL POLYESTER FILM CAPACITOR	CL21X100V334K C5 BELT	C125,C126
02600029	CD	CD11 16V47U±20%5×11 C5 BELT	C101,C104,C107,C108,C115,C132,C142,C147,C152,C154
02604389	CD	CD11 16V4.7U±20%5×11C5 BELT	C111,C117,C118,C119,C120,C121,C122,C129,C130,C133,C134,C135,C138,C136,C137
05800459	VOLTAGE REGULATOR DIODE	6.8V±5% 1/2W BELT	VD100,VD101
05800099	VOLTAGE REGULATOR DIODE	9.1V±5% 1/2W BELT	VD112
07801389	TRIODE	8050D BELT	V106
1564153	PCB	2110T-1	
<b>6.3 SIGNAL DISPOSAL BOARD</b>			
AV225T(RU)	5448199		

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0880230	IC	PT2399 DIP	N209
0880417	IC	CD4053BCN DIP	N205
0881430	IC	CD4053BE DIP	N205
0880379	IC	LM7805 GOLD SEALED TO-220	N107
0880247	IC	MC7805CT GOLD SEALED TO-220	N107
0880499	IC	L7805CV GOLD SEALED TO-220	N107
0881743	IC	F4558 DIP	N201~N204
0882161	IC	AZ4558 DIP	N201~N204
0880445	IC	4558C DIP	N201~N204
0880124	IC	NJM4558D DIP	N201~N204
0881393	IC	IL4558N DIP	N201~N204
0882223	IC	NE5532 DIP	N100~N102
0880807	IC	PT2315 SOP	N200
0880271	IC	CD4051 DIP	N207,N208
0881428	IC	CD4051BE DIP	N207,N208
0880444	IC	CD4094BCN DIP	N210,N211
0880654	IC	TC4094BP DIP	N210,N211
0882338	IC	CD4094BE(TI) DIP	N210,N211
0260030	CD	CD11 16V1000U±20%10×16 5	C130
0010226	METAL OXIDE FILM RESISTOR	1/2W220±5% SHAPED 12.5	R106
1940002	SOCKET	3P 2.5mm	XS23,XS24
1940003	SOCKET	4P 2.5mm	XS6,XS12
1940004	SOCKET	5P 2.5mm	XS13
1940007	SOCKET	7P 2.5mm	XS9
1940009	SOCKET	8P 2.5mm	XS102
1940029	SOCKET	9P 2.5mm	XS103
1910034	TERMINAL SOCKET	AV1-8.4-5G BLACK	XC100
1970064	FLAT NEEDLE	15P 40mm2.54mm GLUE CORE OUTSIDE SPACE BETWEEN:28.4mm	
2120296	FLATCABLE	5P140 2.5 2 SOCKET WITH NEEDLE	XS25
2121187	FLATCABLE	10P75 2.5 2 PIN,WITH NEEDLE,THE SAME DIRECTION	XP20
2121561	FLATCABLE	9P75 2.5 2 PIN,WITH NEEDLE,TOGETHER DIRECTION	XP22

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
3580092	HEAT RADIATION BOARD	14x8x16 AV130	
3870591	GROUNDING PIECE	AV100	
3026724	PLASTIC BRACKET	H=28.4mm AV230	
4000197	SELF-TAPPING SCREW	BT3x8 NICKEL	
4000462	SELF-TAPPING SCREW	BT 3x6H WHITE NICKEL	
5448200	PCB SEMI-FINISHED PRODUCT	3215T-3 AV225T(RU)AI SEGMENT	
5448201	PCB SEMI-FINISHED PRODUCT	7228-1 AV225T(RU)	
<b>6.4 SIGNAL DISPOSAL BOARD AI SEGMENT</b>			
AV225T(RU)		5448200	
2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	W1,W3~W24,W26~W46,W48~59,W84,W85
2100004	CONNECTED CORDS	F 0.6 SHAPED 10mm	W2,W60~W70
2100007	CONNECTION CORDS	F 0.6 SHAPEN 15mm	W71~W78
2100017	CONNECTED CORDS	F 0.6 SHAPED 20mm	W79~W83
0000029	CARBON FILM RESISTOR	1/6W10±5% BELT	R259
00000119	CARBON FILM RESISTOR	1/6W2200±5% BELT	R158,R161
00000139	CARBON FILM RESISTOR	1/6W3300±5% BELT	R242
00000179	CARBON FILM RESISTOR	1/6W5100±5% BELT	R236,R273
00000199	CARBON FILM RESISTOR	1/6W6800±5% BELT	R239,R274
00000229	CARBON FILM RESISTOR	1/6W1K±5% BELT	R110,R109,R209~R211
00000269	CARBON FILM RESISTOR	1/6W2K±5% BELT	R248~R252,R213,R215
00000279	CARBON FILM RESISTOR	1/6W2.2K±5% BELT	R151,R152
00000309	CARBON FILM RESISTOR	1/6W3.3K±5% BELT	R272
00000329	CARBON FILM RESISTOR	1/6W3.9K±5% BELT	R247
00000349	CARBON FILM RESISTOR	1/6W4.7K±5% BELT	R153,R167,R168,R169,R264,R111,R112
00000359	CARBON FILM RESISTOR	1/6W 5.1K±5% BELT	R207
00000369	CARBON FILM RESISTOR	1/6W5.6K±5% BELT	R216
00000379	CARBON FILM RESISTOR	1/6W6.8K±5% BELT	R270
00000389	CARBON FILM RESISTOR	1/6W8.2K±5% BELT	R266
00000409	CARBON FILM RESISTOR	1/6W10K±5% BELT	R139,R220,R222,R238,R253,R267,R268,R143,R162,R163,R224,R225,R227,R243,R265,R275
00000419	CARBON FILM RESISTOR	1/6W12K±5% BELT	R271,R221,R137,R140,R124,R103
00000439	CARBON FILM RESISTOR	1/6W15K±5% BELT	R232,R254,R226,R230



MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
00000449	CARBON FILM RESISTOR	1/6W18K±5% BELT	R261
00000459	CARBON FILM RESISTOR	1/6W20K±5% BELT	R202,R129,R218
00000469	CARBON FILM RESISTOR	1/6W22K±5% BELT	R121,R123,R120,R128,R284,R134,R104,R105
00000489	CARBON FILM RESISTOR	1/6W27K±5% BELT	R223,R132,R133
00000499	CARBON FILM RESISTOR	1/6W30K±5% BELT	R260
00000509	CARBON FILM RESISTOR	1/6W33K±5% BELT	R269
00000519	CARBON FILM RESISTOR	1/6W39K±5% BELT	R127,R122,R246,R200
00000529	CARBON FILM RESISTOR	1/6W47K±5% BELT	R100,R241,R231,R142,R145
00000549	CARBON FILM RESISTOR	1/6W56K±5% BELT	R258
00000559	CARBON FILM RESISTOR	1/6W62K±5% BELT	R256
00000599	CARBON FILM RESISTOR	1/6W100K±5% BELT	R115,R116,R228,R229,R118
00000609	CARBON FILM RESISTOR	1/6W120K±5% BELT	R257
00000629	CARBON FILM RESISTOR	1/6W150K±5% BELT	R244
00000659	CARBON FILM RESISTOR	1/6W200K±5% BELT	R233,R234,R235
00000669	CARBON FILM RESISTOR	1/6W220K±5% BELT	R240
00001759	CARBON FILM RESISTOR	1/4W100O±5% BELT	R204
00003459	CARBON FILM RESISTOR	1/6W36K±5% BELT	R255
00003519	CARBON FILM RESISTOR	1/6W43K±5% BELT	R262,R101,R102
00003609	CARBON FILM RESISTOR	1/6W 7.5K±5% BELT	R108
00006239	CARBON FILM RESISTOR	1/2W220O±5% BELT	R263
00102289	METAL OXIDE FILM RESISTOR	1/4W10±5% BELT	R170,R171
02003069	POLYPROPYLENECAPACITOR	50V 47P±10% SHAPED 5mm BELT	C103~C108
02003079	POLYPROPYLENECAPACITOR	50V 101±10% SHAPED 5mm BELT	C235
02003109	POLYPROPYLENECAPACITOR	50V 103±10% SHAPED 5mm BELT	C237~C239,C135,C138,C137
02003159	POLYPROPYLENECAPACITOR	50V 10P±10% SHAPED 5mm BELT	C236
02003299	POLYPROPYLENECAPACITOR	50V561±10% SHAPED 5mm BELT	C250,C251
02003309	POLYPROPYLENECAPACITOR	50V151±10% SHAPED 5mm BELT	C200
02100689	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 683 ±10% SHAPED 5mm BELT	C227,C228,C231
02101439	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V392±10% C5 BELT	C234
02101489	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 473±10% SHAPED 5mm BELT	C121,C122,C128,C129,C143,C144,C209~C212
02102209	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 473±5% SHAPED 5mm BELT	C121,C122,C128,C129,C143,C144,C209~C212

