DW9918K

service manual

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Chapter One About Maintenance

1.1 Safety precautions

1.1.1 Power supply

When maintenance personnel are repairing DVD players, he should pay special attention to the power board with 220V AC and 330V DC which will cause hurt and damage to persons!

1.1.2 Precautions for antistatic

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

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

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

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

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

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

1.1.3 Precautions for laser head

1. Do not stare at laser head directly, for laser emission will occur when laser head is working, which will Hurt your eyes!

2. Do not use wiping water or alcohol to clean laser head, and you may use cotton swab.

1.1.4 About placement position

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

1.2 Maintenance method

1.2.1 Visualized method

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

1.2.2 Electric resistance method

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

1.2.3 Voltage method

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

1.2.4 Current method

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

1.2.5 Cutting method

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

1.2.6 Element substitution method

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

1.2.7 Comparison method

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

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

1.3 Required device for maintenance

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

Chapter Two

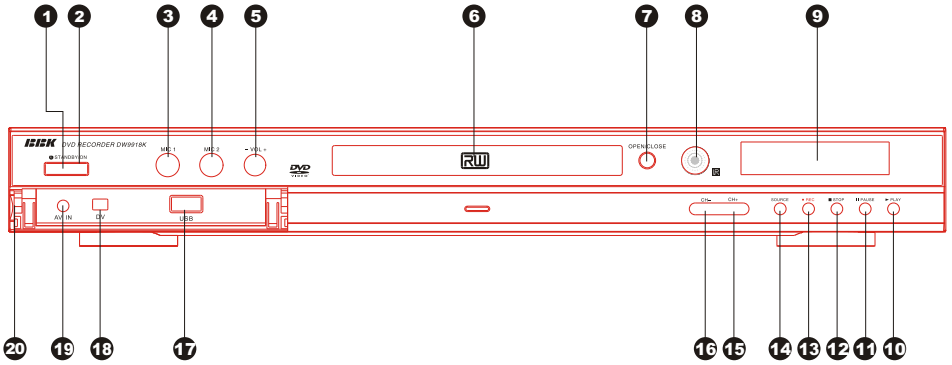
Functions and Operation Instructions

2.1 Features

Utilizes MPEG-Ⅱ Real-Time encoding and decoding technology, capable of directly recording TV and external program sources on to DVD+R, DVD+ RW discs
Capable of recording your favorite video tapes into DVD
Built-in DV (i. LINK/IEEE1394) input jack enables high fidelity digital recording of digital video camera signals
Progressive scan capable of producing stable and clear pictures without flickering,
Built-in 5.1CH Dolby Digital surround decoder, separate 5.1CH outputs, 2CH Dolby outputs, optical and coaxial outputs for digital audio
24bit audio DAC capable of producing perfect acoustic fidelity
With normal DVD playback function, capable of playing DVD, SVCD, VCD, CD, MP3, JPEG, DivX DVD+R and DVD+RW discs
Recorded discs playable on normal DVD players
Capable of recording up to 6 hours of video on single-sided discs DVD+R/DVD+RW (4.7GB)
Supports 4 recording modes: HQ, SP, EP, SLP
OTR function enables one-touch recording, convenient to select the length of recording time
Manual/automatic insertion of chapter mark
Features chapter hiding, disc locking to the recorded discs (DVD+RW) and titles renaming
Title index pictures of recorded disc (DVD+RW) are freely selectable
Multi-dubbing, multi-angle, multi-subtitle for selection
Built-in TV tuner with automatic channel scanning
AV input S-Video, DV (i. LINK/IEEE1394) and antenna input conveniently located on both the front and rear panels, to record various program sources
Supports composite video, component/progressive-scan video output terminals and TV antenna output terminals
Built-in USB jack, capable of playing JPEG, MP3 file
Intelligent preset timer recording function makes you won't miss any wonderful programs
Recording and output system supports both PAL/NTSC systems
Wide range of operating power supply: ~100V—240V, 50/60Hz, standby power consumption≤3W
Intelligent software upgrading capability
Dual SCART: one for input, another for output
Dual Kara OK function

2.2 BASIC INFORMATION

2.2.1 Illustration of the Front Panel

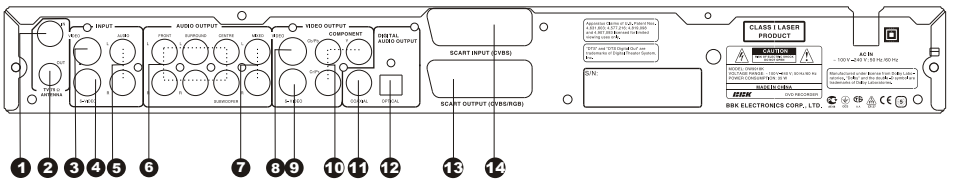


1. STANDBY indicator
2. STANDBY/ON button
3. MICPHONE 1
4. MICPHONE 2
5. VOL KNOB
6. Disc tray
7. OPEN/CLOSE button
8. Infrared remote sensor
9. VFD display window
10. PLAY button
11. PAUSE button
12. STOP button
13. REC button
14. SOURCE button
15. CH+button
16. CH- button
17. USB input terminal
18. DV input terminal
19. Front AV input terminal
20. Open the terminal protection cover here

The function of buttons on the front panel is the same with that of the corresponding ones on the remote control.

The input terminals on the front panel can only be seen when the protection cover is opened

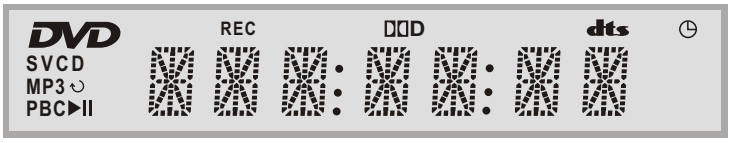
2.2.2 Illustration of the Rear Panel



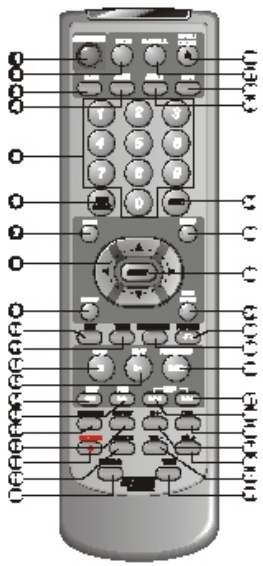
1. TV TUNER input terminal
   # The antenna cable plug is inserted here
2. TV TUNER output terminal
   # This terminal is directly connected with the TV TUNER Input Terminal inside this unit
3. Rear COMPOSITE Video input terminal
4. Rear S-Video input terminal
5. L/R channel audio input terminals
6. 5.1CH output terminals
7. L/R channel audio output terminal
8. COMPOSITE VIDEO out terminal
9. S-VIDEO output terminal
10. COMPONENT VIDEO output terminal
11. COAXIAL output terminal
12. OPTICAL output terminal
13. CVBS/ RGB and audio output terminal
14. CVBS and audio input terminal

2.2.3 Illustration of the VFD

The look of VFD is shown as the following figure:



2.2.4 Illustration of the Remote Control



31 DISC OPER button
Enter the disc operate mode

32 SELECT button
Confirm the selected item

33 MENU button
Display the disc menu
Open/close PBC

34 GOTO button
Play from the desired location

35 ANGLE button
Change camera angles

36 IS/PS button
The progressive scan and interlacing scan conversion

37 SUBTITLE button
Change subtitle languages

38 OPEN/CLOSE button
Open or close the disc tray

16 PAL/NTSC button
Switch the PAL/NTSC TV output system

17 REPEAT button
Repeat playback

18 RECORD button
Record the external signals

19 SOURCE button
Enter monitoring mode, switch external input signal source

20 USB/DVD button
Switch between USB and DVD

21 TIME button
Playing DVD disc , display corresponding time

22 VOL- button
Decrease volume

23 VOL+ button
Increase volume

24 CH- button
Switch TV channels

25 CH+ button
Switch TV channels

26 PREV button
Skip backward

27 NEXT button
Skip forward

28 PAUSE/STEP button
Pause or play frame by frame

29 NAVIGATION button
Display/hide menu

30 RETURN button
Back to the previous menu

1 STANDBY/ON button
Switch between standby state and working state

2 AUDIO button
Switch the audio channel
Switch the audio stream

3 MUTE button
Enable or disable audio output

4 ZOOM button
Enlarge the DVD/VCD picture

5 NUMBER buttons

6 ADD/CLEAR button
Add/Clear the content items in the list window
Clear the wrong input numbers

7 TITLE button
Display DVD titles menu

8 CURSOR buttons
Move the cursor

9 SETUP button
System setup

10 EDIT button
Enter/quit the edit mode

11 TIMER button
Enter/quit the timing record setup

12 STOP button
Stop playing/recording

13 PLAY button
Play a disc

14 REW button
Fast backward play

15 Forward button
Fast forward play

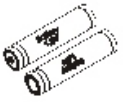
2.2.5 Accessories

One Mini-DV cable

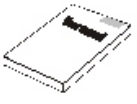
One 75Ω TV coaxial cable

Two audio/video cables

One remote control


Two AAA batteries

One warranty card


One owner's manual

2.3 SYSTEM SETUP

In order to satisfy different kinds of consumers and because of the outfits with different performance, this unit is equipped with various functions. You can proceed the system setup to meet your needs and cooperate with your outfits. Certainly you may use the default settings to satisfy your basic requirements .

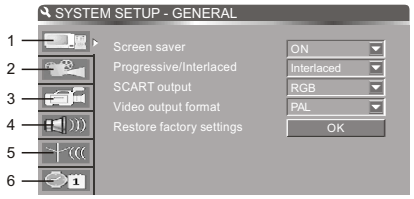
2.3.1 Operation Interface and General Steps

This section introduces the operation interface and general steps of the system setup.

1.Press [SETUP] button to enter system setup mode. Then the TV screen displays the system setup control menu, which is shown in the following:

If the system displays" ", it means the System Setup mode cannot be entered in current mode, so please exit this mode first.

The meanings of the icons are as follows:



System Setup Menu

❶ General setup

❷ Playback setup

❸ Record setup

❹ Language setup

❺ Channel Scan

❻ Date, Time setup

2.Select the desired item on the control bar by [5], [6] buttons, and then press [SELECT] button toenter the corresponding setup submenu .

3.In the submenu , operate the relative controllers by direct buttons and [SELECT] button to fulfill the corresponding setup.

4.Press [RETURN] button to return to the previous menu, or press [SETUP] button to exit

Notes

The steps above are general operations. Some setup may not need a certain step, or need more steps.

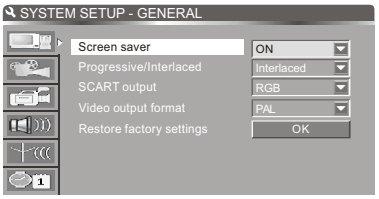
Please proceed the system setup in tray out or no disc status, otherwise some setup may not be proceeded.

2.3.2 General Setup

1.Enter the system setup mode.

2.Select the item " " in the system setupcontrol menu by [5],[6] buttons.

3.Press [SELECT] button to enter the general setup submenu, which is shown as the right figure.



General Setup Menu

2.3.3 Screen Saver Setup

The screen saver function is that an interesting screen saver picture appears on the screen automatically,when this unit's video output signal has no change(that is the image on the TV screen has no change)for a certain time.

1.In the general setup menu, move the cursorto select item "Screen saver" by [5], [6] buttons.

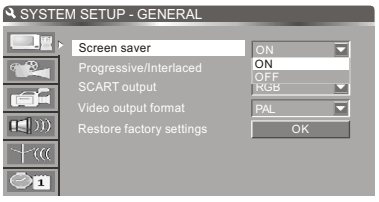
2.Press [SELECT] button , then a pop-up list will be displayed , which is shown as the right figure.

3.Move the cursor up and down to select "ON" or "OFF" by [5], [6] buttons.

4.Press [SELECT] button to turn on or turn off the screen saver function.

Pressing any button can exit the screen saver mode after the screen saver picture appears.

The screen saver function is invalid when playing Mp3and CD-DA Disc.



2.3.4 Progressive / Interlaced Setup

1.In the general setup menu, use [5], [6] buttons to select "Progressive / Interlaced" item and press [SELECT] button, then a list will appear.

2.Select "Progressive" or "Interlaced".

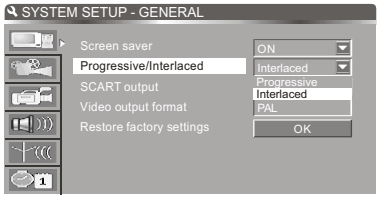
3.Press[SELECT]button to fulfill theProgressive/ Interlaced switch.

4.You can also keep on pressing [IS/PS] button for 3 seconds to perform the Progressive / Interlaced switching.

The value of this setting must accord with the scanning mode of the TV, otherwise the TV screen will display Nothing.

If nothing is shown on the TV screen, you may try to keep on pressing [IS/PS] button for 3 seconds.

To avoid instability of output signal, please don't perform " Progressive/Interlace" function by component(Y,Cb/Pb, Cr/Pr) terminal on the rear panel when "SCART output" item is RGB.



2.3.5 SCART Output Setup

1.In general setup menu, highlight "SCART output ", and press [SELECT] button, and then a list will appear.

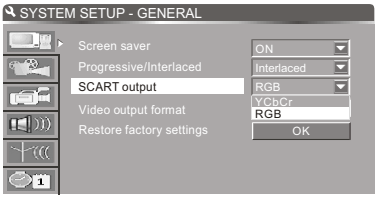
2.Select "YCbCr" or "RGB" in the list.

When using component video output, please select "YCbCr".

When using SCART output, you may select according to the fact .But you had better select the "RGB".

This setup does not affect the composite video output.

3.Press [SELECT] button to confirm.



2.3.6 Video Output Format Setup

This unit has two video output systems: PAL and NTSC . You can select one of them according to your TV set specs.

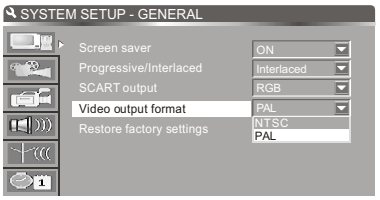
1.Highlight "Video output format" in the general setup menu and press [SELECT] button. A pop-up menu will appear.

2.Select the proper option according to factual requirements.

3.Press [SELECT] button, and then the system will switch the output format to what you select right now.

You can switch the TV output format by pressing the [PAL/NTSC] button too.

Changing the output format may cause no picture on the TV screen. If this happens, you can press [PAL/NTSC] button to restore the output format.



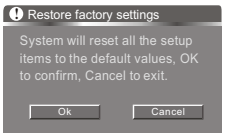
2.3.7 Restore Factory Settings

1.Select "Restore factory setting" by [5], [6]buttons in the general setup menu, then press[SELECT] button, and the TV screen displays:

2.Highlight "OK" in the menu by [3], [4] buttons.

3.Press [SELECT] button to make all setup items restore the factory settings.

When your unit is in abnormal working mode, it is probably caused by your wrong setup. Please try the "Restore Factory Settings" operation to make it work normally.

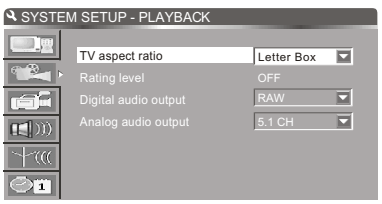


2.3.8 Playback Settings

1.Display the system setup control menu.

2.Move the cursor by [5],[6] buttons to select " " item .

3.Press [SELECT] button to enter the playback setup mode. The right figure is the main menu of playback setup.



the main menu of playback setup

2.3.9 TV Aspect Ratio

1.In the playback setup menu, select item "TV aspect ratio" by[5], [6] buttons, press [SELECT] button and then the value list will appear, which is shown as the right figure.

2.Select the suitable value by using [5], [6] buttons, and then press [SELECT] button.

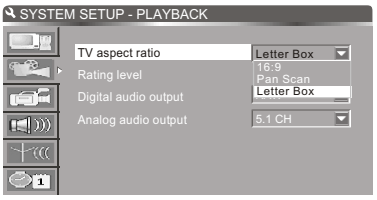
The meaning of each value to be selected of this item is as follows:

16 : 9: Applicable to wide screen TV set.

Pan Scan: Suitable for the common size TV set. When playing wide screen pictures, left and right edges of the original pictures are cut off. The picture will be displayed to full screen.

Letter Box: Suitable for the common size TV set. When playing wide screen pictures, black banners will appear on the top and bottom of the TV set.

3.Press [RETURN] button to return to the previous menu and proceed other settings.



Notes

The playback effect is related to the playing disc.If a disc is recorded in the aspect ratio of 4:3, the ratio can only be 4:3, no matter which screen setting you select.

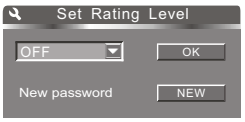
This setting should conform to the aspect ratio of the TV set.

2.3.10 Rating Level Setup

By setting this unit's authorization rating and password, some discs with control grade cannot be played without inputting the password. In this way, you can confine the children to watch the disc unsuitable to them.

1.In the playback setup menu, move the cursor upand down by [ ] , [ ] buttons to select the item "Rating level", and then press [SELECT] button. The TV screen displays:

2.Input the password and press [SELECT] button.If the password is right, the TV screen displays the window shown as the right figure.The super password is 3308.

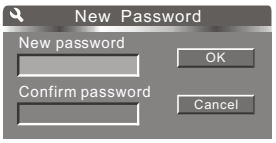


3.Select "Set rating level" , and press [SELECT] button to display the pop-up list which is shown

4.Select the rating level by [5], [6] buttons and press [SELECT] button to confirm.

5.If you do not want to change the original password, highlight the "OK" in the menu through cursor buttons and then press [SELECT] button.

6.To change the password, please highlight the "New" in the above figure and press [SELECT] button. Now the TV screen will display:



7.Select "New password" by the cursor buttons and input the new password by number buttons.

8.Select "Confirm password" by the cursor buttons and input this password again by number buttons.

The input password in the "New password " must accord with that in the "Confirm password".

9.Highlight "OK" by cursor buttons and then press [SELECT] button.

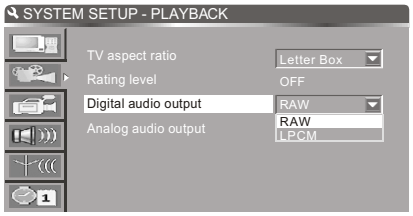
After setting the rating level, when playing the disc with the rating level higher than what you have set, you must input the password.

If you forget the password, you may input the super password.

2.3.11 Digital Audio Output Setup

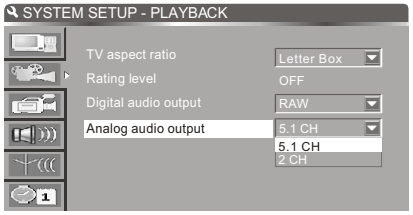
This unit has digital audio output jacks. So you can enjoy the higher quality audio with an amplifier with digital audio decoders.

1.Access the playback setup menu. Select item “Digital audio output" by [5], [6]buttons, and then press [SELECT] button. A list will pop up:
2.Select the proper value by [5], [6]
RAW :This unit doesn't perform
LPCM: This unit performs decoding



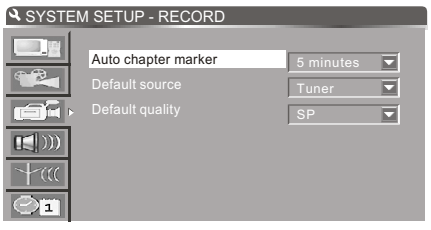
2.3.12 Analog Audio Output Setup

This setting is used to select an analog audio output format between 2CH analog mix audio output and Dolby 5.1 CH analog output.
1.Select "Analog audio output" item by [5], [6] buttons, and press [SELECT] button, then a pop-up list will appear:
2.Select the desired value by [5], [6] buttons then press [SELECT] button to confirm.



2.3.13 Record Setup

After finishing the settings introduced in this chapter, when recording, the values you set will become the default values of the correlative items.
1.In the system setup control menu, select item " " by [5], [6] buttons and then press [SELECT] button to enter record setup menu. The screen displays:



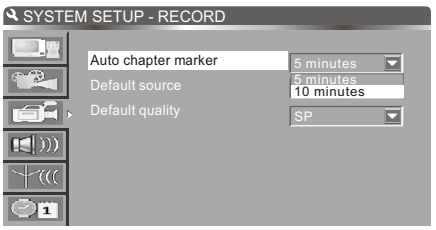
the record setup menu

Note

If the TV screen displays " ", when pressing [5]/[6]button, it may indicate that the current activated menu will not be the system setup control menu. Please press [RETURN] button once or more to activate the system setup control menu.

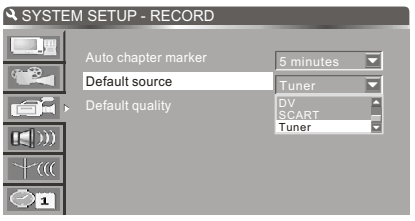
2.3.14 Auto Chapter Marker Setup

1.In the record setup menu, select item "Auto chapter marker" by [5], [6] buttons, press [SELECT] button, and then a pop-up menu will appear:
2.Select the proper value by [5], [6] buttons, and then press [SELECT] button to confirm.
This setup is used to make sure whether insert the chapter marker automatically when recording.
If you don't set this item to "OFF", the recorded contents will be automatically divided into some chapters with the same length according to the interval time you`ve selected.



2.3.15 Default Input Signal Sources Selection

1.In the record setup menu, select "Default source" by [5], [6] buttons and press [SELECT] button, then a pop-up menu will appear:
2.Select the desired value by [5], [6] buttons and then press [SELECT] button.

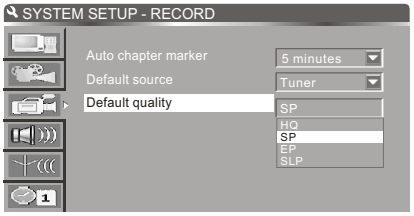


There are several groups of input source ports. Please refer to the "Basic Information—Illustration of the Front/Rear Panel " for their position on the unit.
Front CVBS: Front panel composite video and audio inputs.

Rear CVBS: Rear panel composite video and audio inputs.
Rear S-VIDEO: Rear panel S-video and audio inputs.
DV: Front panel DV input.
SCART: Rear panel CVBS and audio inputs.
TUNER: Rear panel TV tuner input.

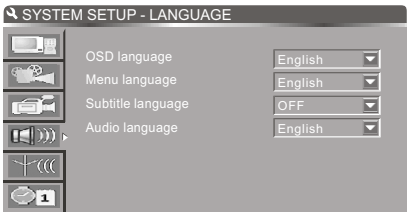
2.3.16 Default Recording Quality Selection

1.In the record setup menu, select item "Default quality" by [5], [6] buttons, press [SELECT] button, and then a list menu will appear.
2.Select the desired value by [5], [6] buttons, and then press [SELECT] button.
Please refer to the "TERMS" for the four different recording qualities: SP, SLP, EP, HQ.



2.3.17 Language Setup

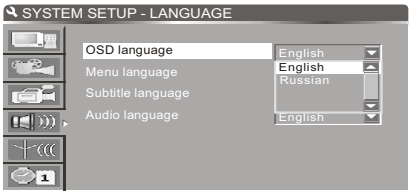
To meet the needs of consumers in different regions, this unit is equipped with many kinds of operation interface languages for your selection.
1.Enter the system setup mode.
2.In the system setup control bar, move the cursor by [5], [6] buttons. Select item
" ", and then press [SELECT] button to enter the language setup menu. The screen displays:



the language setup menu

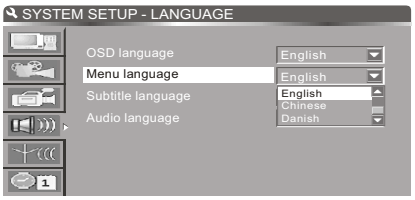
2.3.18 OSD Language Setup

1.In the language setup menu, select item "OSD language" by [5], [6] buttons, press [SELECT] button, and then a list will pop up, which is shown as the following figure:
2.Select your desired language by [5], [6] buttons, press [SELECT] button to confirm, and then the OSD language will change correspondingly.



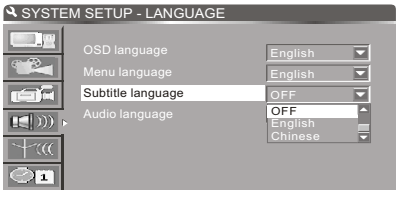
2.3.19 DVD Menu Language Setup

1.In language setup menu, select item "Menu language" by [5], [6] buttons, press [SELECT] button, and then a list will pop up, which is shown as the following figure.
2.Select your desired language by [5],[6] buttons, and then press [SELECT]button.
If you play the DVD discs that support the selected language, the system will adopt this language as the DVD menu Language.
If the disc does not support the selected language, the system will use the language supported by the disc.



2.3.20 DVD Subtitle Language Setup

Some DVD discs have many kinds of subtitle languages and this setup is used to set the default DVD subtitle language.
1.In the language setup menu, select item "Subtitle language" by [5], [6] buttons, press [SELECT] button, and then a list will pop up, which is shown as the following figure:
2.Select your desired language by [5], [6] buttons, and then press [SELECT] .
"OFF" means closing the subtitle output.
The system will select this setup language as the DVD subtitle language preferentially. If the DVD discs you select do not support this language, this setup is invalid.
You may change the subtitle language at random when playing. Please refer to "Playback mode" for details.



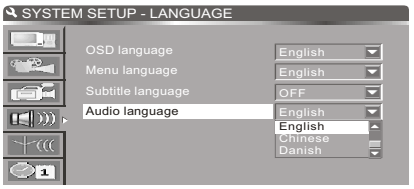
2.3.21 DVD AUDIO Language Setup

1.In the language setup menu, select item "Audio language" by [5], [6] buttons, press [SELECT] button, and then a list menu will pop up, which is shown as the following figure.

2.Select your desired language by [5], [6] buttons, and then press [SELECT] button.

The system will use the setup language as the DVD output language preferentially. If the disc dose not support this setup,the setup is invalid.

When playing DVD discs, you may change the output language at random. Please refer to "Playback Mode" for details.



Notes

About the DVD language setup introduced in this chapter, some discs have not the language you set, so the setup will be invalid. When playing, the relative languages are the corresponding ones provided by the discs.

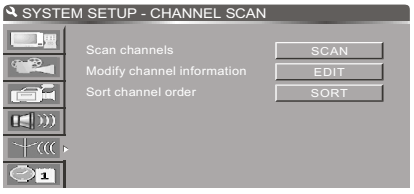
For some DVD discs, when playing, it will display the language selection menu. If you perform the selection in it, the corresponding setup of this unit will be invalid, and the relative languages are the ones you select.

2.3.22 Channel Tuning

This unit is equipped with a TV tuner, by which you can receive TV signals. Before receiving TV signals, you must proceed tuning operation . The result of the operation will be saved and will not be lost after this unit is switched off.This operation can tune this unit automatically to receive the TV programs.

1.In the System Setup Control menu , highlight item " " by [5], [6] buttons .

2.Press [SELECT] button, then the SYSTEM SETUP-CHANNEL SCAN menu will appear, as shown in the following figure.



2.3.23 Auto Scan Channels

1.Highlight item "Scan channels", and press [SELECT] button to start channel scanning.

You can press [STOP] button to stop the scanning during the operation. If do so, the channel information having been obtained during scanning can also be saved.

When scanning a channel, the TV will show the image of this channel's program.

Note

Before the channel scan operation, you must connect the system properly to ensure the TV signals can enter the system through the "TV TUNER input" jack. Please refer to "System Connection-System Connection of Recording External Signals" for the connection illustration.

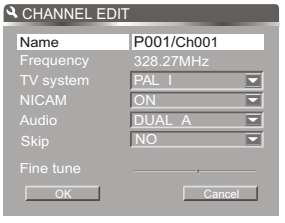
2.3.24 Modify channel Information

Here, you can name the channel after the corresponding program's name or any other name you like, sort the channel order to access the special channel easily, tune the channel finely, and scan the channel manually. You can manage the channels more easily, and make this unit receive the TV signal better by these operations introduced in this section.

1.Highlight item "Modify channel information" in "SYSTEM SETUP-CHANNEL SCAN"menu, and press [SELECT] button, then the "Channel Edit" menu will appear, as shown in the right figure:

If this unit have not scanned some programs,the "Channel Edit"menu can not be displayed.

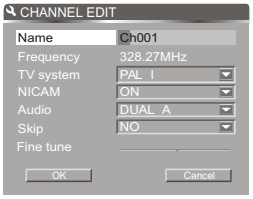
2.Select the desired channel to modify by pressing [CH+] / [CH-] button.



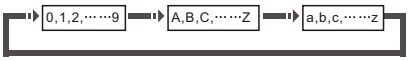
2.3.25 Modify Channel Information (CONTINUED)

3.Change the Channel name: Highlight the "Name"item, press [SELECT] button, and then the right window of the same line will become input status shown as the following figure.

Move the cursor toa character by [3], [4] buttons, and then change the character by [5], [6] buttons. When finishing changing all the characters, press [SELECT] button to confirm.



The changing sequence of the character when pressing [5] button is as following:



When pressing [6] button the sequence is reverse.

4.Change TV system: Highlight the item "TV system",and press [SELECT] button to display the drop down list. Select proper value , and then press [SELECT] button to confirm.

The value of the TV system must match the received TV signal. If it is not right, the system will not receive the program's sound signal. So you should select the right value.

5.Manual Scan Channels:

A.Select a channel number by pressing [CH+], [CH-] buttons.

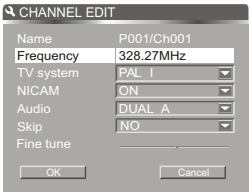
B.According to the demands of the local TV system, set items "TV system" by the methods described in step❹.

C.Highlight "Frequency" item in the "Channel Edit" menu by [5],[6] buttons, and press [3]/[4] button, then the system shall start scanning channels.

If you press [4] button, the system shall forward scan channels from the current frequency.

If you press [3] button, the system shall backward scan channels from the current frequency.

When encountering a channel with TV program, the scanning will stop.



D.When the scanning ending ,that is, encountering a channel with TV program, press [SELECT] button, then the TV program signal shall be correlated with the current channel number & name, that is the current channel number & name represents this TV program.

6.Skip a channel: Highlight the item "skip", and press [SELECT] button to display the drop down list. Select" YES" or "NO", and then press [SELECT] button to confirm.

If you select "YES", and when receiving TV programs, this channel can not be received, as if it does not exist.

7.Channel Fine Tuning: Highlight item "Fine tune" in the "Channel Edit" menu. Then you can start fine tuning the channel.

After finishing the channel scanning, maybe some channels' frequency is not adjusted to right value. In this way, when watching these channels, the image and sound will be misty. Then you should perform channel fine tuning to right adjust these channels' frequency.

2.3.26 Modify Channel Information(CONTINUED)

Pressing [3] button once can decrease the frequency.

Pressing [4] button once can increase the frequency.

When changing the frequency, the definition of the image or sound will be changed correspondingly, then from this, you can know the effect of the fine tuning.

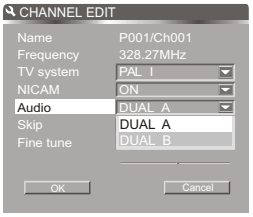
8.Close/Open NICAM functions: Highlight the item "NICAM" , and press [SELECT] button to display the drop down list. Select "ON" or "OFF" from the list, and then press [SELECT] button to confirm.

The so-called NICAM functions include stereo function and dual dubbings function. When "NICAM" item is "ON", if the received TV program supports stereo function, this unit will output the stereo dubbing; on the other hand, if the received TV program supports dual dubbings function, you can select one of the two dubbings as output by item "System Setup-Channel Scan- Channel audio language" . Of course , if you set "NICAM" to "OFF"or receive TV program without NICAM function, the above functions are invalid.

9.Switch channel audio language:when receiving the TV programs supporting dual dubbings functions, you can select one of the two dubbings as output by this item.

A.Highlight item "Audio"in the "Channel Edit"menu, and then press [SELECT] button to pop up a submenu list.

B.Select "DUAL A" or "DUAL B " in the list, and then press [SELECT] button to confirm.



You must open the NICAM function first, otherwise this function will be invalid. Please refer to step ❽ in section " Modify Channel Information " to open the NICAM function.

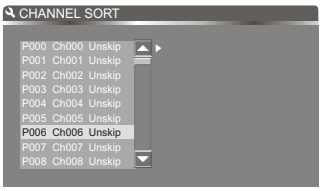
The value "DUAL A" or "DUAL B"stands for one of the two dubbings. If the received TV program can not support dual dubbing function, the above operations shall not influence the output dubbing.

You can select "DUAL A" or "DUAL B" by [AUDIO] button in the remote control when not in "CHANNEL EDIT" menu.

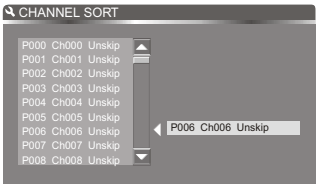
2.3.27 Sort Channel Order

1.Highlight item "Sort channel order",and press [SELECT] button, then a corresponding menu will appear, as shown in the right figure.

If this unit has not scanned some programs,the "Sort channel order"menu can not beDisplayed.



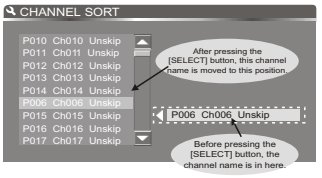
2.Highlight the desired channel in the left list window by cursor buttons, and press [SELECT] button, then the channel name will appear in the right list window, shown as the right figure.



3.Move the channel name up and down by [5],[6] button to select the right position where you want to insert this channel.

4.Press [SELECT] button to insert the channel name to the selected position in the left list window, as shown in the right figure.

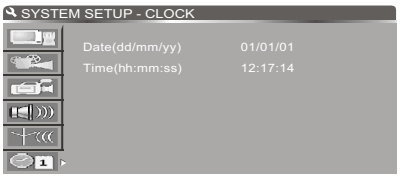
5.Press [RETURN] button to return to the previous menu and proceed other settings.



2.3.28 System Clock Setup

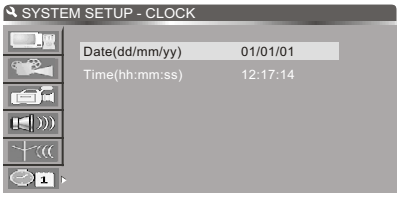
1.Enter the system setup mode.

2.In the system setup control menu, move the cursor to select item " " by [5], [6] buttons, and then press [SELECT] button, so the TV screen will display the time setup window, which is shown as the right figure.

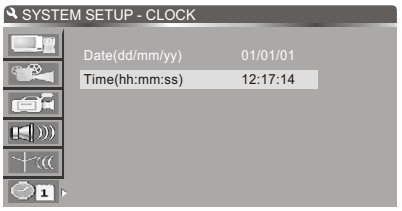


2.3.29 System Clock Setup (CONTINUED)

3.Select item "Date (dd /mm / yy)" and make it in input mode. Highlight a number by [3], [4] buttons, and change it by [5],[6]buttons. After inputting the date by sequence of "date/ month/year",press [SELECT] to confirm.



4.Select item "Time (hh: mm: ss)" and make it in input mode. Highlight a number by [3],[4] buttons, and change it by [5],[6]buttons. After inputting the time by sequence of "hh:mm:ss",press [SELECT] to confirm.



The correct setup of system clock is the precondition of time recording.

2.4 RECORDING MODE

2.4.1 Summarization

This unit has various external input signal terminals including S-video input, composite video input, TV tuner input, DV input , SCART input and stereo audio input. You can record any group of these video and audio input signals.

The recordable discs of this unit are DVD+RW and DVD+R. There are four recording qualities to be selected,including SLP (about 6 hours), EP (about 4 hours), SP (about 2 hours) and HQ (about 1 hour).

This unit also incorporates time recording function with which you can prepare a record schedule before-hand and it will record your desired programs according to the schedule on time.

2.4.2 How to Receive the TV Program

1.Connect the system according to the figure shown in section "System Connections - Connecting to the TV set".

2.Connect the power plugs of the TV and this unit to the outlet.

3.Switch the TV set to AV mode, and turn on this unit by pressing the [STANDBY/ON] button .

4.Press the [SETUP] button to enter the System Setup mode, and then perform the Channel Scanning and Channel Fine Tuning according to the steps introduced in chapter" System Setup - Channel Tuning" .After finishing, please press [SETUP] button to exit setup mode.

Before receiving TV programs for the first time, you must do this step, this unit will save corresponding information after you have done it .

5.According to the method described in section "Viewing the Input Source",select the TV input source to view.

6.Press [CH+]/[CH-] to switch the TV program.

2.4.3 Viewing the Input Source

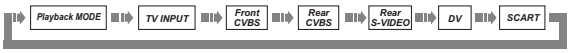
You can let the input source signal be shown directly on the TV screen. By this function you can get a preview of the external signals for more rightly selecting the desired signal.

1.Please connect the system according to "System Connections-System Connection of Recording External Signals" .

Make the source equipment work properly, and let it output the signal intended for recording.

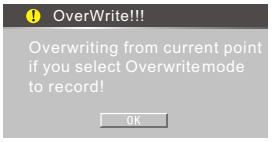
2.There are three ways for selecting the signal to view.

A.Pressing [SOURCE] button can directly view the external signals one by one. The sequence of viewing the external signal is shown in the following.

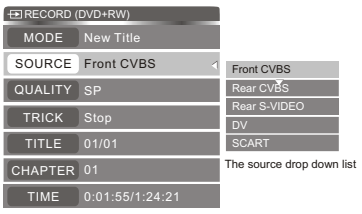


B.When this unit is playing a title of a DVD+RW disc, after pressing [SOURCE] button, a warning message window will appear as shown in the following figure .

Please press [SELECT] button, and then select the signal you want by method in point ⓐ



C.Press [NAVIGATION] button once or twice to display the record control menu. Select "SOURCE" item by [5], [6] button , then press [SELECT] button to display the source drop down list as shown in the following figure . Select the desired source from the list, and press [SELECT] button, then the TV screen will show the corresponding picture.



Record control menu

Notes

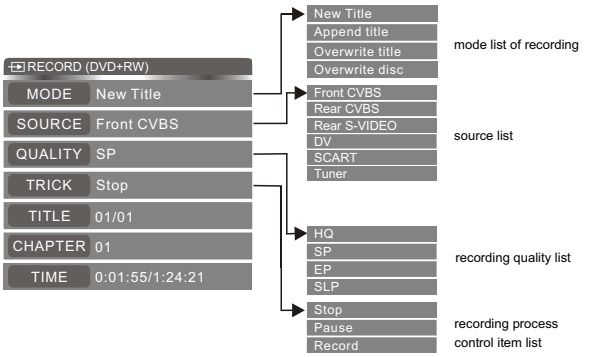
In the above three ways , if the system displays " ", means viewing the input source can not be realized in the current mode , so please press [RETURN] button once or more times to quit the current mode, then perform the corresponding operations again.

When the unit is recording ,if you want to view the external signals , you must stop the recording first.

2.4.4 Manual Recording

The following figure shows the construction of the menu in recording mode.

The last three items can not be controlled in this mode, but you can learn some information by them. Please follow the following steps to finish a recording task.



the menu construction in recording mode

1.Make sure an unfinalized DVD+R or DVD+RW disc has been in the disc tray.
2.Select the desired external signal source to be recorded according to the way in section "Viewing the Input Source".
3.Press [NAVIGATION] button to display the record control menu .
4.Refer to the menu construction figure, rightly set the values of "MODE" and "QUALITY". You can refer to following contents to realize this step.

Highlight the desired menu item by [5], [6] buttons, pop out the submenu by [4] or [SELECT] button, and confirm by [SELECT] button.

Meanings of some values in the submenu are as follow:

2.4.5 Manual Recording (CONTINUED)

MODE

New title: Add a new title when recording.

Append title: Append the recording content to the last title, and does not add a new title. Overwrite title: When you perform this order by method as follow , this unit will overwrite the current title from current point as a new title .In this situation, the recording will stop automatically when meeting the end of the current title .If you press [STOP] button before the recording stops automatically, the remanent part of the current title will turn into another new title.When you perform this order by method as follow, this unit will overwrite the current title from the beginning of the current title , and the recording will stop automatically when meeting the end of the current title. If you press [STOP] Button before the recording stops automatically, the remanent part of the current title will turn into another new title.

Overwrite disc:When you perform this order by method ⓐ as follow , this unit will overwrite the disc from current point as a new title. In this situation , the recording won't stop until you press [STOP] button. If an existed title doesn't be overwritten totally after you press [STOP] button, the remanent of the current title will turn into another new title .When you perform this order by method ⓑ as follow, this unit will overwrite the disc from the beginning of the current title. In this situation , the recording won't stop until you press [STOP] button. If an existed title doesn't be overwritten totally after you press [STOP] button , the remanent of the current title will turn into another new title .

Notes

In some situations , "Overwrite title" and "Overwrite disc" may be invalid . To make it valid , there are two ways as follow:

A.When selecting the desired external signal ❺ source in step ❷ described above , make sure that the Step ⓑ in section "Viewing the Input Source" has been done. Then please perform steps ❸ , ❹ and ❺ .

B.After the unit has read an unempty DVD+RW disc , select an unempty title by [5],[6] button then press [4] button to display the control menu . From it ,select "Overwrite title "or "Overwrite disc " item by [5],[6] button and press [SELECT] button to confirm. Then please perform steps ❸ , ❹ and ❺

SOURCE

Front CVBS :	Front panel composite Videoand audio inputs
Rear CVBS :	Rear panel composite video And audio inputs
Rear S-VIDEO :	Rear panel S-video and audio Inputs
DV :	Front panel DV input
SCART :	Rear panel CVBS and audio Inputs
Tuner :	Rear panel TV turner input, please select the TV program By [CH+],[CH-] buttons.

Notes

The source value must match the port through which the external source signal is inputted.

QUALITY

HQ: perfect quality, a single-side DVD disc can record about one hour program.

SP: standard play, a single-side DVD disc can record about two hours program.

EP: extend play, a single-side DVD disc can record about four hours program.

SLP: standard long play, a single-side DVD disc can record about six hours program.

YRICK

Stop : Stop the recording

Pause : Pause the recording

Record : Start recording

5.After finishing the steps described above, please set item "TRICK" to "Record" ,then press [SELECT]button to start recording . While recording , you can pause or stop recording by setting item "TRICK" to the corresponding value. Certainly , you can more conveniently realize these control by pressing [RECORD], [PAUSE] and [STOP] buttons.

2.4.6 One Touch Recording (OTR)

This function can make you set the end time of the recording.When the time is up,the recording will stop automatically.

1.Enter the recording mode and start recording.

2.According to the desired time, press the [RECORD] button once or more.

Pressing [RECORD] button once, the length of the recording time will extend for 15 minutes (≤ 60minutes)or 30 minutes(>60minutes). If it exceeds the disc recordable time, the system will cancel OTR function and switch to normal recording mode.

If the OTR process is paused or stopped, the system will cancel the OTR.

2.4.7 To Control the DV Camera Recorder by this Unit

This unit may control the DV camera recorder through the 1394 serial interface, that is, when using DV as input source, you may fulfill the operations of playback ,pause, etc. to the DV through the remote control of this unit.

1.Properly connect the DV (Please refer to "System Connection of Recording External Signals" for details) and make it work normally. Then set the "Source" item in the control menu bar of this unit to "DV".

2.When pressing the [STOP] button, if this unit is in recording mode, the recording will stop and the DV can not be influenced, on the other hand , if the unit is not in recording mode, this unit can not be influenced and the DV will stop.

This operation can make the recording control bar disappear.

3.Pressing the [PLAY] button doesn't influence this unit, but can make the DV switch to normal playback.When pressing [PAUSE / STEP] button, if this unit is in recording mode, the recording will pause and the DV can not be influenced; on the other hand, if the unit is not in recording mode, it can not be influenced and the DV will pause.

This operation can make the recording control bar disappear.

5.When pressing the [REW] button, the DV will play fast backward. If this unit is in recording mode, the recording will pause.

This operation can make the recording control bar disappear.

6.When pressing the [FWD] button, the DV will play fast forward. If this unit is in recording mode, the recording will pause.

his operation can make the recording control bar disappear.

Do not shake this unit or unplug it when recording.

A finalized DVD+R disc cannot be used to record.

If you want to play the recorded disc in normal player, you should perform the operation of Finalizing or Making Compatible. Please refer to "Disc Operation" for details.

2.5 TIMER TASK SETTING MODE

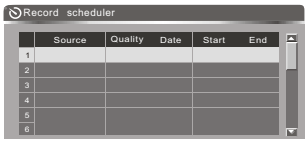
2.5.1 Summarization

This function can make this unit record automatically according to the preset requirements when the preset timeis coming. And it will resume the original mode after finishing the recording.To carry out this function. You should set down a record schedule first and then finish the configuring of the system according to the requirements on the schedule. If you are busy and unwilling to miss any wonderful program, this unit can satisfy your requirements.

Operation Steps

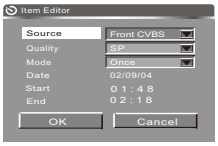
1.Press the [TIMER] button to display the record scheduler menu shown as the following figure.

Highlighting any non-empty note by cursor buttons, and then pressing [ADD/CLEAR] button, can delete it.



2.Press [SELECT] button ,then the TV screen will display the Item Editor window as shown in the following figure.

Performing the relative setting in this Item Editor window can make a record Scheduler.

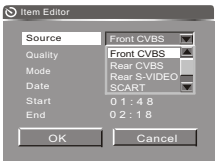


the Item Editor window

3.Setting the input source:Press [SELECT] button to display the drop down list, then select the right item from the list by [5],[6] buttons. At last, press [SELECT] button to confirm.

Please refer to "System Setup -Record Settings - Default Input Signal Sources Selection " for the values of the " Source" Item.

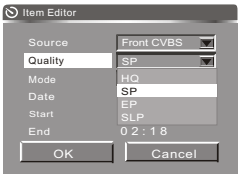
For example, if you want to record the Ch003 TV program, you may set the value of the Source item to Ch003.



2.5.2 Operation Steps (CONTINUED)

Highlight "Quality" item by [5],[6]buttons, and press [SELECT] button to display the drop down list, select the right value from the list, and then press [SELECT] button to confirm.

As for the recording quality, please refer to "Basic Information -Terms" for details.