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
02101579	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 562±10% SHAPED 5mm BELT	C225,C226,C242,C243
02102219	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 562±5% SHAPED 5mm BELT	C225,C226,C242,C243
2101049	METAL POLYESTER FILM CAPACITOR	CL21X100V224 K C5BD	C213,C214
02101459	METAL POLYESTER FILM CAPACITOR	CL21X 100V 104K C5 BELT	C232,C233
02600019	CD	CD11 16V22U±20%5×11 C5 BELT	C119,C115
02600029	CD	CD11 16V47U±20%5×11 C5 BELT	C124,C125,C202~C207
02601819	CD	CD11 16V220U±20%6×12 C5 BELT	C134
02601889	CD	CD11 16V100U±20%6×12 C5 BELT	C142,C208
02603909	CD	CD11 50V0.47U±20%5×11C5 BELT	C240
02604379	CD	CD11 16V10U±20%5×11C5 BELT	C131,C100,C101,C132,C215~C217, C219,C221,C252
02604389	CD	CD11 16V4.7U±20%5×11C5 BELT	C113,C114,C118,C245~C249
05700049	DIODE	1N4004 BELT	VD106,VD107
0570006	DIODE	1N4148	VD201,VD100,VD101,VD103,VD104, VD108,VD203~VD206
05800069	VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W BELT	VD202
05800099	VOLTAGE REGULATOR DIODE	9.1V±5% 1/2W BELT	VD200
07800259	TRIODE	2N5401 BELT	V103,V107,V108
07800329	TRIODE	9014C BELT	V102,V110,V111,V200,V201,V202
07801389	TRIODE	8050D BELT	V105,V101,V104,V100,V109
1564230	PCB	3215T-3	
<b>6.5 CPU BOARD</b>			
AV225T(RU) 5448201			
0260019	CD	CD11 16V10U±20%5×11 2	C111,C112,C114,C115,C139
0260025	CD	CD11 16V47U±20%5×11 2	C100
0260049	CD	CD11 50V0.22U±20%5×11 2	C138
0260067	CD	CD11 50V2.2U±20%5×11 2	C118,C121,C124,C127,C130,C133,C136,C109
0260096	CD	CD110 16V100U±20%6×12 2.5	C140,C141
0260127	CD	CD11 16V4.7U±20%5×11 2	C110,C106
0880013	IC	LM324N DIP	N105,N106
0880271	IC	CD4051 DIP	N104,N108
0881428	IC	CD4051BE DIP	N104,N108
0881523	IC	AT24C04 DIP	N101

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0881227	IC	RC4558P DIP	N102,N103,N107
0880445	IC	4558C DIP	N102,N103,N107
0880124	IC	NJM4558D DIP	N102,N103,N107
0881393	IC	IL4558N DIP	N102,N103,N107
0100008	RESISTANCE NETWORK	1/6W 4.7K±5% 9P	RR100
0970036	CERAMIC RESONATOR	24.576MHz	G100
0960165	CRYSTAL OSCILLATOR	24.576MHz 49-U	G100
0960169	CRYSTAL OSCILLATOR	24.576MHz 49-S	G100
0390168	INDUCTOR	100UH±10% 0410 SHAPED 12.5mm	L100
0390353	SMDMAGNETIC BEADS	RH-357508 SHAPED 12.5mm	L101
0000279	CARBON FILM RESISTOR	1/4W4700±5% SHAPED 10	R118,R119
0210111	METAL POLYESTER FILMCAPACITOR	CL21X 63V 104±5% 5	C137
0570006	DIODE	1N4148	VD102,VD103,VD108,VD109,VD110,VD111,VD112,VD113,VD114,VD115,VD116,VD118,VD119
05800019	VOLTAGE REGULATOR DIODE	3.3V±5% 1/2W BELT	VD117
05800059	VOLTAGE REGULATOR DIODE	4.7V±5% 1/2W BELT	VD101
05800459	VOLTAGE REGULATOR DIODE	6.8V±5% 1/2W BELT	VD106,VD107
0780025	TRIODE	2N5401	V103
0780032	TRIODE	9014C	V101,V104,V102,V105,V100
0890283	PROGRAM CPU	CPU225TRU-0	
1850005	DUAL RANKIC SOCKET	40P DIP	N100
5448209	PCB SEMI-FINISHED PRODUCT	7228-1-SMD AV225T(RU)	
0260547	CD	CD11C 16V1U±20%4x7 1.5	C104~C108
0260548	CD	CD11C 16V2.2u±20%4x7 1.5	C100~C103
1970073	DUAL FLAT NEEDLE	2x4 11.6/16.5 2.54mm STRAIGHT FLEX	XP104,XP105
<b>6.6 CPU BOARD-SMD</b>			
AV225T(RU)		5448209	
0090004	SMD RESISTOR	1/16W 220±5% 0603	R209
0090011	SMD RESISTOR	1/16W 4700±5% 0603	R191,R192,R195~R208,R215~R231
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R136,R141,R146,R151,R155,R160,R165,R170,R177
0090016	SMD RESISTOR	1/16W 1.5K±5% 0603	R122,R114
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R112,R123,R175