5.Setting recording date

You can perform this setting at the third row in the "Item Editor". Move the cursor to select this rowand press [SELECT] button, then a list will pop up. It is shown as follows:

From this illustration, we can learn that this pop up list has six options. Their meanings are as follows:

ONCE: record at a certain time

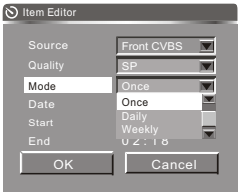
DAILY: record once per day

WEEKLY: record once per week

Mon~Fri: record once per day from Monday to Friday

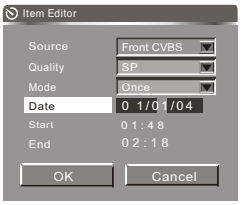
Mon~Sat: record once per day from Monday to Saturday

Sat~Sun: record once per day from Saturday to Sunday

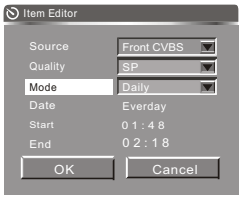


A.If you select "ONCE", after confirming by [SELECT] button, move cursor by[6] button and press[SELECT] button to make the next row into input mode, then input the date in sequence of "date/month/year" . Finally press [SELECT] button to Confirm.

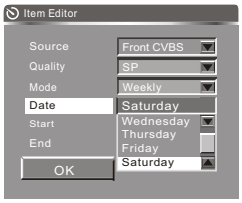
When the date input window is in input mode, you can select a number by [3], [4]buttons ,then press [5]/[6] button to change it .



B.If you select "DAILY"/"Mon~Fri"/"Mon~Sat"/ “Sat~Sun", you only need to press [SELECT] button to confirm. And then the TV screen will display the following figure.



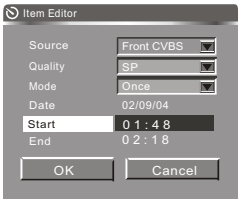
C.If you select "WEEKLY", after confirming by [SELECT] button, move cursor by [6] button and press [SELECT] button to display the weekday list, then select what you need from the list.



2.5.3 Operation Steps (CONTINUED)

6.Setting the start time of recording.Select the "Start" item by [5], [6] buttons in the "Item Editor" and press [SELECT] button to make it in input mode, as shown in the right figure. Input the time between 00:00~23:59 by number buttons, then press [SELECT] button to confirm.

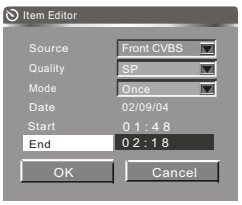
Highlighting a number by [3], [4] buttons, and then pressing[5], [6] buttons can change the number.



7.Setting the end time of recording. The operation is similar to that in step ❻ .

The meaning of this setting is that when the finish time is up, the recording will be over and the unit will resume to the original mode before recording.

If the record time (from the start time to the End time) is too long,an error message window will appear on the button of the screen, and you can not perform the following steps. And then you need to set the "Start" time and "End" time again.



8.After every parameter of the time recording is well set, please highlight the "OK" button in the "Item Editor" , and press [SELECT] button to finish the setup.

9.Set another timer recording task or press [TIMER] button to quit the record schedule menu.

10.After finishing setting the recording schedule, collocate the system according to the requirements in the recording schedule and make this unit in standby or working mode.

In 3 minutes before recording, if the unit is working normally, a message dialogue will appear to require whether it starts to record. If the recording conditions are satisfied, please highlight the "OK" button on the dialogue and press [SELECT] button to confirm.

If this dialogue is not managed, the system will think you are agree to record. After a moment, it will start recording.

If the system is in standby mode, it will automatically switch on and enter the recording mode in about 1 minutes before recording, and then start recording.

After the recording is finished, the system automatically enters the standby mode.

Notes

This unit can't perform two or more timer record tasks at the same time.

Before timer recording, you must set the system time & date (refer to "System Setup-System Clock Setup" for details) properly, otherwise, this function introduced in this chapter will not be implemented.

The system must be properly collocated to fulfill the schedule recording task.

Do not use the finalized DVD+R disc.

After finishing recording a DVD+RW/ DVD +R disc, you may play it in this unit, then you can do some operations on it to make it more easy to use. When loading this disc, the TV screen will display the following picture. Each little icon in the picture stands for a title, the right words and numbers indicate some information of the title. Their meanings are as follows:

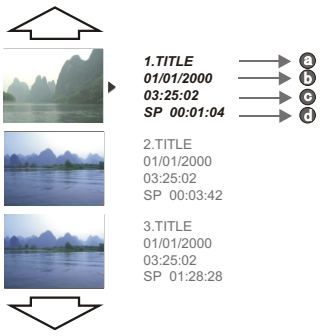
a.Title name, and "Title" is the default name.

b.The date of recording this title.

c.The time of recording this title

D.The record quality and length of the title

The following descriptions will tell you how to do when meeting this picture.



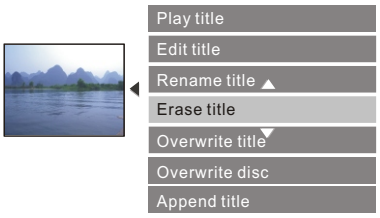
The start picture whenplaying DVD+R/RW discrecorded by this unit(Title list)

2.5.4 To Browse the Contents of the Disc and Select one Title to Play

1.Roll up and down the title list picture by [5], [6] buttons to browse all the titles.
2.Highlight a title icon you desire to play by [5], [6] buttons, then press [SELECT] button to play it.
3.During playing, you can press [TITLE] button to switch the TV screen picture to Title List to select another title to play.

2.5.5 Erasing Title

1.Highlight a title icon you want to delete in the Title List picture and press [4] button, then a menu will pop up as shown in the right figure.
2.Highlight "Erase title" item, and press [SELECT] button, then the system will erase this title.



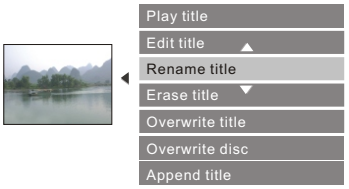
2.5.6 Edit Title

This operation can switch the system to edit mode.The functions and operations for edit mode are described at the next chapter.

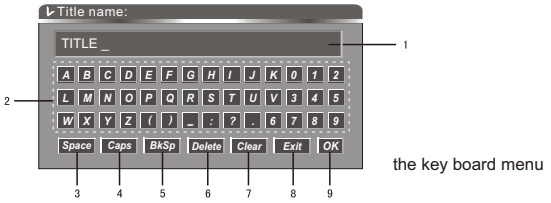
1.Highlight a title icon you want to edit in the title List picture and press [4] button, then a menu will pop up as shown in the right figure.
2.Highlight "Edit title" item, and press [SELECT]button, then the system will enter edit mode.
3.Then, refer to chapter "Editing Mode"to perform corresponding operations.
4.To exit, please press [EDIT] button first and wait a few seconds until system operation is finished.

2.5.7 Rename Title

1.Highlight a title icon you want to rename in the Title List and press [4] button, then a menu will pop up as shown in the right figure.



2.Highlight "Rename title" item, and press [SELECT] button, then a key board menu will pop up.



the key board menu

The meanings and operations of the controller in the key board menu are as follows:

Title Name Editing window
Characters area: select a certain key in this area by using cursor buttons, and then press the [SELECT] button. The letter on the key will appear in the Title Name Editing window.
Space: blank button by which you can insert a blank to title name.
Caps: selecting this key and pressing the [SELECT] button can make the letters in the Characters area switch between the capitalization and the common letterform.
BkSp: selecting this key and pressing the [SELECT] button can cancel the letter before the cursor in the Title Name Editing window, meanwhile the cursor backs a space.
Delete: selecting this key and pressing the [SELECT] button can cancel the letter after the cursor in the Title Name Editing window.
Clear: selecting this key and pressing the [SELECT] button can clear all the letters in the Title Name Editing window.
Exit: selecting this key and pressing the [SELECT] button can exit this menu and keep

the Title Index name unchanged.

OK: selecting this key and pressing the [SELECT] button can exit this menu, meanwhile change the Title Index to the one in title Name Editing window.

3.Type a new title name in the Title Name Editing window by the keyboard in the menu.

4.Select the "OK" key and press the [SELECT] button to fulfill the naming to the title.

2.5.8 Overwrite Title / Append Title / Overwrite Disc

"Overwrite title", "Append title" and "Overwrite disc" are three kinds of record mode. The meaning about them is introduced in section "RECORDING MODE --Manual Recording--MODE". If youhave connected the external signal to this unit, you can select one of them to perform recording.

1.Highlight a title icon you want to overwrite and press [4] button to display the menu.

2.Highlight "Overwrite title" item, " Append title" item or "Overwrite disc" item, then press [SELECT] button to confirm.please note that you can see "Append title" item only in menu of the last title.

Highlighting the "overwrite title"item

Highlighting the "overwrite disc"item

Highlighting the "Append title"item

2.6 EDITING MODE

2.6.1 Summarization

For the recorded disc, the dividing of the title and chapter can't match your fancy. The index icon and name of each title are confirmed by the system, which are not striking, not beautiful, not convenient to skim over the disc, and not possible to meet your personalized enjoyment either. The edit function is set for getting over the above limitations.

2.6.2 Entering the Editing Mode

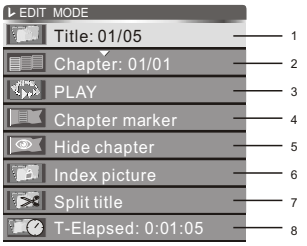
When the disc in the loader is DVD+R/RW and the system is not in the mode of writing or erasing ,pressing the [EDIT] button can enter the edit mode and display the control menu.

Notes

When" " appears while you press the [EDIT] button, it mayindicate that the DVD+RW disc in the loader has been write protected, or the system in current mode can not enter the editing mode. You can perform the disc operation to cancel the write-protect or exit current mode.

2.6.3 Menu Explanation

The editing control menu is shown in the



1.Title : the left of the number beside the icon is the current title number, and the right is the total of the titles in the disc.

2.Chapter : the left of the number beside the icon is the current chapter number, and the right is the total of the chapters in the disc.

3.Play : this item can perform the following functions: Play, Pause, Fast forward, Slow forward, and Step.

4.Chapter marker : separate or combine the chapters.

5.Hide/Unhide chapter: display or skip the chapter when playing it.

6.Index picture : change the index icon .

7.Split title : divide current title to 2 titles at current point.

8.T-Elapsed: can not be controlled, showing the elapsed time.

2.6.4 Operation Steps

Selecting the Title/Chapter to be Edited

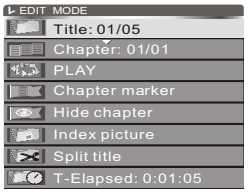
1.Enter the editing mode

2.Select the Title/Chapter item by using [5], [6] buttons in the editing control menu.

2.6.5 Selecting the Title /Chapter to be Edited (CONTINUED)

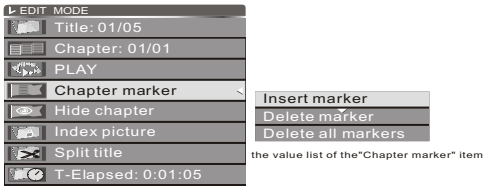
3.Press [SELECT] button to make the Title/Chapter item in input mode.

4.Input the number of the Title/Chapter to be edited by using number buttons,and press [SELECT] button, then the system starts to play the selectedtitle or the one which the selected chapter belongs to repeatedly.



2.6.6 Insert Chapter Marker

1.In the edit control menu, move the cursor by [5], [6] buttons to highlight the "Chapter marker" item, then press [4] / [SELECT] button to display the value list shown as the following figure.



2.Select proper value from the list by [5], [6] buttons, and press [SELECT] button to confirm, then the system will start separating or combining the current chapter.

If you select "Delete marker", this chapter and the former chapter will be combined to one chapter.

If you select "Insert marker", this chapter will be separated into two at the current location.

If you select "Delete all markers", all chapters of this title will be combined into one chapter.

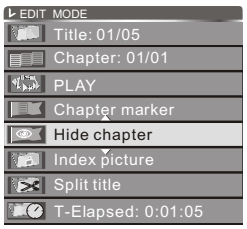
2.6.7 Hiding / Unhiding Chapter

1.In the edit control menu, move the cursor by [5], [6] buttons to select the Chapter Hide/Unhide item.

2.Press the [SELECT] button to switch the value of this item.

If the value is "Hide chapter", this chapter will be played when playing in normal mode.

If the value is "Unhide chapter", this chapter will be skipped when playing in normal mode.



Notes

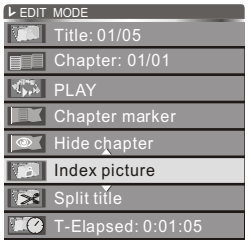
This operation is invalid to DVD+R.

2.6.8 Changing the Index Picture

When entering the DVD title menu(Press the [TITLE] button when playing), the title index will be shown on the screen as a little icon, standing for a title (Please refer to "Playback Mode").The method of changing the title index is introduced in the following.

1.In the edit control menu, move the cursor by [5], [6] buttons to select the "Index picture" item.

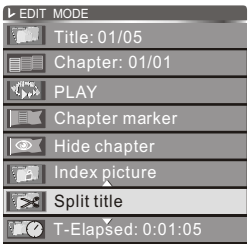
2.Now, please watch the playing picture carefully, when meeting a picture you like, you can press [SELECT] button to replace that title icon by that picture.



2.6.9 Split Title

1.Highlight the "Split title" item in edit control menu, shown as the following figure, then press [SELECT] button.

The operation will divide current title to 2 titles at current point, and it will occupy many time, please wait for a moment.



Notes

This operation is invalid to DVD+R disc.

2.6.10 Exiting the Editing Mode

1.Press [EDIT] button to exit this mode.

When exiting, the system will write some information into the disc, so the unit will stop responding for a while.

2.7 DISC OPERATION MODE

2.7.1 Summarization

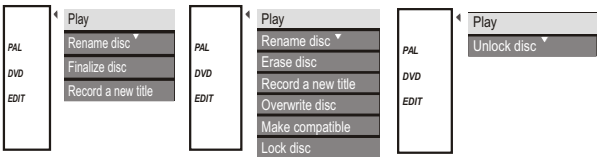
The disc operations refer to some operations about the disc in the loader , including viewing the disc information, finalizing

a disc, erasing the disc content, erasing the title, lock/unlock the disc and so on.

2.7.2 Entering the Disc Operation Mode

If you load unfinalizing DVD+R or DVD+RW disc, you can enter this mode. There are two ways to enter this mode.

1.During playing, you can enter this mode by [DISC OPER] button. After entering the mode, pleas press [4] button to display the control main menu, as shown in the following figures.



When playing unfinalizing DVD+R | When playing DVD+RW | When playing locked DVD+RW

2.Display Title List picture by the methods introduced at chapter "Playing and Processing the Disc Recorded by this Unit", and press [5] button continuously until the icon

appears, then press [4] button.

2.7.3 Operations

Play: Highlight item "Play" in the menu, and then press [SELECT] button.

Rename disc:

Highlight item "Rename disc", and press [SELECT] button, then a keyboard menu will appear. By the keyboard, you can rename the disc through the methods introduced in chapter"Playing and Processing the Disc Recorded by this Unit".

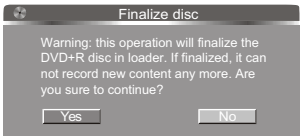
Finalize disc/Make compatible :

the key board menu by
which you can rename the disc

"Finalize disc" is valid for DVD+R disc. If do this, the disc can be played in normal DVD player, but can't record new contents. "Make compatible" is valid for DVD+RW disc. These operations can make the disc able to be played in normal player. Highlight item "Finalize disc" and press [SELECT] button, then a dialogue will open shown as the right figure, please highlight "Ok" key in the dialogue, then press [SELECT] button to start this operation.

◆These operations will occupy some time, Please wait for a few minutes.

"Make compatible" can appear if you make "Insert Maker" operation according to the method in section "EDIT MODE -Insert Chapter Maker".



Lock disc: " Lock disc" is valid for DVD+RW. This operation can protect the recorded contents frombeing deleted. If you want to record new contents in the disc, you must unlock the disc. You can highlight item "Lock disc" and press [SELECT] button to lock or unlock the disc. If the disc is locked, this operationwill unlock the disc, otherwise it will lock it.

Erase disc: This operation is only available for DVD+RW disc.Highlight item "Erase disc" and press [SELECT] button, then the system will start erasing disc contents. This operation will occupy many time. When erasing, any other operations can not be proceeded, including standby. Once the operation starts, it cannot be cancelled midway. Please do not unplug the unit midway. Otherwise, the disc will be probably damaged.

Record a new title / Overwrite disc: These operations can perform recording function. "Record a new title " can add a new title when recording , and "overwrite disc"can overwrite all the contents in the disc as new one. You can highlight "Record a new title" or "Overwrite disc" item, and press [SELECT] button to start recording.

2.7.4 Exiting the Disc Operation Mode

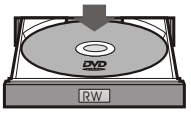
1.Press [DISC OPER] again to exit.

2.8 PLAYBACK MODE

2.8.1 Entering the Playback Mode

In the playback mode, this unit is totally the same as a high quality DVD player. The way to enter the playback mode is as follows:

1.Connect this unit with the TV set (Refer to "System Connection" for details), turn on the TV set and switch it to the AV input mode.



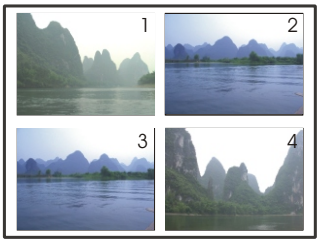
2.Plug in the unit, then press [STANDBY / ON] button to turn it on.
3.Press [OPEN / CLOSE] button to open the disc tray.
4.Load the disc correctly as shown in the illustration.
5.Press [OPEN / CLOSE] button to close the disc tray, then the system starts playing.
According to different discs, the system will probably enter the Title Selecting Playback mode or Menu Playback mode. If this condition appears , the disc will not be continued playing (please refer to the following text).
6.If system is in other working mode, please press [PLAY] button to enter the playback mode.
7.If you press [PLAY] button, the TV screen displays " " . Please exit current working mode first, and then press [PLAY] button again.
When writing or erasing, pressing [PLAY] button will be invalid.
If there is no disc in the loader or load the disc that this unit doesn't support or has been damaged badly, pressing [PLAY] button will be invalid.

2.8.2 Playback from the Menu Displayed

1.When playing a DVD disc, it will enter menu playing mode.The menus of different discs are different. In general, you can select the playing language, set the subtitle language and so on by that menu. To perform some operations,you only need to highlight the corresponding item by cursor buttons and confirm by [SELECT] button.
2.When playing some VCD disc, these menus will be a list of tracks. You can select a track by number or cursor buttons,then press [SELECT] button to play the selected track.
3.During playing, you can open the disc menu by pressing [MENU] button. Of course, all the functions about the disc menu can be fulfilled by the corresponding control menu based on this unit.

2.8.3 Playback from the Titles Displayed

This operation is only available for the DVD disc.During playing, if you want to select some title to play, you can press [TITLE] button. Then the screen will display the title icons list, shown as the right figure. You can highlight an icon you like, then press [SELECT] button to play it.



Notes

The title menu of different DVD discs may be different.
Not all DVD discs have title menu. For some DVD discs without title menu, pressing [TITLE] button is invalid.

2.8.4 Ending Playback

This unit enters the pre-stop mode.
In this pre-stop mode, this unit automatically memorizes the pre-stop point. If you press [PLAY] button ,this unit will resume the playback from the pre-stop point (Playback starts from the beginning of the pre-stopped track for MP3). If you press [STOP] button twice, this unit will enter stop mode and the memory is cleared.
2.Press [OPEN/CLOSE] button to eject the tray.
3.Take the disc out.
4.Press [OPEN/CLOSE] button to retract the disc tray.
5.Press [STANDBY/ON] button to end the operation.

Note

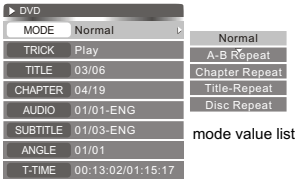
If the disc is badly damaged or loaded incorrectly, the OSD will display "NO DISC".

2.8.5 Playing Mode Control

1.Press [NAVIGATION] button twice to open the main control menu.
2.Highlight "MODE" item by [5], [6] buttons, and press [SELECT]/[4] button to display the drop down list window shown as the right figure.
3.Select one value in the list, then press [SELECT] button to confirm.The meanings of the values are as the following:

1.BIRNAK	Sequence Playback
2.A-B	A-B Playback
3.C-RPT	Segment Repeat Playback
4.T-RPT	Title Repeat Playback
5.D-RPT	Disc Repeat Playback
6.TR-RPT	Track Repeat Playback

7.PROG Program Playback
8.RANDOM Random Playback



mode value list

Main control menu

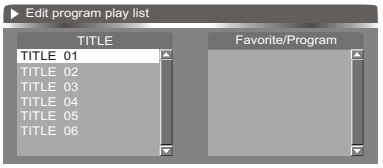
The list values are different when playing different discs.

For most operations, if you perform step ❸, things are over, but if you select "A-B Repeat" and "Program",you shall perform the following steps.

4.If you select "A-B Repeat", when pressing [SELECT] button, the menu becomes the style shown as the right figure. You need to set the B point. Press [SELECT] button to display Mode value list again and select"A-B Repeat ".Now, please wait, and when meeting your desired point,you can press [SELECT] button to set the B point.

During your waiting, the main control menu will disappear. You also can press [NAVIGATION] button to hide the menu.

5.If you select "Program" in step ❸, the following list windows will pop up.



By this menu you can select your favorite contents from the disc to play in your pointed sequence.

2.8.6 Playing Mode Control (CONTINUED)

You can control the two list windows by the following points.

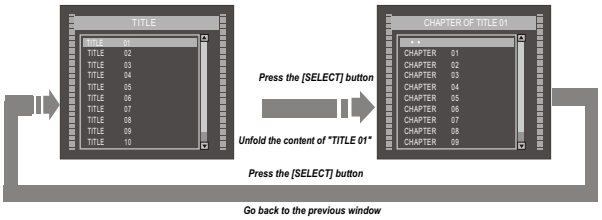
Move the cursor between left window and right window by [ ], [ ] buttons.

Move the cursor up and down in one of the windows by [ ], [ ] buttons.

Highlighting an item in left window, then pressing [ADD/CLEAR] button can add the item to right list window.

Highlighting an item in right window, then pressing [ADD/CLEAR] button can delete the item

If the items of the left window is title, you can expand item by pressing [SELECT] button, shown as the following figure:



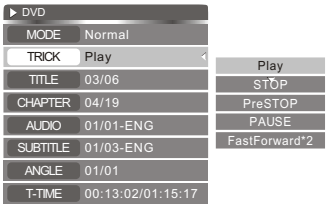
6.Add your favorite contents to right window in your desired sequence according to theabove description, then move the cursor to the right window and press [SELECT] button to start program playback.

2.8.7 Playback Process Control

1.Press [NAVIGATION] button twice to open the main control menu.

2.Highlight "TRICK " item by [5], [6] buttons, and press [SELECT]/[4] button to pop out the drop down list window shown as the right figure.

3.Select one value in the list, then press [SELECT] button to confirm.



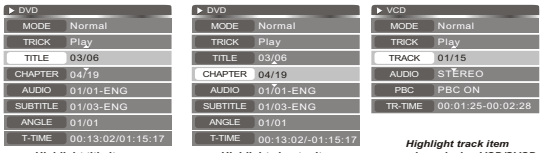
The means of the List values are as following:

❶ PLAY playback
❷ STOP stop
❸ PreSTOP prestop
❹ PAUSE pause
❺ FastForward2~32 fast playback, the number shows the speed of the playback
❻ FastBackward2~32 fast backward playback, the number shows the speed of the backward Playback
❼ SlowForward1/2~1/16 slow playback, the fraction shows the degree of slow Playback

The list values are different when playing different disc.

2.8.8 Title/Chapter/Track Selection

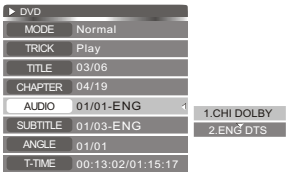
1.Press [NAVIGATION] button twice to open the main control menu.
2.Highlight "Title"/"Chapter"/"Track" (for VCD/SVCD) item, and press [SELECT] button to make it in input mode.
3.Enter your desired number by number buttons, and press [SELECT] button, then the system will start playing the selected Title/Chapter/Track.
The left part of the item value is the number of current playingcontent; the right one is the tota l number.



Highlight title item *Highlight chapter item* *Highlight track item when playing VCD/SVCD.*

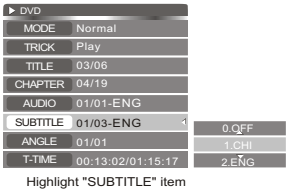
2.8.9 Audio / Subtitle Selection

1.Press [NAVIGATION] button twice to open the main control menu.
2.Highlight "AUDIO"/"SUBTITLE" item by [5], [6] buttons,then press [SELECT]/[4] button to open the drop down list shown as the right figure.



Highlight "AUDIO" item

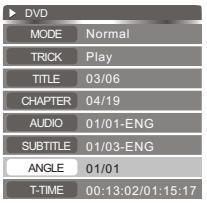
3.Select one value in the list, and then press [SELECT] button to confirm.
The values of the lists are based on the played disc
For DVD disc, the values of audio list will be DOLBY, DTS and so on.
For VCD/SVCD, the values of audio list will be STEREO, LEFT and RIGHT.
The settings of these items also can be done in DVD menus.The initial value of the two items can be set in System Setup.



Highlight "SUBTITLE" item

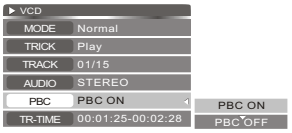
2.8.10 Angle Selection

1.Press [NAVIGATION] button twice to open the main control menu.
2.Highlight "ANGLE" item by [5], [6] buttons, and press[SELECT]button to make it in input mode.
The right side of the numbers beside the icon is the total angle number of this disc ; the left is the current angle number.
3.Input the ANGLE number you need by number buttons, and press [SELECT] button to confirm.



2.8.11 PBC ON/OFF

1.Press [NAVIGATION] button twice to display the main control menu.
2.Highlight "PBC" item by [5], [6] buttons, and then press [SELECT]/[4] button to display the drop down list window shown as the right figure.
3.Select "ON" or "OFF" from the list, and then press [SELECT] button.
4.Pressing [MENU] button also can make the PBC on or off.



Notes

The PBC function refers to the menu playback function of the VCD 2.0 disc. When the PBC is on, the TV screen displays a list of all the tracks. You can select any track by number buttons on theremote control, and press [SELECT] button to play from the selected track. During the playing, if you want to play the other track , you need to press [MENU] button to display the track list, and select another track by number buttons then press [SELECT] button to confirm. When the PBC is off, the system plays the disc contents in sequence.
Not all the VCD discs can proceed PBC playback.

2.8.12 T-Time/Tr-Time Display

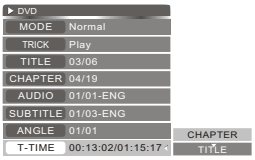
1.Press [NAVIGATION] button twice to display the main control menu.

2.Highlight "T-Time" (For DVD) or "Tr-Time"(For VCD/SVCD) item by [5], [6] buttons, and then press [SELECT] button to open the drop down list shown as the right figure.

3.Select your desired item by [5], [6] buttons, then press [SELECT] button to confirm.

In DVD playing mode, it includes "TITLE" and "CHAPTER" , in VCD/SVCD playing mode, it includes "DISC" and "TRACK".

The left part of the item values is the elapsed time of the title/track, the right one is the remain time.



2.8.13 The Operations of Function Buttons

Most of the operations in playing mode can be done by menu or function buttons, some operations only can be done by menu, and other operations only can be done by function buttons.

1.REPEAT button - Repeat playback Press [REPEAT] button repeatedly, and the playing mode will be circularly switched in the following sequence:

2.FWD button - Forward playback Press [FWD] button repeatedly, and the playing speed will be changed in the following sequence:

3.REW button - backward playback Press [REW] button repeatedly, and the backward playing speed will be changed in the following sequence:

4.SKIP button

A.If you press the [⏭] button on the remote control, the system goes forward into the next chapter (to DVD) or track (to VCD) and begins playback

B.If you press the [⏮] button on the remote control, the system goes backward into the previous chapter (to DVD) or track (to VCD) and begins playback.

5.PAUSE/STEP button - Pause playback & playing frame by frame.

A.When playing the valid disc , if you press [PAUSE/STEP] button, the playback will pause.

B.If you press [PAUSE/STEP] button again, the picture goes forward a frame.

C.If you press [PLAY] button, the system will enter normal playback.

Pressing the [PAUSE] button the second time means normal playback when playing CD-DA and MP3 discs.

6.VOL+/VOL-/MUTE button - Volume control

A.If you press [MUTE] button, the system has or hasn't audio output.

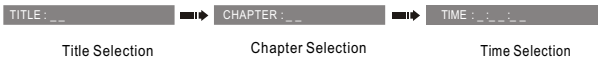
B.If you press the [VOL+] button, the volume increases.

C.If you press the [VOL-] button, the volume decreases.

7.GOTO button - Switching the mode of selection playing

A.In the playback mode, you can press [GOTO] button to highlight different select item circularly in the playback control menu. You can input the corresponding values by using the remote control with the method aforesaid.

The illustration below is the example of playing the DVD disc. It is similar to other discs.



Pressing [GOTO] button is invalid to some discs.

B.When play disc (as JPEG/MP3/DivX disc) with directory structure, you must press [GOTO] button toconfirm instead of pressing [SELECT] button.

In directory structure, to go to corresponding directory, you need press [GOTO] button once and input the number of the directory then press [GOTO] button again to confirm. Press [SELECT]button to open it.

In file structure, to go to corresponding file and start playing it, please operate according to the method in " directory structure " .

In playing MP3/DivX file, to go to some time position of current file and start playing, at first press [GOTO] button twice and input the number your desired then press [GOTO] button again to confirm.

2.8.14 Playing JPEG/MP3/CD/ DivX Disc

Operation

When loading disc with directory structure, the TV screen will display the disc content list and favourite/programlist windows as shown in the following figure. From this you can do selection playback or program playback.

1.Highlight your desired file or directory by [5], [6] buttons, and then press [SELECT] button.

If the highlight item is file, the system will start playing it.

If the highlight item is directory, the system will expand its contents.

To return to previous menu, please press [RETURN] button. If you press [ADD/CLEAR] button, the highlighted file itemwill be added to the right list window, then you can do program playback by the following steps.

2.Select your desired content from left list window by [5], [6] buttons and add it to right list windowby pressing [ADD/CLEAR] buttons.

3.Move the cursorto the right list window by [4] button and press[SELECT] button,then the system starts playing the contents of the right list window one by one.

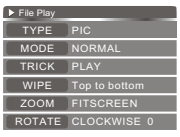
Highlighting the item in right list window by [5], [6] buttons and pressing[ADD/CLEAR] button can delete it.

4.When you play JPEG/DivX file, please press [<] button to return to previous menu.

2.8.15 Playback Control Menu

Loaded a disc with directory structure or playing a file like JPEG/MP3/CD/DivX, your can display the playback control menu by pressing [NAVIGATION] button once or twice. You can do some operation to current file by the playback control menu. The playback control menu will be different when playing different type disc.

When playing MP3/CD



When playing JPEG

When playing DivX

The means of the list values are as following:

1.Type: display current playback type AUDIO - Playing MP3/CD

PIC - playing JPEG

VIDEO - playing DivX

2.MODE: please refer to " Playback Mode - Playing Mode Control " for submenu content.

3.TRICK: please refer to " Playback Mode - Playback Process Control " for submenu content

4.AUDIO: you can select different audio channel output (stereo/left/right),you can also do it by press [AUDIO] button repeatedly.

5.TIME: you can select displaying elapsed time or remain time.

6.WIPE: please refer to " Playback Mode - Control Wipe Mode when Playing JPEG Disc " .

7.ZOOM: please refer to " Playback Mode - Control Zoom Mode when Playing JPEG Disc " .

8.ROTATE: please refer to " Picture Rotating when Playing JPEG Disc " .

9.LANG: if the disc include several kinds of language, you can select desired language from this item.

Notes

Some discs labelled with MPEG4 on the market actually are *.rm/*.ra/*.ram/*.rmm others,withwhich are incompatible. Please take care when buying discs.

2.8.16 Control Wipe Mode when Playing JPEG Disc

In general, many pictures will be saved in the disc as the JPEG file format. When playing this disc, the pictures will be shown on the screen one by one. You can select the mode of the picture switching.

1.Playing a JPEG file, press [NAVIGATION] button twice to display the playback control menu.

2.In the playback control menu, select the Control Wipe Mode item by[5], [6] buttons, and then press [SELECT] button to display thewipe mode list shown as the right figure.

3.Select the desired mode of the picture switching from the list by [5], [6] buttons and then press [SELECT] button.

4.Press [NAVIGATION] button to return to the previous menu.

2.8.17 Control Zoom Mode when Playing JPEG Disc

This function can zoom in or zoom out the picture to facilitate your watching.

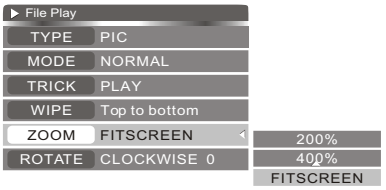
1.Playing a JPEG file, press [NAVIGATION] button twice to display the playback control menu.

2.In the playback control menu, select the Control Zoom Mode item by [5], [6] buttons, and then press [SELECT] button to display the zoom mode list shown as the right figure.

3.Select the percentage of zoom from the list by [5], [6]buttons, and then press [SELECT] button.

The value of "FITSCREEN" means the full screen display.

4.Press [NAVIGATION] button to return to the previous menu.



2.8.18 Picture Rotating when Playing JPEG Disc

This function can change the angle of the placement of the picture on the screen to facilitate your enjoying.

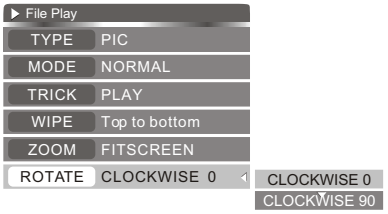
1.Playing a JPEG file, press [NAVIGATION] button twice to display the playback control menu.

2.Select the Picture Rotating Select item in the playback control menu by [5], [6] buttons, and then press [SELECT] button to display the rotating value list shown as the right figure.

There are four kinds of rotating angles: 0°, 90°, 180°, 270°

3.Select the desired angle from the list by [5], [6] buttons and then press [SELECT] button.

4.Press [NAVIGATION] button to return to the previous menu.



2.9 USB MODE

2.9.1 Summarization

This unit is equipped with an USB socket, then the equipment with USB socket(e.g.DV,DC,Mp3 Player, Flash Driver, USB Hub, USB Card reader) can be connected to this unit.

This unit only supports such file formats in USB device: JPEG,MP3 and WMA.

Only when the other file format is translated to one supported by this unit , can it be played.

2.9.2 Operations

1.Insert the USB device to the USB socket in this unit .

2.Plug in this unit , and then turn it on by button [STANDBY/ON].

3.Press button [USB/DVD] to enter the mode of reading USB.

4.When playing the files in USB, please perform the corresponding operations according to chapters: "Playback Mode - Playing JPEG/ MP3/CD Disc", "Control Wipe Mode when playing JPEG Disc", "Control Zoom Mode when Playing JPEG Disc" and "Picture Rotating when Playing JPEG Disc".

2.9.3 Exiting the USB mode

Press button [SOURCE] or [USB/DVD] to exit the USB mode.

Note:

This unit can not support all the USB devices of DV，DC，MP3 Player，Flash Driver，USB Hub，and USB Card reader in the market. We list some USB devices passing the test in this unit for your use reference.

Table 1

USB card reader model \ CARD model	CF	MD (micro Drive)	SD	MMC	MS	XD	SM
USB 2.0(NEQ ND3260)	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Zynet 8 in 1 USB 2.0(NEQ ND3260)	PASS	PASS	PASS	PASS	PASS	X	PASS
PQI 7 IN 1,USB flash 1.1(SI)	PASS	PASS	PASS	PASS	PASS	X	PASS
No branch 8 in 1,USB 1.1(ALCOR Au9632)	PASS	N/A	PASS	PASS	N/A	PASS	PASS
Cyberhome 5 in 1,(ALIM5635)	PASS	X	N/A	N/A	PASS	N/A	PASS
BBK 8 in 1,(ALCOR Au9632)	PASS	N/A	PASS	PASS	PASS	N/A	PASS
Neodio 8 in 1,(ND3060-LB)	PASS	PASS	PASS	PASS	PASS	N/A	PASS

cells marked "PASS" means these card are supported on this unit.
cells marked "N/A" means these card are not recognized on this unit.
cells marked " ╳ " means the card reader have not corresponding slot.

Table 2:

Name	Equipment	Model/Character	Details/Remarke	SQA Comments (updated on Build042)
DV	Sony	DCR-TRV18	120×digital zoom	Can detect and play
	Sony	DCR-PC101E	120×digital zoom	Can detect and play
	JVC	GR-D70U	700×dingital zoom	Can detect and play
	CANON	ZR65 MCA	400×digtal zoom	Not support
DC	CANON	IXUS S430	4M Pixels,3X,CF card	Can detect and play
	SONY	DSC-F717,Milpitas prefer	5M Pixels,7X,MS card	Can detecct and play
	Nikon	Coolpic 5000	CF Card	Can detect and play
	Olympus	□300	3M Pixel,3X,XD card	Can detect and play
	FUJIFILM	FinePix F420	3M Pixels,3X,XD card	Can detect and play
MP3 player	APPLE	iPod 15G	MP3(CBR/VBR)/WAV/AAC,)	Can detect and play
	SAMSUNG	Yepp YP-55V,USB 1.1	MP3/WMA	Can detect and play
	ZARVA	CA-128M	MP3/WMA	Can detect and play
	MSC	MSNHA-128F	MP3/WMA,USB interface	Can detect and play
	Sony(MD)	N10	MP3/WAV/WMA/ATRAC3	Not support
Flash Driver	Apacer	128M	128M,USB 1.1	Can detect and play
	Aigo	Mini king	128M,USB 1.1	Can detect and play
	SanDisk	Cruzer Mini USB 2.0 128M	128M,USB 2.0	Can detect and play
	Putian	U-571	128M,USB 1.1,USB 2.0	Can detect and play
	NETAC	U215	64M,USB 1.1	Can detect and play
	Longview		32M,USB 1.1	Can detect and play
	SONY	128M MV	128M,USB 2.0	Can detect and play

USB Hub	1 to 4,USB 1.1	Sprinters DX-174BP USB SLIM HUB	Can detect and play w hen connect more than one USB devices

Note

USB refers to Universal Serial Bus. Most of USB devices on the market are USB1.1 or USB2.0.There are some types USB 1.1 devices:Monitors, Communication devices,Audio, Human input, Mass storage.

Most FLASH MEMORY,MP3 PLayer ,USB HDD ect. belong to MASS storage Class . Mass storage Class include 2 transport manners:

1. USB 1.1 Mass Storage Class Control/Bulk/Interrupt (CBI) Transport
2. USB 1.1 Mass Storage Class Bulk-Only Transport

This unit support USB 1.1 Mass Storage Class Bulk-Only Transport, we are not sure that other USB devices can be supported !So please find out about the features of USB equipments before buy.

When use USB 1.1 Mass Storage Class Bulk-Only Transport devices,please notice the file operation system support Windows FAT ,not support FAT32 and NTFS ect. file system.

2.10 SPECIFICATIONS

Playable discs	DVD,DVD+R/RW, SVCD,VCD,CD-DA,Mixed CD-DA ,MP3, JPEG,DivX		
Recordable discs	DVD+R, DVD+RW		
Recording formats	DVD(MPEG 1 1)		
Recording quality	SLP(Standard Long Play),SP(Standard play) ER(Extend play),HQ(Perfect Quality)		
Input	Composite video input S-video input(Y/C) DV camera jack input(IEE1394,I-Link) USB input RF input Analog audio input SCART input MIC input		
Output	Composite video output S-video output(Y/C) Component video output(Y Pb/Cb Pr/Cr) SCART output 2CH analog mix audio output 5.1CH aalog output Digital audio coaxial output Digital audio optical output		
Video characteristics	output	Composite video:	NTSC/PAL system Video amplitude 1.0□0.2V(p-p),75□
		S-video:	Y ioutput amplitude 1.0V(p-p),75□ C output amplitude 0.286V(p-p),75□
	Input	Composite video:	NTSC/PAL system Video amplitude 1.0□0.2V(p-p),75□
		S-video:	Y input amplitude 1.0V(p-p),75□ C input amplitude 0.286V(p-p),75□
Audio characteristics	Output	Audio amplitude 2.0 Vrms,10k□ AF response 20Hz~20kHz(±1dB) Signal/noise ratio≥85dB Audio distortion+noise≤-65dB(1kHz)	
	Input	Audio amplitude≤2.0Vrms Impedance 10k□	

General Specification	Power supply: ~100V-240V ,50/60Hz Power consumption: ≤35W Standby power consumption: ≤3W	Dimension: 430mm×296mm×48mm	Weight: Net weight: 3.4kg ross weight: 4.5kg
Operating temperature	5℃~35℃		
Operation humidity	Relative humidity 15%~75%(No condensation)		

Chapter Three Unit Circuit Principle

Section One Principle of the Player

DW9918K is a DVD disc playing and recording player that integrates playing and recording together, which supports DVD-R DVD-RW DVD+R DVD+RW format record disc, and plays DVD/CD/MP3 format discs. This player is composed by decode board, loader, AV board, power board and main panel.

Decode board: it is the main part of the player, which includes decode chip, audio/video D/A conversion and FLASH/SDRAM module, etc. The main function is fulfil the decompression of data during the course of playing to reconvert signals conveyed by loader into analog audio/video signals; and responsible to converse analog audio/video signals to digital signal and perform decoding to send to the player during the course of recording; and also control the system of the working of the player.

Loader components: includes loader laser head, frame and servo board. This loader adopts ATAPI jack, with strong applicability, which may read DVD, CD format discs and support the write function of DVD-R DVD-RW DVD+R DVD+RW discs at the same time.

AV board: includes input/output amplifying circuit of multi-channel audio/video, input/output channel selection, switch circuit, Nicam decode circuit, output terminal and tuner.

Power board: provides power required by each circuit of the player. The main output voltage has ± 12V, +3.3V, +2.5V, +5V, STB5V and -25V, etc. In special conditions, STB5V and panel VFD drive voltage are only provided.

Main panel: includes panel function control, VFD display control, remote control and decode function, and is mainly composed by VFD and D16316.

3.1.1 PCB board composition figure and video signal figure

PCB board composition diagram is shown as in the following figure 3.1.1.1:

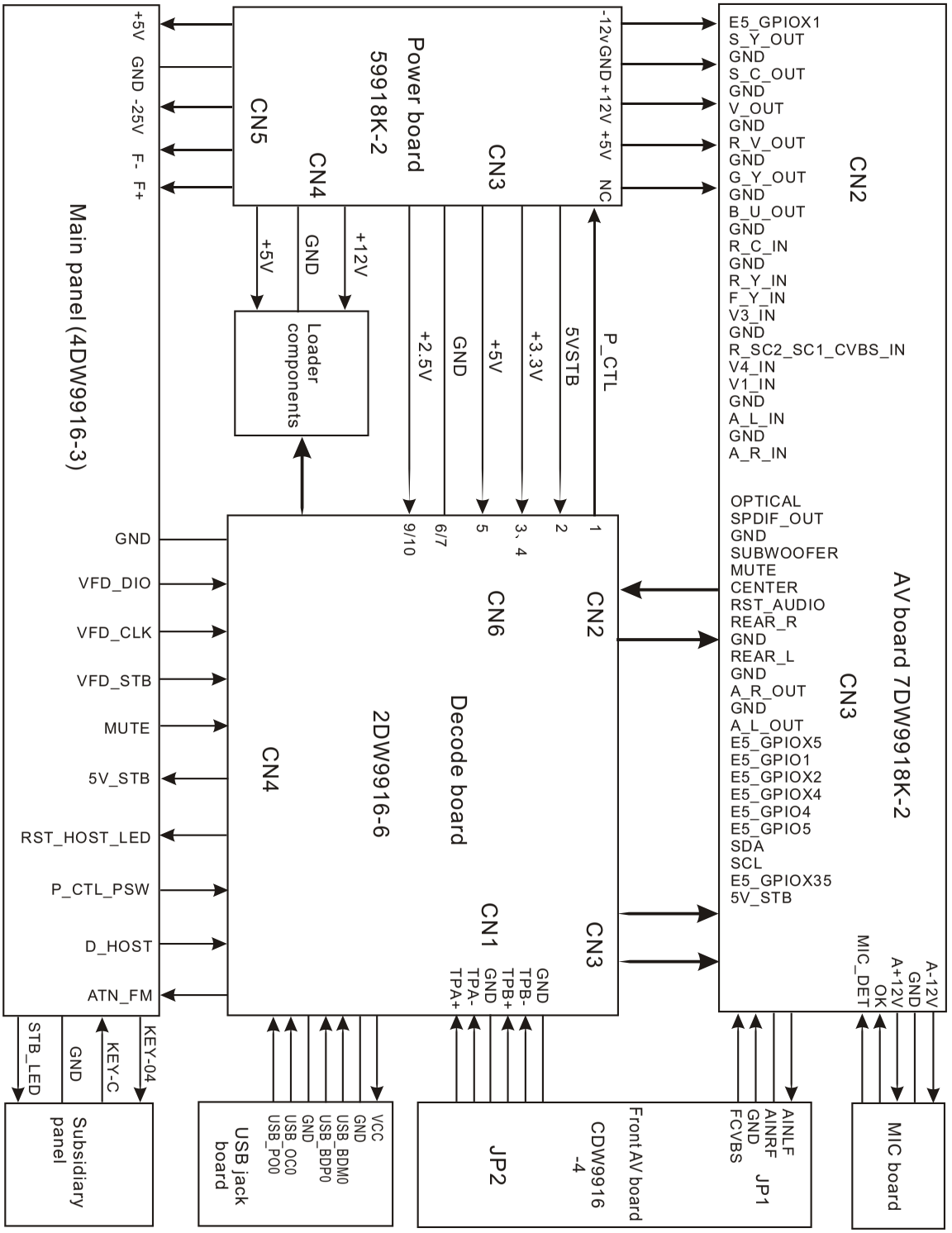


Figure 3.1.1.1 PCB board composition figure

3.1.2 Block diagram of the player

Block diagram of the player is shown in the figure 3.1.2.1:

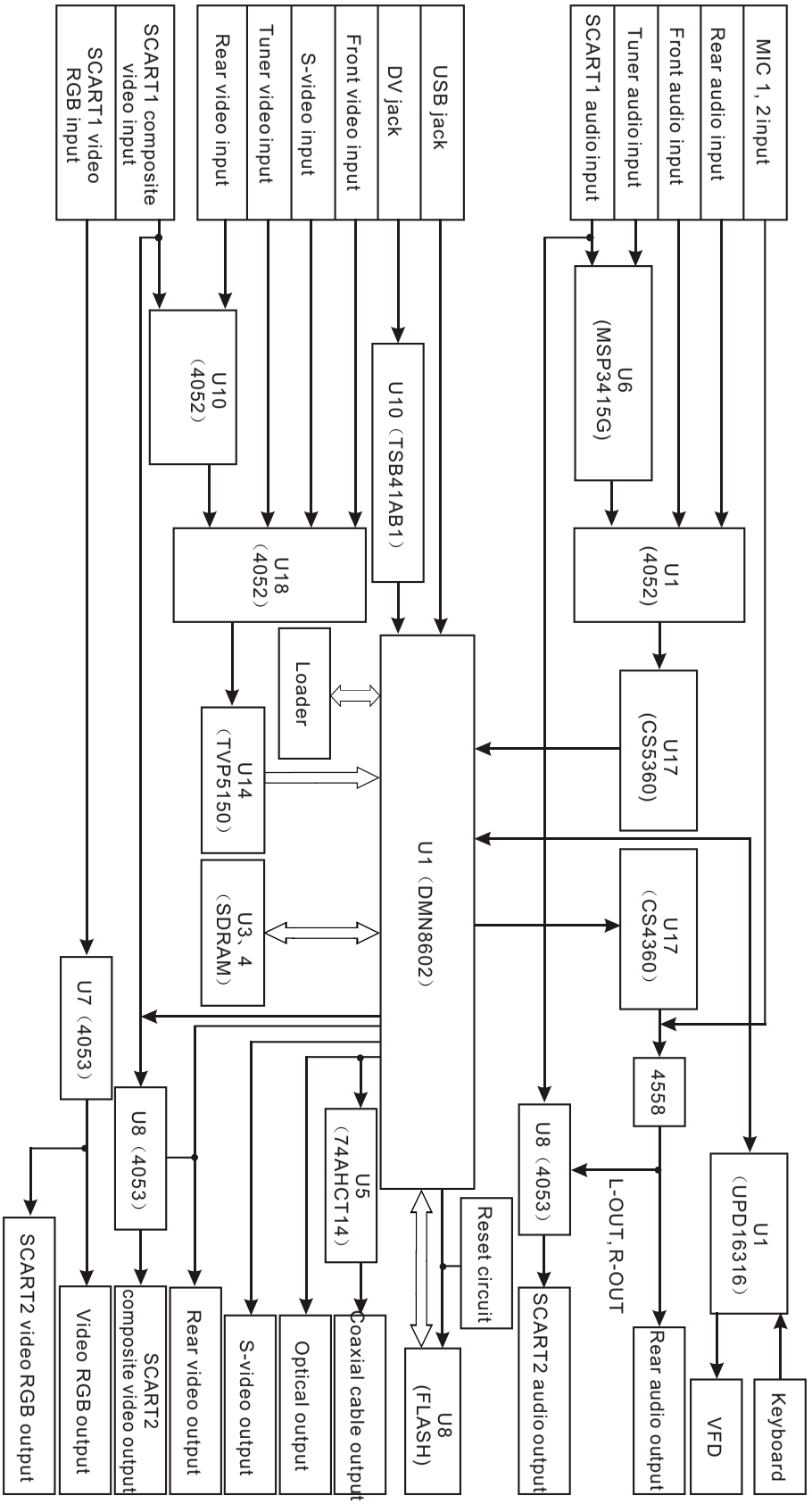


Figure 3.1.2.1 Block diagram of the player

3.1.3 Introduction to IC used by this player

Introduction to IC used by this player is shown in the following table:

Board Number	SN	Material code	Model	Location	Function explanation
Decode board 2DW9916-6	1	0881935	DMN-8602 BGA	U1	main chip
	2	0882839	EM6353BX2SP3B-2.9V SOT23-3L	U6	reset IC
	3	0881814	LP2995 SOP	U2	DDR final linear voltage regulator (1.25V)
	4	0881815	M13S128168A-6T TSOP	U3, U4	SDRAM(128M)
	5	0881816	SN74HCT14PWR TSSOP	U5	reverter
	6	0881818	SN74ALVCH16373 TSSOP	U7	memorizer
	7	0881819	TSB41AB1PHP QFP	U10	DV jack IC(1394)
	8	0881820	PQ018EZ02ZP	U11	1.8V voltage regulating IC
	9	0881693	TL 74HC4052D SOP	U18	video input switch IC
	10	0881821	PQ025EZ01ZP	U13	2.5V voltage regulating IC
	11	0882873	TVP5150	U14	video A/D converter
	12	0881057	CS4360 SSOP	U15	audio D/A conversion
	13	0882353	CS5340 TSSOP	U17	audio A/D conversion
	14	0881236	39VF160-70	U8	FLASH
4DW9916-3	1	0881013	D16316 QFP	U1	panel VFD drive, button coding
59918K-2	1	08805819	TL431C TO-226AA(LP)	IC3	precise voltage regulator
	2	0882462	AZ431AZ-A TO-92	IC4, IC5	precise voltage regulator
	3	0880765	5L0380R YDTU	IC6	power switch module
	4	1080032	@HS817 VDE	IC2	photoelectric coupler
69918K-3	1	0881226	RC4558D SOP	U1	operational amplifier
79918K-2	1	0881080	PCF8563T SO8	U2	clock IC
	2	0881693	TL 74HC4052D SOP	U1, U10	(channel selection) electronic switch
	3	0881965	MAX4052A SOP	U1, U10	(channel selection) electronic switch
	4	0881226	RC4558D SOP	U3, U4, U5	operational amplifier (audio amplifying)
	5	0881842	MSP3415G QFP	U6	NICAM IC
	6	0881992	HC4053M SOIC	U7, U8, U9	electronic switch (channel selection)

Section Two Unit Circuit Principle

3.2.1 System control and code, decode circuit

1. This layer adopts the single-chip processor DMN-8602 of recordable DVD products used for single drive of the second generation of LSI Logic Company. The single chip includes a 2nd-generation DV coder, 5th-generqtion coder, USB controller, shown in the figure 3.2.1.1, NTSC/PAL TV coder and

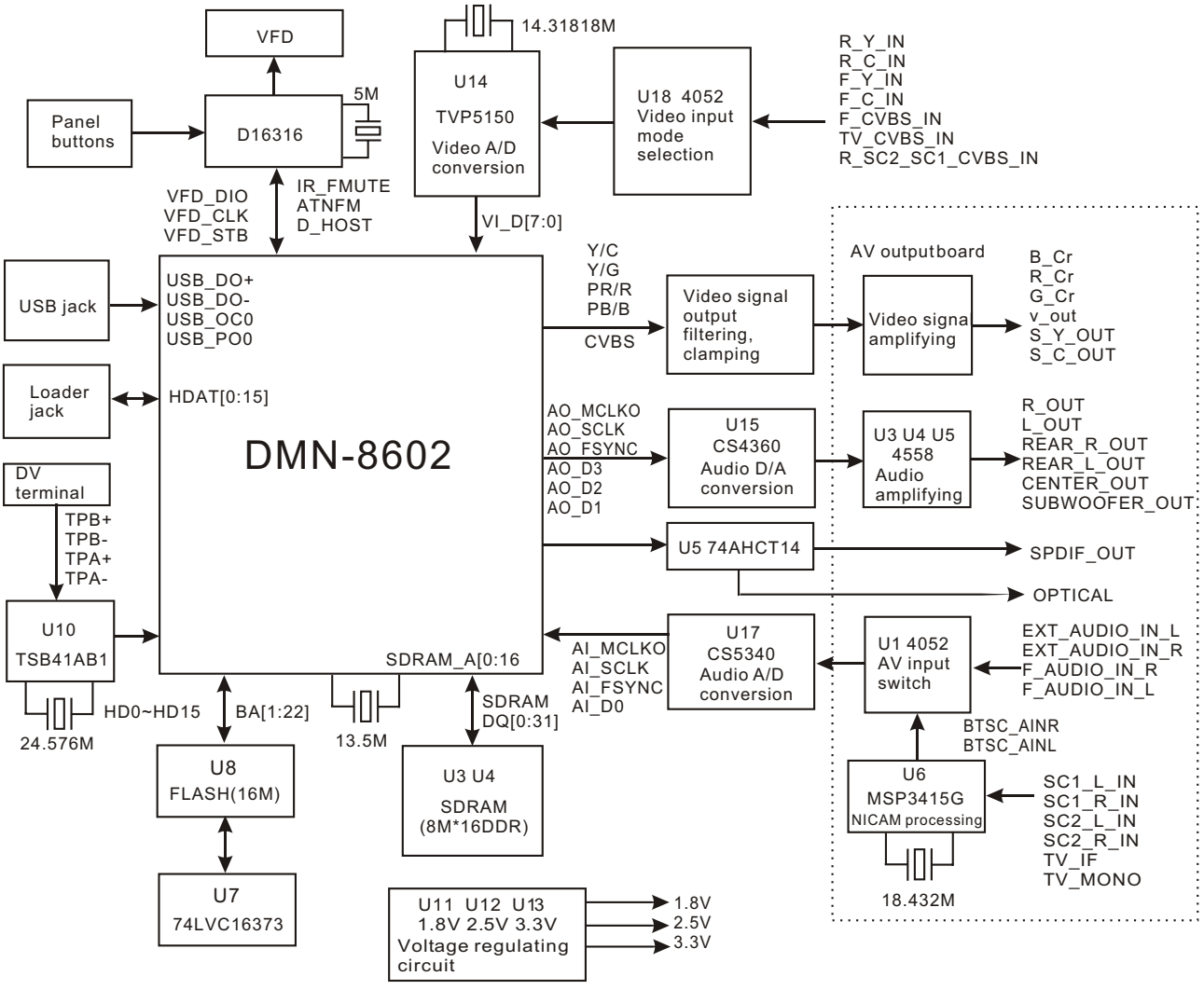


Figure 3.2.1.1 System control and code, decode circuit block diagram

DoMiNoFX Technique. Single-chip design supports all recordable DVD formats, ensures the ample features of recordable DVD; compared with the system with the similar level, the cost has been reduced greatly, and the complexity of electronic communication manufacturer is reduced at the same time. DMN-8602 provides advanced product features, for instance, the direct digital dubbing technology makes personal digital contents convert from portable video camera to DVD simplification; a single small contact control and re-playable MPEG-4 video format can make general audio, video signal adopt MPEG-2 format to record into high quality DVD discs, and also can make DV signal of some machines, such as video camera, realize DVD format with higher quality image. At the same time, this machine is also a high-performance DVD player, which may record DV signal and normal audio, video signal to MPEG-2 format in DVD+RW , DVD+R discs. Input audio/video signal, DV signal and TV TUNER signal, manual and timing record function, with playback function of DVD player, which may play DVD, VCD, SVCD, CD-DA; compatible with DVD-RW, DVD-R, DVCD, Mp3, JPEG format discs. DV (IEEE 1394) jack may realize Hi-Fi digital record, front and back multi-channel AV, S-VIDEO input and TV tuner input. Progressive scanning output and component video output makes picture more perfect. 24 bit DAC audio output high quality sound is adopted. Single-sided disc DVD+RW, DVD+R has 6-hour recordable time at most (stream 1.7 M bit/S), and 1-hour high quality image (stream 9.72 M bit/S).

2. Function realization explanation

(1) System control circuit: fulfilled by U1 DMN-8602, the basic core to fulfill the ordered working of the player, through the control to each function circuit by the bus, the player works ib an orderly way according to the requirements designed by program. After switching the internal working mode through software, the system selects input signal, DV, jack, external input signal (external audio signal, external video signal and TV signal), DVD signal, USB signal. The working principle is as follows:

(2) External input: the system sends the externally-inputtedvideo signals to decode board, through U18 4052 video input selection, sends to video decoder U14 TVP5150 for video decode, TVP5150 converses NTSC, PAL and SECAM video signal into digital component video signal, and sends the digital component video signal after being decoded to DMN-8602 for MPEG coding processing and then send to DVD recorder driver to fulfill disc record storage after coding, at the same time outputs from DMN-8602 analog video output jack directly and makes analog video signal output after being filtering, clamping and amplifying to realize the simultaneous output in the course of recording and the appearance will not be affected. The externally-inputted audio signals, after being NICAM processed on AV board through U15 MSP3415, are sent to U1 4052 for channel selection, and audio signals after selecting are sent to AD converter U17 CS5340 of decode board to converse analog signals to digital audio signals, then send to AIN jack of DMN-8602, through DMN-8602 processing, output from AOUT jack of DMN-8602, the outputted digital audio signals are sent to DA converter U15 CS4360 to convert to analog signal and then send to output terminal for output after amplifying analog signal, at the same time AO_IEC958 of DMN-8602 outputs digital audio signal.

(3) DV input means: DV signal is inputted through DV jack, then sent to U10 TSB41AB1 cable transceiver of decode board for decoding to send the data after being decoded to 1394 jack of DMN-8602 directly for code processing and then send to DVD recorder driver to realize disc record storage or output signals after being coded from DMN-8602 analog video output jack (VDENC) and AVOUT analog audio output jack, or output at the same time of recording.

(4) DVD signal output: DMN-8602 communicates with DVD|Recorder through ATAP jack, the disc information achieved by DVD Recorder is sent to DMN-8602 for decoding through ATAP jack, and the decoded data is send to analog video output jack (VDENC) and digital audio output jack AOUT for output.

(5) USB signal: DMN-8602 has a USB1.1 jack, which supports low speed and full speed transmission modes. USB data is sent to the USB jack of decode board DMN-8602 through jack for format conversion, and then encodes different format according to user's requirements to send to DVD recorder driver to realize disc record storage, or output from DMN-8602 analog video output jack and audio output jack directly.

The working principle of audio, video output is the same with that of DVD player. After loader reads data, it is sent to U1 DMN-8602 ATAPI jack through ATAPI bus then to decode chip DMN-8602 for audio, video decode and then save the data after being decoded inside SDRAM temporarily, when uses need to play, decode chip calls the data saved in SDRAM for replay, audio data performs D/A conversion through U15 CS4360 and outputs analog audio signal, video signals are kept inside decode chip for video decode and then output analog video signal, after filtering and amplifying, the output is completed.

3.2.2 Audio output circuit

1. Audio signal output flow chart is shown in the following figure 3.2.2.1:

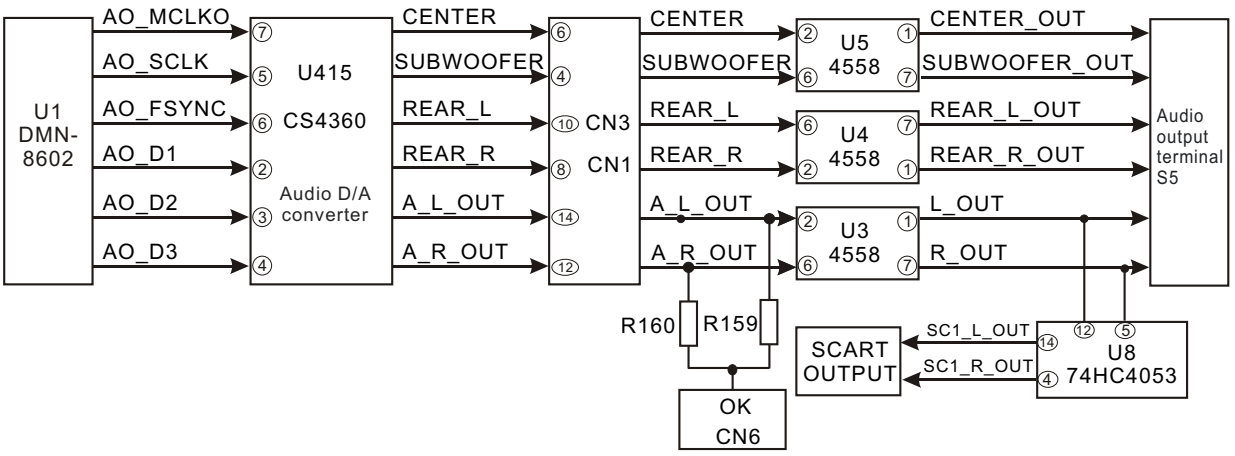


Figure 3.2.2.1 Audio signal output flow chart

When the player is playing again, decode chip U1 DMN-8602 reverts the disc information conveyed from loader, digital audio signal outputs through the pin of decode chip AOUT module to D/A converter, audio data performs D/A conversion through CS4360 and outputs analog 5.1CH audio signal, after

Capacitor C253~C258 coupling and filtering capacitor C259~C264 filtering, audio signals are sent to CN3 to send audio signal to AV board through CN3.

Because DMN-8602 is BGA packaging, we cannot test IC pin, as for the chip about BGA packaging in future, the pin will not be noted and the output signal definition is as follows:

E5_GPIO3: the pin that decode chip performs reset to CS4630.

AO_MCLKOS: MASTERCLOCK signal.

AO_SCLK: SERIAL CLOCK signal.

AO_FSYNC: LEFT/RIGHT CLOCK signal.

AO_D1, AO_D1, AO_D2: digital audio signal serial data jack.

AO_IEC958: digital audio output (optical, coaxial).

2. Audio amplifying circuit (this part lies in AV board)

The 6-channel audio analog signals transmitted from decode board are sent to U3, U4 and U5 through CN1 for amplifying, in which, A_R_OUT A_L_OUT is sent to U3 for amplifying, MIC board, through the MIC signal conveyed from CN6, is overlayed to the input end of U3 through R159 R160, and performs mixed amplifying with left and right channel of audio signal, the signals after being amplified through filtering, R_OUT L_OUT signal is divided into two ways: one way directly outputs to audio output terminal S5, the other way performs output sound source selection through U8 (LOOP_DECODER_C end is low level, R_OUT L_OUT signal outputs) to send to SCART terminal (SC1). After amplifying and filtering through U5, SUBWOOFER, CENTER signal outputs to audio output terminal S5 for output. After amplifying and filtering through U4, REAR_R, REAR_L signal outputs audio output terminal S5 for output.

Audio amplifying circuit is mainly composed by operational amplifier, shown in the figure 3.2.2.2, take right channel signal amplifying as an instance, A_R_OUT signal arrives at reverse input end pin 6 of operational amplifier through R44, R45 for amplifying, and outputs from pin 7, in which C34, C35 are input and output filtering capacitors respectively, R43 is feedback resistor.

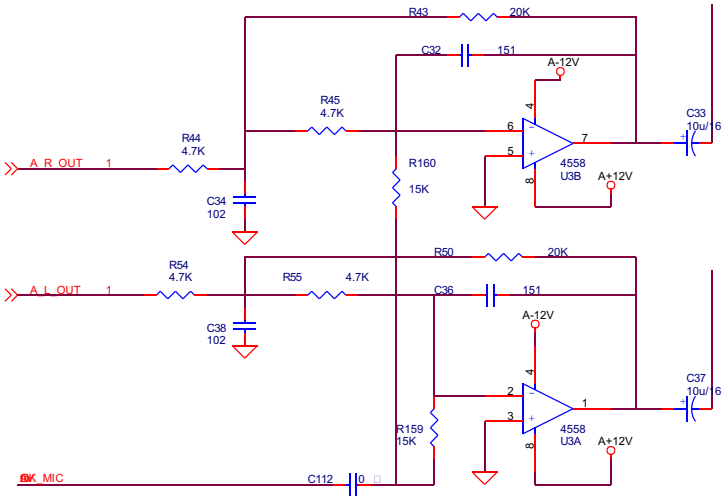


Figure 3.2.2.2 Audio amplifying circuit

3. Digital audio signal output circuit

Decode chip outputs digital audio signal (AO_IEC958) through R76 to decode board socket CN3, CN3 transmits this signal to AV board directly to input to optical terminal Op1 for output, at the same time, (AO_IEC958) also transmits through U5/R78/L5 to decode board socket CN3 and directly outputs the coaxial terminal S4 on AV board to output digital audio signal (coaxial signal).

4. Mute circuit

Mute circuit is shown in the figure 3.2.2.3:

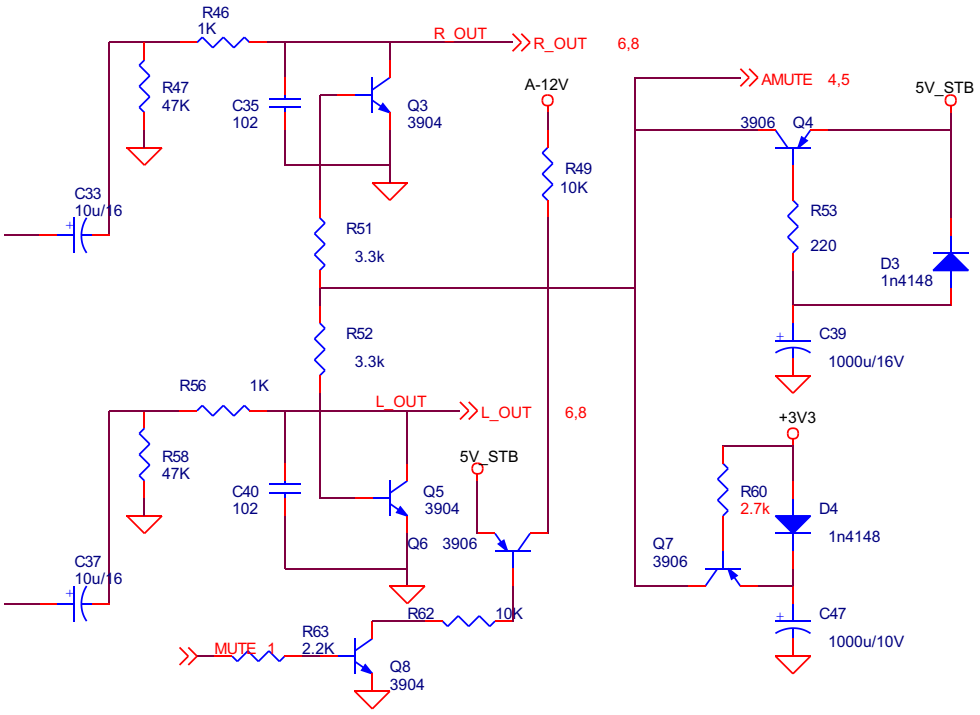


Figure 3.2.2.3 Mute circuit diagram

Power-on mute: after power on, 5V_STB output is normal, Q4 base electrode is low level, 5V_STB arrives at mute pipe through Q4C E electrode to fulfill mute function, C39 charges, when the voltage drop of the two ends is more than 4.3V, Q4 cuts off, now panel begins working and machine enters standby state, panel MUTE pin outputs high level signal and transmits to R63 of AV board through decode to make Q8 Q5 saturated on, 5V_STB transmits to the mute pipe of each channel through C E electrode of Q5 to make audio output circuit in mute state to reach the purpose of power-on mute; when machine reads disc information or switches to other working mode, MUTE changes from high level to low level, mute circuit does not work, and audio output of the player is normal.

Power-off mute: when machine enters standby state from power-on state, panel MUTE pin outputs high level signal and transmits to R63 of AV board through decode to make Q8 Q5 saturated on, 5V_STB transits to the mute pipe of each channel through C E electrode of Q5 to make audio output circuit in mute state to reach the purpose of mute. After power off, C47 discharges through Q7 to make mute pipe of each channel saturated on to realize the function of power-off mute.

3.2.3 Video output circuit

1. Video signal output flow chart is shown in the figure 3.2.3.1:

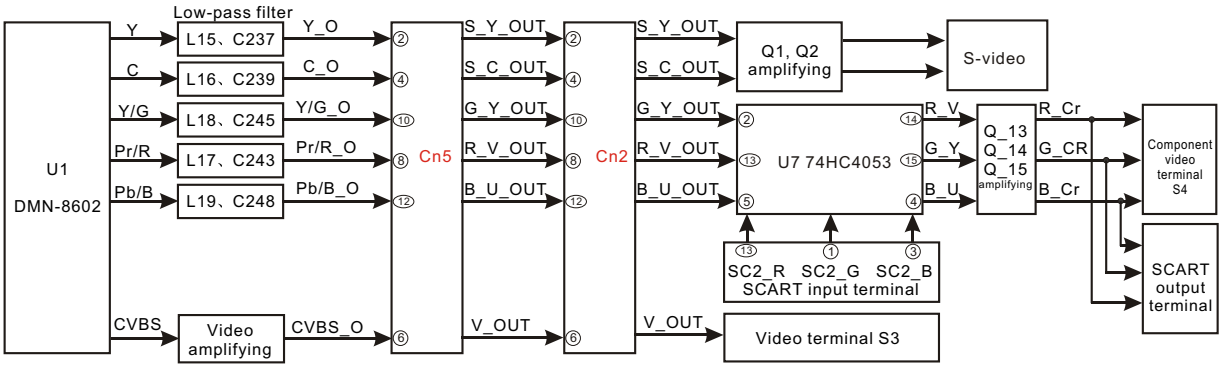


Figure 3.2.3.1 Video signal output flow chart

2. Filtering and amplifying circuit

When the machine is playing again, decode chip U1 DMN-8602 reverts the disc information conveyed from loader into digital video signal, through D/A converter inside U1 DMN-8602, reverts digital video signal to analog video signal to output, analog signals are divided into 6 channels: chroma signal (C), brightness signal (Y), composite video signal (CVBS) and RGB signal. Shown in the figure 3.2.3.2, composite video signals, through video filtering circuit and amplifying circuit, perform filtering and amplifying to video signals and then output to AV board.

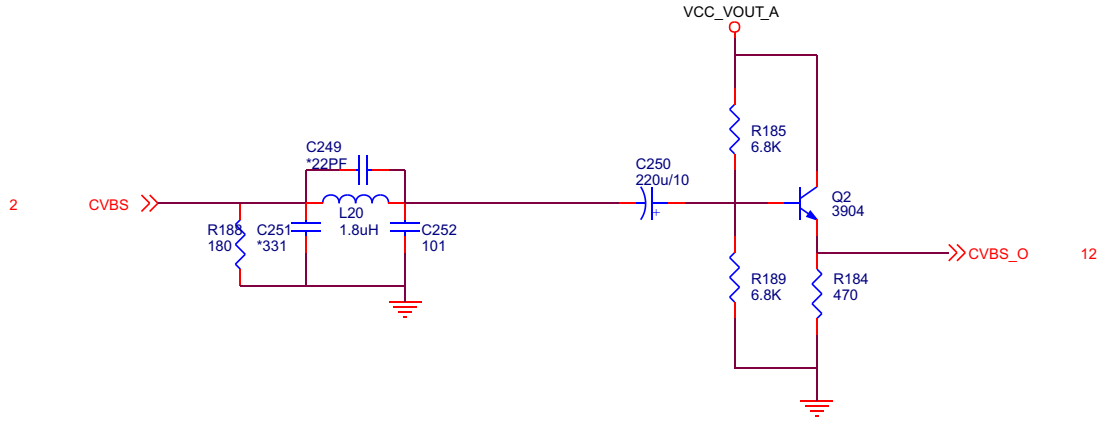


Figure 3.2.3.2 Filtering and amplifying circuit

3. Video output circuit

5-channel video signals, after being filtered through filtering circuit, directly output to AV board for amplifying output. Video signal is sent to socket CN2 of AV board through Cn5, in which S_C_OUT S_Y_OUT signal, after being amplified by the amplifying circuit composed of Q1 Q2, directly transmits to S-video (S3) to output. One way of V_OUT signal is sent to composite video terminal S3 through R29 to output directly, the other way performs output selection (when LOOP_DECODER_C end is low level, V_

Signal outputs) through U8 to output to SCART terminal (SC1). The 3-way component video signals of R_V_OUT, G_Y_OUT and B_U_OUT are sent to U7 for output selection (when LOOP_DECODER_C end is low level, R_V_OUT G_Y_OUT B_U_OUT signal outputs, when LOOP_DECODER_C end is high level, the component video signal inputted by the other SCART (input terminal) outputs). R_V G_Y B_ signals outputted through selection, after being amplified by the amplified circuit composed by Q13 Q14 Q15, output to component video terminal (S4) and SCART output terminal.

3.2.4 Audio input circuit

The audio signals inputted by AV input terminal and tuner, through input switch circuit selection, audio signals performs A/D conversion through U17 Cs5340 and outputs serial audio data stream which transmits to U1 DMN-8602 digital audio input port, DMN-8602 performs coding to externally-inputted audio signal to transmit the signal after being coded to loader and controls loader and feed circuit through DMN-8602 to fulfill the record working of disc.

1. Audio input flow chart is shown in the figure 3.2.4.1:

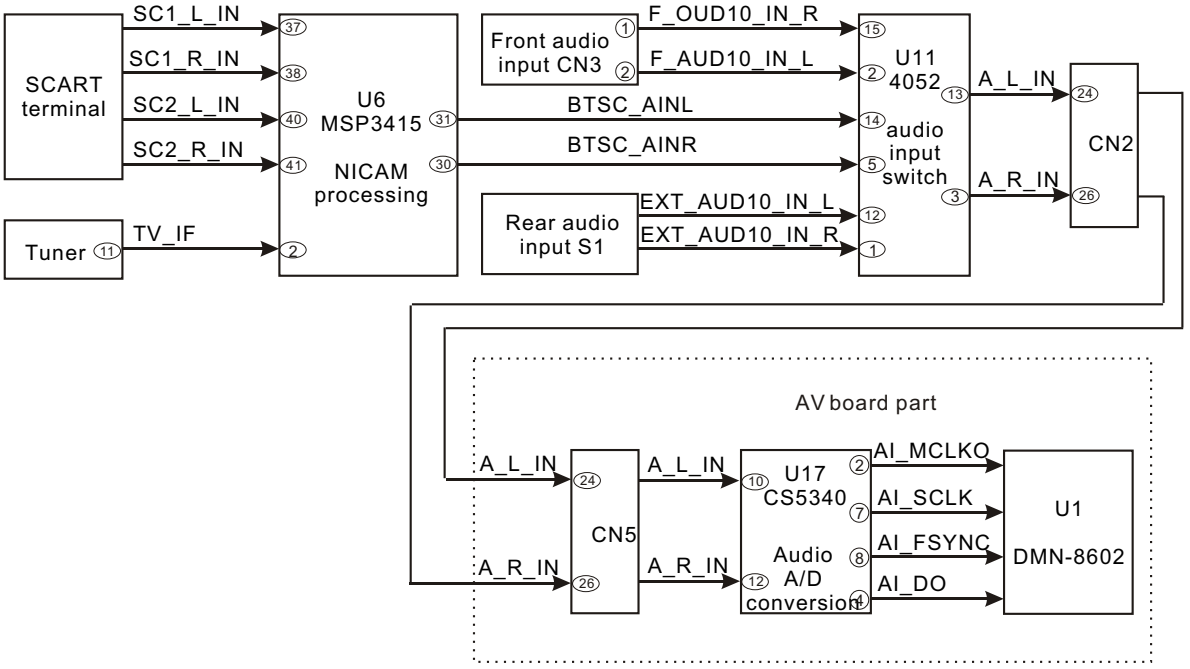


Figure 3.2.4.1 Audio input flow chart

2. Audio input working principle: take TV signal as an instance, other signals are the same on the whole. When the machine is set in TV signal input, TUN1 receives high frequency signal and then outputs audio signal after being processed. Tuner pin function introduction is shown in the following table:

PIN	Name	Function description	working voltage (v)	PIN	Name	Function description	working voltage (v)
1	Vcc1	power supply pin 1	5	8、9	NC	blank pin	0
2	BT	channel selection pin (unused)	9.4	10	AGC	AGC control pin (unused)	4.36/1.91
3	VCC2	power supply pin 2	5	11	2ND SIF	audio signal output	0
4	SCL	clock signal pin of IIC bus	3.63	12	VIDEO OUT	video output	2.14/1.38
5	SDA	data signal pin of IIC bus	3.63	13	VCC3	power supply pin 3	5
6	AS	unused (grounding)	0	14	AUDIO OUT	MONO audio signal output	2.44
7	AFC	AFC control pin (unused)	1.42/0.9				

3. NICAM processing circuit

Audio signals output from pin 11 of TUN1, and also may output mono channel audio signal from pin 14. Now we do not use pin 14 to output mono channel audio signals. Audio signal TV_IF, after being coupled by C80 C81, arrives at NICAM decode IC U6 (MSP3415) for NICAM decode, at the same time, the audio input of SCART1 SCART2 also inputs to U6 for audio switch, and the audio signals after being switched are outputted by pin 30/31 of U6. The switch of this output sound source is decided by software; when the machine is set in TV signal input, BTSC_AINL and BTSC_AINR output the audio signal of TV set; the TV audio signals after being NICAM decoded output to UI for selection through pin 30, 31 of U6.

4. Audio input switch circuit

Shown in the figure 3.2.4.2, U1 has 4 kinds of sound source input: front audio input (F_AUDIO), back audio input (R_AUDIO), audio signal (BTSC_AINR BTSC_AINL) inputted by NICAM decode IC and sound source or FM sound source used by LOOP function. Audio signals input from pin 1, 2, 4, 5, 12, 14, 15, 11 of U1, and then output from pin 3, 13 to audio A/D conversion circuit after switch. The sound source selection truth value table is shown as follows:

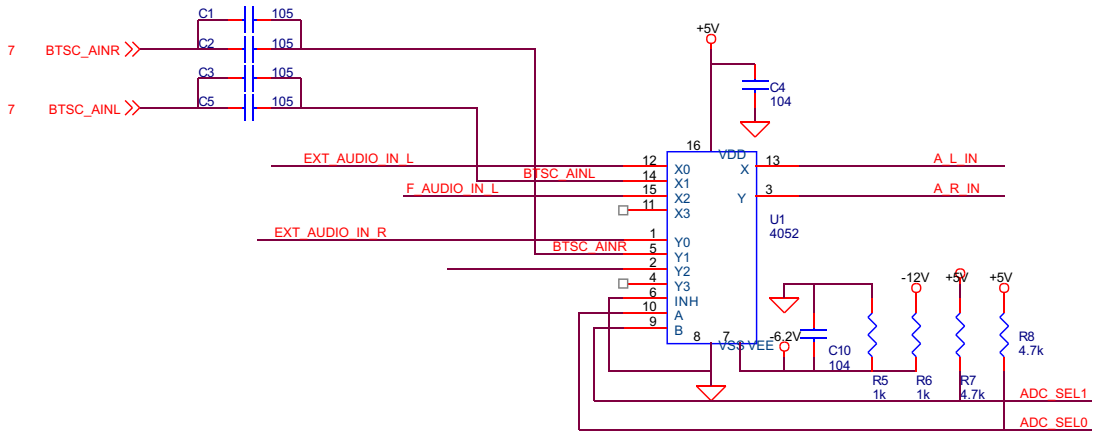


Figure 3.2.4.2 Audio input switch circuit diagram

Sound source selection truth value table:

B	A	ADC_SEL1	ADC_SEL0	SOURCE
1	1	1	1	R AUDIO
1	0	1	0	TUNER&SCART
0	1	0	1	F AUDIO
0	0	0	0	FM OR LOOP

5. Audio A/D conversion circuit

Shown in the figure 3.2.4.3, the audio signals after being selected (A_L_IN A_R_IN) are outputted from pin 13, 3 of U1 to CN2 and then transmitted to decode board Cn5. The inputted audio signals directly input to audio A/D converter CS5340 (U17) for A/D conversion.

Analog audio signals input from pin 16, 12, the digital audio signals AI_D0 after A/D conversion directly input to DMN8602 for coding and recording, and DMN8602 outputs this audio signal at the same time. Audio output circuit (output together with the played audio signal) outputs audio signal, which facilitates use to select something to record.

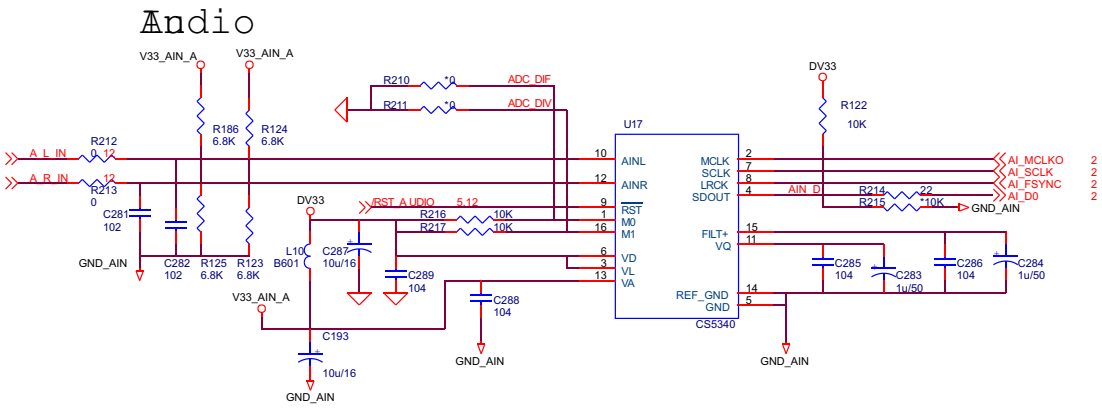


Figure 3.2.4.3 Audio A/D conversion circuit diagram

3.2.5 Video input circuit

The video signals inputted by AV input terminal, S-Video terminal and tuner, through being selected by input switch circuit, video signals select through U14 U1 TVP5150 and perform A/D conversion, the video data stream is outputted to U1 DMN-8602 digital video input port. DMN-8602 performs code to externally-inputted video signal and transmits the signal after being coded to loader, DMN-8602 controls loader and circuit to complete the record working of disc.

1. Video input flow chart is shown in the figure 3.2.5.1:

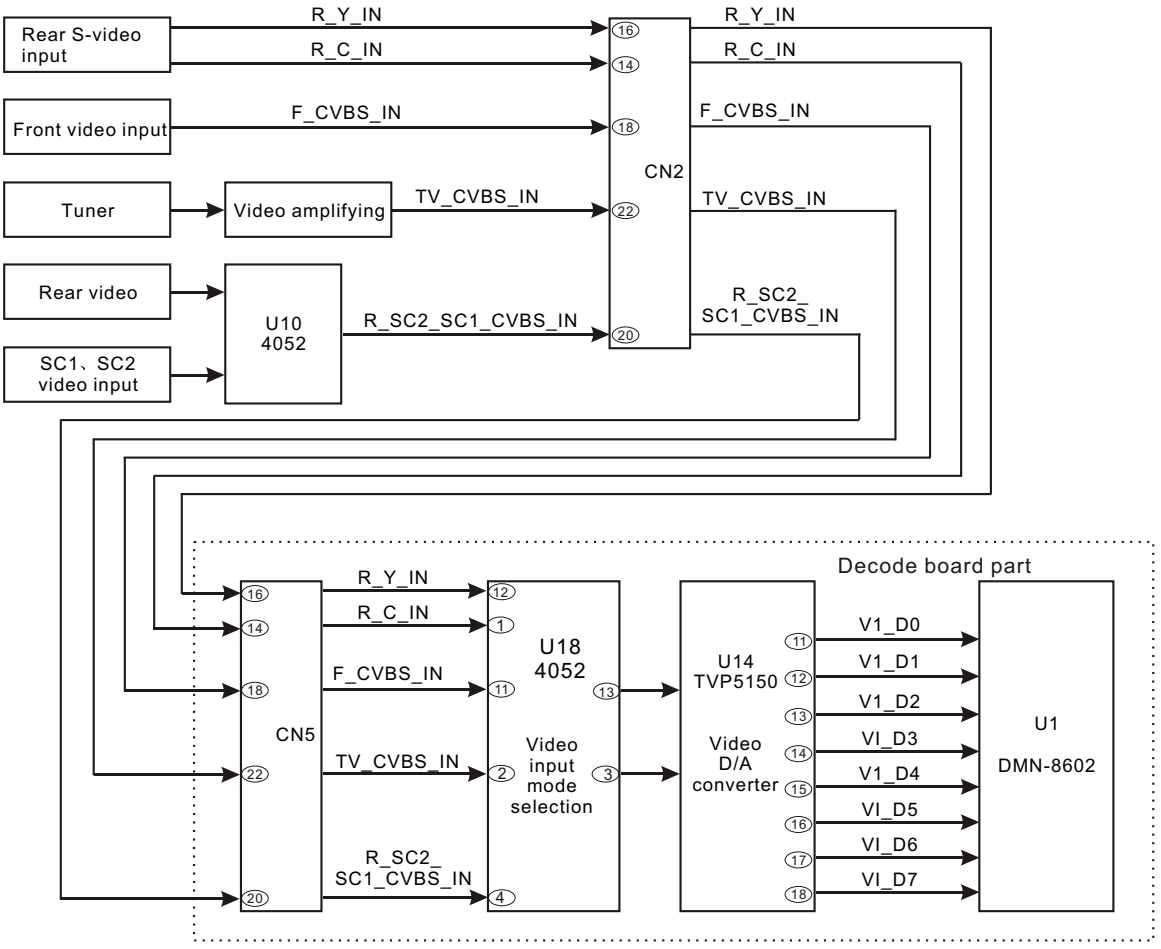


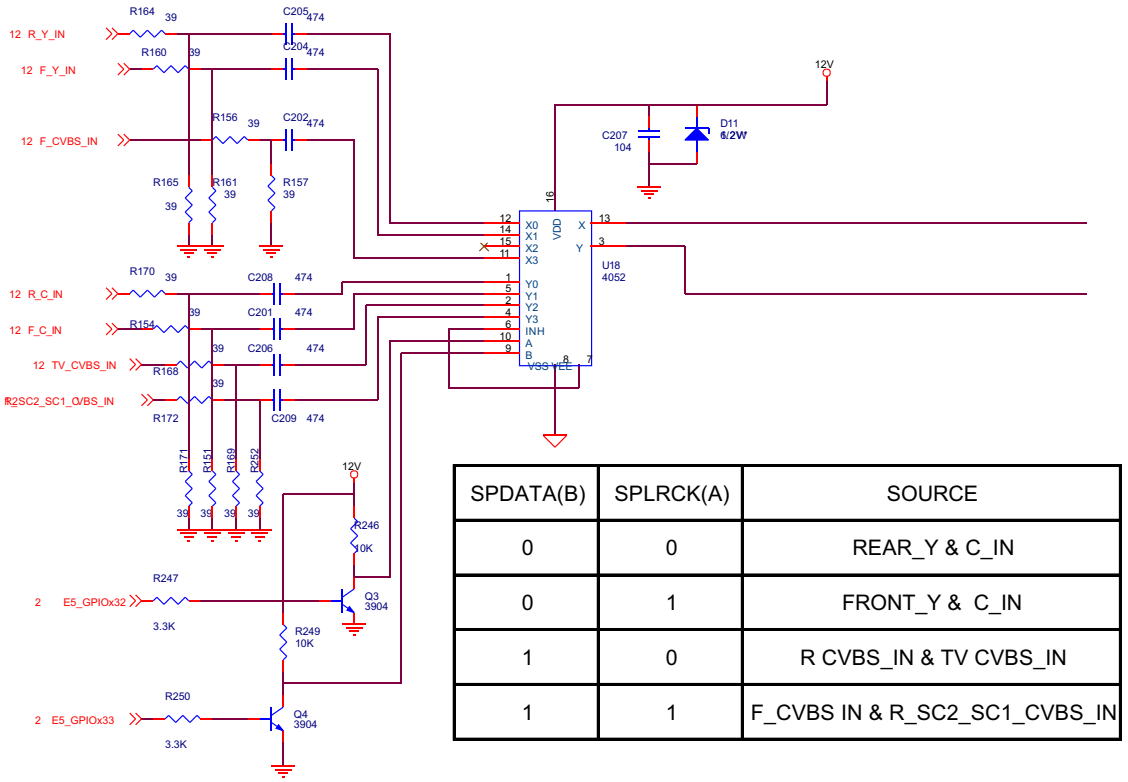
Figure 3.2.5.1 Video input flow chart

As for video signal input, take tuner input as an instance, when the machine is switching to TV signal input, tuner is controlled by IIC bus to perform audio channel selection or other function operation through firmware. Video signals output from pin 12 , through the amplified circuit composed of Q31/Q33, and amplify the video signals of TV set to input to decode board for selection. The definition of each video input signal on CN2 of Av board has TV_V1_IN (video signal transmitted from tuner), V3_IN (front composite video signal), R_Y_IN R_C_IN is chroma and brightness signal inputted by rear S-video, V2_IN is rear composite video signal input, this channel signal selects with SCART terminal and inputs to decode board through R_SC1_SC2_CVBS_IN pin (for the switch relationship with SCART, we will introduce in SCART terminal switch).

2. Video input switch circuit

Shown in the figure 3.2.5.2, video input signals have: front video, rear video (includes SCART terminal input), TV signal input and rear SD-video (front terminal is not used in this player). This switch

Circuit is controlled by E5_GPIO32 E5_GPIO33 of U1 DMN8602 to realize different input selection, and the truth value table is shown as follows:



SPDATA(B)	SPLRCK(A)	SOURCE
0	0	REAR_Y & C_IN
0	1	FRONT_Y & C_IN
1	0	R CVBS_IN & TV CVBS_IN
1	1	F_CVBS IN & R_SC2_SC1_CVBS_IN

Figure 3.2.5.2 Video input switch circuit diagram

3. Video A/D conversion circuit

Shown in the figure 3.2.5.3, video signals, after being selected by U18, directly input to pin 1, 2 of video coder U14 (TVP5150), under the control of system, U14 switches analog video signals to digital video signals, and adopts 8-bit parallel data means to input to UI DMN8602 for coding and recoding.