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R111,R134,R139,R144,R149,R153,R158,R163,R174,R185,R101
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R108,R117,R125,R131,R133,R137,R138,R142,R143,R147,R148,R152,R156,R157,R161,R162,R166,R172,R178,R179,R186,R187,R189,R212,R213,R214
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R109
0090026	SMD RESISTOR	1/16W 22K±5% 0603	R100,R110,R132,R183
0090027	SMD RESISTOR	1/16W 27K±5% 0603	R126
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R115,R180
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R135,R140,R145,R150,R154,R159,R164,R167
0090109	SMD RESISTOR	1/16W 1M0±5% 0603	R210
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R107,R181,R182
0090184	SMD RESISTOR	1/16W 4.3K±5% 0603	R124,R211
0090199	SMD RESISTOR	1/16W 180K±5% 0603	R128,R113
0090208	SMD RESISTOR	1/16W 470K±5% 0603	R129,R130,R116,R169
0090225	SMD RESISTOR	1/16W 5.6K±5% 0603	R173,R184
0090242	SMD RESISTOR	1/16W 75K±5% 0603	R127
0310067	SMD CAPACITOR	50V 152 ±10% 0603	C119,C120
0310072	SMD CAPACITOR	50V 103 ±10% 0603	C105,C142,C143,C144,C145,C146,C147,C148,C149,C150,C125,C126,C152,C151
0310594	SMD CAPACITOR	25V 104 ±10% 0603	C102,C107,C108,C155
0310188	SMD CAPACITOR	50V 10P ±5% NPO 0603	C113
0310191	SMD CAPACITOR	50V 30P ±5% NPO 0603	C103,C104
0310471	SMD CAPACITOR	50V 561±5% NPO 0603	C116,C117
0310198	SMD CAPACITOR	50V 472 ±10% X7R 0603	C122,C123
0310202	SMD CAPACITOR	50V 223 ±10% 0603	C128,C129
0310206	SMD CAPACITOR	50V 683 ±10% 0603	C131,C132
0310634	SMD CAPACITOR	25V 154 ±10% X7R 0603	C134,C135
1631531	PCB	7228-1	
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R100,R101
1940214	CABLE SOCKET	28P 0.5mm SMD, SUBMIT MEET WITH CLASP	B100
1631476	PCB	1228-0	
<b>6.7 AMPLIFIER BOARD</b>			

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
AV225T(RU)	5448202		
2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	W1,W16,W42,W43,W54,W61,W76,W77,W78
2100004	CONNECTED CORDS	F 0.6 SHAPED 10mm	W8,W9,W15,W21,W24,W36,W37,W45,W46,W48,W51,W57,W63,W69,W71,W74,W80
2100006	CONNECTION CORDS	F 0.6 SHAPED 12.5mm	W3,W18,W20,W22,W27,W31,W35,W41,W52,W59,W62,W65,W70,W73
2100007	CONNECTION CORDS	F 0.6 SHAPEN 15mm	W2,W14,W19,W26,W50,W53,W67,W72,W81
2100010	CONNECTED CORDS	F 0.6 SHAPED 5mm	W33,W47,W49,W60,W68
2100016	CONNECTION CORDS	F 0.6 SHAPEN 18mm	W28,W39,W40,W58,W75
2100017	CONNECTED CORDS	F 0.6 SHAPED 20mm	W56
2100024	CONNECTION CORDS	F 0.6 SHAPEN 22mm	W5,W6,W7,W10,W11,W12,W13,W64
0010340	RY	3W10O±5% SHAPED R 20x8	R183,R184
0000125	CARBON FILM RESISTOR	1/6W510O±5% SHAPED 7.5	R110,R140
0000128	CARBON FILM RESISTOR	1/6W820O±5% SHAPED 7.5	R170,R174,R178
0000129	CARBON FILM RESISTOR	1/6W1K±5% SHAPED 7.5	R103,R109,R112,R133,R139,R142,R173,R177
0000130	CARBON FILM RESISTOR	1/6W1.2K±5% SHAPED 7.5	R115,R145
0000133	CARBON FILM RESISTOR	1/6W4.7K±5% SHAPED 7.5	R161,R166,R165,R167
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	R101,R131,R162,R163,R168
00000139	CARBON FILM RESISTOR	1/6W330O±5% BELT	R164
0000141	CARBON FILM RESISTOR	1/6W27K±5% SHAPED 7.5	R171,R176
0000144	CARBON FILM RESISTOR	1/6W47K±5% SHAPED 7.5	R104,R134,R172,R169
0000146	CARBON FILM RESISTOR	1/6W100K±5% SHAPED 7.5	R102,R132
0000276	CARBON FILM RESISTOR	1/4W100O±5% SHAPED 10	R120,R122,R150,R152
0000339	CARBON FILM RESISTOR	1/6W3.3K±5% SHAPED 7.5	R129,R159
0000379	CARBON FILM RESISTOR	1/6W2K±5% SHAPED 7.5	R105,R106,R135,R136
0000386	CARBON FILM RESISTOR	1/6W30K±5% SHAPED 7.5	R175,R179
0000452	CARBON FILM RESISTOR	1/6W150O±5% SHAPED 7.5	R113,R116,R143,R146
0000466	CARBON FILM RESISTOR	1/2W220O±5% SHAPED 12.5	R117,R125,R147,R155
0000495	CARBON FILM RESISTOR	1/6W4.3K±5% SHAPED 7.5	R128,R130,R158,R160
0000475	CARBON FILM RESISTOR	1/6W2.7K±5% SHAPED 7.5	R114,R144
0000556	CARBON FILM RESISTOR	1/6W47O±5% SHAPED 7.5	R107,R108,R137,R138
0040069	CEMENT RESISTOR	7W0.25O±5%SQM SHAPED R 10x5	R126,R127,R156,R157