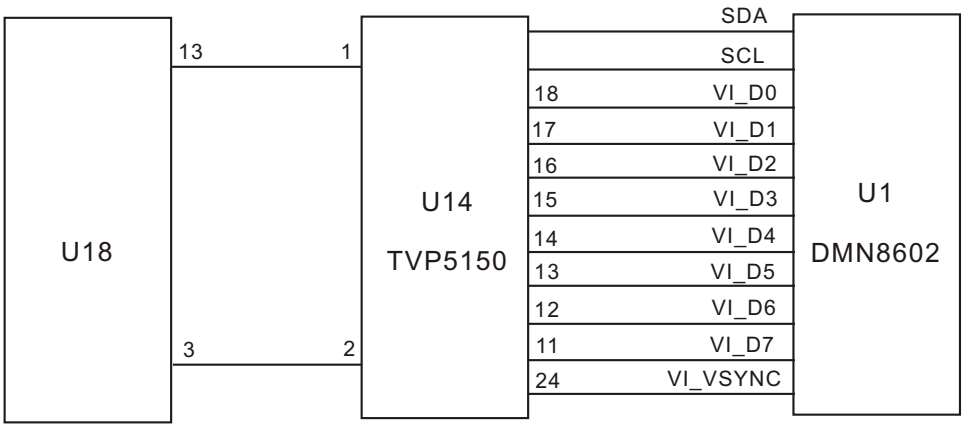


Figure 3.2.5.3 Video A/D conversion circuit diagram

3.2.6 Reset circuit

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

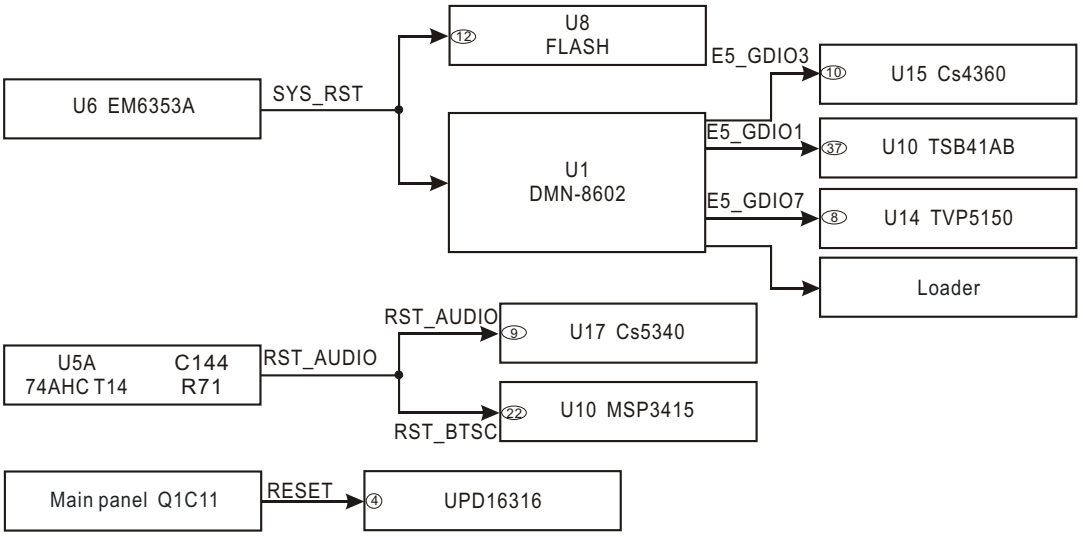


Figure 3.2.6.1 Reset circuit block diagram

2. System reset circuit

Shown in the figure 3.2.6.2, when machine enters working mode from standby, V33 voltage increases, pin 1 of U6 outputs a level signal that maintains 25MS to reset system and FLASH; after system reset finishes, U1 outputs multi-channel reset signal to other subsidiary circuit for reset (loader, CS4360, TSB41AB, TVP5150).

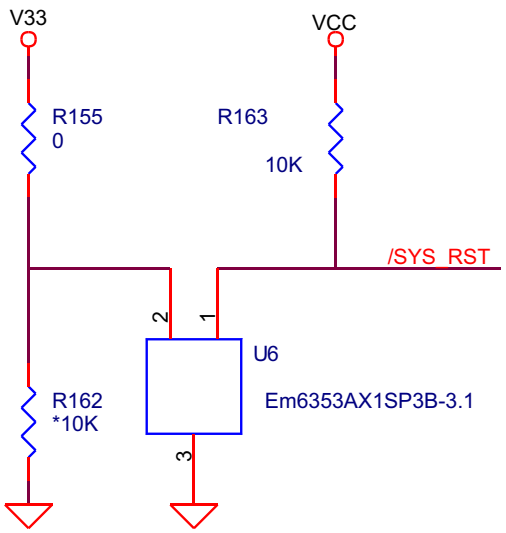


Figure 3.2.6.2 System reset circuit diagram

3. Audio reset circuit

Shown in the figure 3.2.6.3, after machine enters working mode from standby, the voltage on two ends of C144 cannot change suddenly, pin 1 of U5 inputs high level during the course when C144 is charging, so pin 2 of U5 outputs low level; after C144 is fully charged, voltage of pin 1 of U5 changes to low level, and pin 2 of U5 keeps outputting high level. The reset time of this circuit is decided by C144 and RC of R71.

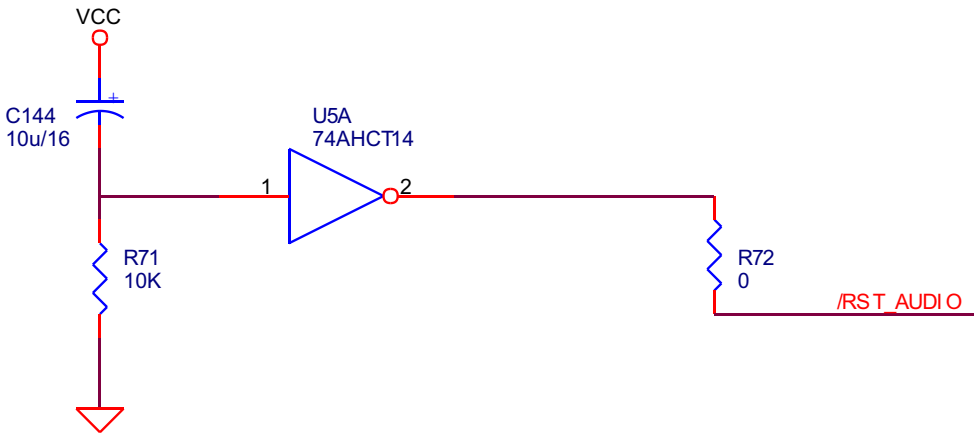


Figure 3.2.6.3 Audio reset circuit diagram

3.2.7 IIC bus control circuit

IIC bus is a kind of simple, dual-direction and synchronous serial bus developed by PHILIPS company, only two lines (serial clock line and serial data line) are required to transmit information among the elements that connect bus. This bus is high-performance serial bus, with the judge and high/low speed device synchronous function required by multi-system and application is very wide. SDA SCL bus control connecting diagram is shown in the figure 3.2.7.1:

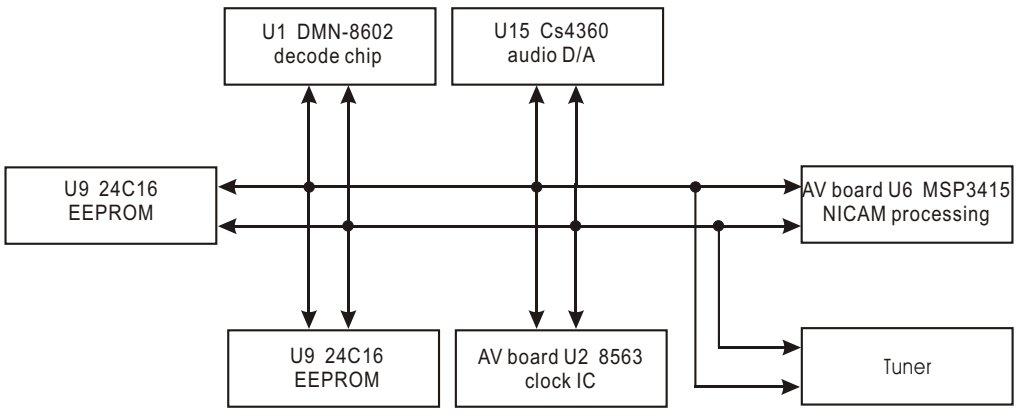


Figure 3.2.7.1 SDA SCL connecting diagram

2. Data transmission regulation of IIC bus

Once data transmission of IIC bus from main player is called a frame, which is composed of start initiating signal, address code, some data byte, response bit and stop signal. When communication starts up, it sends out an initiating signal (when SCL line is high level, SDA line produces a descend edge), address code of subordinate machine (8-digit) and read-write signal; when communication stops, main machine sends out a stop signal (when SCL line is high level, SDA line produces a ascend edge). During the course of data transmission, when SCL line is high level, data of SDA line must be assured stable; transmission of one byte's data, receiver must send out a response signal. Transmission speed of bus is 100kbps (standard)～400kbps (high speed). When adopting +5V power to supply power, input level is ruled as: VILmax=1.5V, VIHmin=3V; when adopting wide power voltage, level is ruled as VILmax=1.5VDD, VIHmin=3VDD.

3. This player adopts the IIC bus defined by DMN8602 to control each function circuit. For the sake of understanding, we suppose DMN8602 is the main unit, other chips are subordinate unit, the main unit sends control information and receives the status report information sent back by subordinate unit, and sends new information according to report information to the function circuit that needs control. The subordinate unit may perform the control information sent from main unit and report the status information of this unit to main unit to realize the control function of I2C bus through the dual-direction information exchange course. In which, 24C16 is status memorizer used to store the user-set information required to save to facilitate the usage next time when power on, the main functions of this player may be controlled by IIC bus (such as, video A/D conversion, audio D/A conversion, tuner channel selection, clock, user information, and NICAM decode).

3.2.8 Voltage regulating circuit

1. 1.8V voltage regulating circuit, shown in the figure 3.2.8.1, is mainly provided for the usage of the logic circuit inside decode chip, 2.5V power inputs from pin 1 of U11, after being voltage regulated by

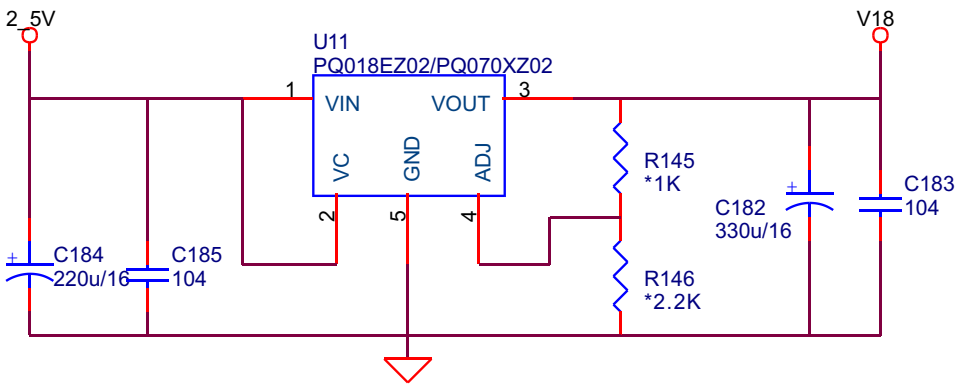


Figure 3.2.8.1 1.8V voltage regulating circuit

Voltage regulating IC Po018, outputted by pin 3, the output voltage of this voltage regulating circuit may be adjusted through R145 R146.

2. 3.3V voltage regulating circuit, shown in the figure 3.2.8.2, mainly supplies power for decode chip, FLASH and SDRAM. 5V power inputs from pin 3 of U12, through being voltage regulated by voltage regulating IC Lt1117, is outputted by pin 2, output voltage of this voltage regulating circuit can be adjusted through R147.

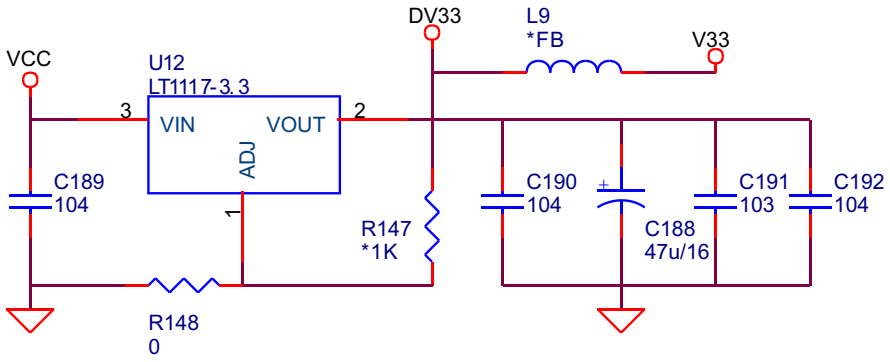


Figure 3.2.8.2 3.3V voltage regulating circuit diagram

3. 2.5V voltage regulating circuit, shown in the figure 3.2.8.3, mainly supplies power for decode chip, 3.3V power inputs from pin 1 of U13, through being voltage regulated by voltage regulating IC Pq025, is outputted by pin 3, output voltage of this voltage regulating circuit can be adjusted through R149 R150.

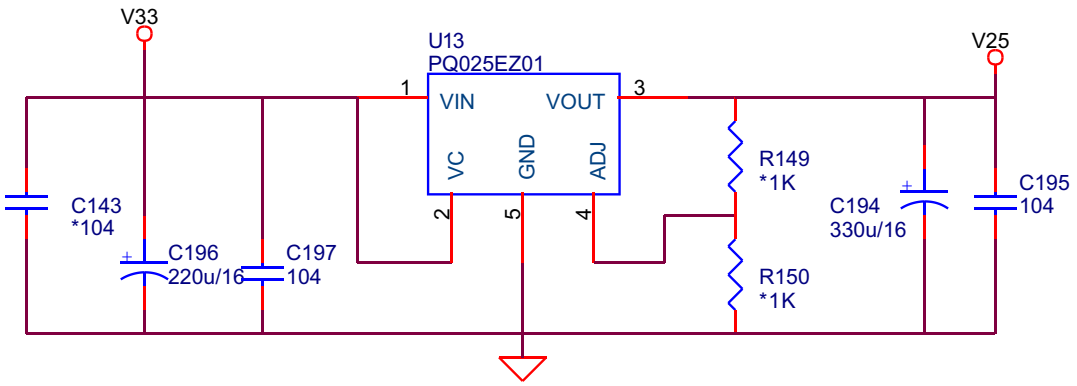


Figure 3.2.8.3 2.5V voltage regulating circuit diagram

3.2.9 USB jack circuit

1. DMN-8602 integrates USB module circuit inside, shown in the figure 3.2.9.1, and it can directly read external USB device. After the integrated USB module circuit inside DMN-8602 detects external equipment connection, it applies for intermission continuously to the control module of DMN-8602 to wait for the response of DMN-8602 control module; after control module gives response, USB module circuit achieves internal bus to read data of external equipment in directly.

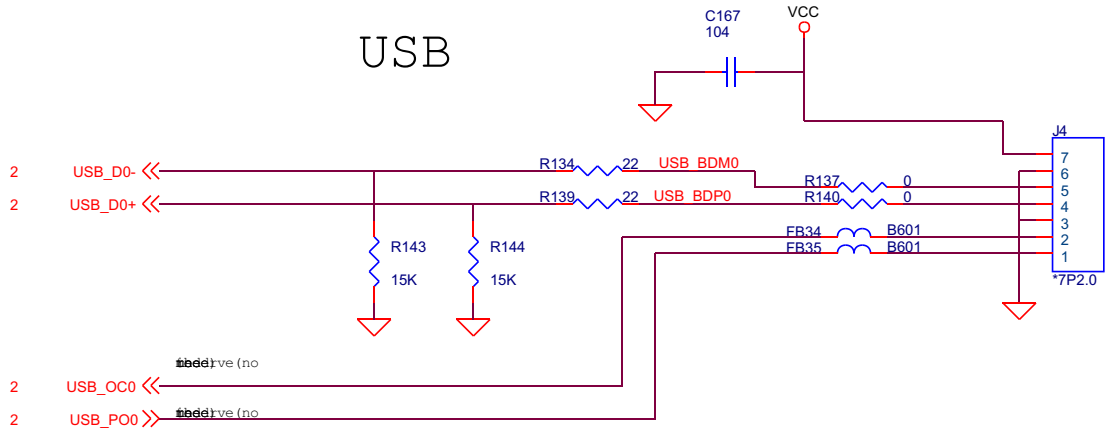


Figure 3.2.9.1 USB circuit diagram

2. Introduction to pin of USB is shown in the following table:

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+5V	1	+5V	3	Data+	3	Data-
2	Data-	2	Data+	4	Grounding	4	Grounding

3.2.10 DV jack circuit

In DV player and DVCAM player, you will see a flat 4P or 6P port, which is usually called DV digital jack and named as i.LINK by SONY company. It accords with IEEE 1394 standard and has the following features:

Directly transmit digital data, so there is no picture and audio distortion.

Only one cable is needed to make video, audio and control signals perform data multi-channel transmission.

Hot plugging and unplugging function may perform data transmission among multiple data

TSB41AB1: it has DV monitoring circuit inside, which can automatically detect DV input. System selects DV mode, DMN-8602 communicates with TSB41AB1, when DV jack has signal input, signals inputted by DV input to pin 28-31 of TSB41AB1, after being processed by TSB41AB1, then they are sent to DMN-8602 for coding and decoding.

3.2.11 Loader jack circuit

A complete “loader components” is used in this machine, which includes servo circuit, laser head and mechanical part. Working principle is the same with that of other players, so we will not repeat here. The following is loader pin introduction shown in the following table:

Pin	Name	Description	Pin	Name	Description
1	/RESET	Reset（reset signal）	21	n/c	Not connected（blank）
2	GND	Ground（ground）	22	GND	Ground（ground）
3	DD7	Data 7	23	/IOW	Write Strobe（write gating）
4	DD8	Data 8	24	GND	Ground（ground）
5	DD6	Data 6	25	/IOR	Read Strobe（read gating）
6	DD9	Data 9	26	GND	Ground（ground）
7	DD5	Data 5	27	IO_CH_RDY	I/O ready
8	DD10	Data 10	28	ALE	Address Latch Enable
9	DD4	Data 4	29	n/c	Not connected（blank）
10	DD11	Data 11	30	GND	Ground（ground）
11	DD3	Data 3	31	IRQR	Interrupt Request
12	DD12	Data 12	32	/IOCS16	IO ChipSelect 16
13	DD2	Data 2	33	DA1	Address 1
14	DD13	Data 13	34	n/c	Not connected（blank）
15	DD1	Data 1	35	DA0	Address 0
16	DD14	Data 14	36	DA2	Address 2
17	DD0	Data 0	37	/IDE_CS0	(1F0-1F7)
18	DD15	Data 15	38	/IDE_CS1	(3F6-3F7)
19	GND	Ground（ground）	39	/ACTIVE	Led driver indicator light drive
20	KEY	Key	40	GND	Ground（ground）

3.2.12 Control panel

1. Control panel block diagram is shown in the figure 3.2.12.1:

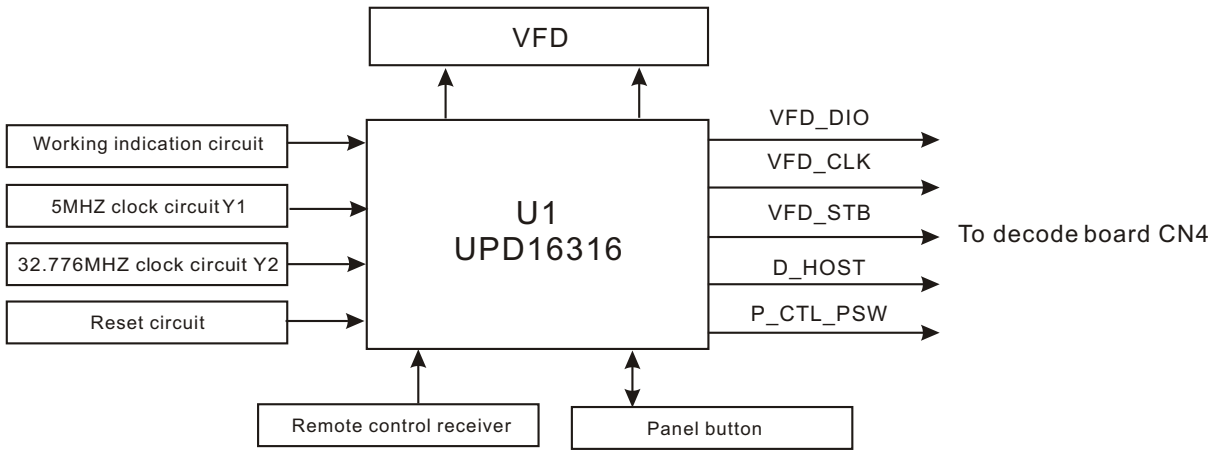


Figure 3.2.12.1 Control panel circuit block diagram

2. Reset circuit

Shown in the figure 3.2.12.2, it is a low level effective reset circuit, after power on, VDD power charges C11 through R24, the voltage on two ends of capacitor cannot change suddenly, so Q1 base electrode is high level, Q1 is saturated on, RESET end outputs low level; the charge course of capacitor makes the electric potential of Q1 base electrode decreases quickly, Q1 cuts off, RESET end outputs high level and reset finishes.

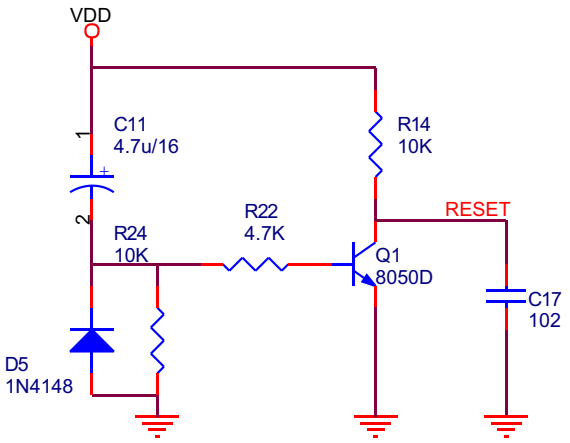


Figure 3..2.12.2 Reset circuit

3. Remote control circuit

The power supply of remote control circuit uses 5V_STB power to ensure the remote control receiver can receive the instruction transmitted from remote controller in standby status. The remote control instruction received by remote control receiver directly transmits to panel IC for remote control decode.

In standby status, panel IC only receives the wake code transmitted from remote controller.

4. Standby working status

After power on, P_CTL_PSW control end is low level, Q2 is saturated on to make the standby light of subsidiary board on and perform standby instruction, now power board main power +12V, +5V, +3.3V have no voltage output, 5V_STB and other supplementary winding power outputs normally to provide reset circuit to reset U1 (pin 4 of U1) at the same time of power on, panel IC standby module enters working status, in which Y2 and the clock circuit inside IC produce clock signal to realize the time display and timing function in standby status, Y1 is externally connected clock of D16316. In standby status, panel control IC and display screen have working power, so the display screen of machine can normally display the time in standby status.

5. Working status after power on

When users are pressing POWER button on the panel or remote controller, UPD16312 enters normal working status, P_CTL_PSW ens inputs high level, panel standby indicator light turns out, the

Blue light of panel receives power and is on, main power output of power board is normal, each circuit of the player begins working, machine displays power-on picture and enters working status. After power on, audio circuit will produce noise in the course of power on, to avoid noise being amplified outputted, panel IC (46PIN) outputs MUTE signal to mute circuit (working principle will be introduced in mute circuit), after decode system works, it communicates with panel IC to fulfill functions of panel display and remote control function operation.

3.2.13 AV circuit

AV circuit is mainly in charge of audio/video signal input and output, audio/video amplifying circuit, audio input switch circuit, NICAM processing circuit, clock circuit, SCART terminal input and output control circuit.

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

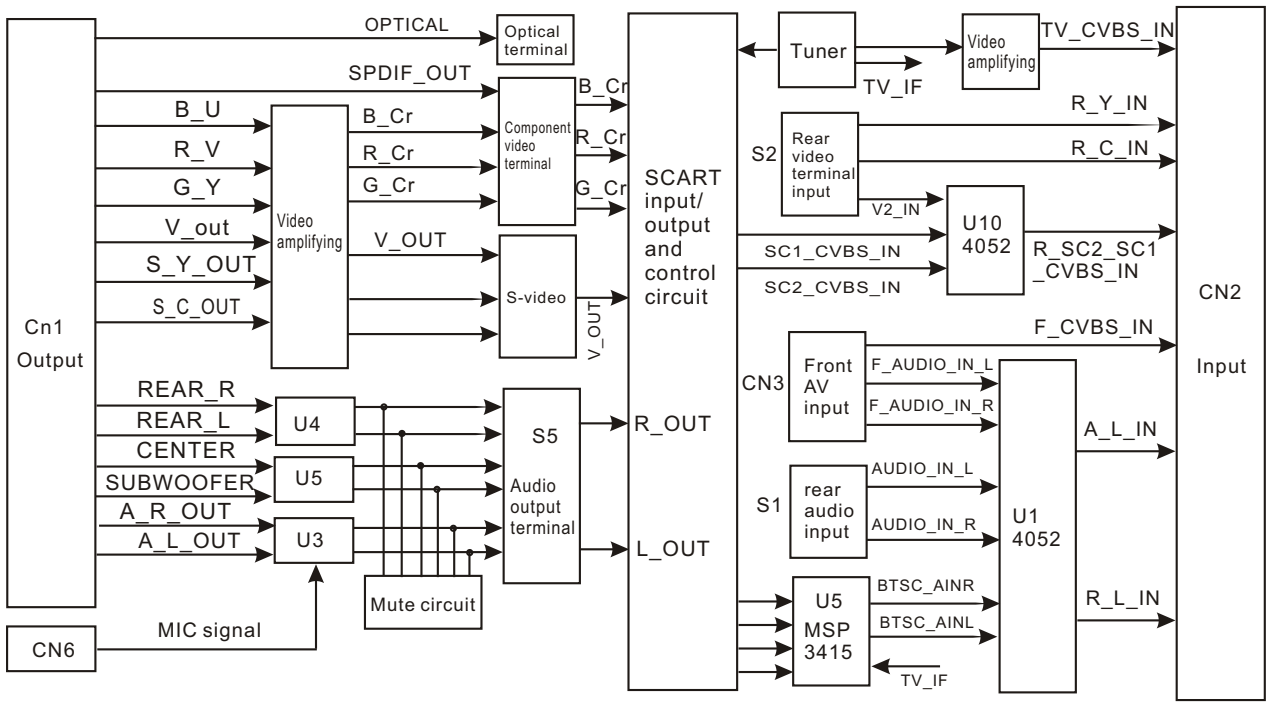


Figure 3.2.13.1 AV circuit block diagram

2. Clock circuit: shown in the figure 3.2.13.2, clock circuit mainly provides a clock signal for system, which can record year, month and date. Power supply means of External battery or standby power is adopted, U2 is clock IC with working voltage between 2.0 and 5.5V, after machine power off, battery Bt1 supplies power for U2 through D2, after the player power on or enters standby status, 5V_STB supplies power for U2 through D1. D1 D2 makes a separation function in the circuit.

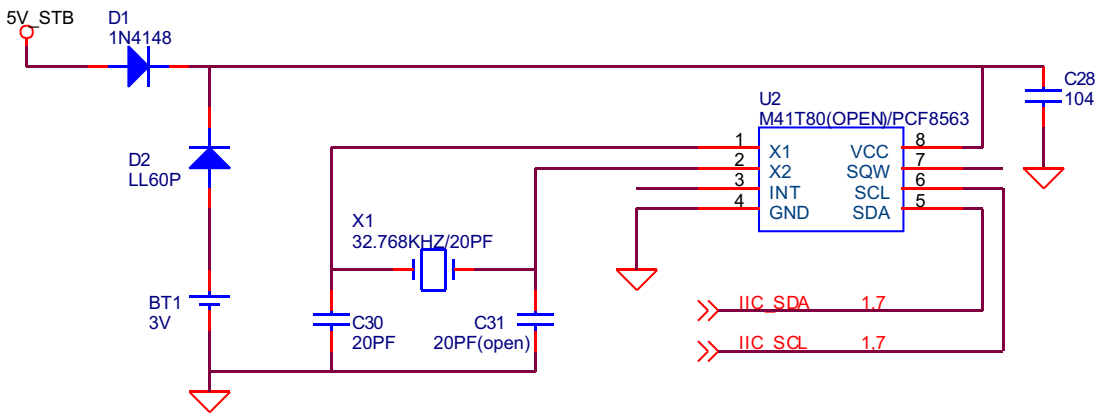


Figure 3.2.13.2 Clock circuit diagram

3. SCART output mode control circuit

(1) CVBS/RGB output control circuit: when the machine is in power-on status, SCART terminal is required to output RGB signal, we switch the output mode if machine in RGB state, shown in the figure 3.2.13.3, decode chip E5_GPIOX4 outputs high level to make Q28, Q26 saturated on, SC1_CVBS_RGB_SEL end outputs high level; when output mode of the machine is composite video, decode chip E5_GPIOX4 outputs low level to make Q28, Q26 cutoff, SC1_CVBS_RGB_SEL end outputs low level; when machine enters standby status (machine enters LOOP working mode), +5V power is 0V, Q29 cuts off, Q27 is controlled by VI_FSS end level of SCART input terminal, so SC1_CVBS_RGB_SEL end is controlled by VI_FSS end, now output mode is decided by external input source.

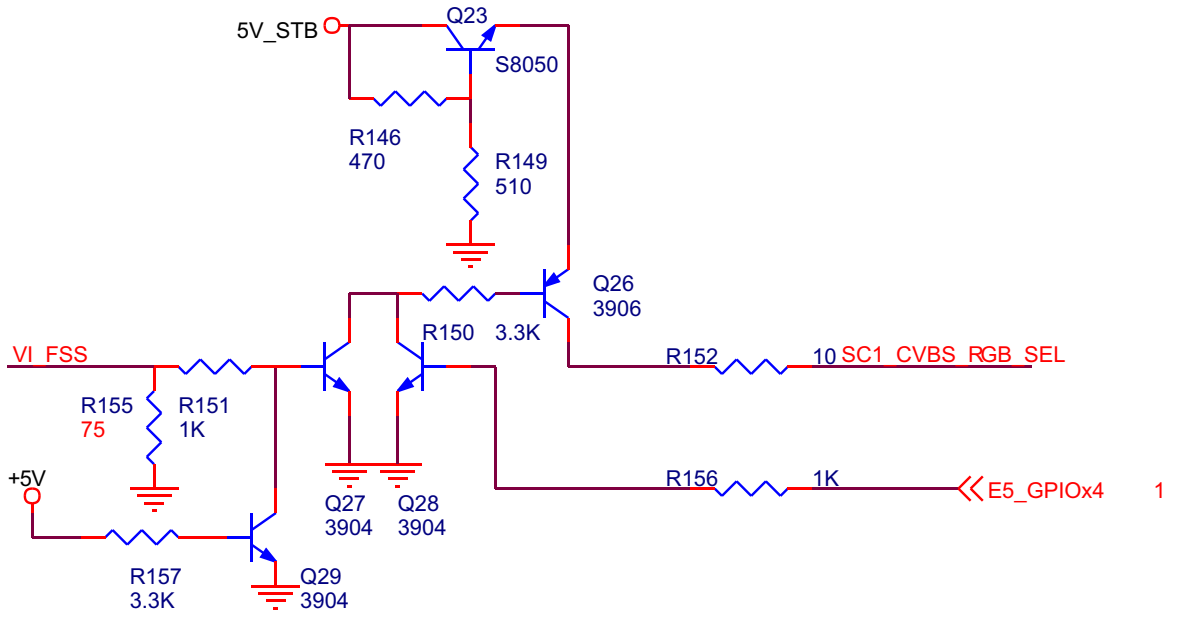


Figure 3.2.13.3 CVBS/RGB output control circuit diagram

(2) Screen display ratio control circuit

When the machine is playing discs with different ratio pictures, if SCART terminal output is needed, we set “screen ratio setup” item in machine setup page according to requirements, shown in the figure 3.2.13.4, E5_GPIOX2 end of decode chip outputs level to make Q17, Q20 on, AV_CONTROL end outputs the voltage required by screen ratio switch to TV set. When machine enters standby status (machine enters LOOP working mode), AV_CONTROL ens is controlled by pin 8 of SCART input terminal.

Function select (AV CONTROL) Pin8	E5_GPIOx2	Levele of PIN8 (AV_COMTROL)
AV mode	L	High(9.5-12V)
Wide-screen 16:9	H	Mid(5-8V)

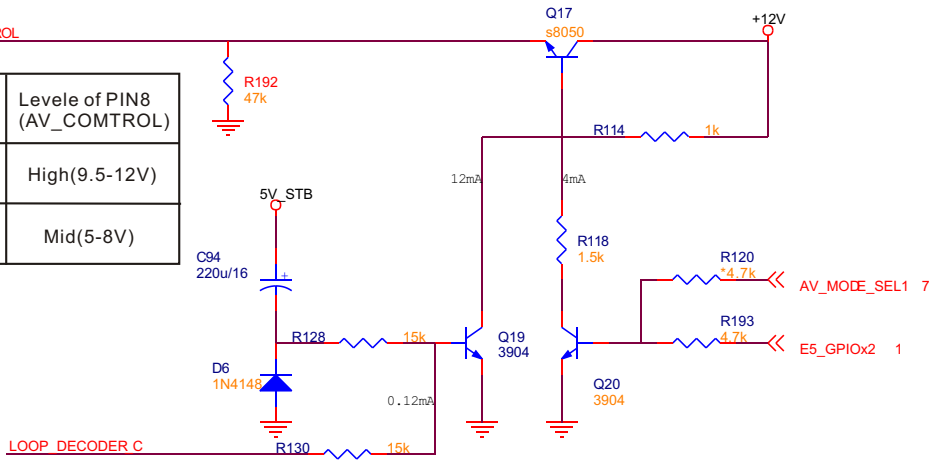


Figure 3.2.13.4 Screen display ratio control circuit

4. SCART circuit block diagram is shown in the figure 3.2.13.5:

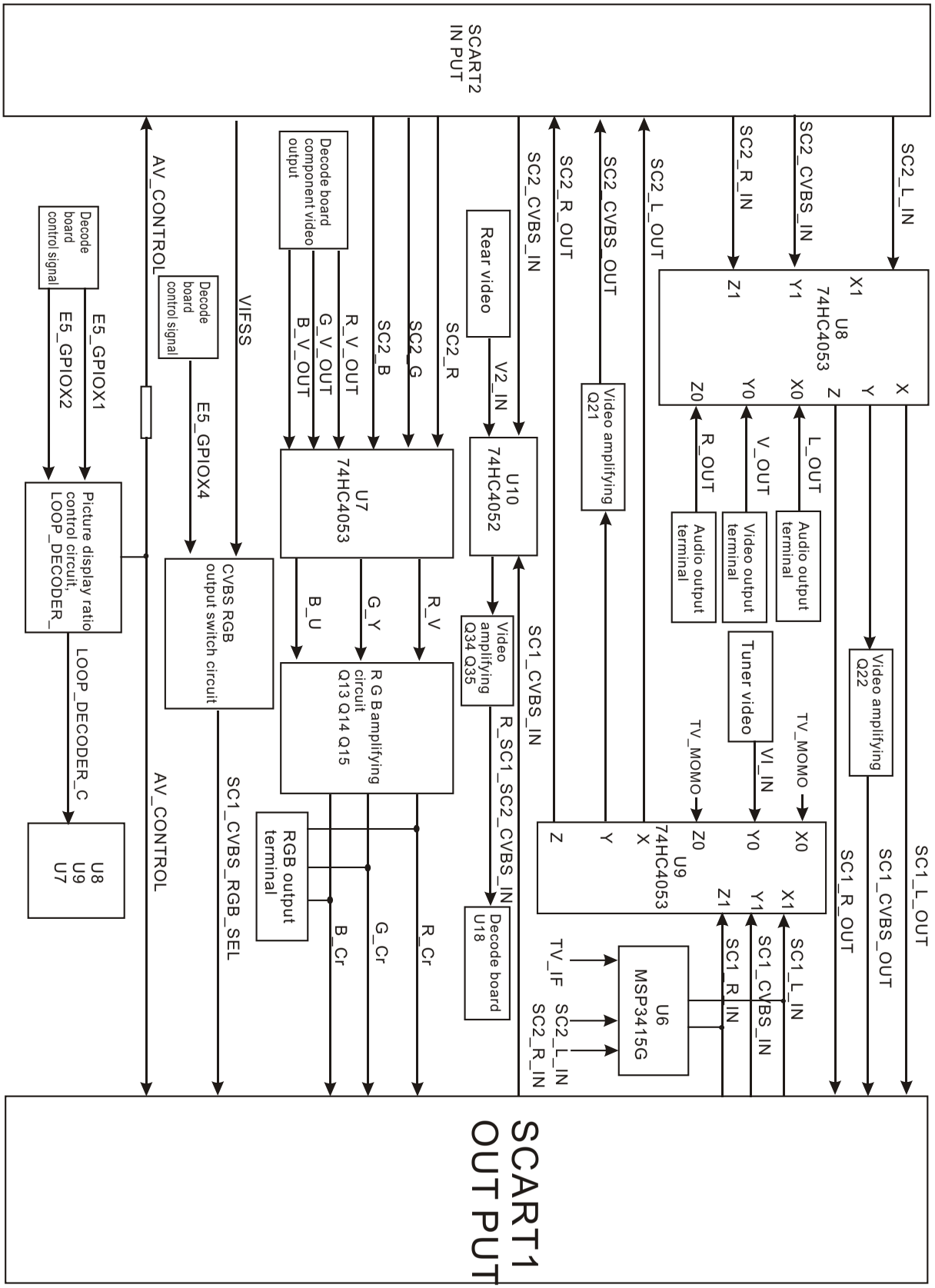


Figure 3.2.13.5 SCART circuit block diagram

(1) Audio, video signals output flow chart and working principle

When the player is in DVD playback status or external input status, LOOP_DECODER_C end is low level, CVBS/RGB switch circuit and screen display ratio control circuit are both controlled by the control signals outputted by decode. Audio/video signals input to U8 and output from pin 14, 15, 4 of U8, audio signals are directly sent to SCART output terminal for output, video signals are amplified through the amplified circuit composed of Q22 and then sent to SCART output terminal for output. There is one group of input port in output terminals. Suppose output terminal is connected with TV set, audio/video signals sent from TV set input from input port to NICAM decode IC for selection, and input to main board for record usage. Video signals select through U10, Q34/Q35 amplifies and inputs to main board for record usage. Audio/video signals sent from tuner output through U9 to the output port of SCART input terminal to connect decoder or other re record devices. Component video switches through U7 and we have introduced in video output part.

Remark: this player does not use DECODER function; to be easy to understand, we define SCART (SC2) is input terminal, and SCART (SC1) is output terminal.

(2) LOOP working mode signal flow chart and working principle

When the player is in standby status, the machine enters LOOP working mode (only when SCART input and output are inserted at the same time, there is LOOP working mode function), LOOP_DECODER_C end is high level; pin 14, 15 of U8 output the audio/video signals inputted by SCART input terminal to make signals of input terminal connect to SCART output terminal through U8 for output. There is one group of input port in output terminal. When output ens is connected with TV set, audio/video signals sent from TV set input from the input port, after selection through U9, output to the output port of “SCART input terminal” for output. The component video signals inputted by SCART input terminal output to the amplified circuit composed of Q13 Q14 Q15 through U7 for output. When LOOP is working, CVBS/RGB output control circuit and screen display ratio control circuit do not work and are totally controlled by input source.

Remark: LOOP function is a switch function, in this period, the machine has no contact with external signal, but is only used as a switch port. To be easy to understand, we define Sc1 as output terminal, and Sc2 as input terminal (different from principle diagram, only for reference).

5、SCART terminal function selection is shown as the following table:

PIN	Definition	Description	Signal direction	PIN	Definition	Description	Signal direction
1	SC1_R_OUT	right channel audio output	OUT	12	NC	unused	
2	SC1_R_IN	right channel audio input	IN	13	GND	R_Cr signal ground	
3	SC1_L_OUT	left channel audio output	OUT	14	NC	unused	
4	GND	audio ground w ire		15	R_Cr	component video R_Cr signal output	OUT

5	GND	B_Cr signal ground		16	SC1_CVBS_RGB_SEL	CVBS/RGB control output	OUT
6	SC1_L_IN	left channel audio input	IN	17	GND	ground wire	
7	B_Cr	component video B_Cr signal output	OUT	18	GND	CVBS ground wire	
8	AV_CONTROL	screen ratio control output	OUT	19	SC1_CVBS_OUT	video output	OUT
9	GND	G_Cr signal ground		20	SCI_CVBS_IN	video input	IN
10	NC	unused		21	GND	ground wire	
11	G_Cr	component video G_Cr signal output	OUT				

6. SCART input terminal pin function introduction is shown in the following table:

PIN	Definition	Description	Signal direction	PIN	Definition	Description	Signal direction
1	SC2_R_OUT	right channel audio output	OUT	12	NC	unused	
2	SC2_R_IN	right channel audio input	IN	13	GND	R signal ground	
3	SC2_L_OUT	left channel audio output	OUT	14	NC	unused	
4	GND	audio ground wire		15	SC2_R	R signal input	IN
5	GND	B_Cr signal ground		16	VI_FSS	screen ratio control input	IN
6	SC2_L_IN	left channel audio input	IN	17	GND	ground wire	
7	SC2_B	B signal input	IN	18	GND	video ground	
8	AV_CONTROL	screen ratio control		19	SC2_CVBS_OUT	video output	OUT
9	GND	G signal ground		20	SC2_CVBS_IN	video input	IN
10	NC	unused		21	GND	ground wire	
11	SC2_G	G signal input	IN				

3.2.14 MIC circuit

1. MIC circuit block diagram is shown in the figure 3.2.14.1:

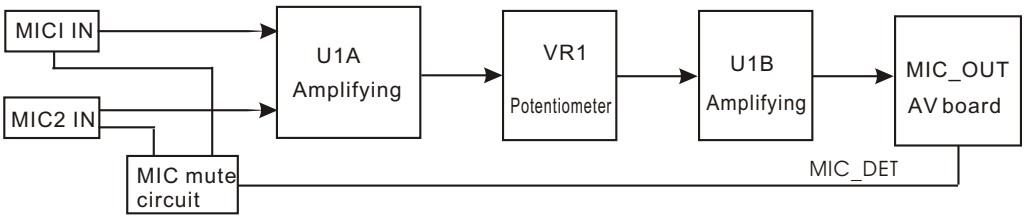


Figure 3.2.14.1 MIC circuit block diagram

2. MIC mute circuit

Shown in the figure 3.2.14.2, microphone detect is fulfilled through judging the level change of microphone socket MIC_DET pin; when microphone is inserted, MIC_DET +12V voltage suddenly decreases to 0V, C13 C14 in the circuit discharge through Q3 to make Q3 continue on, MIC_DET end keeps outputting high level to MIC signal in mute. For the electric charge of C13 C14 discharges quickly, after a period, MIC_DET end outputs negative voltage and MIC signal may output normally.

The delayed time may be changed through changing the RC constant of C14 C13 R17 R19.

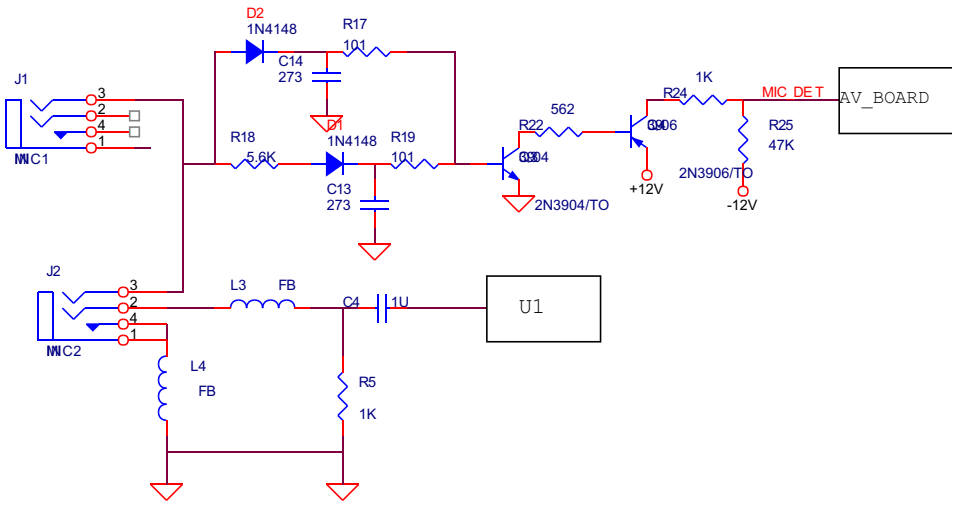


Figure 3.2.14.2 MIC mute circuit diagram

3. Amplifying circuit

Shown in the figure 3.2.14.3, the MIC signals inputted by MIC1, MIC2, through filtering circuit, input to pin 3 of U1 and then output from pin 1 after being amplified by U1A, input to potentiometer for volume adjustment, input to pin 5 of U1 for the second time amplification, R11 is feedback resistor and VR1 is potentiometer.

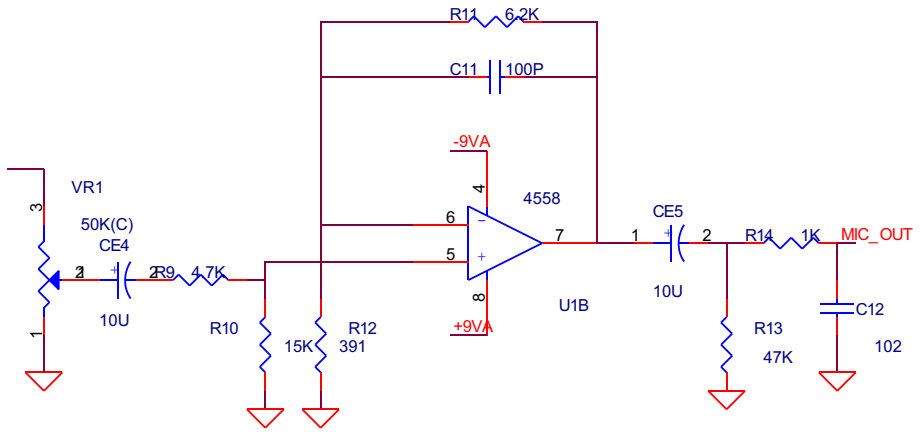


Figure 3.2.14.3 Amplifying circuit diagram

3.2.15 Power circuit

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

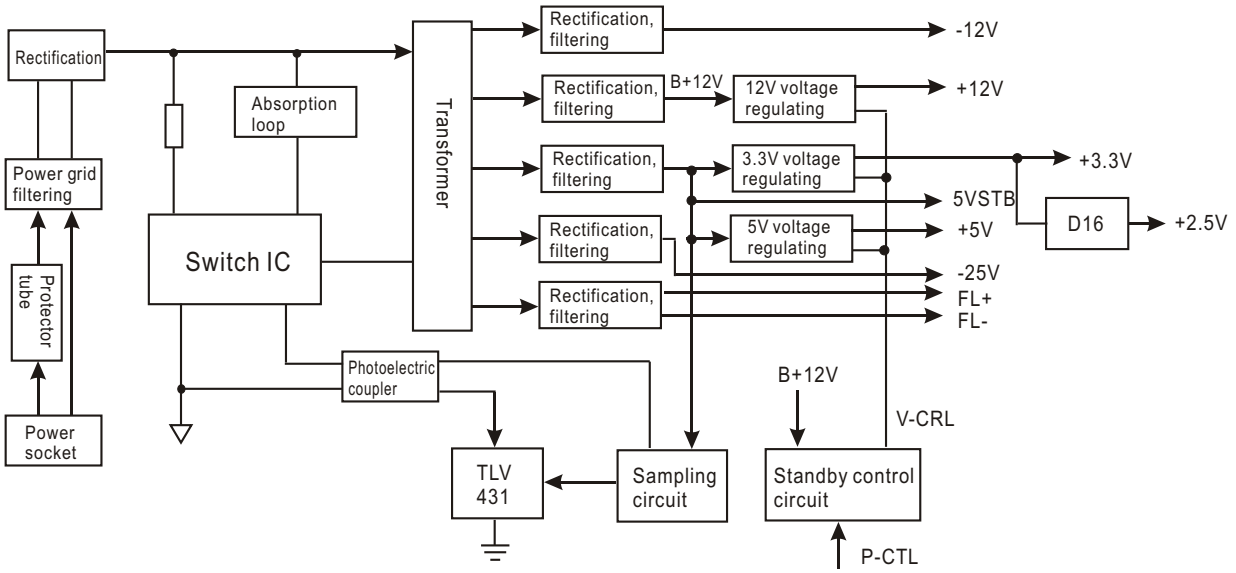


Figure 3.2.15.1 Power circuit block diagram

2. Working principle: after city power is inputted, through protection circuit and power grid filtering circuit, it directly enters the rectification circuit composed of D9～D12, in which protection circuit has over-voltage, over-current and temperature protection circuit. After being rectified, city power changes to DC current (the effective value is 1.4 times of city power, that is 300V) and is rectified by CE5. 300V power is divided into two ways: one way, through R6 voltage drop, is supplied to the start pin of switch module (IC1_6/IC6_4), the other way, through the 24 winding of transformer, arrives at the power pin of switch module (IC1_1/IC6_2) to make transformer perform the storage and discharge of energy through the internal switch pipe. When discharging energy, reverse peak voltage will produce, to prevent damaging the MOS pipe in switch module, the absorption loop protects MOS pipe. 6-7 winding is sampling winding, when the primary winding of transformer is discharging energy, the induction current forms between secondary winding and sampling winding, and induction voltage forms on the two ends of each secondary winding, after being rectified through secondary rectification diode, provides the required DC power for each circuit of the player. For power wave is large, to provide stable DC output, one winding of output end, after rectification and filtering (+5V or +3.3V generally), performs sampling, which is fulfilled by IC3 and the sampling circuit composed of the peripheral); when output voltage is on high side, IC3A K is on to make the light emission diode inside IC2 emit light to control the photo triode inside IC2, CE is on to change the space occupation ratio of switch pipe control end to make the output voltage become low, or else output voltage is on high side.