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0010322	METAL OXIDE FILM RESISTOR	1/4W33K±5%	R121,R151
0010321	METAL OXIDE FILM RESISTOR	1/2W33K±5% SHAPED 12.5	R111,R141
0200066	PORCELAINCAPACITOR	50V 221±10% 2.5mm	C104,C114
0200333	POLYPROPYLENECAPACITOR	500V33P±10% NPO SHAPED 5mm	C108,C118
0200306	POLYPROPYLENECAPACITOR	50V 47P±10% SHAPED 5mm	C155,C156
0210030	TERYLENECAPACITOR	100V 104±10% 7mm	C143,C144
0210147	TERYLENECAPACITOR	100V 473±10% 5mm	C109,C119,C127,C128,C139,C140,C150,C151,C102,C106,C112,C116,C134,C157
0260039	CD	CD11 25V47U±20%5×11 2	C135,C136
0260019	CD	CD11 16V10U±20%5×11 2	C101,C111,C124
0260021	CD	CD11 16V22U±20%5×11 2	C121,C123,C122,C125,C131,C132
0260027	CD	CD11 16V100U±20%6×12 2.5	C105,C115,C148,C149
0260063	CD	CD11 50V1U±20%5×11 2	C129,C130,C110,C120,C137
0260163	CD	CD11 50V47U±20%6×12 2.5	C103,C107,C113,C117
0260134	CD	CD11 25V4700U±20%16×35 7.5	C141,C142
0260135	CD	CD11 25V4700U±20%16×40 7.5	C141,C142
0260465	CD	CD11 100V10U±20%6.3×11 2.5	C159
0260487	CD	CD11K35V220U±20% 8×16 3.5	C146,C147
0882646	IC	CW7812CS TO-220	N101
0880131	IC	L7812CV GOLD SEALED TO-220	N101
0880380	IC	LM7812 GOLD SEALED TO-220	N101
0881418	IC	UA7812C GOLD SEALED TO - 220	N101
0880324	IC	MC7812CT GOLD SEALED TO-220	N101
0880325	IC	MC7912CT GOLD SEALED TO-220	N102
0880381	IC	LM7912CT GOLD SEALED TO-220	N102
0882618	IC	CD1875CZ TO-220	N104
0881102	IC	TDA7265 Multiwatt11	N106
0570006	DIODE	1N4148	VD101~VD107
0570020	DIODE	1N5404	VD111,VD112,VD113,VD114
0580080	VOLTAGE REGULATOR DIODE	3.3V±5% 1/2W SHAPED 7.5	VD10
0780032	TRIODE	9014C	V150,V151
0780025	TRIODE	2N5401	V105,V115,V120,V130

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0780026	TRIODE	2N5551	V102~V104,V106~V107,V114,V117~V119,V121~V122,V129
0780138	TRIODE	8050D	V101,V116,V131
0780070	TRIODE	2SA1964E	V133,V135
0780255	TRIODE	2SA940	V133,V135
0780257	TRIODE	KSA940	V133,V135
0780072	TRIODE	2SC5248E	V132,V134
0780021	TRIODE	2SC2073	V132,V134
0780258	TRIODE	KSC2073	V132,V134
0780275	TRIODE	2SD1047C	V112,V127
0780274	TRIODE	2SB817C	V113,V128
1564209	PCB	4225T-0	
1940003	SOCKET	4P 2.5mm	XS7
1940040	SOCKET	3P 3.96mm	XS5
1940155	SOCKET	9P 3.96mm	XS8
2120267	FLATCABLE	4P140 2.5 2 SOCKET WITH NEEDLE	XP6
2121182	FLATCABLE	5P 125 2.5 2 PIN,WITH NEEDLE,THE SAME DIRECTION	XP13
2121183	FLATCABLE	7P 145 2.5 2 PIN,WITH NEEDLE,THE SAME DIRECTION	XP9
3580085	HEAT RADIATION BOARD	15.4x10.7x45 AV220	
3580092	HEAT RADIATION BOARD	14x8x16 AV130	
3580118	BIG HEAT RADIATION BOARD	261x50x100 AV228	
2300005	FUSE	T6.3AL 250V	FL101,FL102
3870057	FUSE HOLDER		FL101,FL102
3870603	PCB BRACKET	AV130	
4000516	SELF-TAPPING SCREW	PT 3x12H WHITE NICKEL	
4000453	SELF-TAPPING SCREW	BT 3x8H WHITE NICKEL	
4000462	SELF-TAPPING SCREW	BT 3x6H WHITE NICKEL	
3870950	IC PRESSING PIECE	AV228	
4450012	BOLT PAD	F 3x7.2x0.5	
4490001	SPRING PAD	F 3	
5230395	INSULATED SPACER SET	F 3x6x3	
5232281	INSULATED SPACER SET	F 3x6x3.2	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
5230979	MICA PAD	28x22x0.1	
5230928	MICA PAD	18x13x0.1	
5231418	MICA PAD	22x22x0.1	
5232006	SOFT SPONGE SPACER	80x12x1.5 SINGLE-FACED,SOFT	
<b>6.8 SURFACE CONTROL BOARD</b>			
AV225T(RU) 5448203			
2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	W1 ~ W12
0000133	CARBON FILM RESISTOR	1/6W4.7K±5% SHAPED 7.5	R105
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	R101
0000338	CARBON FILM RESISTOR	1/6W15K±5% SHAPED 7.5	R104
0000129	CARBON FILM RESISTOR	1/6W1K±5% SHAPED 7.5	R106
0000488	CARBON FILM RESISTOR	1/6W220O±5% SHAPED 7.5	R107
0000556	CARBON FILM RESISTOR	1/6W47O±5% SHAPED 7.5	R102,R103
0000599	CARBON FILM RESISTOR	1/6W1O±5% SHAPED 7.5	R100
0200062	PORCELAINCAPACITOR	50V 151±10% 2.5mm	C100,C101
0200310	POLYPROPYLENECAPACITOR	50V 103±10% SHAPED 5mm	C109
0200138	PORCELAINCAPACITOR	50V 104±20% 5mm	C102,C103
0210147	TERYLENECAPACITOR	100V 473±10% 5mm	C105,C106
0210025	TERYLENECAPACITOR	100V 473±5% 6mm	C105,C106 ( 21 )
0260025	CD	CD11 16V47U±20%5x11 2	C104,C107,C108,C110
0882135	IC	SN74HC245DW SOP	N102,N103
0882134	IC	SN74AHC245DW SOP	N102,N103
0882088	IC	74AHC245D SOP	N102,N103 ( 22 )
0880220	IC	PT2222 SOP	N101 ( 23 )
0570006	DIODE	1N4148	VD101~VD109
0780032	TRIODE	9014C	V101
0780138	TRIODE	8050D	V100
0630003	EMISSION PIPE	TSAL6200	VD100
0970003	CERAMIC RESONATOR	455E	G100
1350090	POWER SUPPLY SWITCH	@PS4D-A-062 VDE	
1340003	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6x6x1	S100~S111
2121085	FLATCABLE	2P270 7.92 1 PIN	



MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2121387	FLAT CABLE	8P 150 2.5 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION	XP102
2121388	FLAT CABLE	9P 150 2.5 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION	XP103
2360011	IR SENSOR	HS0038A2	N100
3027993	LCD SCREEN BRACKET	AV228 BLACK	
0620126	LED GROUND LIGHT SOURCE	QBL04021A-09 73x33	
1200566	LCD SCREEN SCREEN	JCM12864V 58x28	
5233838	PYROCONDENSATION SLEEVE	@F 22 UL	
5232576	SOFT SPONGE SPACER	11x11x11 DOUBLE-FACED,HARD	
1563092	PCB	6228-1	

#### 6.9 VIDEO INPUT OUTPUT BOARD

AV225T(RU) 5447611

0260027	CD	CD11 16V100U±20%6x12 2.5	TC101
0260028	CD	CD11 16V220U±20%6x12 2.5	TC103,TC104
0880271	IC	CD4051 DIP	N101
0881428	IC	CD4051BE DIP	N101 (24)
0780043	TRIODE	2SA1015	V101
0000599	CARBON FILM RESISTOR	1/6W10±5% SHAPED 7.5	R108
0000120	CARBON FILM RESISTOR	1/6W220±5% SHAPED 7.5	R103
0000122	CARBON FILM RESISTOR	1/6W1000±5% SHAPED 7.5	R101,R102,R104,R105
0000140	CARBON FILM RESISTOR	1/6W22K±5% SHAPED 7.5	R106
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	R107
0200174	PORCELAINCAPACITOR	50V 103±10% 2.5mm	C101,C102,C103
1940006	SOCKET	6P 2.5mm	XS101
1910239	TERMINAL SOCKET	AV3-8.4-14/ES-10	XC101
1564056	PCB	C110T-2	

#### 6.10 MICROPHONE HOLDER BOARD

AV225T(RU) 5448204

2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	W1,W2,W3
0000133	CARBON FILM RESISTOR	1/6W4.7K±5% SHAPED 7.5	R103,R104
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	R107,R108
0000140	CARBON FILM RESISTOR	1/6W22K±5% SHAPED 7.5	R100
0000144	CARBON FILM RESISTOR	1/6W47K±5% SHAPED 7.5	R101,R102,R105,R106,R109,R110