3. Working principle for standby switching to power on

Power-on standby: 5V_STB is supplied to panel IC13616 to make panel circuit begin working, display screen displays time, P_CTL pin of panel IC outputs low level to V_CRL end output low level, power of +3.3V +12V +5V cannot output (other power is normally supplied during this period), and machine enters standby status. After panel or remote controller inputs power-on instruction, P_CTL pin of UPD16316 outputs high level to make B+12V arrive at the switch control circuit of +3.3V, +12V, +5V through C-E electrode of Q9. Q2/Q7/Q11 is on, +3.3V +12V +5V output is normal, and the player enters working status.

4. Working principle

On/off control: when the player is in standby mode, P_CTL is low level, shown in the figure 3.2.15.2, Q6 cuts off to make Q9 cutoff, V_CRL end is low level, Q10 and Q11 cutoff, +12V has no power output, and the machine enters standby status. When power on, P_CTL is high level, Q6 is on, and Q9 is on at the same time, V_CRL end is high level, Q10 and Q11 are both on, +12V has power output and machine enters working status.

Voltage regulating principle: when output voltage is on high side, shown in the figure 3.2.15.2, the control pin voltage of IC4 (in normal conditions, control voltage, after R13/R12 partial voltage, is 2.5V) is on high side (more than 2.5V), cathode and anode of IC4 is on to make Q10, Q11 cutoff, now load power is supplied by CE16 discharge, after discharging, power is on low side, IC4 control pin voltage is on low side, anode and cathode disconnect, Q10 and Q11 resumes on status to supply power for load, this the repeat on/off course reaches the purpose of voltage regulating. V_CRL end also controls the switch control circuit of +5V +3.3V at the same time, and its on/off course and voltage regulating principle are the same with +12V. +5V is controlled by Ic3 and no voltage regulating circuit is added.

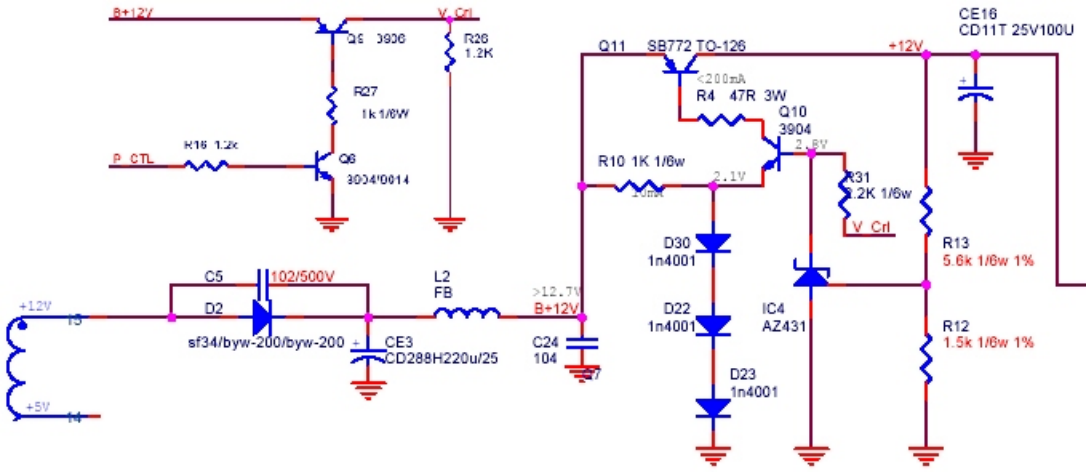


Figure 3.2.15.2 Switch control, voltage regulating circuit diagram

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Symptom: power not on

Description: after inserting power plug, power indicator light is not on, picture of the player has no output, panel has no screen display , panel buttons have no function.

Analysis and troubleshooting: according to trouble description, we can judge that trouble lies in power or decode part, use DC level of multimeter to test voltage of two ends of CE5, normal voltage is about 300V and test result is normal, then test pin 4 of IC6 and it is 0V, which is about 16V in normal conditions, after power off, use multimeter to test resistence to ground of pin 4 of IC6 and it is 0 ohm, after changing IC1 KA5L0380, trouble is removed.

[Example 2] Symptom: player not switch on

Description: after inserting power plug, power indicator light is on, press POWER button, power indicator light is off but the player has no power-on picture output

Analysis and troubleshooting: firstly test power supply and find that +3.3, +5V, +12V have no voltage output, so we preliminarily judge that trouble lies in standby control circuit. Shown in the figure 3.3.1.1, test V_Crl end and find that voltage is 0V, test P_CTL end and it is high level (normal), test Q9E electrode voltage and it is 13V, so we doubt that Q9 has trouble, after changing it, trouble is removed.

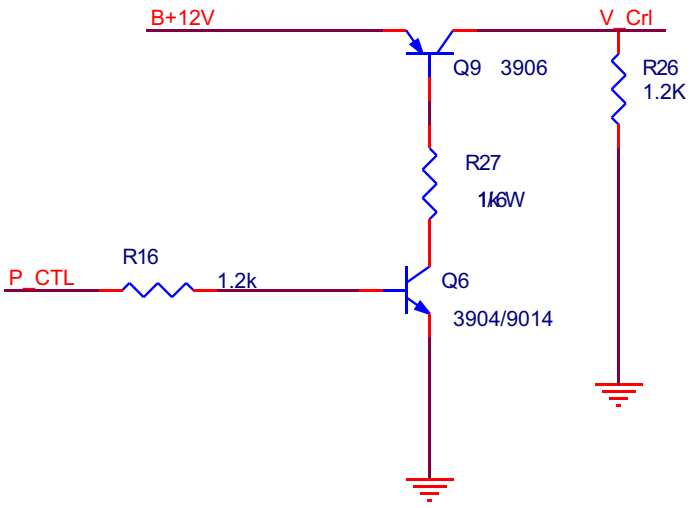


Figure 3.3.1.1 Standby circuit diagram

[Example 3] Symptom: machine down after power on

Description: after inserting power plug, power indicator light is on, picture of the player has output, but after pressing POWER switch, HELLO always displays and panel buttons have no function.

Analysis and troubleshooting: troubleshooting of this type of trouble is difficult; when loader, decode board, AV board, I2C bus and each voltage is abnormal, HELLO will display and the player will get down. It is easy to use substitution method to repair this type of machine. Firstly judge that which board has caused the trouble, then repair that board, which will be easier. Firstly use multimeter to test loader power supply 5V, 12V. When testing 12V, this voltage displays 0. This voltage is supplied by power board to AV board audio amplifying and loader. When checking this type of trouble, firstly use disconnection method, if rear stage is disconnected, load voltage restores to be normal, it means that trouble is caused by rear stage load; if load voltage is still 0, check power board; if voltage restores to be normal after disconnecting loader, it means that the short circuit of loader causes that there is 12V power supply, loader cannot start up, so machine will be down after power on; after changing loader, trouble is removed.

[Example 4]Symptom: no sound

Description: when playing DVD, switching external signal and receiving TV signal, there is no sound.

Analysis and troubleshooting: the reason to cause this trouble is that the common channel of sound is blocked. Use oscillograph to test AV board C33, C37 and there is audio signal output, but output terminal has no sound output. Because other channels also have no sound output, we preliminarily judge that trouble lies in mute circuit, use multimeter to test mute circuit and MUET is high level, which should be negative voltage when in normal playback, which means that mute circuit has started up. This mute circuit is divided into power-on mute and power-off mute circuit, if any one of the two has trouble, incorrect mute phenomenon will appear. After testing, we find that MUTE_1 end is high level (low level when playing normally, high level when power on), this signal is controlled by pin 47 of panel U1 (UPD16316), after changing IC (UPD16316), trouble us removed.

[Example 5] Symptom: no sound output when receiving TV signal

Description: when playing DVD disc normally or using external signal input, sound and picture output is normal. When switching TV signal input, image output is normal.

Analysis and troubleshooting: TV signal sound is outputted by pin 14 of AV board high frequency tuner to AV board U6 for NICAM processing, then outputted by pin 30, 31 of U6 and sent to U1 for switch input to decode board for audio processing. Use oscillograph to test pin 14 of AV board tuner and output is normal, pin 30, 31 of U6 has no waveform output, which means that this IC does not work normally, firstly test power supply of U6 and it is normal, test clock of U6 (two ends of X2 crystal oscillator have no oscillation waveform), after changing X2 (18.432MHZ crystal oscillator), trouble is removed.

[Example 6] Symptom: machine down

Description: after inserting power plug, power indicator light is on, picture of the player has no output, panel has no screen display, panel buttons have no function.

Analysis and troubleshooting: firstly test power supply conditions, and each group of power supply voltage is normal, then use substitution method: firstly judge which board has caused the trouble, then repair the trouble board. We use substitution method to judge that the trouble in main panel causes the machine down, which has the following aspects: clock is not correct, reset circuit cannot work normally, main panel U1 (UPD16316) cannot work normally, shown in the figure 3.3.1.2, use multimeter to check U1 (UPD16316) and voltage of each pin is normal, use oscillograph to test 5MHZ crystal oscillator and there is no oscillation frequency, after change the crystal oscillator with the same specification, trouble is removed.

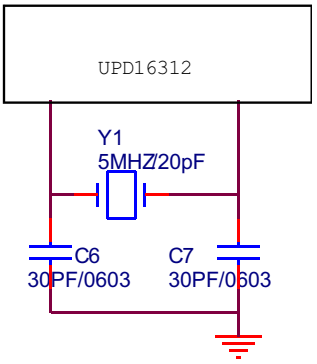


Figure 3.3.1.2 Clock circuit diagram

[Example 7] Symptom: clock not saved

Description: after power off each time, screen of panel does not display the local time

Analysis and troubleshooting: this player is with RTC function, only when local time is well set, power on after power off each time, the local time will be kept. For this type of machine, we start from AV board RTC circuit troubleshooting, use oscillograph to test X1 32.768KHZ crystal oscillator, and there should be oscillation waveform when in normal conditions, but there is no waveform at this time, after changing crystal oscillator with the same specification, trouble is removed.

[Example 8] Symptom: picture of the player has mosaic when switching in external input

Description: when player is switching from normal playback to external signal input, TV picture appears disturbance, no external input image, but there is sound output.

Analysis and troubleshooting: according to trouble description, we can judge that trouble appears in externally-inputted video processing circuit, firstly test each power supply voltage of decode board U14 (TVP5150) and it is normal, use oscillograph to test clock signal of P5, P6, and pin 6 has no waveform output, but it should have 14.31818MHZ waveform output in normal working condition, after changing crystal oscillator with the same specification, trouble is removed.

[Example 9] Symptom: machine down when searching TV signal

Description: machine down each time when searching TV signal, that is, panel button and remote controller have no function

Analysis and troubleshooting: shown in the figure 3.3.1.3, machine will be down when receiving TV signal, and this trouble is in AV board high frequency tuner and its peripheral circuit, use multimeter to test voltage of power supply pin (pin 1) and I2C bus pin (pin 5, 6) of high frequency tuner and the real test value is that IIC bus pin voltage is 3.3V and tuner power supply pin (pin 1) voltage is 0V (power supply pin voltage is 5V and IIC bus pin voltage is 3.3V in normal conditions). According to circuit principle, power supply of frequency tuner is provided by power board, +5V is supplied to the power supply pin of high frequency tuner through (FB1), observe carefully and find that FB1 inductor has been broken to make high frequency tuner have no working voltage to make it cannot work, so machine down when searching channels, after changing elements with the same specification, trouble is removed.

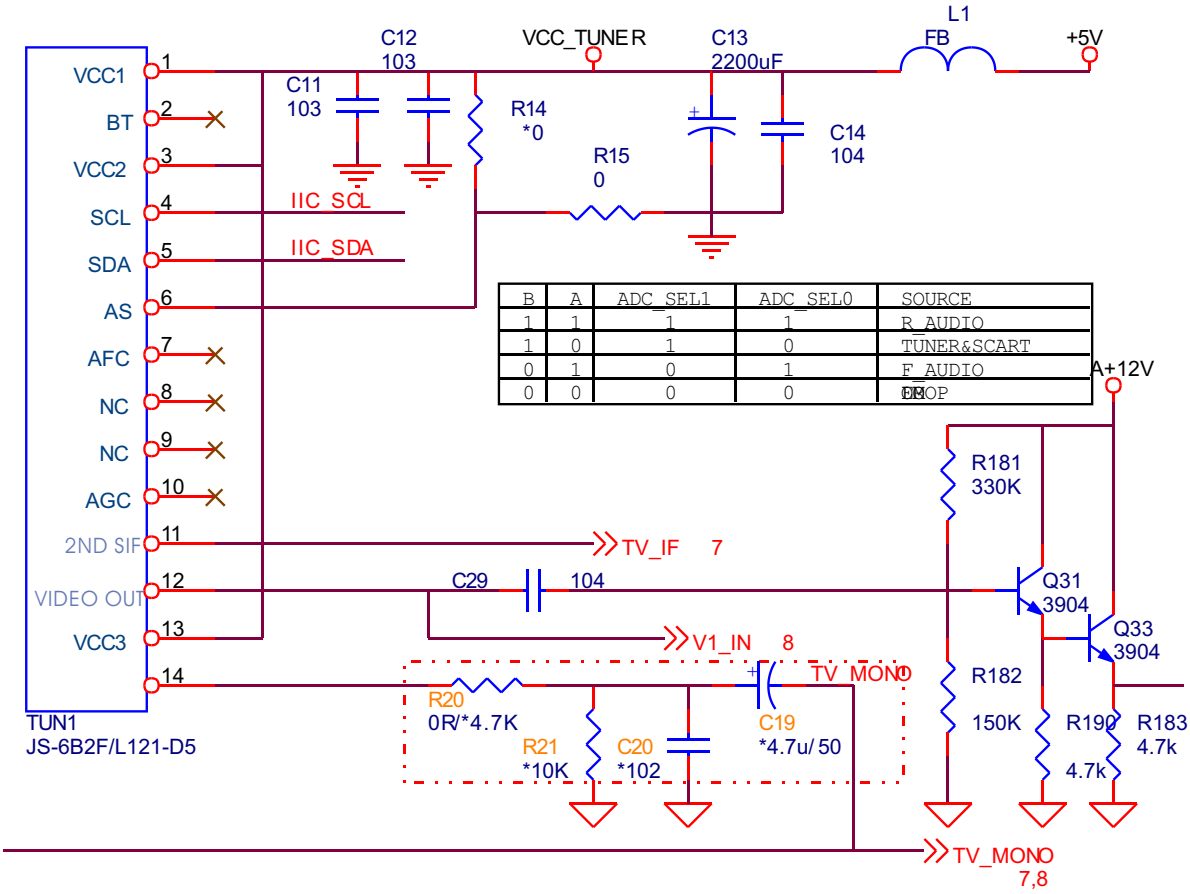


Figure 3.3.1.3 High frequency tuner circuit diagram

[Example 10] Symptom: no external sound

Description: when playing DVD, sound and picture are normal, when switching external, there is picture but no sound

Analysis and troubleshooting: this kind of trouble mainly lies in external input audio signal processing circuit. Check from rear stage circuit of AV board U1, switch the machine in rear audio input state, use oscillograph to test pin 3, 13 of AV board U1 and there is audio signal output, then test pin 10, 12 of decode board U17 (Cs5340) and there is also audio signal input, but pin 4 of U17 has no digital signal output. Test each pin voltage of U17 (Cs5340) and it is normal, so we doubt that U17 has trouble, after changing U17, trouble is removed.

[Example 11]Symptom: not read disc

Description: when reading DVD, VCD, CD, "NO DISC" displays

Analysis and troubleshooting: it is easy to adopt substitution method to check this type of trouble. Firstly use a good loader and computer flat cable to substitute the original loader and computer flat cable. After using loader component with the same specification to substitute, disc reading, playback and recording are all normal. (Loader component are all in one, change directly after damaging loader)

[Example 12] Symptom: DV cannot input

Description: other external inputs are normal, DV signal cannot input

Analysis and troubleshooting: firstly judge the location of PCB board in which trouble lies, test DV jack board flat cable position and check whether there is signal input, if there is signal input, the trouble lies in decode board. After testing, we find that trouble lies in DV board, so we doubt trouble lies in DV socket part, after changing DV socket, trouble is removed.

[Example 13]Symptom: no sound

Description: no sound when in external input and playing DVD player

Analysis and troubleshooting: we judge that trouble lies in audio processing circuit, test pin 2 of U15 and there is signal input, clock and power supply of U15 are both normal, test U15 audio output pin and find that there is no analog audio signal output, so we doubt that U15 has trouble, firstly weld U15 again, trouble disappears, so the rosin joint of IC leads to it after confirmation. Conclusion: before changing IC, weld IC again firstly to avoid incorrect judgment.

[Example 14] Symptom: player not switch on

Description: after power on, standby indicator light is on, press POWER button, indicator light cannot turn out, and the player cannot enter power-on state.

Analysis and troubleshooting: according to trouble symptom, we can judge that trouble lies in panel, test P_CTL_PSW pin and there is no high level output, test STB_5V voltage and it is normal, so we doubt that power button has trouble, after changing it, trouble is removed.

[Example 15] Symptom: component video output picture has distortion

Description: the output picture has no red

Analysis and troubleshooting: it is judged that trouble is in red fundamental olor output circuit, shown in the figure 3.3.1.5, test C65 and there is signal output, test R89 and there is no signal output, so we doubt that amplifying circuit has trouble, after changing Q13, trouble is removed.

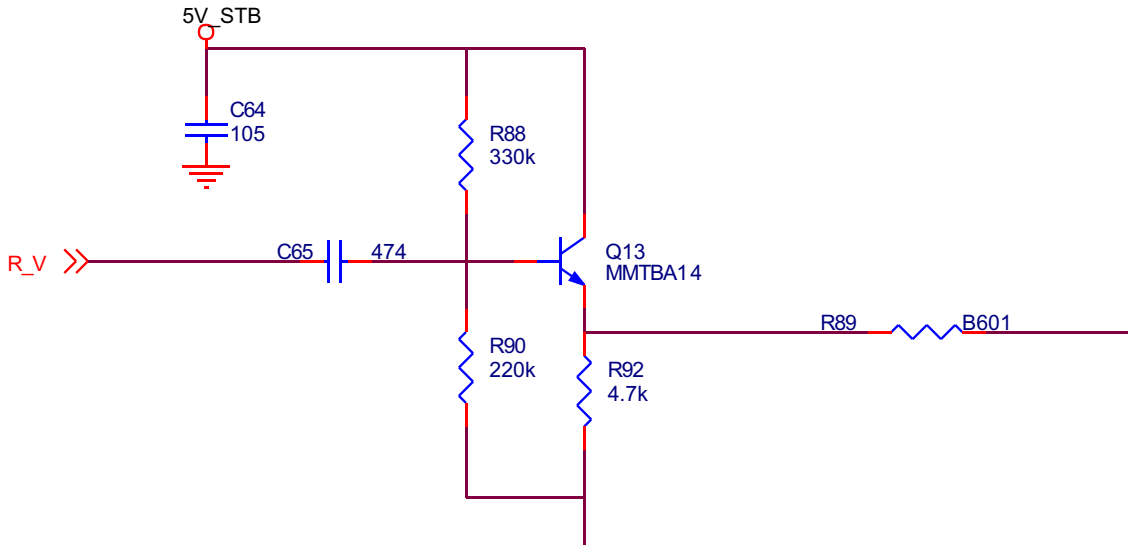


Figure 3.3.1.5 Component video output circuit

3.3.2 Troubleshooting flow chart

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

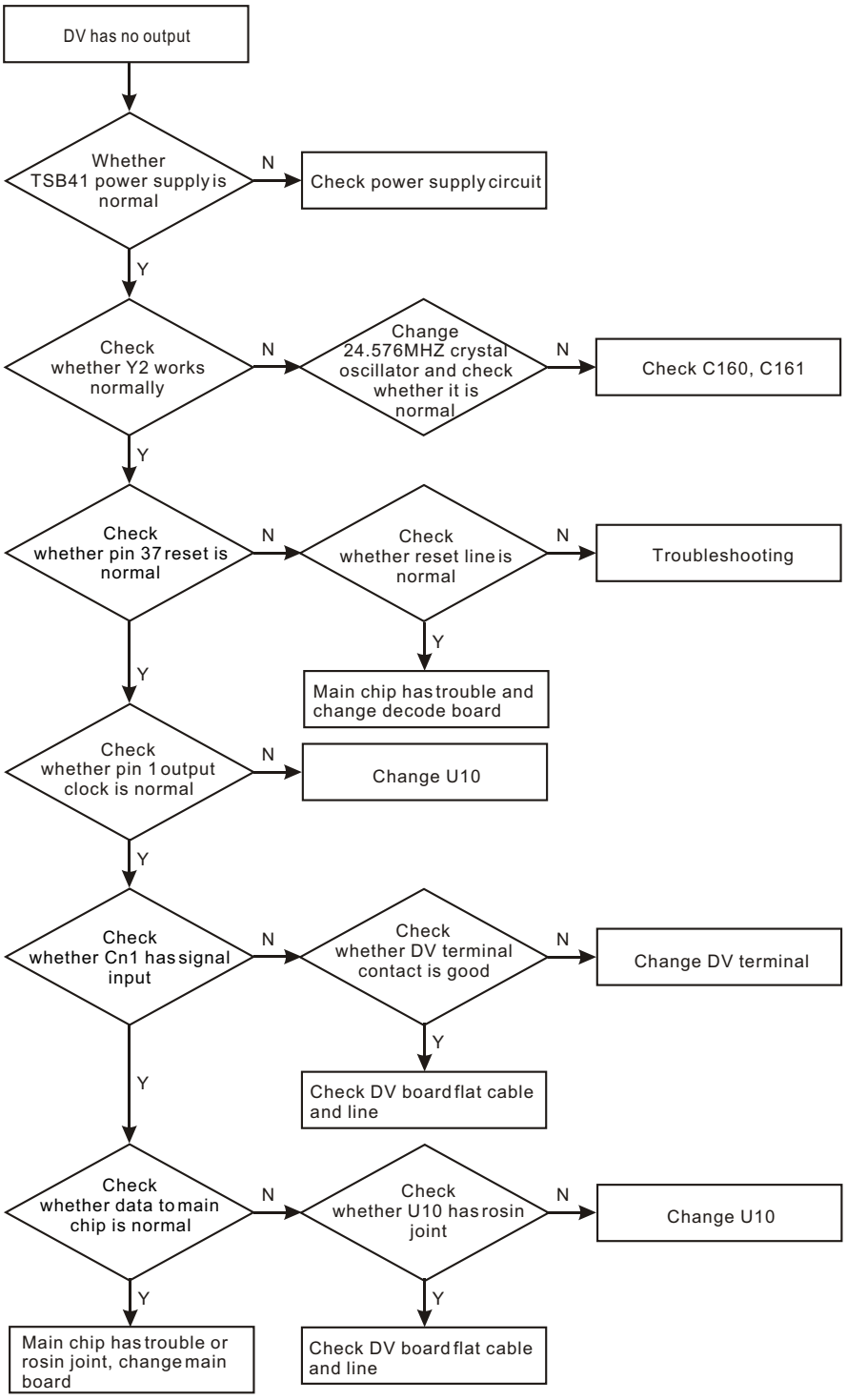


Figure 3.3.2.1 “Troubleshooting flow chart for “DV has no output”

2. Troubleshooting process for “Not read USB device” is shown in the figure 3.3.2.2:

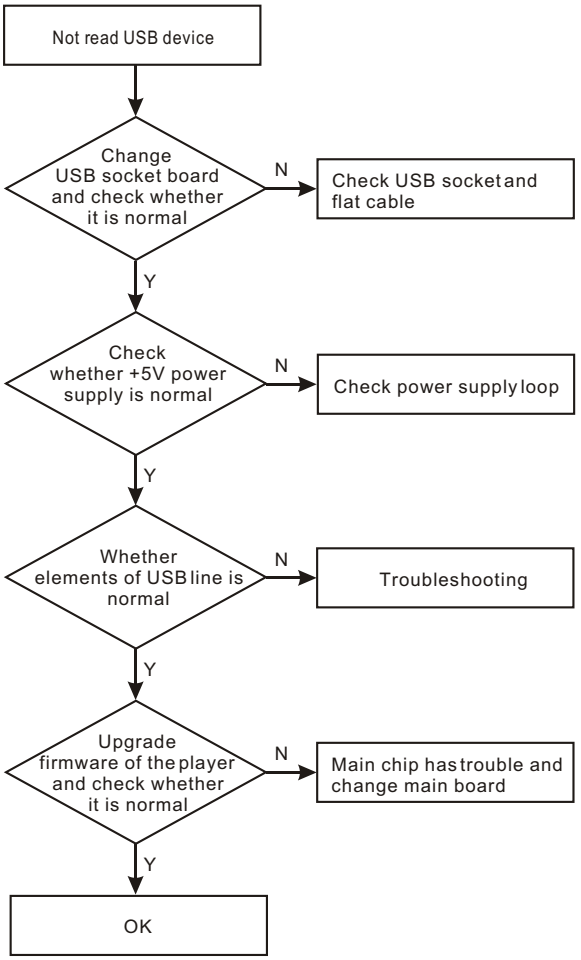


Figure 3.3.2.2 Troubleshooting flow chart for “Not read USB device”

3. Troubleshooting process for “Power not on” is shown in the figure 3.3.2.3;

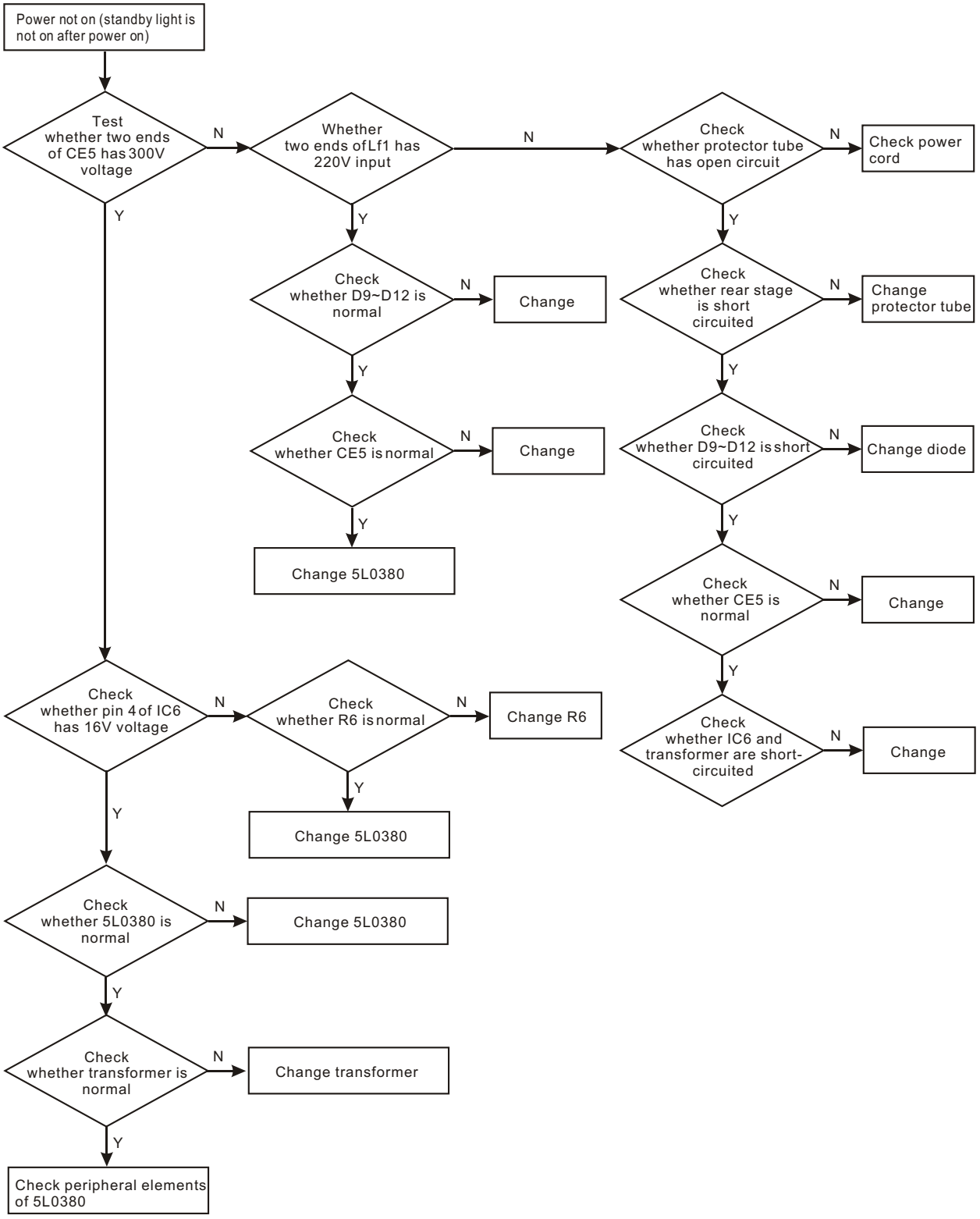


Figure 3.3.2.3 Troubleshooting flow chart for “Power not on”

4. Troubleshooting process for “Cannot enter power-on from standby” is shown in the figure 3.3.2.4:

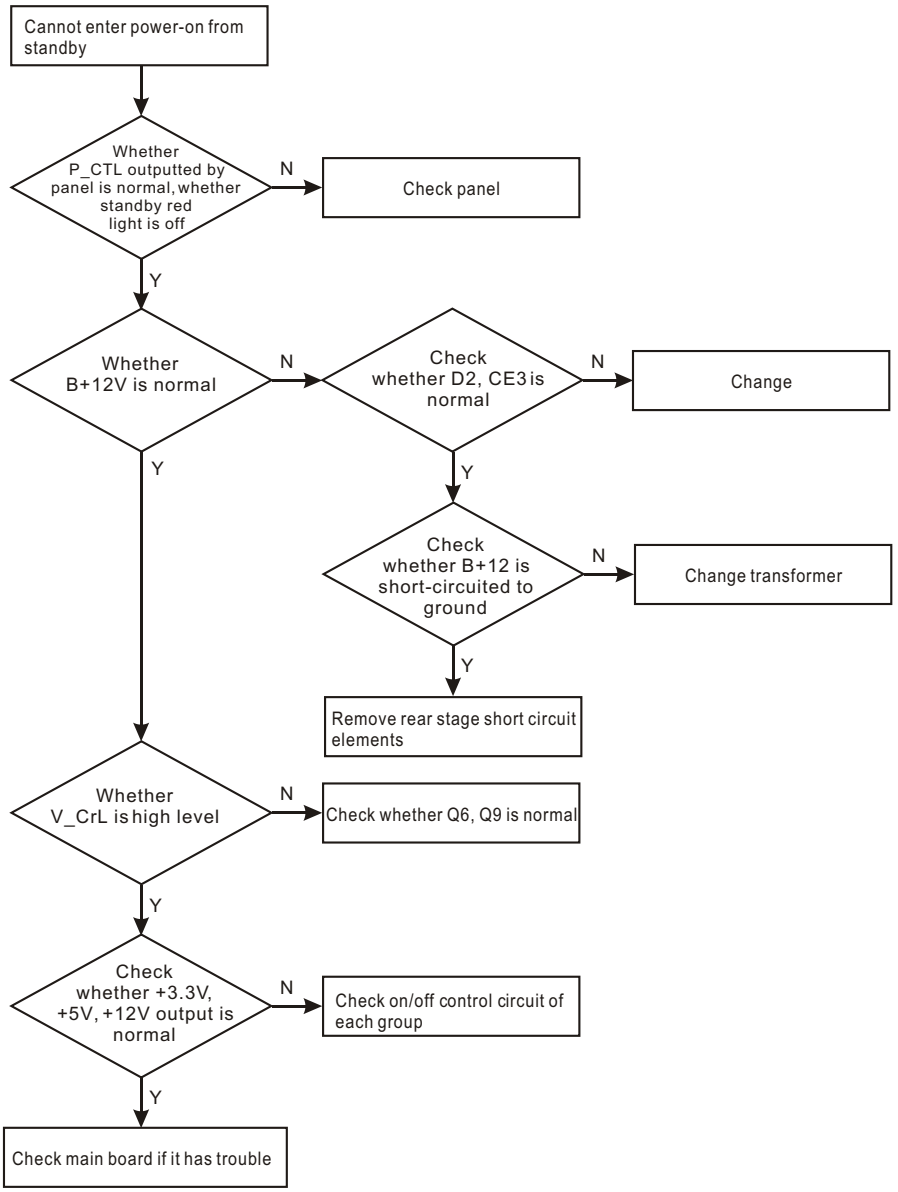


Figure 3.3.2.4 Troubleshooting flow chart for “cannot enter power-on from standby”

5. Troubleshooting process for “No display” is shown in the figure 3.3.2.5:

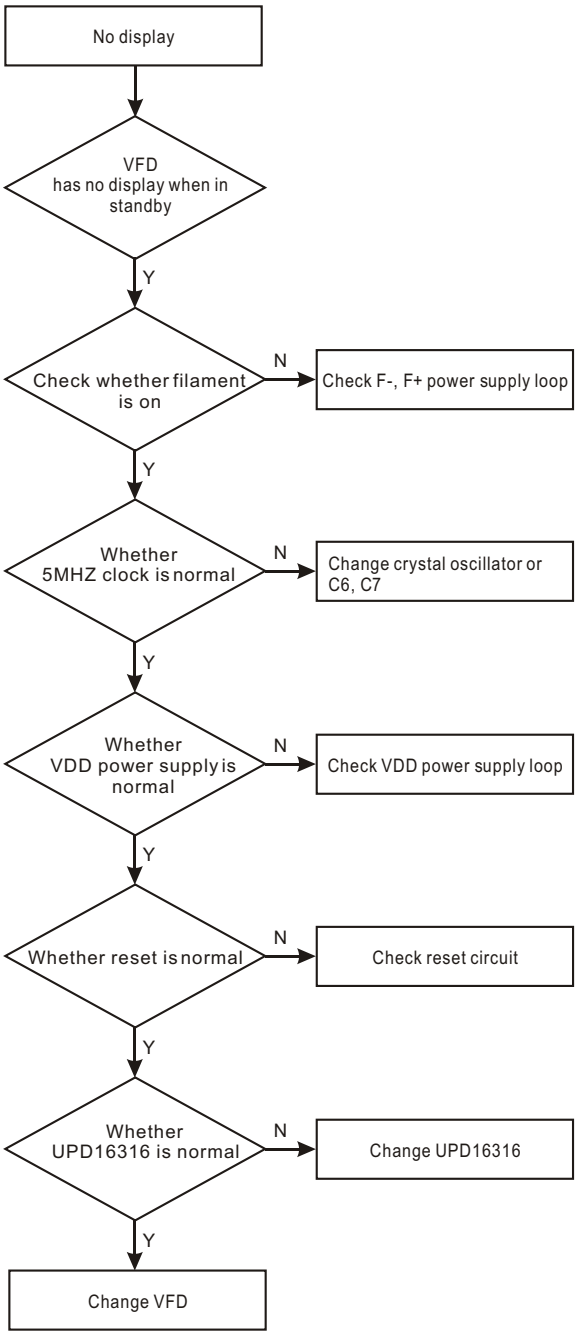


Figure 3.3.2.5 Troubleshooting flow chart for “No display”

6. Troubleshooting process for “+12V has no voltage output” is shown in the figure 3.3.2.6:

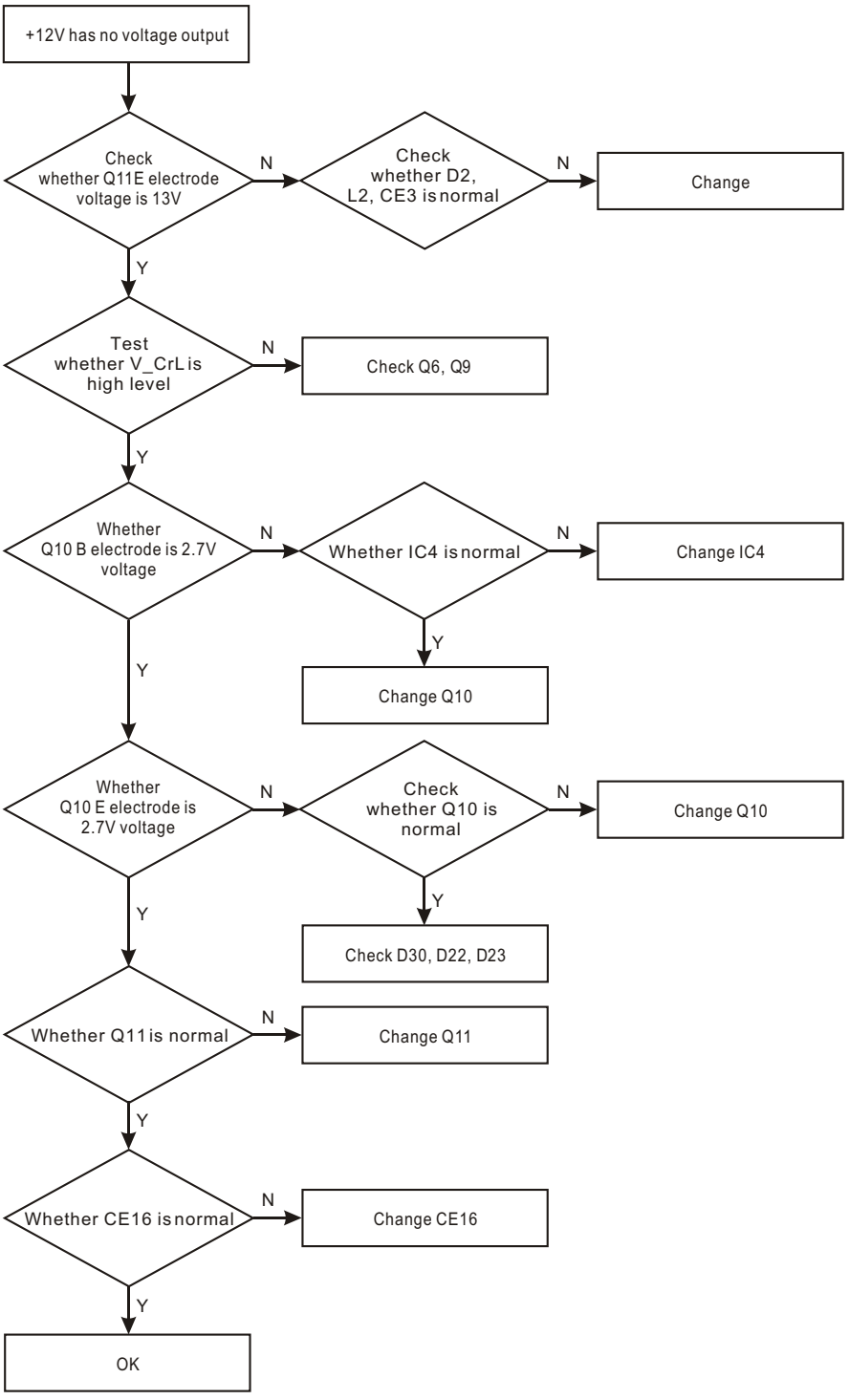


Figure 3.3.2.6 Troubleshooting flow chart for “+12V has no voltage output”

7. Troubleshooting process for “External input has no sound output” is shown in the figure 3.3.2.7:

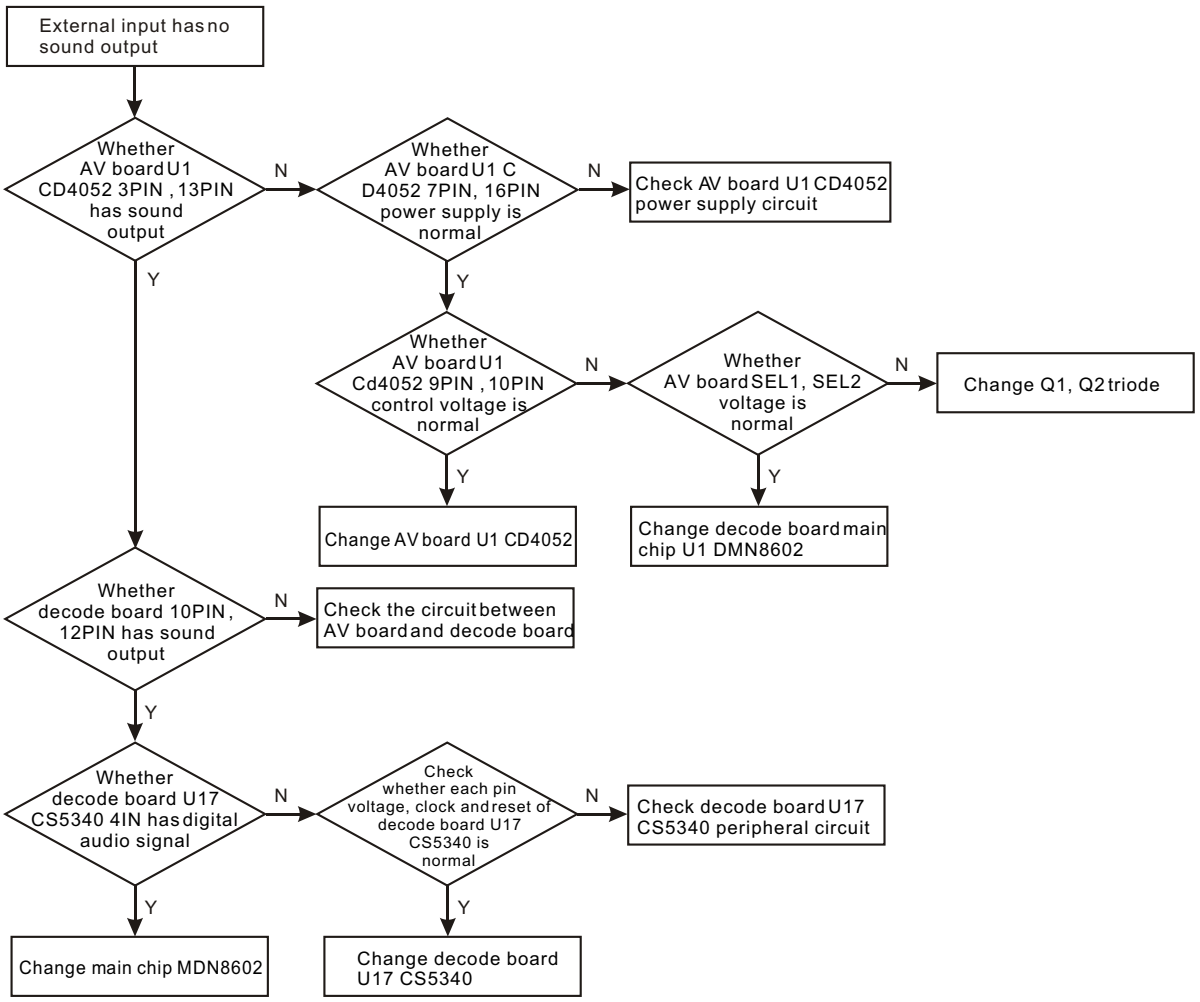


Figure 3.3.2.7 Troubleshooting flow chart for “External input has no sound output”

8. Troubleshooting process for “TV signal has no sound output” is shown in the figure 3.3.2.8:

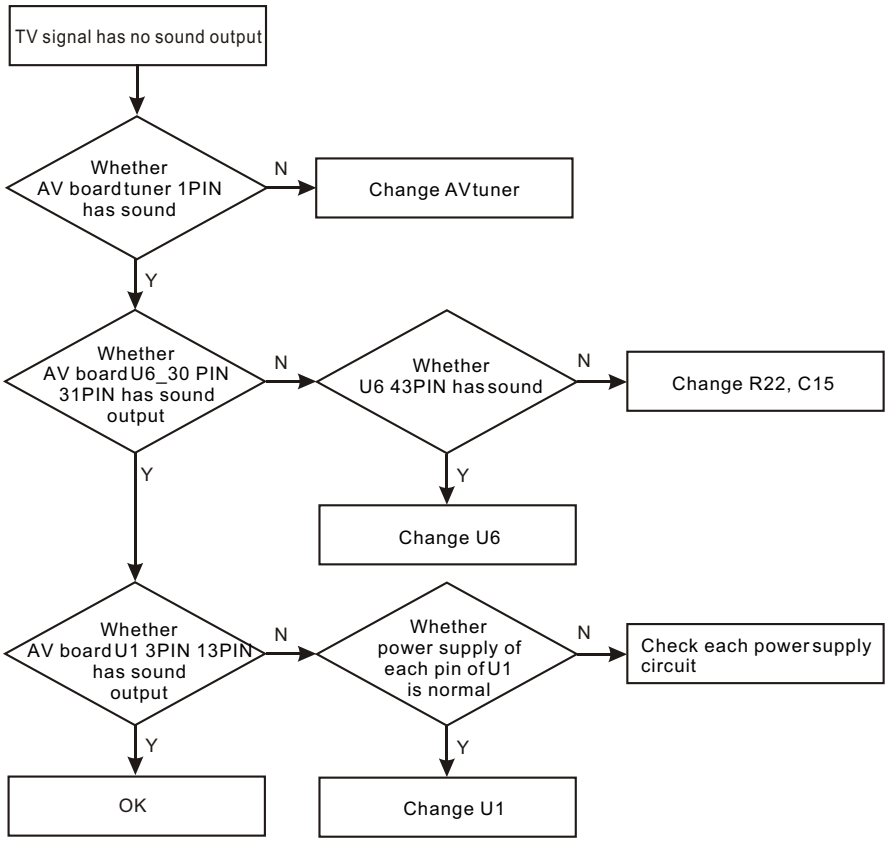


Figure 3.3.2.8 Troubleshooting flow chart for “TV signal has no sound output”