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0200174	PORCELAINCAPACITOR	50V 103±10% 2.5mm	C100,C101
0260019	CD	CD11 16V10U±20%5×11 2	C103,C104,C105
0260027	CD	CD11 16V100U±20%6×12 2.5	C102
0260214	CD	CD11 16V330U±20%8×12 3.5	C106,C107
0881537	IC	TDA1308 SOP	N100
2110329	LEAD	22# 70mm BLACK,WITH WELD PIECE	
2150164	FLAT CABLE	4P250 2.512 2P SHIELD,WITH NEEDLE,DISTANCE MAGNETISM LOOP 200	XP12
1940066	SOCKET	5P 2.5mm STRAIGHT CURVING	XP24
1980006	MICROPHONE SOCKET	CK3-6.35-106	X100
1980030	MICROPHONE SOCKET	CK3-6.35-19	MIC1
1564231	PCB	9215T-2	

#### 6.11 POWER BOARD

AV225T(RU)

5448205

2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	W14,W16,W17,W22
2100004	CONNECTED CORDS	F 0.6 SHAPED 10mm	W7,W8,W10,W11,W1,W2,L102,L103,L104,W13
2100007	CONNECTION CORDS	F 0.6 SHAPEN 15mm	W5,W12,W15,W4,W9,W19
2100008	CONNECTION CORDS	F 0.6 SHAPEN 6mm	W20,W21
2100017	CONNECTED CORDS	F 0.6 SHAPED 20mm	W18,W3,W6
0000129	CARBON FILM RESISTOR	1/6W1K±5% SHAPED 7.5	R101,R102
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	R104,R105
0000144	CARBON FILM RESISTOR	1/6W47K±5% SHAPED 7.5	R103
0000146	CARBON FILM RESISTOR	1/6W100K±5% SHAPED 7.5	R107
0000289	CARBON FILM RESISTOR	1/4W4.7K±5% SHAPED 10	R106
0000294	CARBON FILM RESISTOR	1/4W10K±5% SHAPED 10	R109
0000301	CARBON FILM RESISTOR	1/4W47K±5% SHAPED 10	R118~R120
0000302	CARBON FILM RESISTOR	1/4W51K±5% SHAPED 10	R116,R117
0000305	CARBON FILM RESISTOR	1/4W100K±5% SHAPED 10	R108
0000476	CARBON FILM RESISTOR	1/6W56K±5% SHAPED 7.5	R110
0000499	CARBON FILM RESISTOR	1W4.70±5% SHAPED R 15×9	R111~R115
0000622	CARBON FILM RESISTOR	2W220±5% SHAPED R 20×8	R100
0200138	PORCELAINCAPACITOR	50V 104±20% 5mm	C122
0200174	PORCELAINCAPACITOR	50V 103±10% 2.5mm	C121,C112,C123,C126