9. Troubleshooting process for “TV signal input has no image” is shown in the figure 3.3.2.9:

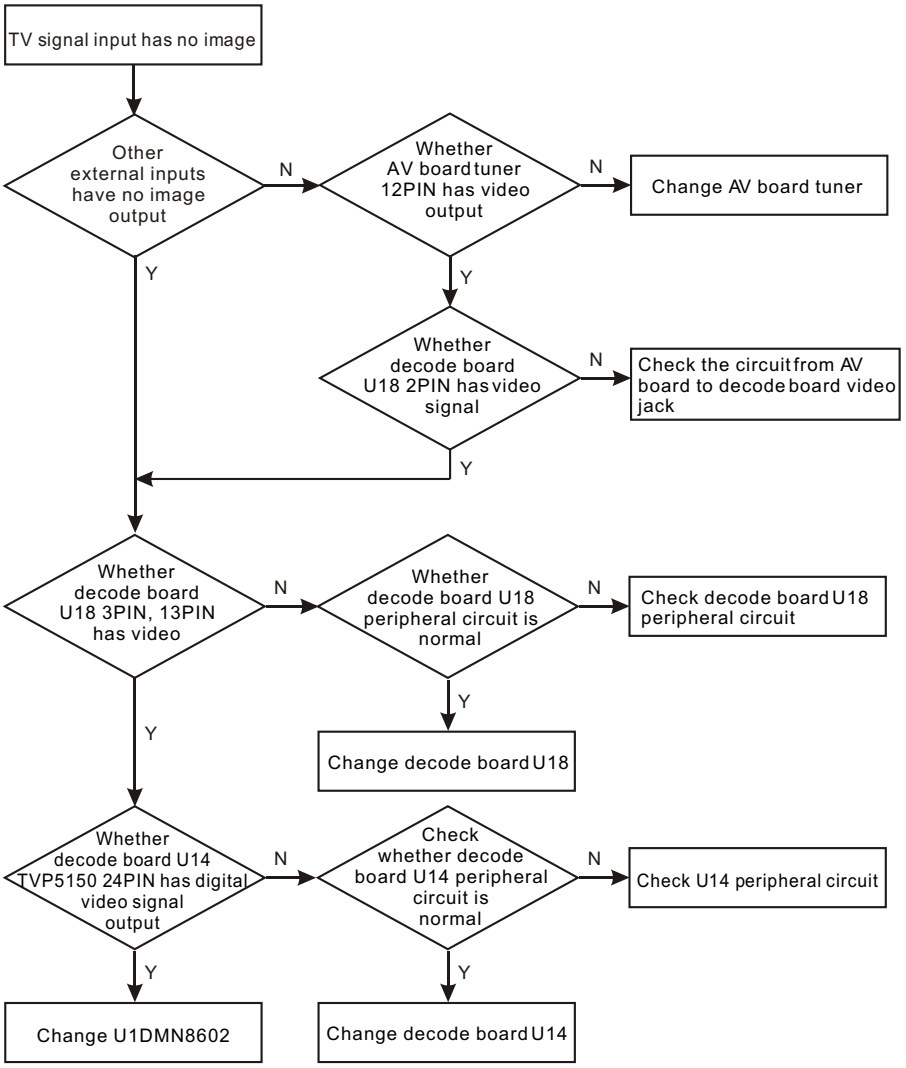


Figure 3.3.2.9 Troubleshooting flow chart for “TV signal input has no image”

10. Troubleshooting process for “Cannot receive TV signal” is shown in the figure 3.3.2.10:

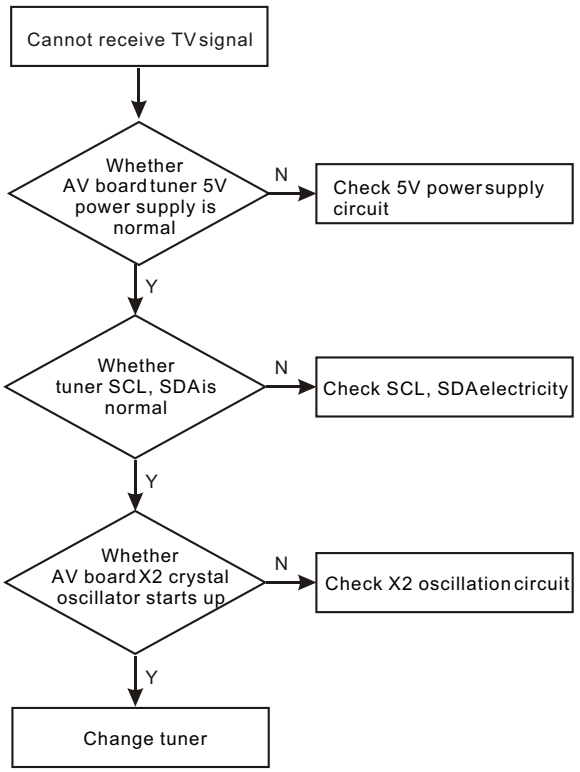


Figure 3.3.2.10 troubleshooting flow chart for “Cannot receive TV signal”

11. Troubleshooting process for “No sound when playing disc” is shown in the figure 3.3.2.11:

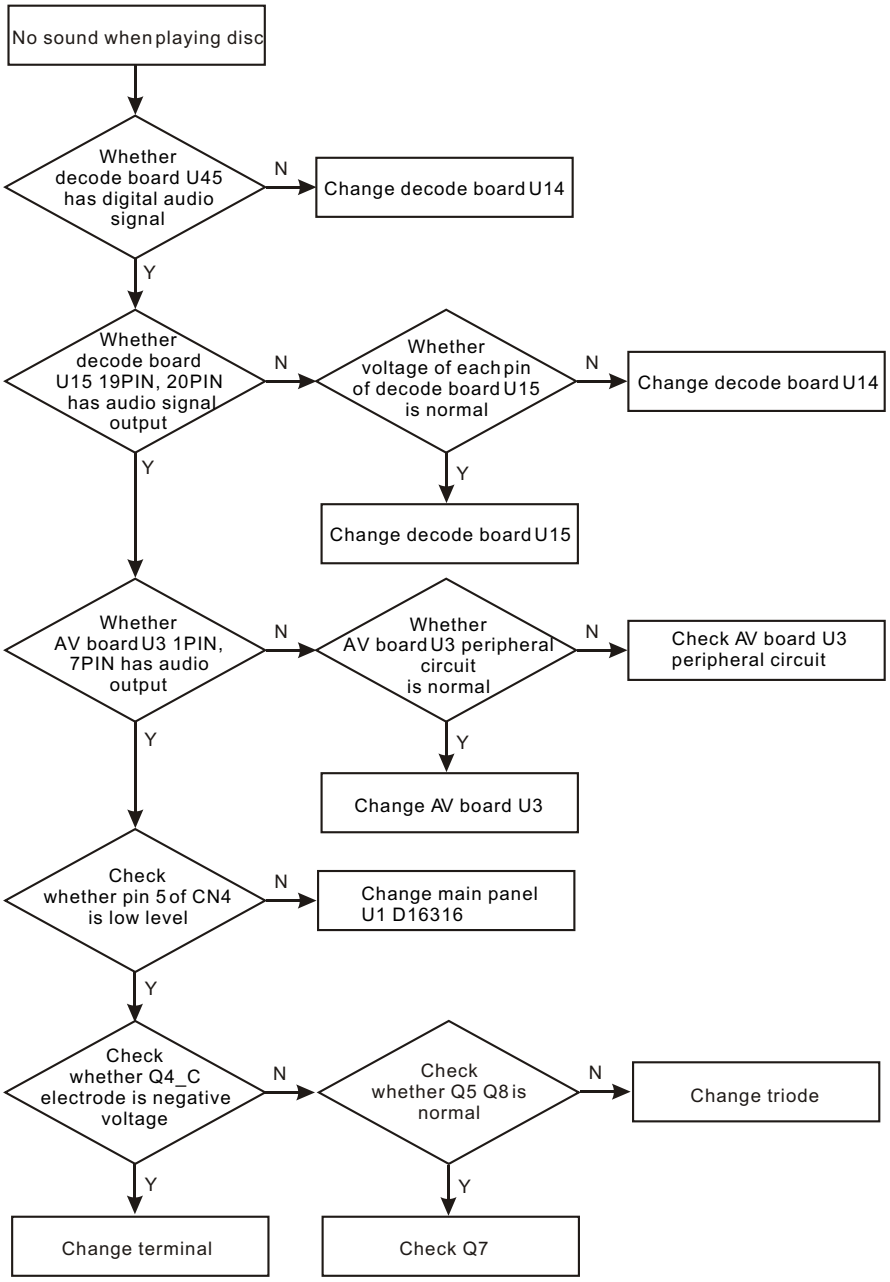


Figure 3.3.2.11 Troubleshooting flow chart for “No sound when playing disc”

12. Troubleshooting process for “External input picture has mosaic” is shown in the figure 3.3.2.12:

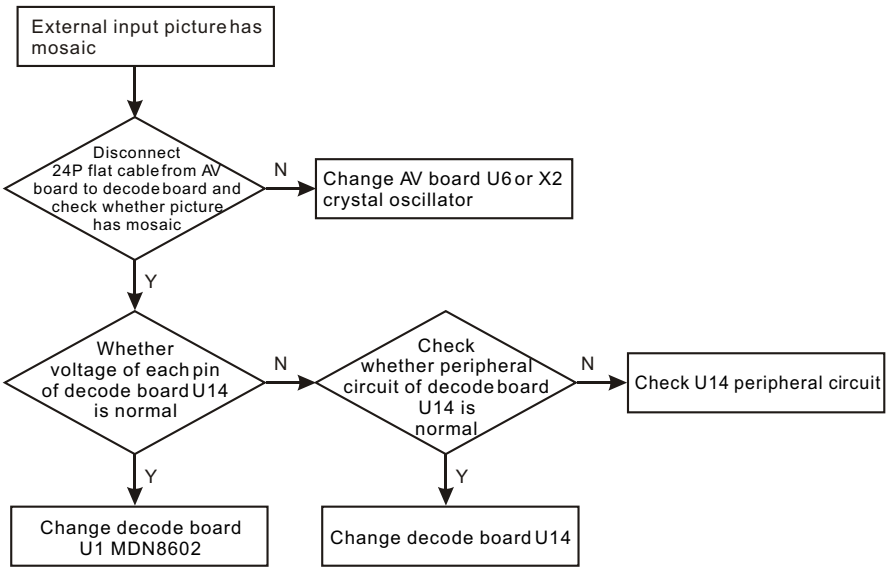


Figure 3.3.2.12 Troubleshooting flow chart for “External input picture has mosaic”

13. Troubleshooting process for “Machine down after power on” (there is power-on picture but no button function) is shown in the figure 3.3.2.13:

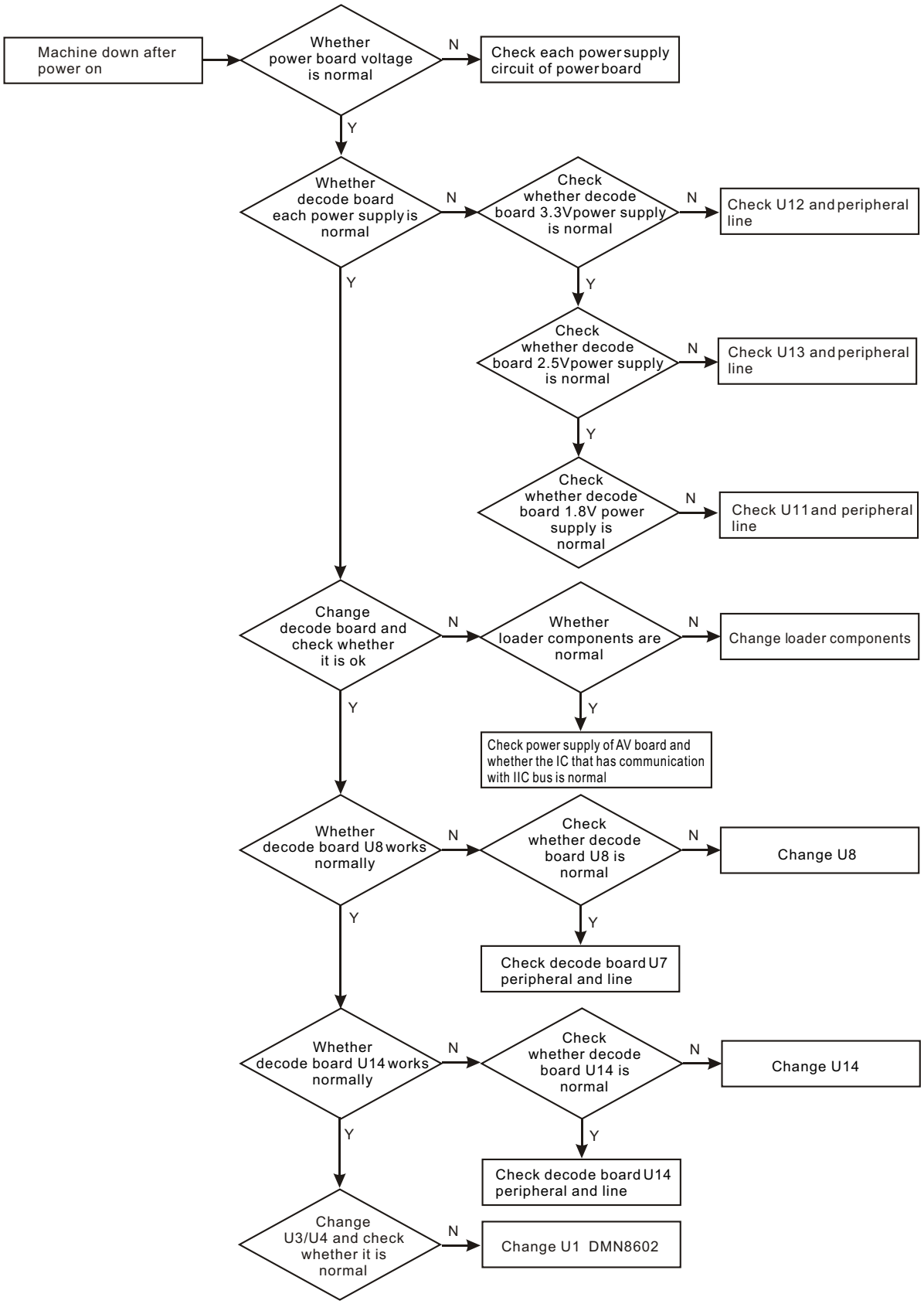


Figure 3.3.2.13 Troubleshooting floe chart for “Machine down after power on”

14. Troubleshooting process for “The player has no output” (no power-on picture and no button function) is shown in the figure 3.3.2.14:

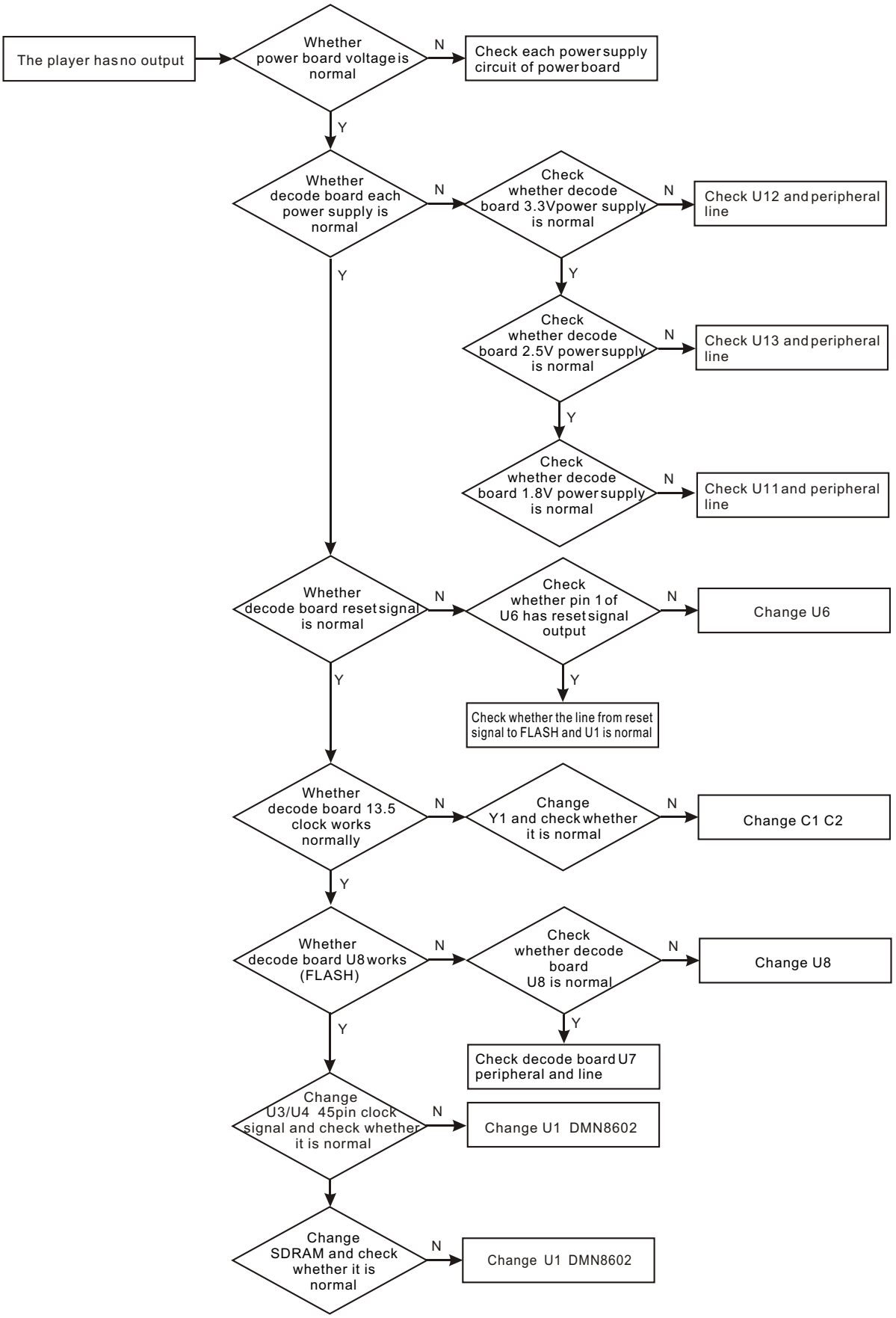


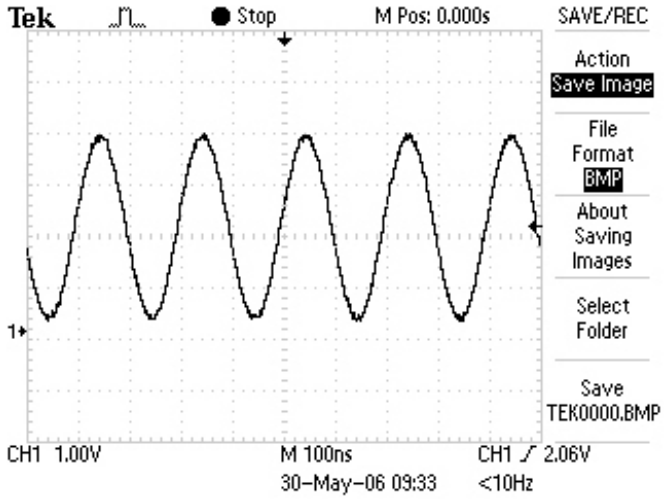
Figure 3.3.2.14 Troubleshooting flow chart for "The player has no output"

Section Four Servicing Parameters

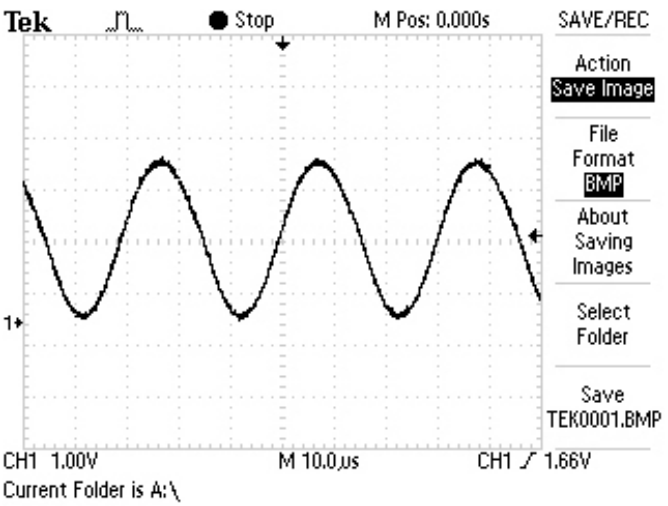
3.4.1 Signal waveform diagram

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

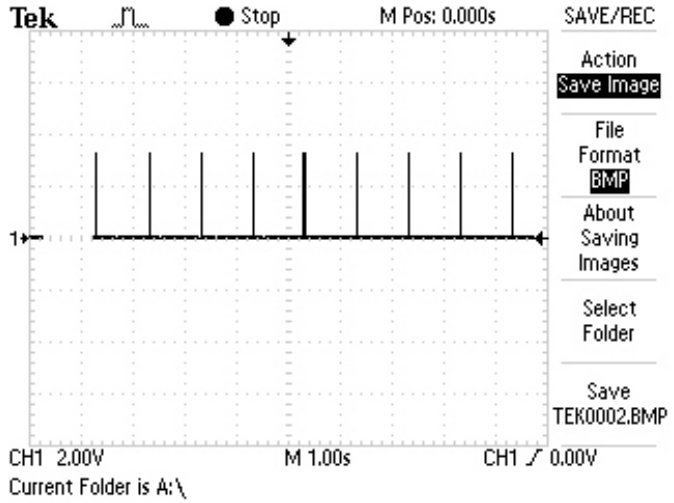
1. Panel main clock (5MHZ) test point U1_51 peak value 3.64V



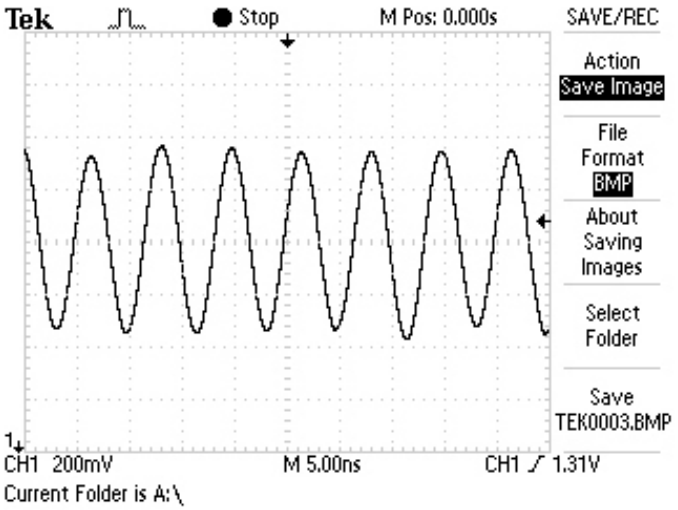
2.Externally connected crystal oscillator of panel clock signal (32.766KHZ) test point U1_2 peak value 3.16V



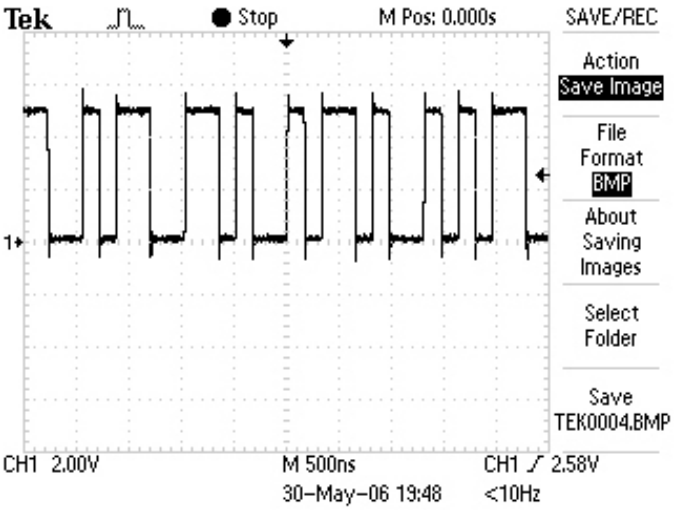
3. VFD_CLK decode board clock signal waveform, test point, panel flat cable position



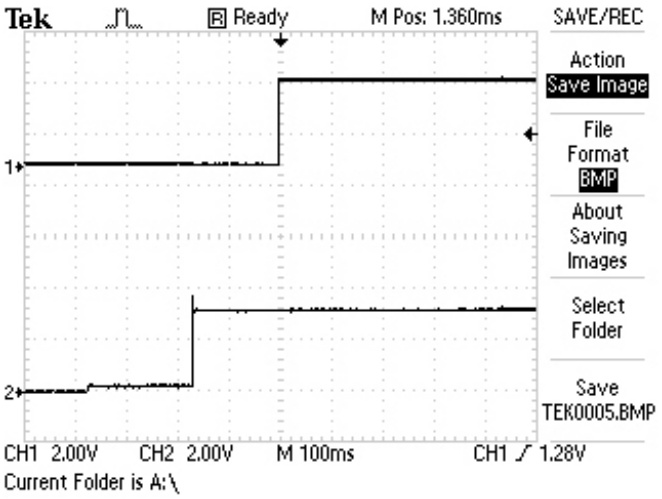
4. SDRAM clock signal waveform diagram test point U3_45 U4_45 peak value 736MV frequency 150MHZ



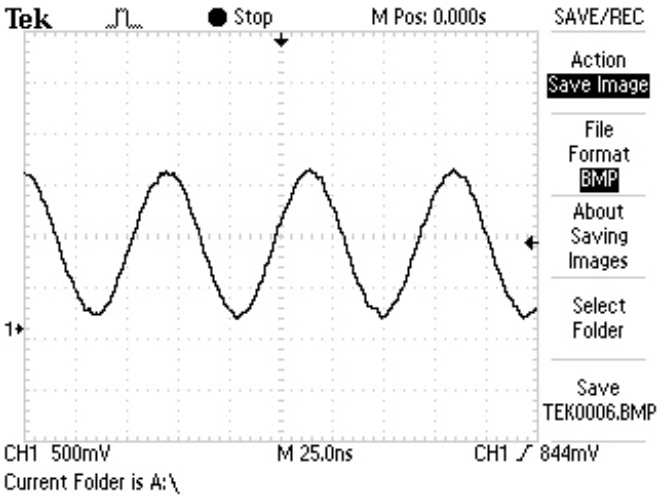
5. SPDIF_OUT signal waveform diagram test point U5_12 peak value 6.56V



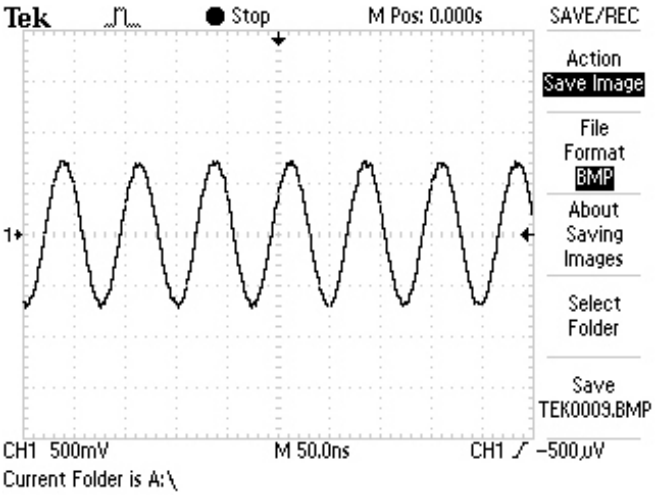
6. System reset signal waveform diagram test point 3.3V power and U5_4



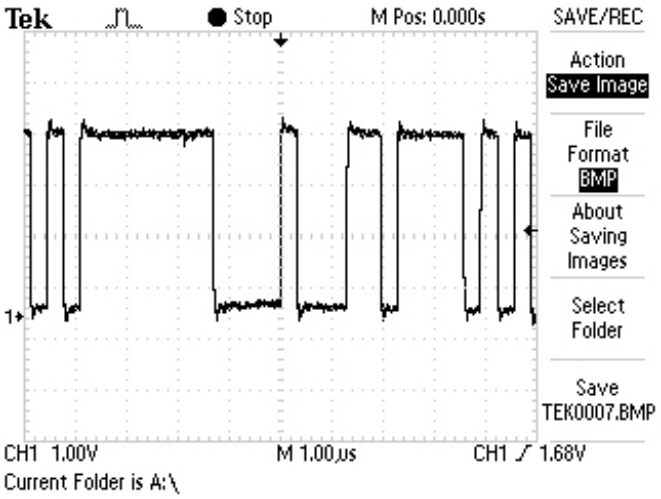
7. Video coder clock waveform diagram test point U14_5 peak value 1.46V frequency 14.3MHZ



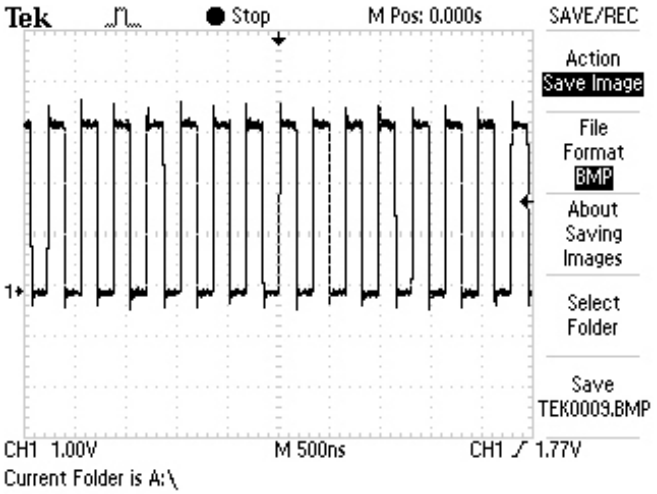
8. Main clock signal waveform (13.5MHZ) test point Y1 peak value voltage 1.44V



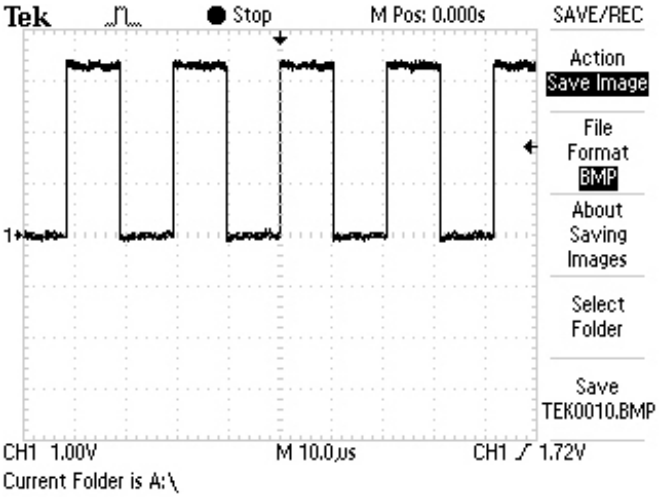
9. Waveform of digital audio signal (AO_D1) outputted by decode chip, when in 5.1CH output, AO_DI/AO_D3 and AO_D1 are the same, test point U15_4 peak value 4.04V test point U15_4



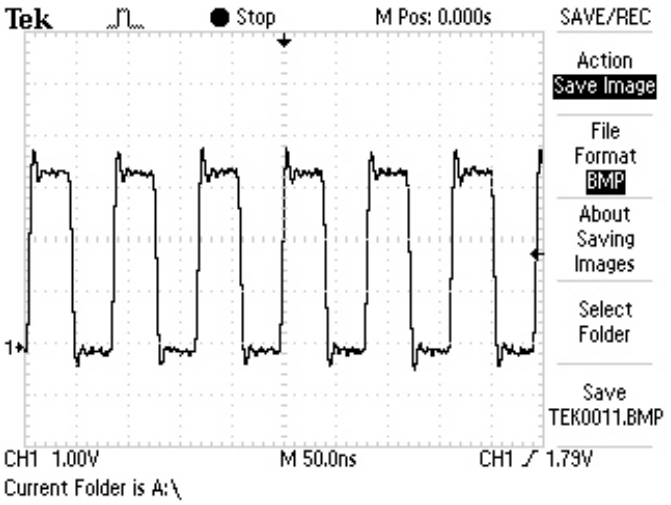
10. AO_SCLK bit clock signal peak value 4.12V voltage 1.64V test point U15_5



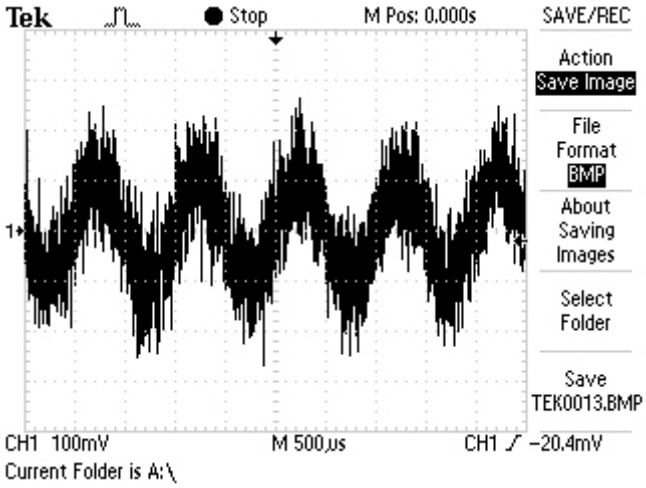
11. AO_FSYNC left/right clock signal peak value 3.52V voltage 1.63V test point U15_6



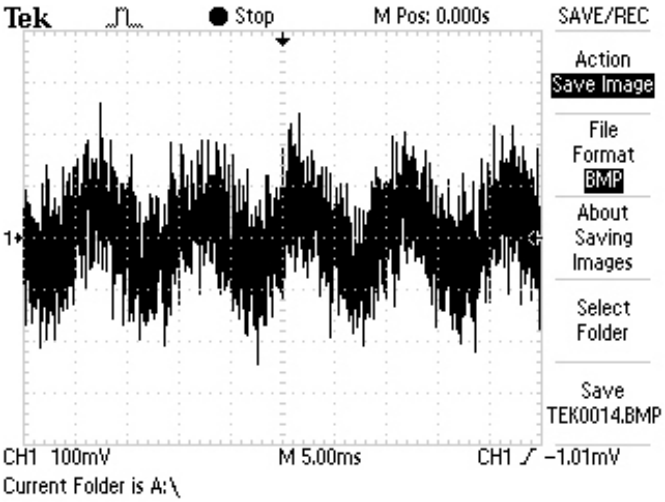
12. AO_MCLKO main clock signal peak value 4.16V voltage 1.66V test point U15_7



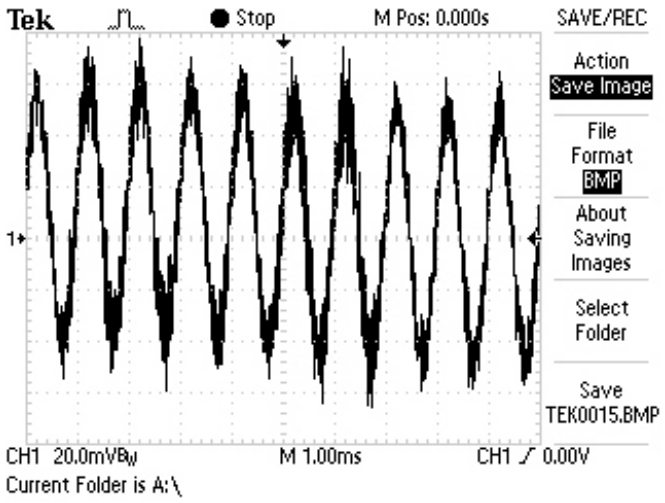
13. Waveform diagram of analog audio signal outputted by CS4360 (1K 0DB signal) left channel, test point R194 (except bass signals, other analog audio output pin waveform is the same)



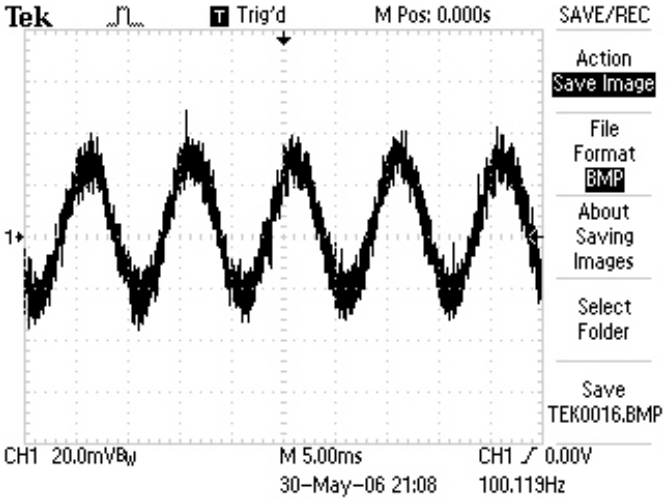
14. Waveform diagram of the analog audio signal outputted by CS4360 (200HZ 0DB signal) test point R191



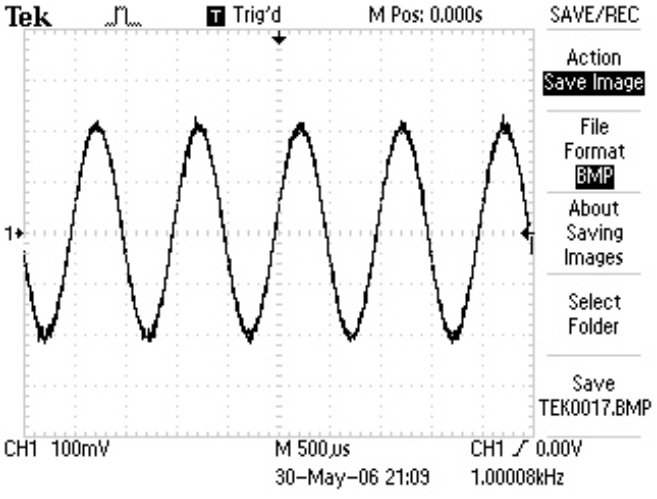
15. Left channel signal after being filtered, test point CN3_14



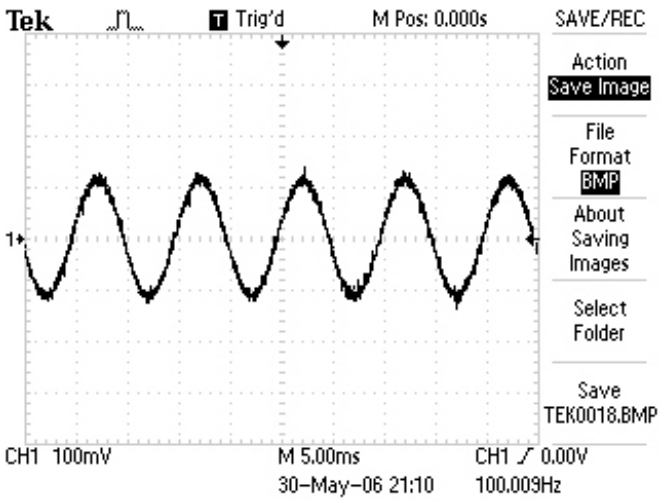
16. Subwoofer signal after being filtered, test point CN3_4



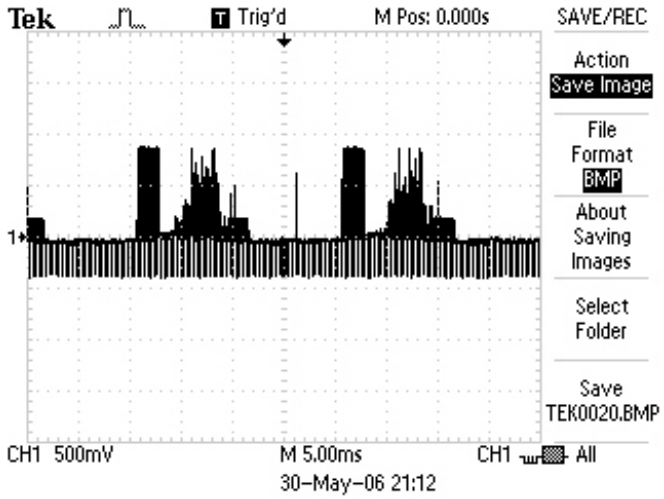
17. Waveform of left channel signal outputted by terminal test point: audio output terminal



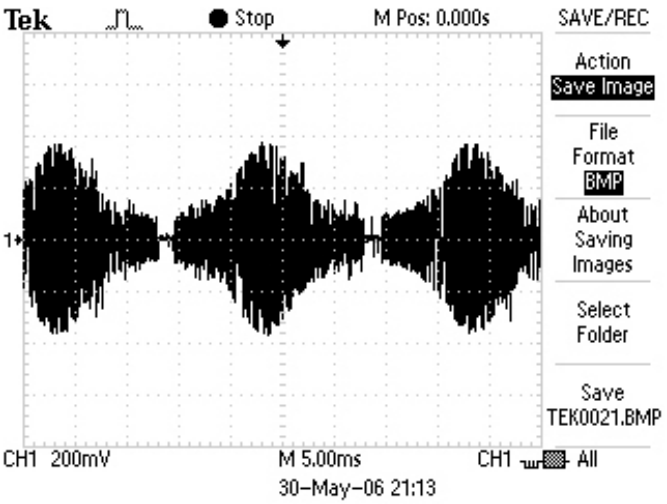
18. Bass signal waveform outputted by terminal test point audio output terminal



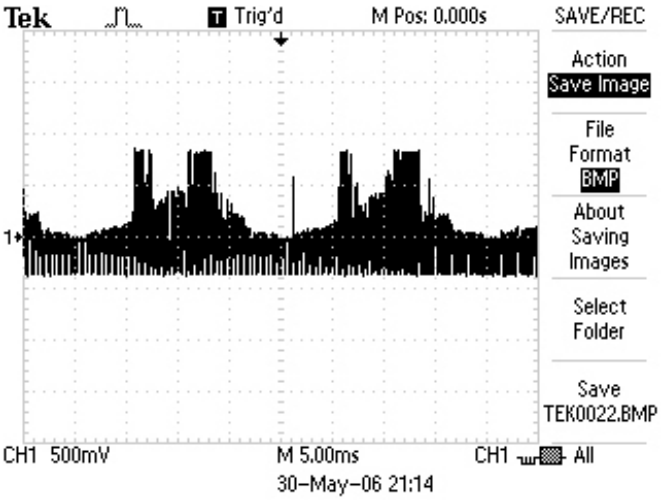
19. Y_OUT (S-Y_OUT) signal waveform diagram, test point CN5_2



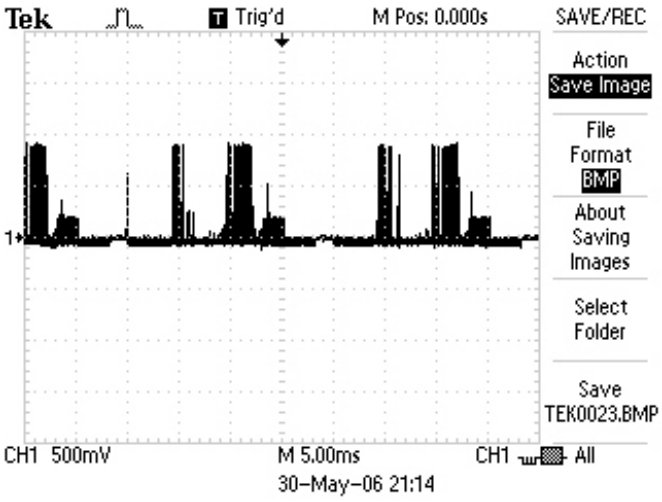
20. C_OUT(S-C_OUT) signal waveform diagram, test point CN5_4



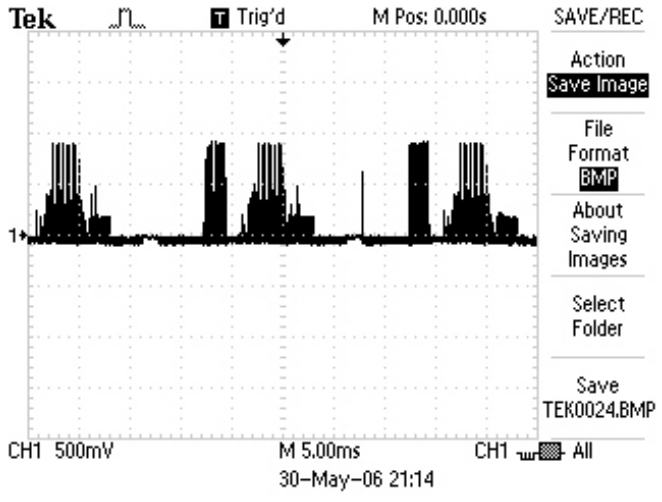
21. CVBS_OUT(V_OUT) signal waveform diagram, test point CN5_6



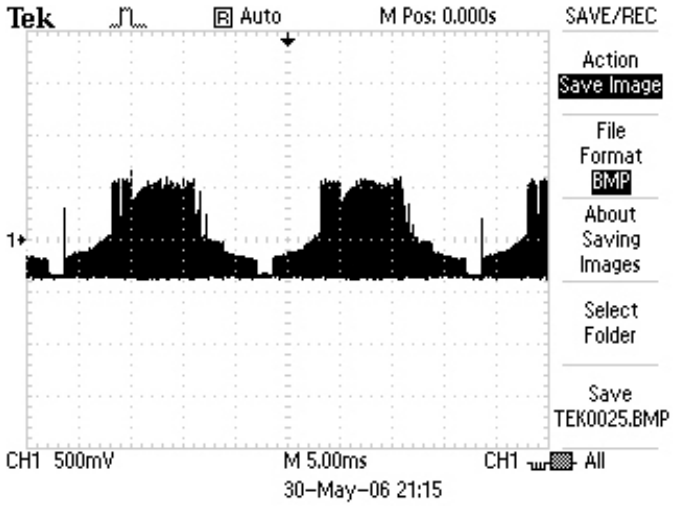
22. PR_OUT(R_V_OUT) signal waveform diagram, test point CN5_8



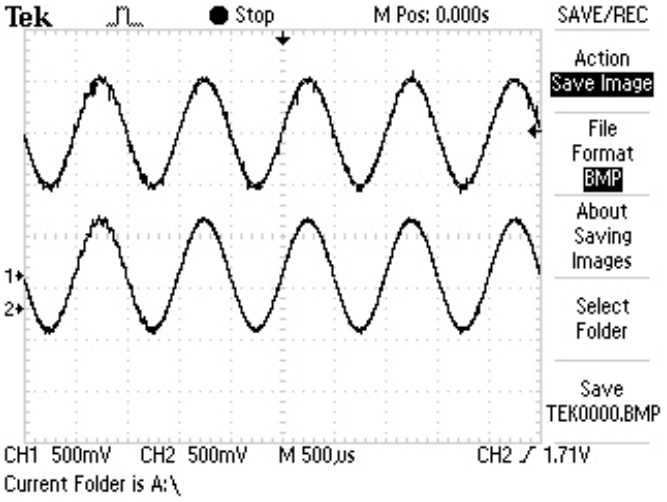
23. Y_OUT(G_Y_OUT) signal waveform diagram, test point CN5_10



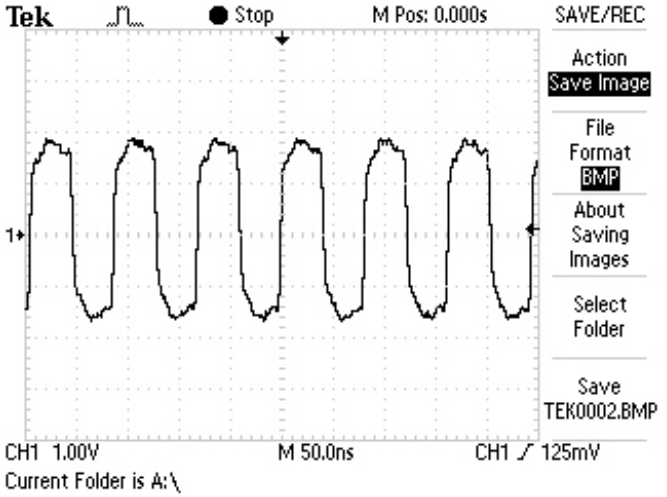
24. PB_OUT(B_U_OUT) signal waveform diagram, test point CN5_12



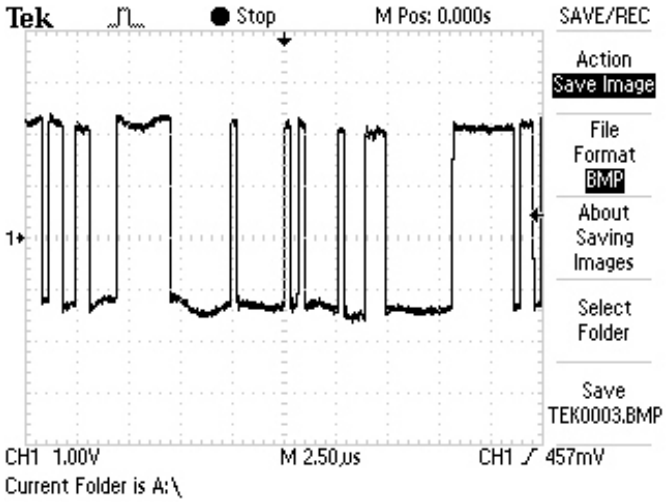
25. External audio input analog audio waveform diagram, test point U17_10 U17_12



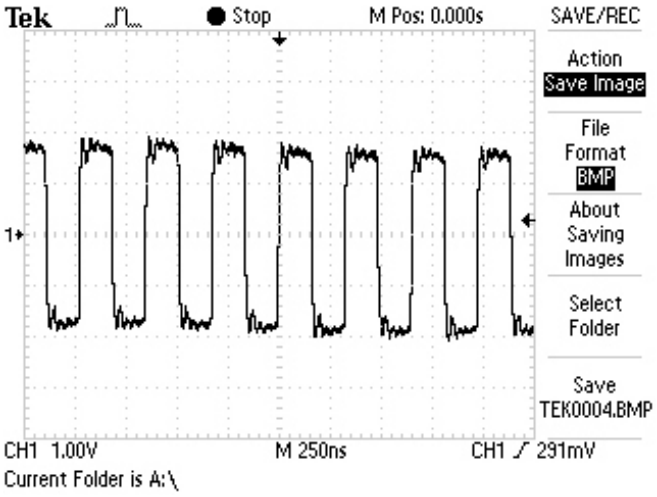
26.I_MCLKO A/D converter main clock signal waveform diagram test point U17_2, peak value 3.56V voltage 1.24V



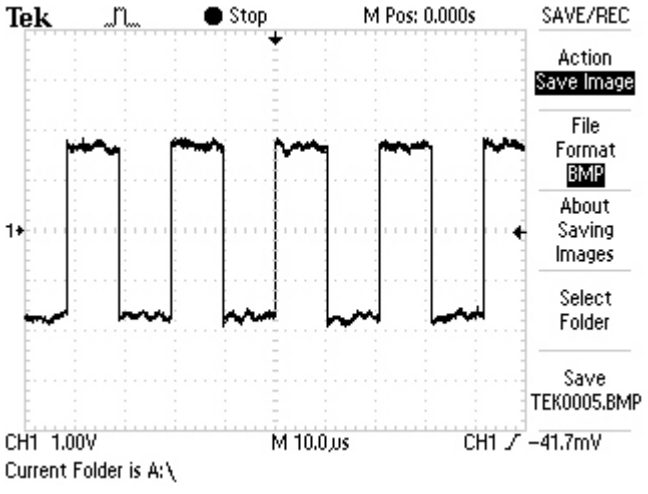
27. Waveform diagram of digital signal outputted after being converted by AI_DO A/D converter test point U17_4 peak value 4.04Vvoltage 1.24V



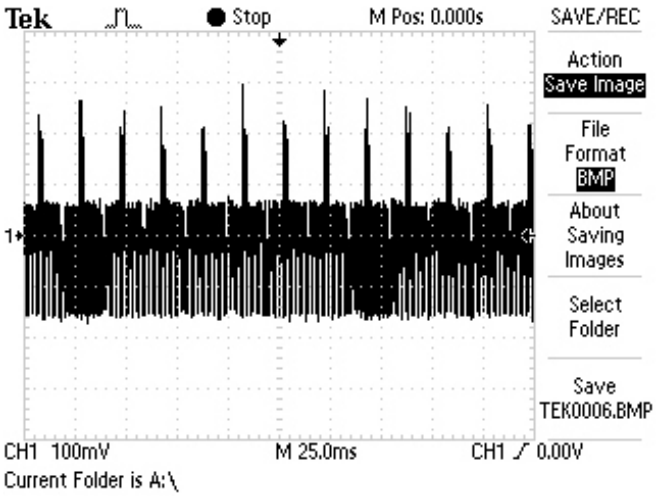
28. I_SCLK A/D converter bit clock signal waveform diagram test point U17_7



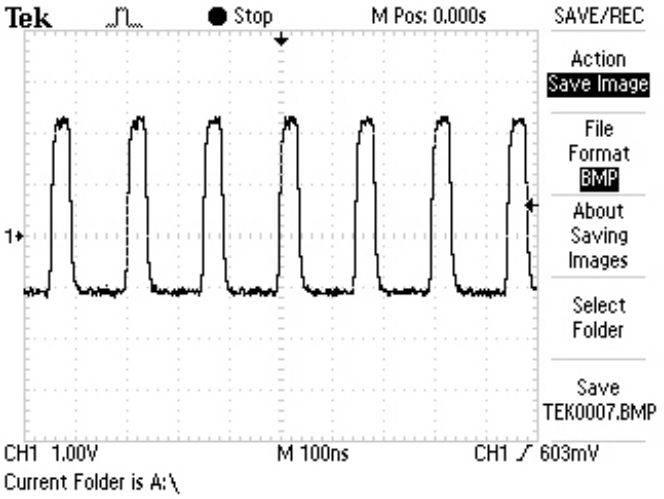
29. I_FSYNC A/D converter function clock signal waveform diagram test point U17_8



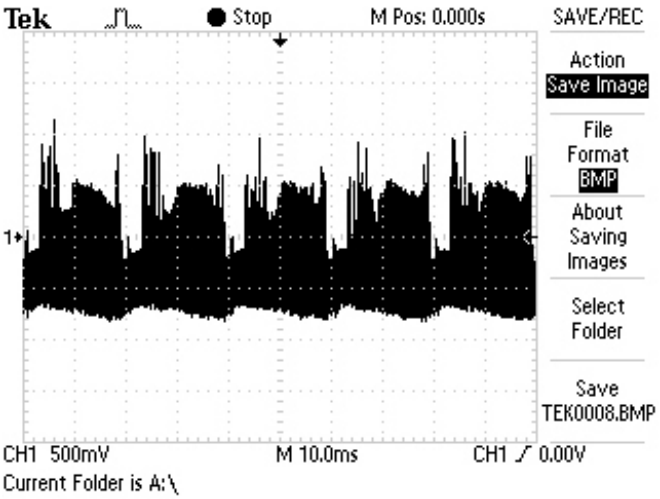
30. Analog input video signal waveform diagram test point U18_3 or U18_13 pin



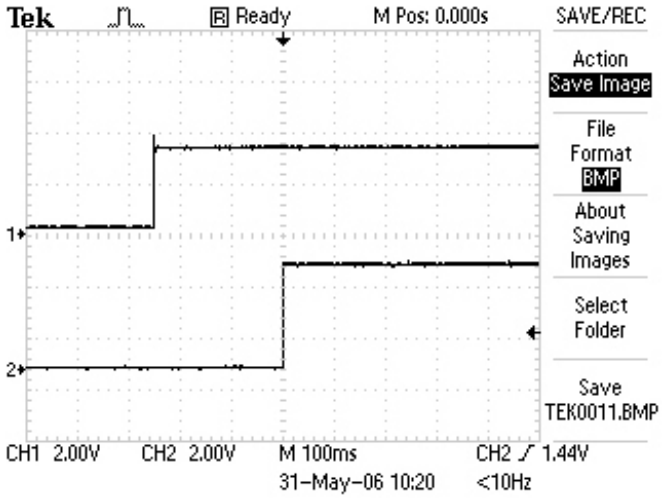
31. Waveform diagram of that switched to digital signal test point RP33 pin voltage 1.03V



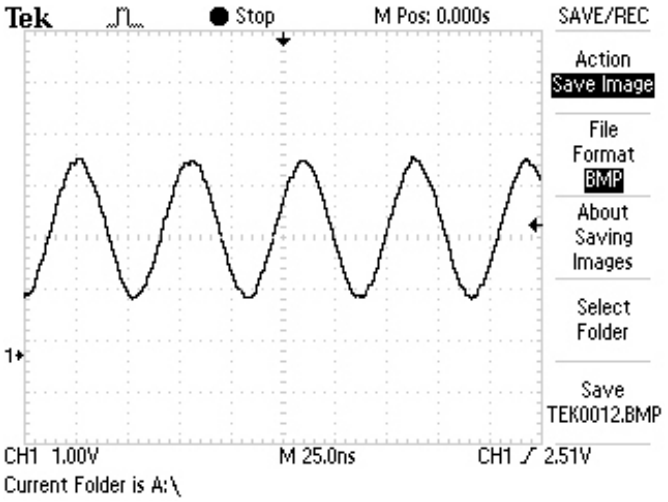
32. Video signal inputted by tuner test point AV board CN2_22



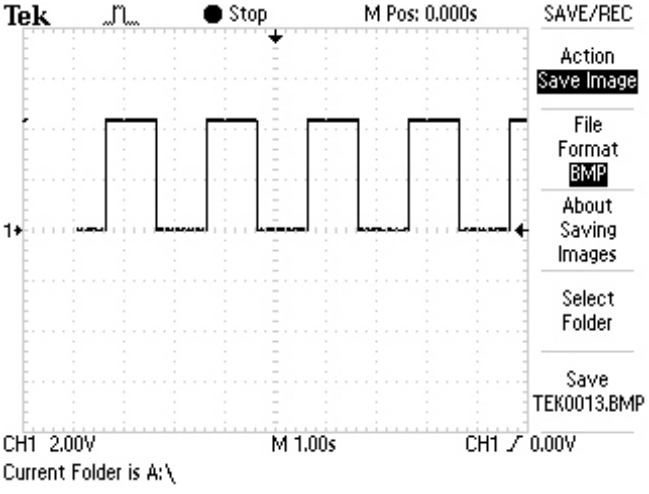
33. Audio reset signal waveform diagram test point 3.3V power supply end and U17_9



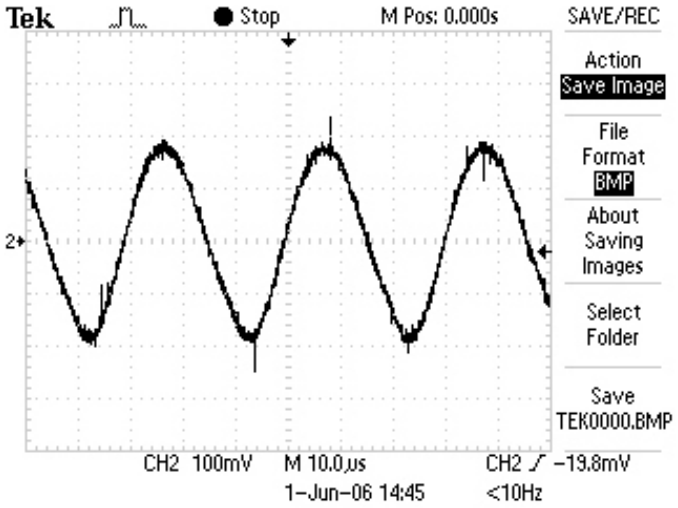
34. NICAM processing IC clock signal X2 test point U6_5 pin voltage 2.76 frequency 18.432MHZ



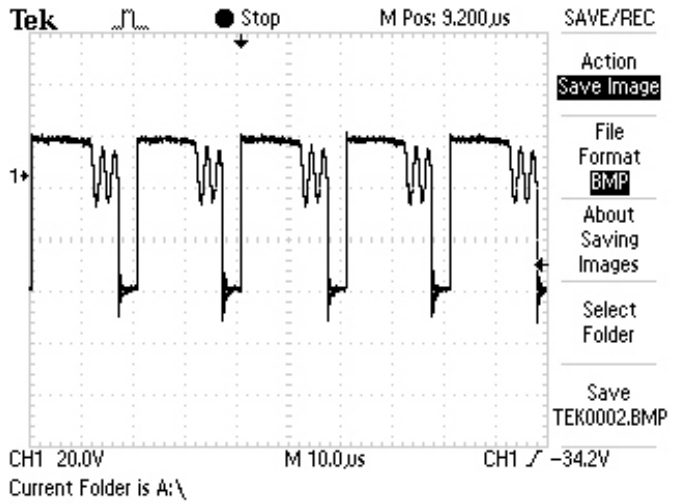
35. standby panel VFD_DIO signal waveform diagram



36. AV board clock circuit waveform diagram, test point U2_1



37. Power board D2 anode waveform diagram



3.4.2 Key point voltage

1. Power board

Key point	Working voltage (V)	Standby voltage (V)	Key point	Working voltage (V)	Standby voltage (V)
CE5 anode	326	326	Q11_B	12.5	12.3
D4 cathode	450	425	Q10_B	2.6	0
D4 anode	340	340	Q10_E	2	2
D7 cathode	15	12	IC4_K	2.5	0
D1 anode	-12.5	-11	CE17 anode	3.3	0
D2 cathode	13	12.8	D16 cathode	2.5	0
D18 cathode	3.9	4.7	IC5_K	2.5	0
D21 cathode	5.1	5.2	IC5_A	5.8	0
D13 anode	-27	-22	L3	3.8	4.7
F-	-21.9	-17	IC3_K	2.5	2.5
F+	-18.9	-14	IC3_A	3.8	3.8
B+12V	13V	12.8	IC2_1	5	5.2
Q9_B	12.1	12.4	Q2_E	5	5.2
V_Ctrl	10.2	0	Q2_C	5	5.1
P_CTL	4.1	0	Q2_B	5.8	0
Q11_C	12	0			

2. Decode board

Key point	Playback status (V)	TV external input status (V)	Key point	Playback status (V)	TV external input status (V)
U2_4	1.25	1.25	U15_13	3.3	3.3
U3_10	2.5	2.5	CN3_1	1.66V	1.66V
U3_49	1.25	1.25	CN3_7	4.3V	4.3V
U3_45	1.25	1.25	CN3_15	0.03	0.03
U6_1	0--3.3	0--3.3	CN3_16	3.31	3.31
U5_2	3.3	3.3	CN3_17	0	0
U9_5	3.2	3.2	CN3_18	3.24	3.24
U9_6	3.2	3.2	CN3_19	3.24	3.24
U10_1	1.6	1.6	CN3_20	0	0
U10_42	1.52	1.52	CN3_21	3.62	3.62
U10_43	1.52	1.52	CN3_22	3.64	3.64
V33_PHY_A	3.3	3.3	CN3_23	0	0
U14_5	0.8	0.8	CN3_24	5.17	5.17

U14_6	0.6	0.6	CN5_1	2.99	2.99
U14_9	1.6	1.6	CN5_2	0.57	0.57
U14_11	0	1.03	CN5_4	0.78	0.78
U14_2	0	0.1	CN5_6	0.64	1.45
U15_10	0--3.3	0--3.3	CN5_8	0.6	0.6
U17_9	0--4.3	0--4.3	CN5_10	0.58	0.58
U15_1	3.3	3.3			

3. Panel

Key point	Working voltage (V)	Standby voltage (V)	Key point	Working voltage (V)	Standby voltage (V)
U1_50	2.6	2.6	Q1_C	4.4	0---4.4
U1_51	2	2	MUTE	0	4.3
U1_2	1.6	1.6	P_CTL_PSW	4.3	0
U1_3	2.6	2.6	RST_HOST_LED	4.3	0
U1_12	4.4	4.4	VFD_DIO	4.3	0-4.3
U2_3	5	5			

4. AV board

Key point	Playback status (V)	TV input status (V)	Key point	Playback status (V)	TV input status (V)
TUN1_1	5	5	Q1_C	5	5
TUN1_2	9.4	9.4	Q1_E	1.7	1.7
TUN1_3	5	5	Q2_B	2.5	2.5
TUN1_4	3.63	3.63	Q2_C	5	5
TUN1_5	3.63	3.63	Q2_E	1.7	1.7
TUN1_6	0	0	U2_1	0	0
TUN1_7	1.42	0.9	U2_2	0.4	0.4
TUN1_8	0	0	U2_5	3.5	3.5
TUN1_9	0	0	U2_6	3.5	3.5
TUN1_10	4.36	1.91	Q4_C	-8	-8
TUN1_11	0	0	U6_1	5	5
TUN1_12	2.14	1.38	U6_2	1.5	1.5
TUN1_13	5	5	U6_5	2.4	2.4
TUN1_14	2.44	2.44	U6_6	2.38	2.38
U1_7	6.2		U6_30	3.75	3.75
U1_9	0	0	U6_31	3.75	3.75
U1_10	3.25	3.25	U6_22	4.19	4.19
Q1_B	2.5	2.5			

Section Five Function Introduction to IC

3.5.1 function introduction to MT 8602

1. Description

The DMN-8602 accepts video from broadcast TV and other analog video sources, and compresses and formats the video for storage on DVD in industry-standard recordable formats (DVD-RAM, DVD-RW/R, DVD+RW/R). The DMN-8602 allows half-duplex operation (record or play back) or full-duplex operation (simultaneous record and playback – time shifting) with only a change of memory configuration. The device permits control of DV camcorders connected via FireWire using the AV/C protocol, and transcodes DV-25 video for storage on DVD. The DMN-8602 also supports leading-edge DVD playback features.

The DMN-8602 supports video compression and decompression in compliance with the MPEG-1, MPEG-2, and DV-25 specifications. It also transcodes between DV-25 and MPEG-2. The product supports corresponding audio compression and decompression in compliance with the Dolby Digital CE and MPEG-1 layer 2 specifications.

The DMN-8602 supports the playback of DVD-Video disks with Dolby Digital 5.1 and DTS audio encoding, DVD Audio disks (MLP), VCD, and SVCD disks. DMN-8602 also supports the play back of audio encoded in MP3 and WMA formats, and the display of pictures encoded in JPEG format.

The DMN-8602 integrates a RISC processor dedicated to video processing that, coupled with a dedicated video digital signal processor and motion estimation engine, enables the handling of multiple advanced-image processing tasks. The DMN-8602 also integrates a RISC processor dedicated to system-level processing and all audio processing tasks. The DMN-8602 supports industry standard audio encoding and decoding formats, as well as audio post-processing tasks such as 3D audio effects and bass management functions.

This combination allows the DMN-8602 to simultaneously handle multiple A/V processing functions while managing all system control tasks, eliminating the need for an external host CPU.

The DMN-8602 has an on-chip ATAPI controller that supports DVD-RAM, DVD-RW/R, and DVD+RW/R recordable DVD drives. The DMN-8602 integrates an analog video encoder, and provides built-in support for simultaneous progressive and interlaced video output. A 1394 link layer function is integrated, requiring only a simple external physical layer device. One USB port is provided, as well as support for PCMCIA 2.1 cards with minimal logic.

The DMN-8602 integrates a RISC processor dedicated to video processing that, coupled with a dedicated video digital signal processor and motion estimation engine, enables the handling of multiple

advanced-image processing tasks. The DMN-8602 also integrates a RISC processor dedicated to system-level processing and all audio processing tasks. The DMN-8602 supports industry standard audio encoding and decoding formats, as well as audio post-processing tasks such as 3D audio effects and bass management functions. This combination allows the DMN-8602 to simultaneously handle multiple A/V processing functions while managing all system control tasks, eliminating the need for an external host CPU.

2. Features

Digital video	A/V Encode/Decode	Multiformat audio and video encode/decode
	Transcoding/rating	Multiformat transcoding, multirate transrating
	Resolutions	Horizontal: 720, 704, 640, 544, 480, 352 Vertical: NTSC (480i, 480p) and PAL (576i)
	Formats	NTSC, PAL, ITU-R BT.656/601, SMPTE 260M
	Input	8- or 10-bit digital video from ITU-R BT.656 (parallel D1) sources; A single 8-bit digital video stream (SMPTE 260M) at 27 MHz
	Output	Single 8-bit ITU-R BT.656 interlaced video output.
Audio	Output	Baseband composite (M) NTSC or (B,D,G,H,I) PAL analog video. Separate analog Y/C outputs to support S-video. Separate analog component video RGB or SMPTE YpbPr outputs.
	Input	Single stream input, supporting common audio formats, including I2S, with four input channels
	Output	Single stream output, supporting common audio formats, including I2S with eight output channels
	Resolutions	16 to 32 bits/sample
	Analog Audio Sampling Frequency	32, 44.1, 48, and 96 kHz output
	Digital Audio Sampling Frequency	8- to 192 kHz over IEC-958
I/O	Serial	IEEE1394, IDC, SPI, IR receive, IR blaster, dual UARTs
	Parallel	ATAPI
	USB1.1	Host low speed and full speed interface. A single port is available for down stream hub or device connection.
System	Host	16/32-bit generic host interface or internal host
	Graphics	2D, 24-bit RGB, 8-bit alpha channel, OSD, flicker filter and video scaler
	Encryption/decryption	CPRM, CPPM, CSS, 5C (via 1394), Watermark detection
Memory	Memory	8-256 Mbytes of SDRAM, SDR or DDR

	Controller	On-chip, 32-bit-wide SDRAM interface, 148.5 MHz
	Peak Bandwidth	1.2 Gbytes/s
Physical	Input Voltages	3.3 V I/O; 1.8 V Core; 2.5 / 3.3 V SDRAM; 3.3 V Isolated Analog
	System Clock	13.5 or 27 MHz
	Operating Power	< 2.7 W @ Vdd = 1.8 V typical
	Package	308-Pin Ball Grid Array (BGA)
JTAG	Compliance	IEEE 1149.1 compliance for boundary scan testing and board assembly testing

3. Signal Descriptions

System Services	CLKI	I	This input provides the timing reference for internally generated DMN-8602 clocks.
	CLKX	I	Connected to the second pin of the 13.5 MHz crystal.
	CLKO_DAC	O	The output of the internal 13.5 MHz crystal oscillator or output a train of digital pulses controlled by the TC Sigma-Delta DAC Control Register (TCdacCtl).
	BYPASS_PLL	I	Bypasses the PLL used to generate the internal processing clock
	#RSEO	O	Reset Out.
	#EPD	O	External Power Down.
	USB_48MHz	I	
1394/ Firewire (Bitstream I/O)	1394_PHY_DATA[7:0]	I/O	Data 0 through data 7 of the phy-link data-bus.
	1394_PHY_CTL[1:0]	I/O	Control 0 and 1 of the phy-link control bus.
	1394_LREQ	O	Link Request.
	1394_LPS	O	Link Power Status.
	1394_LINK_ON	I	Occurrence of a link-on event.
	1394_PHY_CLK	I	PHY_CLK is the 49.152MHz clock supplied by the PHY device.
SDRAM Interface	SDRAM_CLK[1:0]	O	Clock. These outputs are buffered versions of the internal DMN-8602 clock.
	#SDRAM_CLK[1:0]	O	Clock. Differential clock.
	SDRAM_CKE	O	Clock Enable.
	#SDRAM_CAS	O	Column Address Strobe.
	#SDRAM_RAS	O	Row Address Strobe (Activate).
	SDRAM_DQM[3:0]	O	Data Mask (Byte Enables).

	SDRAM_A[17:0]	O	Address, Bank Select, Chip Select.
	SDRAM_DQ[31:0]	I/O	Read / Write Data.
	#SDRAM_WE	O	Write Enable.
	SDRAM_DQS[3:0]	I/O	SDRAM Data Strobe.
	#SDRAM_VREF	I	Reference voltage for SSTL.
Video I/O Interface	VI_CLK	I	Video Input Clock.
	VI_D[9:2]	I	Video Input Data.
	VO_D[7:0]	O	Video Output Data.
	VI_VSYNC	I	Video Input Vertical Sync.
	VO_CLK	I/O	Video Output Clock.
	DAC_OUT[6:1]	I	Analog Video DAC output.
IDC Serial I/O)	SIO_SDA	I/O	IDC clock (open drain).
	SIO_SCL	I/O	IDC data (open drain).
Boundary Scan (JTAG)	#TRST	I	Test Reset
	TDO	O	Test Data Out
	TDI	I	Test Data In
	TMS	I	Test Mode Select
	TCK	I	Test Clock
USB	Dplus	I/O	This is the USB transceiver port differential D+ and D– signals.
	Dminus]	I/O	
	Host_OC	I	This is the USB transceiver port 0 power enable for the external USB power management chips.
	Host_PO	O	This is the USB transceiver port 0 over-current status signal from the external USB power management chips.
UART[2:1] (Serial I/O)	SIO_UART[2:1]_TX	I	UART clear to send.
	SIO_UART[2:1]_RX	O	UART receive.
	SIO_UART[1]_RTS	I	UART request to send.
	SIO_UART[1]_CTS	O	UART transmit.
IR (Serial I/O)	SIO_IRTX1	I	IR transmit 1.
	SIO_IRTX2	O	IR transmit 2
	SIO_IRRX	O	IR receive input.
SPI (Serial I/O)	SIO_SPI_CLK	O	SPI clock.
	SIO_SPI_MOSI	O	SPI master out slave in.
	SIO_SPI_MISO	I	SPI master in slave out.

	SIO_SPI_CS[2:0]	O	SPI chip selects.
ATAPI 1 (Bitstream I/O)	ATAPI_RESET	O	DMN-8602 reset of connected ATAPI devices.
	ATAPI_DATA[15:8]	I	ATAPI_DATA is the bidirectional data bus.
	ATAPI_ADDR[4:0]	I	Device register address.
	#ATAPI_DIOW	I	ATAPI I/O write request.
	#ATAPI_DIOR	O	ATAPI I/O read request.
	ATAPI_INTRQ	O	ATAPI device interrupt request.
	ATAPI_IORDY	I	ATAPI device IO ready.
	ATAPI_DMARQ	I/O	ATAPI device DMA request.
	#ATAPI_DMAACK	O	ATAPI DMA acknowledgement.
Host Interface	HMST_GPIO[6:0]	I/O	General purpose dedicated I/O [6:0].
	#HMST_RST	I	Master Reset signal.
	#HMST_CS[10:0]	O	Master chip select [10:0] outputs.
	M_Addr[26:22]	O	Most significant five host address bits [26:22].
	M_Addr[21:6]/M_Data[15:0]	I/O	Host address bus bits [21:6]./ Host data bus.
	M_Addr[5:1]	O	Least significant five host address bits [5:1]
	#HMST_UWE, HMST_UDS	O	Master upper data strobe (68K-mode).
	#HMST_RD/WR, HMST_LWE	O	Master data transfer direction (68K-mode).
	#HMST_OE, HMST_LDS	O	Master lower data strobe (68K-mode).
	#HMST_ALE	O	Master address latch enable.
	#HMST_WAIT	I	Master wait signal from peripheral.
	#HMST_DTACK	I	Master data transfer acknowledge.
	HMST_CS0_8BIT	I	Set host CS[0] to 8-bit mode in master mode.
	#PCMCIA_IOR	I	PCMCIA I/O read.
	#PCMCIA_IOW	I	PCMCIA I/O write.
Audio I/O Interface	AI_SCLK	I/O	Serial audio bit clock for the audio input stream.
	AO_SCLK	O	Serial audio bit clock for the audio output stream.
	AI_MCLKO	O	Audio Master Input Clock output for the internally generated master input clock.
	AI_MCLKI	I	Audio Master Input Clock input for an externally generated master input clock.
	AO_MCLKO	O	Audio Master Output Clock output for the internally generated master output clock.

	AO_MCLKI	I	Audio Master Output Clock input for an externally generated master output clock.
	AI_D[1:0]	I	Audio Input Data.
	AO_D[3:0]	O	Audio Stream Output Data.
	AI_FSYNC	I/O	AI_FSync determines the start or end of the next stream input sample
	AO_FSYNC	O	AO_FSync determines the start or end of the next stream output sample
	AO_IEC958	O	IEC-958 Interface Output.

3.5.2 Function introduction to CD4053

CD4053 is a 4-group 2-channel data selection device, and is mainly used in the input, output selection of SCART and the realization of LOGO function in DVD recorder. Each pin function is shown as follows:

Pin	Name	Function	Remark
1、2	Y1、Y0	Y signal input	I
13、12	X1、X0	X signal input	I
3、5	Z1、Z0	Z signal output	I
6	EN	Enable end: low level effective	I
7	VEE	-6.2V power	
8	GND	ground	
16	VCC	+5V power	
9、10、11	C、B、A	Gating signal control input	I
14	X	X signal output	O
15	Y	Y signal output	O
4	Z	Z signal output	O

A, B signal strobe condition:

A、B、C	X、Y、Z	Remark
0	X0、Y0、Z0	When A, B, C end is low level, output end X, Y, Z outputs the signals inputted by X0, Y0, Z0.
1	X1、Y1、Z1	When A, B, C end is high level, output end X, Y, Z outputs the signals inputted by X1, Y1, Z1.

Note: in the circuit, part of input pins are not used, A、B、C control end is controlled by LOOP control circuit. When in standby status, LOOP_DECODER_C is high level, when power on, LOOP_DECODER_C is low level.

3.5.3 function introduction to TSB41AB1

1. description

The TSB41AB1 provides the digital and analog transceiver functions needed to implement a one-port node in a cable-based IEEE 1394 network. The cable port incorporates one differential line transceiver. The transceiver includes circuitry to monitor the line conditions as needed for determining connection status, for initialization and arbitration, and for packet reception and transmission. The TSB41AB1 is designed to interface with a link layer controller (LLC).

The TSB41AB1 requires only an external 24.576-MHz crystal as a reference. An external clock may be provided instead of a crystal. An internal oscillator drives an internal phase-locked loop (PLL), This reference signal is internally divided to provide the clock signals used to control transmission of the outbound encoded strobe and data information. The power-down (PD) function, when enabled by asserting the PD terminal high, stops operation of the PLL.

The TSB41AB1 supports an optional isolation barrier between itself and its LLC. When the ISO input terminal is tied high, the LLC interface outputs behave normally. When the ISO terminal is tied low, internal differentiating logic is enabled, and the outputs are driven such that they can be coupled through a capacitive or transformer galvanic isolation barrier as described in Annex J of IEEE Std 1394-1995 and in IEEE 1394a-2000 (section 5.9.4) (hereinafter referred to as Annex J type isolation). To operate with TI bus holder isolation the ISO terminal on the PHY must be high.

Data bits to be transmitted through the cable port are received from the LLC on two, four or eight parallel paths (depending on the requested transmission speed) and are latched internally in the TSB41AB1 in synchronization with the 49.152-MHz system clock. These bits are combined serially, encoded, and transmitted at 98.304, 196.608, or 393.216 Mbits/s (referred to as S100, S200, and S400 speeds, respectively) as the outbound data-strobe information stream. During transmission, the encoded data information is transmitted differentially on the TPB cable pair, and the encoded strobe information is transmitted differentially on the TPA cable pair.

During packet reception the TPA and TPB transmitters of the receiving cable port are disabled, and the receivers for that port are enabled. The encoded data information is received on the TPA cable pair, and the encoded strobe information is received on the TPB cable pair. The received data-strobe information is decoded to recover the receive clock signal and the serial data bits. The serial data bits are split into two-, four-, or eight-bit parallel streams (depending upon the indicated receive speed), resynchronized to the local 49.152-MHz system clock and sent to the associated LLC.

Both the TPA and TPB cable interfaces incorporate differential comparators to monitor the line states during initialization and arbitration. The outputs of these comparators are used by the internal logic to determine the arbitration status. The TPA channel monitors the incoming cable common-mode voltage. The value of this common-mode voltage is used during arbitration to set the speed of the next packet transmission. In addition, the TPB channel monitors the incoming cable common-mode voltage on the TPB pair for the presence of the remotely supplied twisted-pair bias voltage.

The TSB41AB1 provides a 1.86-V nominal bias voltage at the TPBIAS terminal for port termination. This bias voltage, when seen through a cable by a remote receiver, indicates the presence of an active connection. This bias voltage source must be stabilized by an external filter capacitor of 1 μF. TPBIAS is typically VDD¨C0.2 V when the port is not connected to another node.

The line drivers in the TSB41AB1 operate in a high-impedance current mode, and are designed to work with external 112-? line-termination resistor networks in order to match the 110-? cable impedance. One network is provided at each end of a twisted-pair cable. Each network is composed of a pair of series-connected 56-? resistors. The midpoint of the pair of resistors that is directly connected to the twisted-pair-A terminals is connected to its corresponding TPBIAS voltage terminal. The midpoint of the pair of resistors that is directly connected to the twisted-pair-B terminals is coupled to ground through a parallel R-C network with recommended values of 5 k? and 220 pF. The values of the external line termination resistors are designed to meet IEEE Std 1394-1995 when connected in parallel with the internal receiver circuits. An external resistor connected between the R0 and R1 terminals sets the driver output current, along with other internal operating currents. This current-setting resistor has a value of 6.34 k? ±1.0%.

When the power supply of the TSB41AB1 is off while the twisted-pair cables are connected, the TSB41AB1 transmitter and receiver circuitry presents a high impedance to the cable and does not load the TPBIAS voltage at the other end of the cable. Fail-safe circuitry blocks any leakage path from the port back to the device powerplane.

The TESTM, SE, and SM terminals are used to set up various manufacturing test conditions. For normal operation, the TESTM terminal should be connected to VDD through a 1-k? resistor, SE should be tied to ground through a 1-k? resistor, and SM should be connected directly to ground.

Four package terminals are used as inputs to set the default value for four configuration status bits in the self-ID packet, and are tied high through a 1-k? resistor or hardwired low as a function of the equipment design. The PC0¨CPC2 terminals are used to indicate the default power-class status for the node (the need for power from the cable or the ability to supply power to the cable). See Table 9 for power-class encoding. The C/LKON terminal is used as an input to indicate that the node is a contender for either isochronous resource manager (IRM) or for bus manager (BM).

The TSB41AB1 supports suspend/resume as defined in the IEEE 1394a-2000 specification. The suspend mechanism allows pairs of directly connected ports to be placed into a low-power state (suspended state) while maintaining a port-to-port connection between bus segments. While in the suspended state, a port is unable to transmit or receive data transaction packets. However, a port in the suspended state is capable of detecting connection status changes and detecting incoming TPBIAS. When the port of the TSB41AB1 is suspended, all circuits except the band gap reference generator and bias detection circuit is powered down, resulting in significant power savings. For additional details of suspend/resume operation see IEEE 1394a-2000. The use of suspend/resume is recommended for new designs.

The port transmitter and receiver circuitry is disabled during power down (when the PD input terminal is asserted high), during reset (when the RESET input terminal is asserted low), when no active cable is

connected to the port, or when controlled by the internal arbitration logic. The TPBIAS output is disabled during power down, during reset, or when the port is disabled as commanded by the LLC.

The cable-not-active (CNA) output terminal (64-terminal PAP package only) is asserted high when there are no twisted-pair cable ports receiving incoming bias (that is, they are either disconnected or suspended), and can be used along with LPS to determine when to power down the TSB41AB1. The CNA output is not debounced. When the PD terminal is asserted high, the CNA detection circuitry is enabled (regardless of the previous state of the ports) and a pulldown is activated on the RESET terminal so as to force a reset of the TSB41AB1 internal logic.

The LPS (link power status) terminal works with the C/LKON terminal to manage the power usage in the node. The LPS signal from the LLC is used in conjunction with the LCtrl bit (see Table 1 and Table 2 in the Application Information section) to indicate the active/power status of the LLC. The LPS signal is also used to reset, disable, and initialize the PHY-LLC interface (the state of the PHY-LLC interface is controlled solely by the LPS input, regardless of the state of the LCtrl bit).

The LPS input is considered inactive if it remains low for more than 2.6 μs and is considered active otherwise. When the TSB41AB1 detects that LPS is inactive, it places the PHY-LLC interface into a low-power reset state in which the CTL and D outputs are held in the logic zero state and the LREQ input is ignored; however, the SYSCLK output remains active. If the LPS input remains low for more than 26 μs, the PHY-LLC interface is put into a low-power disabled state in which the SYSCLK output is also held inactive. The PHY-LLC interface is also held in the disabled state during hardware reset. The TSB41AB1 continues the necessary repeater functions required for normal network operation regardless of the state of the PHY-LLC interface. When the interface is in the reset or disabled state and LPS is again observed active, the PHY initializes the interface and returns it to normal operation.

When the PHY-LLC interface is in the low-power disabled state, the TSB41AB1 automatically enters a low-power mode if the port is inactive (disconnected, disabled, or suspended). In this low-power mode, the TSB41AB1 disables its internal clock generators and also disables various voltage and current reference circuits depending on the state of the port (some reference circuitry must remain active in order to detect new cable connections, disconnections, or incoming TPBIAS, for example). The lowest power consumption (the ultralow-power sleep mode) is attained when the port is either disconnected, or disabled with the port interrupt enable bit cleared. The TSB41AB1 exits the low-power mode when the LPS input is asserted high or when a port event occurs which requires that the TSB41AB1 become active in order to respond to the event or to notify the LLC of the event (for example, incoming bias is detected on a suspended port, a disconnection is detected on a suspended port, a new connection is detected on a nondisabled port, etc.). The SYSCLK output becomes active (and the PHY-LLC interface is initialized and becomes operative) within 7.3 ms after LPS is asserted high when the TSB41AB1 is in the low-power mode.

The PHY uses the C/LKON terminal to notify the LLC to power up and become active. When activated, the C/LKON signal is a square wave of approximately 163-ns period. The PHY activates the C/LKON output when the LLC is inactive and a wake-up event occurs. The LLC is considered inactive when either the LPS

input is inactive, as described above, or the LCtrl bit is cleared to 0. A wake-up event occurs when a link-on PHY packet addressed to this node is received, or when a PHY interrupt occurs. The PHY deasserts the C/LKON output when the LLC becomes active (both LPS active and the LCtrl bit set to 1). The PHY also deasserts the C/LKON output when a bus reset occurs unless a PHY interrupt condition exists which would otherwise cause C/LKON to be active.

2. FEATURE

◆ Fully Supports Provisions of IEEE 1394-1995 Standard for High Performance Serial Bus. and IEEE 1394a-2000

◆ Fully Interoperable With FireWire and i.LINK Implementation of IEEE Std 1394

◆ Fully Compliant With OpenHCI Requirements

◆ Provides One IEEE 1394a-2000 Fully Compliant Cable Port at 100/200/400 Megabits Per Second (Mbits/s)

◆ Full IEEE 1394a-2000 Support Includes: Connection Debounce, Arbitrated Short Reset, Multispeed Concatenation, Arbitration Acceleration, Fly-By Concatenation, Port Disable/Suspend/Resume

◆ Register Bits Give Software Control of Contender Bit, Power Class Bits, Link Active Control Bit, and IEEE 1394a-2000 Features

◆ IEEE 1394a-2000 Compliant Common Mode Noise Filter on Incoming TPBIAS

◆ Extended Resume Signaling for Compatibility With Legacy DV Devices, and Terminal- and Register-Compatibility With TSB41LV01, Allow Direct Isochronous Transmit to Legacy DV Devices With Any Link Layer Even When Root

◆ Power-Down Features to Conserve Energy in Battery Powered Applications Include: Automatic Device Power Down During Suspend, Device Power-Down Terminal, Link Interface Disable via LPS, and Inactive Ports Powered Down

◆ Failsafe Circuitry Senses Sudden Loss of Power to the Device and Disables the Port to Ensure That the Device Does Not Load TPBIAS of the Connected Device and Blocks Any Leakage Path From the Port Back to the Device Power Plane

◆ Software Device Reset (SWR)

◆ Industry Leading Low Power Consumption

◆ Ultralow-Power Sleep Mode

◆ Cable Power Presence Monitoring

◆ Cable Ports Monitor Line Conditions for Active Connection to Remote Node

◆ Data Interface to Link-Layer Controller Through 2/4/8 Parallel Lines at 49.152 MHz

◆ Interface to Link Layer Controller Supports Low Cost TI Bus-Holder Isolation and Optional Annex J Electrical Isolation

◆ Interoperable With Link-Layer Controllers Using 3.3 V

◆ Single 3.3-V Supply Operation

◆ Low-Cost 24.576-MHz Crystal Provides Transmit, Receive Data at 100/200/400 Mbits/s, and Link-Layer Controller Clock at 49.152 MHz

◆ Low-Cost High-Performance 48/64-Pin TQFP (PHP/PAP) Thermally Enhanced Packages Increase Thermal Performance by up to 210%

◆ Meets Intel Mobile Power Guideline 2000

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	SYSCLK	O	System clock output.
2	CTL0	I/O	Control I/Os.
3	CTL1		
4	D0	I/O	Data I/Os.
5	D1		
6	D2		
7	D3		
8	D4		
9	D5		
10	D6		
11	D7		
12	PD	I	Power-down input.
13	LPS	I	Link power status input.
14	DGND	I	Digital ground
15	C/LKON	I	Bus manager contender programming input and link-on output.
16	PC0	I	Power class programming inputs.
17	PC1	I	
18	PC2	I	
19	#ISO	I	Link interface isolation control input.
20	CPS	I	Cable power status input.
21	DVDD	I	Digital power
22	TESTM	I	Test control input.
23	SE	I	Test control input.
24	SM	I	Test control input.
25	AVDD	I	Analog power
26	AGND	I	Analog ground

27	TPB+	I/O	Twisted-pair cable B differential signal terminals.
28	TPB-	I/O	
29	TPA -	I/O	Twisted-pair cable A differential signal terminals.
30	TPA+	I/O	
31	TPBIAS	O	Twisted-pair bias output.
32	AGND	I	Analog ground
33	R0		Current setting resistor terminals.
34	R1		
35	AVDD	I	Analog power
36	AGND	I	Analog ground
37	#RESET		Reset input
38	FILTER0	I/O	PLL filter terminals.
39	FILTER1		
40	PLLVDD	I	PLL power
41	PLLGND	I	PLL ground
42	XI	I	Crystal oscillator inputs.
43	XO		
44	DVDD	I	Digital power
45	DVDD	I	
46	DGND	I	Digital ground
47	DGND	I	
48	LREQ	I	LLC request input.

3.5.4 function introduction to M13S128168A

1. DESCRIPTION

2M x 16 Bit x 4 Banks

Double Data Rate SDRAM

2. FATUER

- ◆ JEDEC Standard
- ◆ Internal pipelined double-data-rate architecture, two data access per clock cycle
- ◆ Bi-directional data strobe (DQS)
- ◆ On-chip DLL

- ◆ Differential clock inputs (CLK and CLK)
- ◆ DLL aligns DQ and DQS transition with CLK transition
- ◆ Quad bank operation
- ◆ CAS Latency : 3
- ◆ Burst Type : Sequential and Interleave
- ◆ Burst Length : 2, 4, 8
- ◆ All inputs except data & DM are sampled at the rising edge of the system clock(CLK)
- ◆ Data I/O transitions on both edges of data strobe (DQS)
- ◆ DQS is edge-aligned with data for reads; center-aligned with data for WRITE
- ◆ Data mask (DM) for write masking only
- ◆ VDD = 2.375V ~ 2.75V, VDDQ = 2.375V ~ 2.75V
- ◆ Auto & Self refresh
- ◆ 7.8us refresh interval
- ◆ SSTL-2 I/O interface
- ◆ 66pin TSOPII package

3. PIN DESCRIPTION

PIN	Symbol	Description
1	VDD	Supply Voltage
2	DQ0	Data-in/Data-out
3	VDDQ	Supply Voltage for DQ
4	DQ1	Data-in/Data-out
5	DQ2	Data-in/Data-out
6	VSSQ	Ground for DQ
7	DQ3	Data-in/Data-out
8	DQ4	Data-in/Data-out
9	VDDQ	Ground for DQ
10	DQ5	Data-in/Data-out
11	DQ6	Data-in/Data-out
12	VSSQ	Ground for DQ
13	DQ7	Data-in/Data-out
14	NC	No connection
15	VDDQ	Supply Voltage for DQ
16	LDQS	LDQS corresponds to the data on DQ0~DQ7;
17	NC	No connection

18	VDD	Power supply
19	NC	No connection
20	LDM	LDM corresponds to the data on DQ0~DQ7;
21	#WE	Write enable
22	#CAS	Column address strobe
23	#RAS	Row address strobe
24	#CS	Selection input
25	NC	No connection
26	BA	Bank selects
27	BA	Bank selects
28	A10/AP	Address inputs
29	A0	Address inputs
30	A1	Address inputs
31	A2	Address inputs
32	A3	Address inputs
33	VDD	Supply Voltage
34	VSS	Ground
35	A4	Address inputs
36	A5	Address inputs
37	A6	Address inputs
38	A7	Address inputs
39	A8	Address inputs
40	A9	Address inputs
41	A11	Address inputs
42	NC	No connection
43	NC	No connection
44	CKE	Clock enable
45	CLK	Clock input
46	#CLK	Clock input
47	UDM	UDM correspond to the data on DQ8~DQ15.
48	VSS	Ground
49	VREF	Reference Voltage for SSTL-2
50	NC	No connection

51	UDQS	Ground
52	VSSQ	Ground for DQ
53	NC	No connection
54	DQ8	Data-in/Data-out
55	VDDQ	Supply Voltage for DQ
56	DQ9	Data-in/Data-out
57	DQ10	Data-in/Data-out
58	VSSQ	Ground for DQ
59	DSQ11	Data-in/Data-out
60	DQ12	Data-in/Data-out
61	VDDQ	Supply Voltage for DQ
62	DQ13	Data-in/Data-out
63	DQ14	Data-in/Data-out
64	VSSQ	Ground for DQ
65	DQ15	Data-in/Data-out
66	VSS	Ground

3.5.5 Function introduction to CD4052

CD4052 is a 2-group 4-channel data selection device and mainly used in the input selection of audio and video signals in DVD recorder. Each pin function is shown as follows:

Pin	Name	Function	I/O
1、2、4、5	Y0-Y3	Y signal input	I
11、12、14、15	X0-X3	X signal input	I
3、13	Y	Y signal output	O
6	INH	Two groups have no output when two ends are high level	I
7	VEE	-12V power (grounding)	
8	VSS	ground	
16	VDD	+5V power	
9、10	B、A	Strobe signal	I
13	X	X signal output	O

A、 signal strobe condition:

A(10)	B(9)	X(13)	Y(3)	Remark

0	0	X0	Y0	X/Y outputs signals inputted by XO/YO
0	1	X1	Y1	X/Y outputs signals inputted by X1/Y1
1	0	X2	Y2	X/Y outputs signals inputted by X2/Y2
1	1	X3	Y3	X/Y outputs signals inputted by X3/Y3

Note: in the circuit, part of input pins are not used, A, B control end is controlled by main chip. When main chip is switching input signal source, it will control signals to make 4052 perform input source selection.