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0210022	TERYLENECAPACITOR	100V 223±5% 5mm	C100,C101,C105,C111
0210029	TERYLENECAPACITOR	100V 104±5% 7mm	C106,C107,C116~C120
0210031	TERYLENECAPACITOR	100V 224±10% 8mm	C103,C104
0210213	TERYLENECAPACITOR	100V 224±5% 8mm	C103,C104 ( 25 )
0200378	CERAMIC CAPACITOR	@400VAC 472 ±10% 10mm VDE	C102
0260028	CD	CD11 16V220U±20%6×12 2.5	C113,C114
0260039	CD	CD11 25V47U±20%5×11 2	C115
0260452	CD	CD11 35V220U±20% 8×14 3.5	C110
0260572	CD	CD293 63V15000u±20%35×70 10	C108,C109
0570004	DIODE	1N4004	VD113
0570006	DIODE	1N4148	VD112,VD108,VD110
0570020	DIODE	1N5404	VD100~VD107
05800069	VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W BELT	VD111
0780032	TRIODE	9014C	V100,V101,V102,V105
0780033	TRIODE	9015C	V103
0780138	TRIODE	8050D	V104
1250025	RELAY	JH1806-012-(3H1 + 1Z1) DC12V	Y100
0410007	INDUCTOR COIL	0.7UH SC-0.8×8.0×11.5	L100,L101
2120535	FLATCABLE	4P60 2.5 2 SOCKET WITH NEEDLE	XP7
2121040	FLATCABLE	9P60 3.96 1 PIN	XP8
1940037	SOCKET	4P 3.96mm	XS4
1940074	SOCKET	2P 7.92mm	XS1~XS3
2010003	CONNECTION POLE SOCKET	WP4-10A	XL100
2010004	CONNECTION POLE SOCKET	WP6-10A	XL101
2300051	FUSE	@T6.3AL 250V VDE	FL100
2300008	FUSE	T8AL 250V	FL101,FL102
3020402	FUSE HOLDER	BLX-2	FL100
3870057	FUSE HOLDER	0	FL101,FL102
3540076	SCREEN-SHIELDED PIECE	AV100 OUTPUT SOCKET	
3870591	GROUNDING PIECE	AV100	
5180263	NOT DMETAL OXIDE FILM RESISTOR GLUE LABELL	T8AL 250V	
5180388	NOT DMETAL OXIDE FILM RESISTOR GLUE LABELL	T6.3AL250V 18×3	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1564105	PCB	@5100-5 CQC	
<b>6.12 REMOTE CONEROLLER</b>			
AV225T(RU) 5471647			
0000599	CARBON FILM RESISTOR	1/6W10±5% SHAPED 7.5	R800
0200062	PORCELAINCAPACITOR	50V 151±10% 2.5mm	C801,C802
0880220	IC	PT2222 SOP	N800
0570006	DIODE	1N4148	VD800~VD802
0780138	TRIODE	8050D	V800
0630003	EMISSION PIPE	TSAL6200	LED800
4000258	SELF-TAPPING SCREW	BB 2.3x8 BLACK	
0970003	CERAMIC RESONATOR	455E	G800
5070698	GLUE BAG FOR ENVIRONMENTAL PROTECTION (WITHOUT HOLE)	90x255x0.05 PE	
5156245	SURFACE STICKER OF REMOTE CONTROL	AV225T(RU)	
4630759	CONDUCT GLUE OF REMOTE CONTROL	AV215T(RU)	
1561893	PCB	8213-0	
<b>6.13 PANEL UNITS</b>			
AV225T(RU) 5462310			
3072242	GLASS	AV225T(RU) TRANSPARENCE	
3003011	PANEL	AV215T(RU) SUB-LIGHT BLACK	
3027985	RIGHT COVER BOARD	AV228 SILVER	
3072003	LEFT COVER BOARD	AV225T(RU) AETHER SILVER	
3027989	DECORATIVE BOARD	AV228 SILVER	
3029042	POWER PRESS BUTTON BOARD	AV215T(RU) SILVER	
3027988	POWER BUTTON	AV228 BLACK	
3027992	FUNCTION PRESS-BUTTON	AV228 SILVER	
3029043	DECORATIVE BOARD OF FUNCTION PRESS-BUTTON	AV215T(RU) SILVER	
3810047	RESET SPRING	AV228 STAINLESS STEEL	
3870960	SWITCH LOCK CLASP	AV228 BLACK	
3871101	MIC BRACKET	AV215T(RU)	
4000048	SELF-TAPPING SCREW	PB 3x8 COLOR ZINC	
5232707	SOFT SPONGE SPACER	AV228 SINGLE-FACED,HARD	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
5232532	3M DOUBLE-FACE GLUE	65x46 AV228	
5232675	SOFT SPONGE SPACER	8x8x6 SINGLE-FACED,HARD	
5448203	PCB SEMI-FINISHED PRODUCT	6228-1 AV225T(RU)	
5448204	PCB SEMI-FINISHED PRODUCT	9215T-2 AV225T(RU)	
<b>6.14 SOFEWARE PROGRAM</b>			
AV225T(RU) 890283			
0882087	IC	SM79164C25P DIP	N100
5156400	SIGN STICKER	CPU225TRU-0	
<b>6.15 SN LASEL</b>			
AV225T(RU) 5142076			
5142067	SN LABELL	RUSSIA WITHOUT BAR CODE NUMBER	
<b>6.16 SUPPLEMENT MODULE</b>			
AV225T(RU)			
5110002	ELECTRO WELDING WIRE	F 1.0	
5110018	ELECTRO WELDING WIRE	f 2.0	
5110004	ADHESIVE TAPE		
5110003	ELECTRO WELDING WIRE		
5120096	PEANUT OIL		
5120001	THINNER		
5120004	SOLDERING FLUX		
5120011	WIPING WATER		
5120012	RED GLUEWATER		
5120332	SILICONE GREASE HEAT CONDUCT OIL	GB-304	
5120067	GLUEWATER	502	
5230021	SCOTCH TAPE	12mm	
5230022	SEALING PAPER	COLORLESS	
5233436	SEALING PAPER	LENGTH:39M WIDTH:60MM COLORLESS 16X	
5231514	HIGH TEMPERATURE MASKING PAPER	LENGTH:15 YARD WIDTH:20mm	
5231454	HIGH TEMPERATURE MASKING PAPER	LENGTH:15 YARD WIDTH:6mm	
5231455	HIGH TEMPERATURE MASKING PAPER	LENGTH:15 YARD WIDTH:12mm	
5231456	HIGH TEMPERATURE MASKING PAPER	LENGTH:15 YARD WIDTH:24mm	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2100002	CONNECTION CORDS	F 0.6	
5120013	YELLOW GLUEWATER		
5120007	BLACK GLUE	3M4799#	
5180452	QA ENVELOPCASE STICKER	QA PASS 110x45	