3.5.6 function introduction to TVP5150A

1. DESCRIPTION

The TVP5150A device is an ultralow power NTSC/PAL/SECAM video decoder. Available in a space saving 32-pin TQFP package, the TVP5150A decoder converts NTSC, PAL, and SECAM video signals to 8-bit ITU-R BT.656 format. Discrete syncs are also available. The optimized architecture of the TVP5150A decoder allows for ultralow-power consumption. The decoder consumes 115 mW of power in typical operation and consumes less than 1 mW in power-down mode, considerably increasing battery life in portable applications. The decoder uses just one crystal for all supported standards. The TVP5150A decoder can be programmed using an I2C serial interface. The decoder uses a 1.8-V supply for its analog and digital supplies, and a 3.3-V supply for its I/O.

The TVP5150A decoder converts baseband analog video into digital YCbCr 4:2:2 component video. Composite and S-video inputs are supported. The TVP5150A decoder includes one 9-bit analog-to-digital converter (ADC) with 2x sampling. Sampling is ITU-R BT.601 (27.0 MHz, generated from the 14.31818-MHz crystal or oscillator input) and is line-locked. The output formats can be 8-bit 4:2:2 or 8-bit ITU-R BT.656 with embedded synchronization.

The TVP5150A decoder utilizes Texas Instruments patented technology for locking to weak, noisy, or unstable signals. A Genlock/real-time control (RTC) output is generated for synchronizing downstream video encoders.

Complementary 4-line adaptive comb filtering is available for both the luma and chroma data paths to reduce both cross-luma and cross-chroma artifacts; a chroma trap filter is also available.

Video characteristics including hue, contrast, brightness, saturation, and sharpness may be programmed using the industry standard I2C serial interface. The TVP5150A decoder generates synchronization, blanking, lock, and clock signals in addition to digital video outputs. The TVP5150A decoder includes methods for advanced vertical blanking interval (VBI) data retrieval. The VBI data processor slices, parses, and performs error checking on teletext, closed caption, and other data in several formats.

The TVP5150A decoder detects copy-protected input signals according to the Macrovision. standard and detects Type 1, 2, 3, and colorstripe pulses.

The main blocks of the TVP5150A decoder include:

- ◆ Robust sync detector
- ◆ ADC with analog processor
- ◆ Y/C separation using 4-line adaptive comb filter
- ◆ Chrominance processor
- ◆ Luminance processor
- ◆ Video clock/timing processor and power-down control
- ◆ Output formatter
- ◆ I2C interface
- ◆ VBI data processor
- ◆ Macrovision. detection for composite and S-video

2. Features

- ◆ Accepts NTSC (M, 4.43), PAL (B, D, G, H, I, M, N), and SECAM (B, D, G, K, K1, L) video data
- ◆ Supports ITU-R BT.601 standard sampling
- ◆ High-speed 9-bit ADC
- ◆ Two composite inputs or one S-video input
- ◆ Fully differential CMOS analog preprocessing channels with clamping and automatic gain control (AGC)for best signal-to-noise (S/N) performance
- ◆ Ultralow power consumption: 115 mW typical
- ◆ 32-pin TQFP package
- ◆ Power-down mode: <1 mW
- ◆ Brightness, contrast, saturation, hue, and sharpness control through I2C
- ◆ Complementary 4-line (3-H delay) adaptive comb filters for both cross-luminance and cross-chrominance noise reduction
- ◆ Patented architecture for locking to weak, noisy, or unstable signals
- ◆ Single 14.31818-MHz crystal for all standards
- ◆ Internal phase-locked loop (PLL) for line-locked clock and sampling
- ◆ Subcarrier Genlock output for synchronizing color subcarrier of external encoder
- ◆ Standard programmable video output format:
- ◆ ITU-R BT.656, 8-bit 4:2:2 with embedded syncs
- ◆ 8-bit 4:2:2 with discrete syncs
- ◆ Macrovision?opy protection detection
- ◆ Advanced programmable video output formats:
  - 2x oversampled raw VBI data during active video
  - Sliced VBI data during horizontal blanking or active video
- ◆ VBI modes supported

- Teletext (NABTS, WST)
- Closed-caption decode with FIFO, and extended data services (EDS)
- Wide screen signaling, video program system, CGMS, vertical interval tme code
- Gemstar 1x/2x electronic program guide compatible mode
- Custom configuration mode that allows the user to program the slice engine for unique VBI data signals

◆ Power-on reset

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	AIP1A	I	Analog input. Connect to the video analog input via 0.1-? F capacitor.
2	AIP1B	I	
3	PLL_AGND	I	PLL ground.
4	PLL_AVDD	I	PLL power supply
5	XTAL1/OSC	I	External clock reference.
6	XTAL2	O	External clock reference.
7	AGND	I	Substrate. Connect to analog ground.
8	RESETB	I	Active-low reset.
9	PCLK/SCLK	O	System clock at either 1x or 2x the frequency of the pixel clock.
10	IO_DVDD	I	Digital supply.
11	YOUT7/I2CSEL	I/O	MSB of output decoded ITU-R BT.656 output/YCbCr 4:2:2 output. Determines address for I2C
12	YOUT6	I/O	Output decoded ITU-R BT.656 output/YCbCr 4:2:2 output with discrete sync.
13	YOUT5		
14	YOUT4		
15	YOUT3		
16	YOUT2		
17	YOUT1		
18	YOUT0		
19	DGND	I	Digital ground
20	DVDD	I	Digital supply
21	SCL	I/O	I2C serial clock
22	SDA	I/O	I2C serial data
23	FID/GLCO	O	Odd/even field indicator or vertical lock indicator.

			General-purpose control logic.
24	VSYNC/PAL1	O	Vertical synchronization signal PAL line indicator or horizontal lock indicator
25	HSYNC	O	Horizontal synchronization signal
26	AVID	O	Active video indicator.
27	INTREQ	I/O	INTREQ: Interrupt request output. GPCL: General-purpose control logic.
28	PDN	I	Power-down terminal
29	REFP	I	A/D reference ground.
30	REFM	I	A/D reference ground.
31	CH_AGND	O	Analog ground
32	CH_AVDD	O	Analog supply

3.5.7 function introduction to 16316-52

1. DESCRIPTION

FRONT PANEL CONTROLLER WITH POWER CONTROL FUNCTION The 16316-52 is a FIP (Fluorescent Indicator Panel, or Vacuum Fluorescent Display) controller/driver that is driven on a 1/4 to 1/16 duty factor. It consists of 25 FIP, a display memory, a control circuit, a key scan circuit and a remote control decoder. Serial data is input to the 16316-52 through a 5-line serial interface which is fully hand-shake with the HOST. This FIP controller is ideal as a peripheral device for front panel control for DVD/VCD.

2. FEATURES

- FIP controller/driver : 25 display output (1-segment and 24 digits to 24 segment and 1 digit)
- Key scanning (3 X 16)
- Stand-by control
- Remote control code decoding with programmable custom code, support remote formats : N EC, RC5, Kaisakyo, Sony 12 bit, Sony 15 bit
- User configurable wake-up code (8 key-code, 8 remote code)
- Dimming control
- High-voltage output
- User data storage (32 bytes)
- LED ports (4 chs., 20 mA max)
- Serial interface
- Fully compatible with C-CUBE ZIVA Font Panel (MIS) protocol.

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	Vdd		Logic Power
2	XT1		Oscillator Circuit input (Sub-clock)
3	XT2		Oscillator Circuit output(Sub-clock)
4	RESET		Reset
5	RDY_FM		Front Panel Microcontroller Ready
6	ATN_FM		Attention by Front Micom
7	#HOST_RST	O	The reset output to main processor
8	SCK	I	Clock input
9	D_FM	O	Data Output
10	D_HOST	I	The Host transmits 8-bit serial data with LSB first.
11	SCK1	I	Clock input
12	POWER_FAIL	I	Power control pin to control the main power
13	IR	I	Connect to IR receiver module
14	FIP0	O	FIP Driving Pins
15	FIP1		
16	FIP2		
17	FIP3		
18	FIP4		
19	FIP5		
20	FIP6		
21	FIP7		
22	FIP8		
23	FIP9		
24	FIP10		
25	FIP11		
26	FIP12		
27	Vdd	I	Logic Power
28	VLoad	I	Pull-Down level
29	FIP13	O	FIP Driving Pins
30	FIP14		
31	FIP15		

32	FIP16		
33	FIP17		
34	FIP18		
35	FIP19		
36	FIP20		
37	FIP21		
38	FIP22		
39	FIP23		
40	FIP24		
41	KEY_R1	I	Input signal for keyboard scan
42	KEY_R2		
43	KEY_R3		
44	POWER_CTL		Power control pin to control the main power
45	LED1	O	LED Output
46	LED2		
47	LED3		
48	LED4		
49	IC		
50	X1	I	Oscillator Circuit input (main clock)
51	X2	O	Oscillator Circuit output (main clock)
52	VSS	I	Ground

3.5.8 function introduction to SN74LVC16373

1. Description

This 16-bit transparent D-type latch is designed for 2.7-V to 3.6-V VCC operation. The SN74LVC16373 is particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers. It can be used as two 8-bit latches or one 16-bit latch. When the latch-enable (LE) input is high, the Q outputs follow the data (D) inputs. When LE is taken low, the Q outputs are latched at the levels set up at the D inputs. A buffered output-enable (OE) input can be used to place the eight outputs in either a normal logic state (high or low logic levels) or a high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and the increased drive provide the capability to drive bus lines without need for interface or pullup components. OE does not affect internal operations of the latch. Old data can be retained or new data can be entered while the outputs are in the

high-impedance state. To ensure the high-impedance state during power up or power down, OE should be tied to VCC through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver. Active bus-hold circuitry is provided to hold unused or floating data inputs at a valid logic level.

2. Feature

- ◆ Member of the Texas Instruments Widebus? Family
- ◆ EPIC? (Enhanced-Performance Implanted CMOS) Submicron Process
- ◆ Typical VOLP (Output Ground Bounce) < 0.8 V at VCC = 3.3 V, TA = 25? C
- ◆ Typical VOHV (Output VOH Undershoot) > 2 V at VCC = 3.3 V, TA = 25? C
- ◆ Latch-Up Performance Exceeds 250 mA Per JEDEC Standard JESD-17
- ◆ Bus Hold on Data Inputs Eliminates the Need for External Pullup/Pulldown Resistors
- ◆ Package Options Include Plastic 300-mil Shrink Small-Outline (DL) and Thin Shrink Small-Outline (DGG) Packages DGG OR DL PACKAGE

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	#1OE	I	Lacth1 enable input
2	1Q1	O	Latch1 output
3	1Q2	O	Latch1 output
4	GND	I	Ground
5	1Q3	O	Latch1 output
6	1Q4	O	Latch1 output
7	VCC	I	Power supply
8	1Q5	O	Latch1 output
9	1Q6	O	Latch1 output
10	GND	I	Ground
11	1Q7	O	Latch1 output
12	1Q8	O	Latch1 output
13	2Q1	O	Latch2 output
14	2Q2	O	Latch2 output
15	GND	I	Ground
16	2Q3	O	Latch2 output
17	2Q4	O	Latch2 output
18	VCC	I	Power supply
19	2Q5	O	Latch2 output

20	2Q6	O	Latch2 output
21	GND	I	Ground
22	2Q7	O	Latch2 output
23	2Q8	O	Latch2 output
24	#2OE	I	Lacth2 enable input
25	2LE	I	Clock input 2
26	2D8	I	Latch2 input
27	2D7	I	Latch2 input
28	GND	I	Ground
29	2D6	I	Latch2 input
30	2D5	I	Latch2 input
31	VCC	I	Power supply
32	2D4	I	Latch2 input
33	2D3	I	Latch2 input
34	GND	I	Ground
35	2D2	I	Latch2 input
36	2D1	I	Latch2 input
37	1D8	I	Latch1 input
38	1D7	I	Latch1 input
39	GND	I	Ground
40	1D6	I	Latch1 input
41	1D5	I	Latch1 input
42	VCC	I	Power supply
43	1D4	I	Latch1 input
44	1D3	I	Latch1 input
45	GND	I	Ground
46	1D2	I	Latch1 input
47	1D1	I	Latch1 input
48	1LE	I	Clock input 1

3.5.9 function introduction to MSP 34x5G

1. Description

The MSP 34x5G family of single-chip Multistandard Sound Processors covers the sound processing of

all analog TV standards worldwide, as well as the NICAM digital sound standards. The full TV sound processing, starting with analog sound IF signal-in, down to processed analog AF-out, is performed in a single chip. Figure 1–1 shows a simplified functional block diagram of the MSP 34x5G.

This new generation of TV sound processing ICs now includes versions for processing the multichannel television sound (MTS) signal conforming to the standard recommended by the Broadcast Television Systems Committee (BTSC). The DBX noise reduction is performed alignment-free.

Other processed standards are the Japanese FM-FM multiplex standard (EIA-J) and the FM-Stereo-Radio standard.

Current ICs have to perform adjustment procedures in order to achieve good stereo separation for BTSC and EIA-J. The MSP 34x5G has optimum stereo performanceb without any adjustments.

All MSP 34xxG versions are pin compatible to the MSP 34xxD. Only minor modifications are necessary to adapt a MSP 34xxD controlling software to the MSP 34xxG. The MSP 34x5G further simplifies controlling software. Standard selection requires a single I2C transmission only.

2. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	AVSUP	I	Analog power supply +5 V
2	ANA_IN1+	I	IF input 1
3	ANA_IN-	I	IF common
4	TESTEN	I	Test pin
5	XTAL_IN	I	Crystal oscillator
6	XTAL_OUT	O	Crystal oscillator
7	TP	I	Test pin
8	D_CTR_I/O_1	I/O	D_CTR_I/O_1
9	D_CTR_I/O_0	I/O	D_CTR_I/O_0
10	ADR_SEL	I	I2C Bus address select
11	STANDBYQ	I	Standby
12	I2C_SCL	I/O	I2C clock
13	I2C_SDA	I/O	I2C data
14	I2C_CL	I	I2C clock
15	I2C_WS	I	I2C word strobe
16	I2C_DA_OUT	O	I2C data output
17	I2C_DA_IN1	I	I2C data input
18	TP_CO	I	ADR clock
19	DVSUP	I	Digital power supply +5 V

20	DVSS	I	Digital ground
21	I2C_DA_IN2	I	I2S2-data input
22	RESETQ	I	Power-on-reset
23	NC		Not connected
24	NC		Not connected
25	VREF2	I	Reference ground 2 high-voltage part
26	DACM_R	O	Loudspeaker out R
27	DACM_L	O	Loudspeaker out L
28	NC		Not connected
29	VREF1	I	Reference ground 1 high-voltage part
30	SC1_OUT_R	O	SCART 1 output R
31	SC1_OUT_L	O	SCART 1 output L
32	NC		Not connected
33	AHVSUP	I	Analog power supply 8.0 V
34	CAPL_M	I	Volume capacitor MAIN
35	AHVSS	I	Analog ground
36	AGNDC	I	Analog reference voltage high-voltage part
37	SC2_IN_L	I	SCART 1 input 2
38	SC2_IN_R	I	SCART 1 input 2
39	ASG1	I	Analog shield ground
40	SC1_IN_L	I	SCART 1 input 1
41	SC1_IN_R	I	SCART 1 input 1
42	VREFTOP	I	Reference voltage IF A/D converter
43	MONO_IN	I	Mono input
44	AVSS	I	Analog ground

3.5.10 function introduction to TPS2041A

1. Description

The TPS2041A through TPS2044A and TPS2051A through TPS2054A power-distribution switches are intended for applications where heavy capacitive loads and short circuits are likely to be encountered. These devices incorporate 80-mW N-channel MOSFET high-side power switches for power-distribution systems that require multiple power switches in a single package. Each switch is controlled by an independent logic enable input. Gate drive is provided by an internal charge pump designed to control the power-switch rise times and

fall times to minimize current surges during switching. The charge pump requires no external components and allows operation from supplies as low as 2.7 V.

When the output load exceeds the current-limit threshold or a short is present, these devices limit the output current to a safe level by switching into a constant-current mode, pulling the overcurrent (OCx) logic output low. When continuous heavy overloads and short circuits increase the power dissipation in the switch, causing the junction temperature to rise, a thermal protection circuit shuts off the switch to prevent damage. Recovery from a thermal shutdown is automatic once the device has cooled sufficiently. Internal circuitry ensures the switch remains off until valid input voltage is present. These power-distribution switches are designed to current limit at 0.9 A.

2. FEATURE

- ◆ 80-mW High-Side MOSFET Switch
- ◆ 500 mA Continuous Current Per Channel
- ◆ Independent Thermal and Short-Circuit Protection With Overcurrent Logic Output
- ◆ Operating Range . . . 2.7 V to 5.5 V
- ◆ CMOS- and TTL-Compatible Enable Inputs
- ◆ 2.5-ms Typical Rise Time
- ◆ Undervoltage Lockout
- ◆ 10 mA Maximum Standby Supply Current for Single and Dual (20 mA for Triple and Quad)
- ◆ Bidirectional Switch
- ◆ Ambient Temperature Range, 0 ° C to 85 ° C
- ◆ ESD Protection
- ◆ UL Listed ¨C File No. E169910

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	GND	I	Ground
2	IN	I	Input voltage
3	IN	I	Input voltage
4	#EN	I	Enable input
5	#OC	O	Over current
6	OUT	I	Power-switch
7	OUT	I	
8	OUT	I	

3.5.11 function introduction to LP2995

1. Description

The LP2995 linear regulator is designed to meet the JEDEC STL-2 and SSTL-3 specifications for termination of DDRSDRAM. The device contains a high-speed operational amplifier to provide excellent response to load transients. The output stage prevents shoot through while delivering 1.5A continuous current and transient peaks up to 3A in the application as required for DDR-SDRAM termination. The LP2995 also incorporates a VSENSE pin to provide superior load regulation and a VREF output as a reference for the chipset and DDR DIMMS.

2. Features

- ◆ Low output voltage offset
- ◆ Works with +5v, +3.3v and 2.5v rails
- ◆ Source and sink current
- ◆ Low external component count
- ◆ No external resistors required
- ◆ Linear topology
- ◆ Available in SO-8, PSOP-8 or LLP-16 packages
- ◆ Low cost and easy to use

3. PIN DESCRIPTION

PIN	Symbol	Description
1	NC	No internal connection.
2	GND	Ground
3	VSENSE	Feedback pin for regulating VTT .
4	VREF	Buffered internal reference voltage of VDDQ/2.
5	VDD	Input for internal reference equal to VDDQ/2.
6	AVIN	Analog input pin.
7	PVIN	Power input pin.
8	VTT	Output voltage for connection to termination resistors.

3.5.12 function introduction to FSDM0565R

1. Description

The FSDM0565R is specially designed for an off-line Switched mode power supply (SMPS). This device is a current mode PWM controller combined with a high voltage power SenseFET in a single package using BCDMOS technology. The PWM controller includes integrated fixed frequency oscillator, under voltage

lockout, leading edge blanking (LEB), optimized gate driver, internal soft start, temperature compensated precise current sources for a loop compensation and self protection circuitry. Compared with discrete MOSFET and PWM controller solution, it can reduce total cost, component count, size and weight simultaneously increasing efficiency, productivity, and system reliability. This device is well suited for cost effective design of LCD monitor adapter.

2. Features

- ◆ Precise fixed operating frequency (70kHz)
- ◆ Low power consumption (under 1W) at 265VAC with 0.5W load with a burst-mode operation
- ◆ Pulse by pulse current limit
- ◆ Abnormal over current protection (auto restart mode)
- ◆ Over voltage protection (auto restart mode)
- ◆ Over load protection (auto restart mode)
- ◆ Thermal shutdown (auto restart mode)
- ◆ Under voltage lockout
- ◆ Fully avalanche rated and 100% tested senseFET
- ◆ Internal soft start

3. PIN DESCRIPTION

PIN	Symbol	Description
1	Drain	This pin is the high voltage power SenseFET drain.
2	Ground	This pin is the control ground and the SenseFET source.
3	Vcc	This pin is the positive supply voltage input.
4	Feedback	This pin is internally connected to the inverting input of the PWM comparator.
5	Nc	
6	Vstr	This pin is connected directly to the high voltage DC link.

3.5.13 Function introduction to M41T80

1. DESCRIPTION

M41T80 is the latest serial real-time clock chip, and used in batter power supply. M41T80 includes I2C jack and warning function of 400KHz, special 32KHz output, when in low power mode or clock generator reference input, the micro controller of 32Khz is very useful. The warning function of M41T80 includes repeat mode, from once in a year to once in a second. The programmable wave function may perform program from 1Hz to 32KHz, power classification of 2, when voltage power supply is normal, 32KHz output is continuous and may be screen-shielded by software.

2. Features

◆ 2.0 TO 5.5V CLOCK OPERATING VOLTAGE

◆ COUNTERS FOR TENTHS/HUNDREDTHS OF SECONDS, SECONDS, MINUTES, HOURS, DAY, DATE, MONTH, YEAR, and CENTURY

◆ SERIAL INTERFACE SUPPORTS I2C BUS (400KHz)

◆ PROGRAMMABLE ALARM and INTERRUPT FUNCTION

◆ LOW OPERATING CURRENT OF 200¦ÌA

◆ OPERATING TEMPERATURE OF -40 TO 85 ° C

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	XI	I	Crystal oscillator input
2	XO	O	Crystal oscillator output
3	F32K	O	32KHz square wave output
4	VSS	I	Ground
5	SDA	I/O	Serial data input/output
6	SCL	I	Serial clock input
7	IRQ	O	Interrupt / Output Driver / Square Wave (Open Drain)
8	VCC	I	Supply voltage

3.5.14 function introduction to EM6353

1. Description

The EM6353 is an ultra-low current reset circuit available in a large variety of configurations and very small packages for maximum flexibility in all end-applications up to 125° C and using power supplies between 1.5V and 5.5V.

This circuit monitors the supply voltage of any electronic system, and generates the appropriate reset signal after a fixed reset timeout period. The threshold defines the minimum allowed voltage which guarantees the good functionality of the system. When VDD rises above VTH, the output remains active for an additional delay time. This allows the system to stabilize before getting fully active. The EM6353 features three output types: active-low pushpull, active-low open-drain and active-high push-pull. Small SC70-5L and SOT23-3L packages as well as ultra-low supply current of 2.9µ A make the EM6353 an ideal choice for portable and battery-operated devices.

2. Features

◆ 200ms reset timeout period (25ms on request)

◆ Ultra-low supply current of 2.9µ A (VDD=3.3V)

◆ Operating temperature range: -40° C to +125°C

◆±1.5% reset threshold accuracy

◆ 11 reset threshold voltages VTH: 4.63V, 4.4V, 3.08V, 2.93V, 2.63V, 2.2V, 1.8V, 1.66V, 1.57V, 1.38V, 1.31V

◆ 3 reset output options:

Active-low RESET push-pull

Active-low RESET open-drain

Active-high RESET push-pull

◆ No external components

◆ Immune to short negative VDD transients

◆ Guaranteed Reset valid down to 0.8V

◆ Threshold hysteresis: 2.1% of VTH

◆ Very small SOT23-3L and SC70-5L packages

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	NC		
2	VDD	I	Power supply
3	NC		
4	GND	I	Ground
5	RESET	O	Active-low RESET output.

3.5.15 function introduction to KA5H0380R

1. Description

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

2.Features

◆ Precision fixed operating frequency (100/67/50kHz)

◆ Low start-up current(typ. 100uA)

◆ Pulse by pulse current limiting

◆ Over current protection

◆ Over voltage protecton (Min. 25V)

◆ Internal thermal shutdown function

◆ Under voltage lockout

◆ Internal high voltage sense FET

◆ Auto-restart mode

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	GND	I	Ground
2	DRAIN	O	Drain
3	VCC	I	Power supply
4	FB	I	Feedback

3.5.16 function introduction to 74HC/HCT14

1. Description

The 74HC/HCT14 are high-speed Si-gate CMOS devices and are pin compatible with low power Schottky TTL (LSTTL).

They are specified in compliance with JEDEC standard no. 7A.

The 74HC/HCT14 provide six inverting buffers with Schmitt-trigger action. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals.

2. FEATURES

◆ Output capability: standard ◆ ICC category: SSI

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1、3、5、9、11、13	1A to 6A	I	Data inputs
2、4、6、8、10、12	1Y to 6Y	O	Data outputs
7	GND	I	Ground (0 V)
14	VCC	I	Positive supply voltage

Chapter Four

Disassembly and Assembly Process

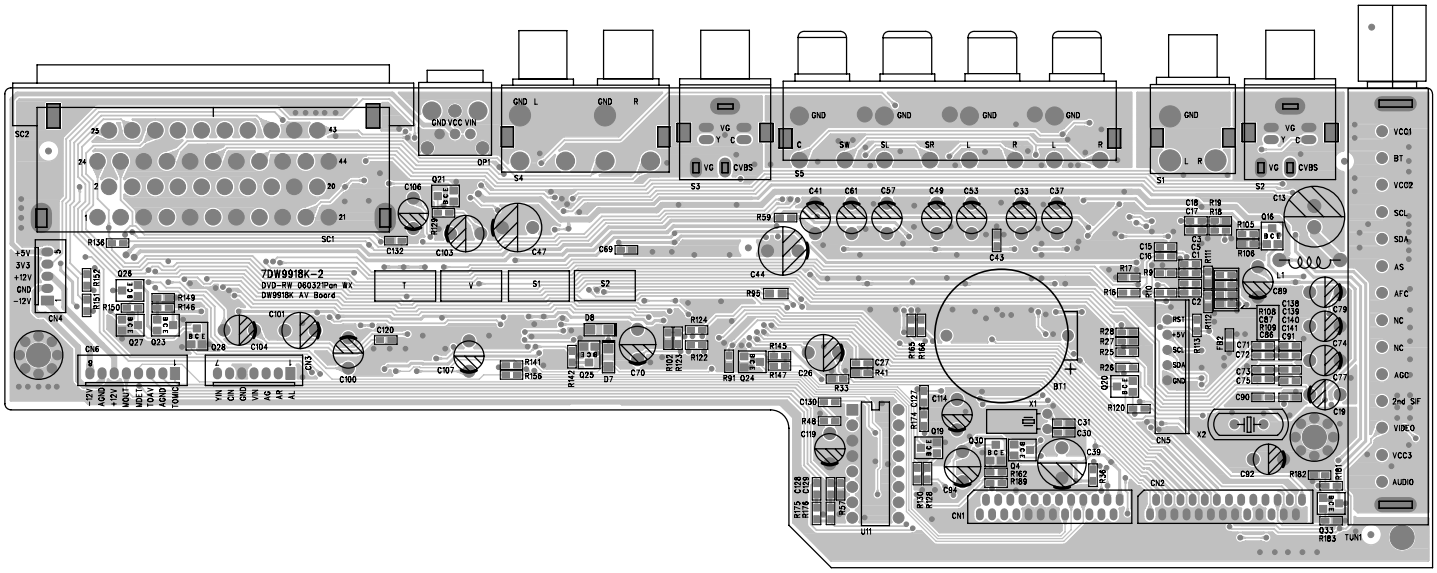
DVD players manufactured in BBK are largely identical but with minor differences and are mainly composed of loader components, control panel components, decode and servo board components, power board components, power amplifier board components, MIC board components and AV board components. In order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

The pictures of this model are shown as follows:

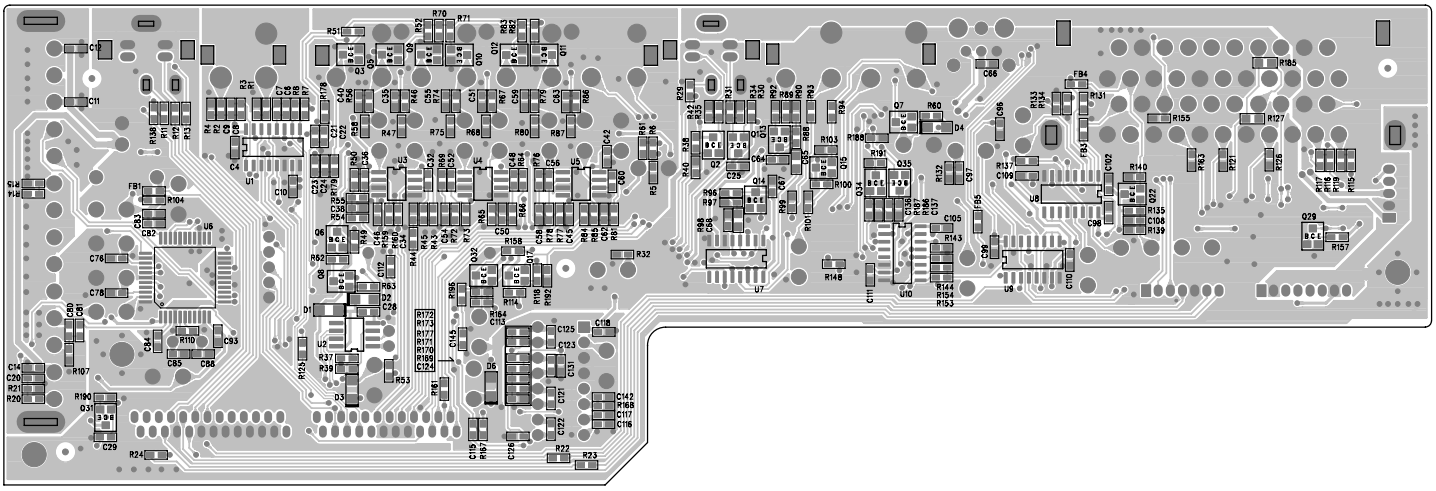
Chapter Cinque
PCB board & Circuit diagram

Section One PCB board

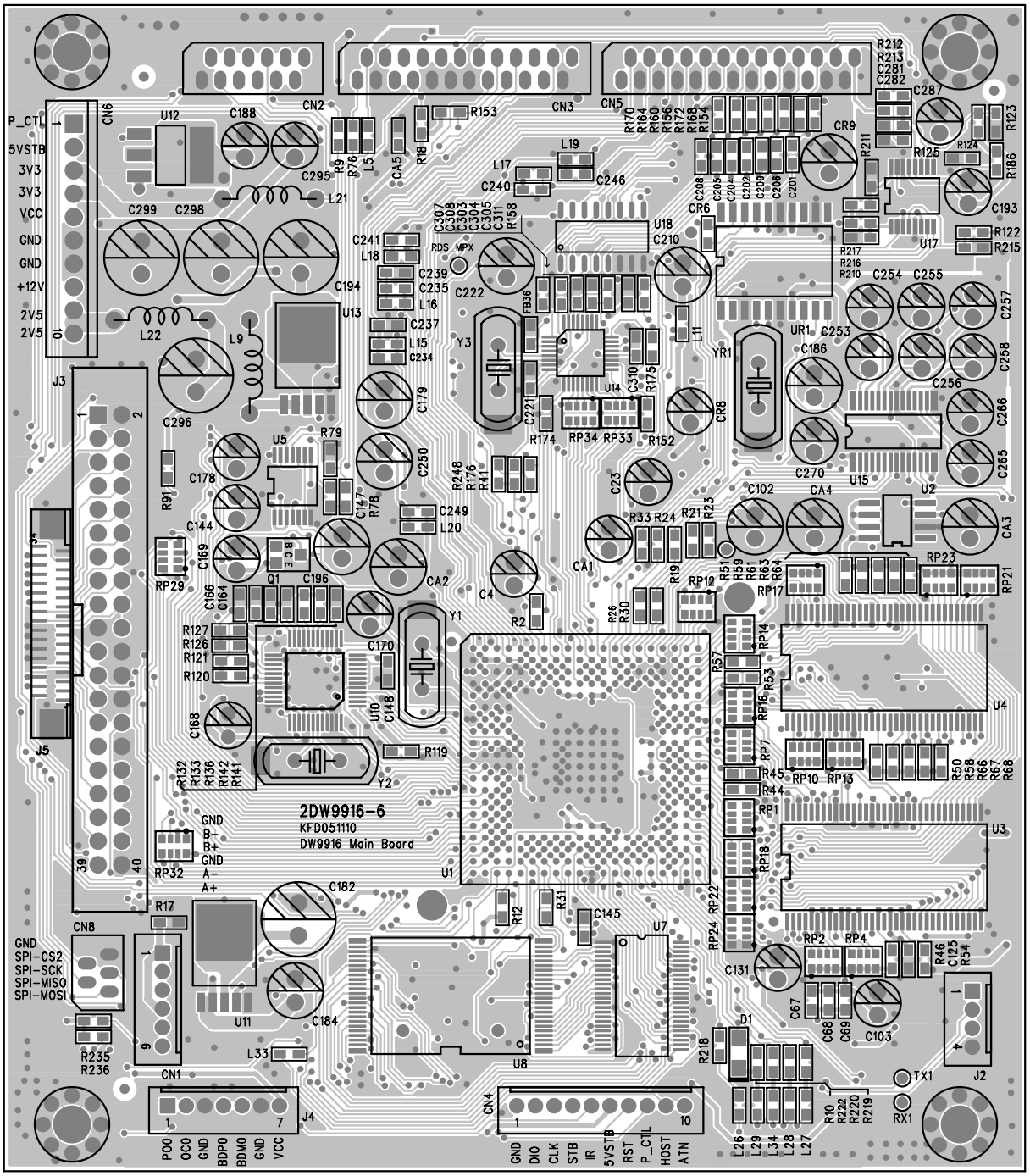
5.1.1 Surface layer of AV OUT Board



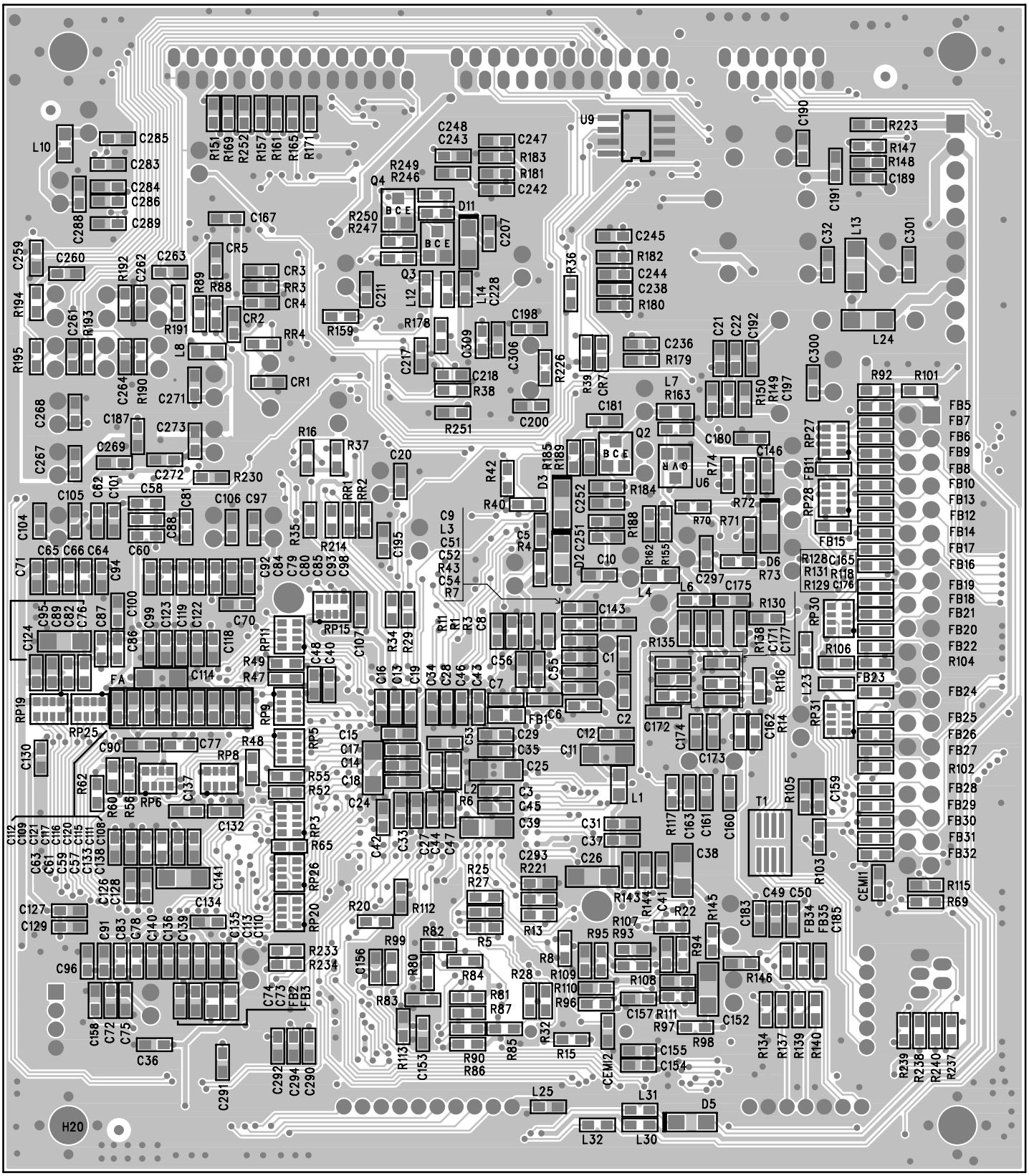
5.1.2 Bottom layer of AV OUT Board



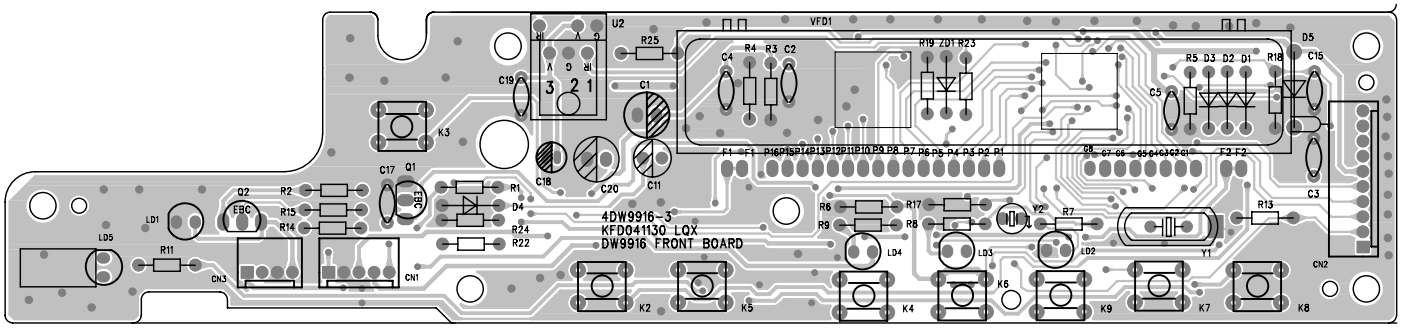
5.1.3 Surface layer of DECODE&SERVO Board



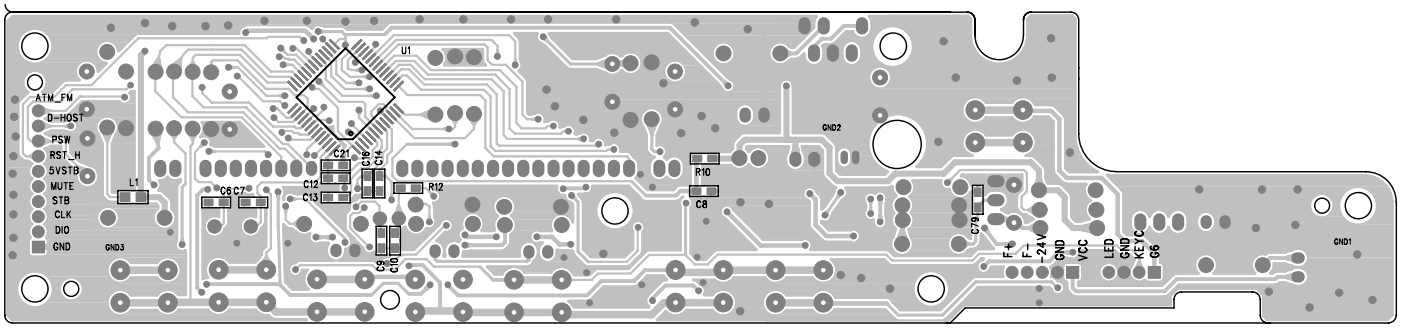
5.1.4 Bottom layer of DECODE&SERVO Board



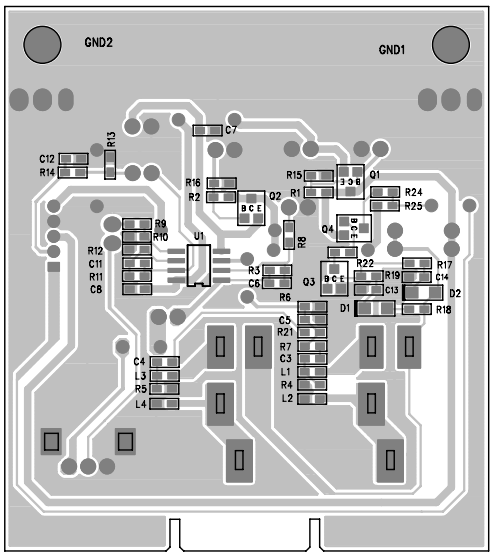
5.1.5 Surface layer of KEY SCAN Board



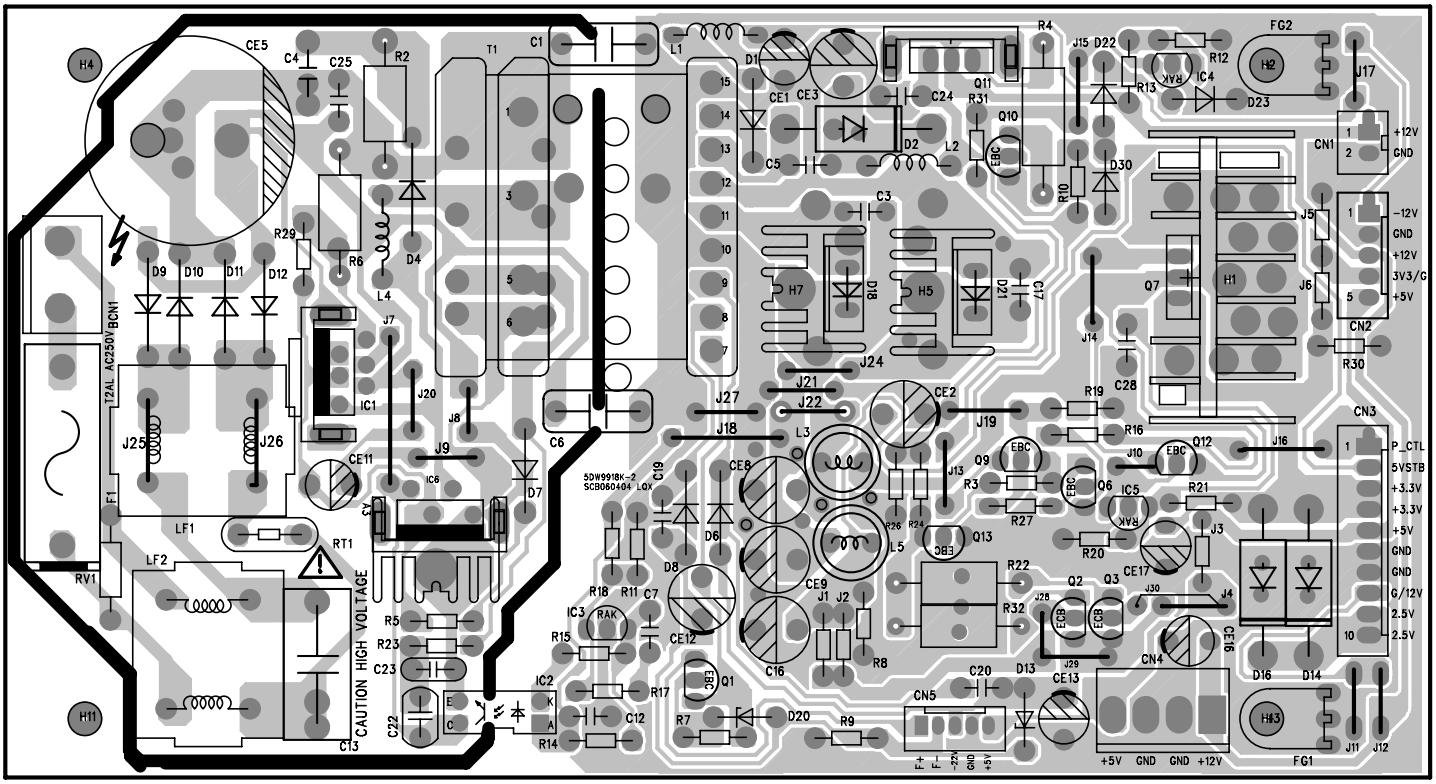
5.1.6 Bottom layer of KEY SCAN Board

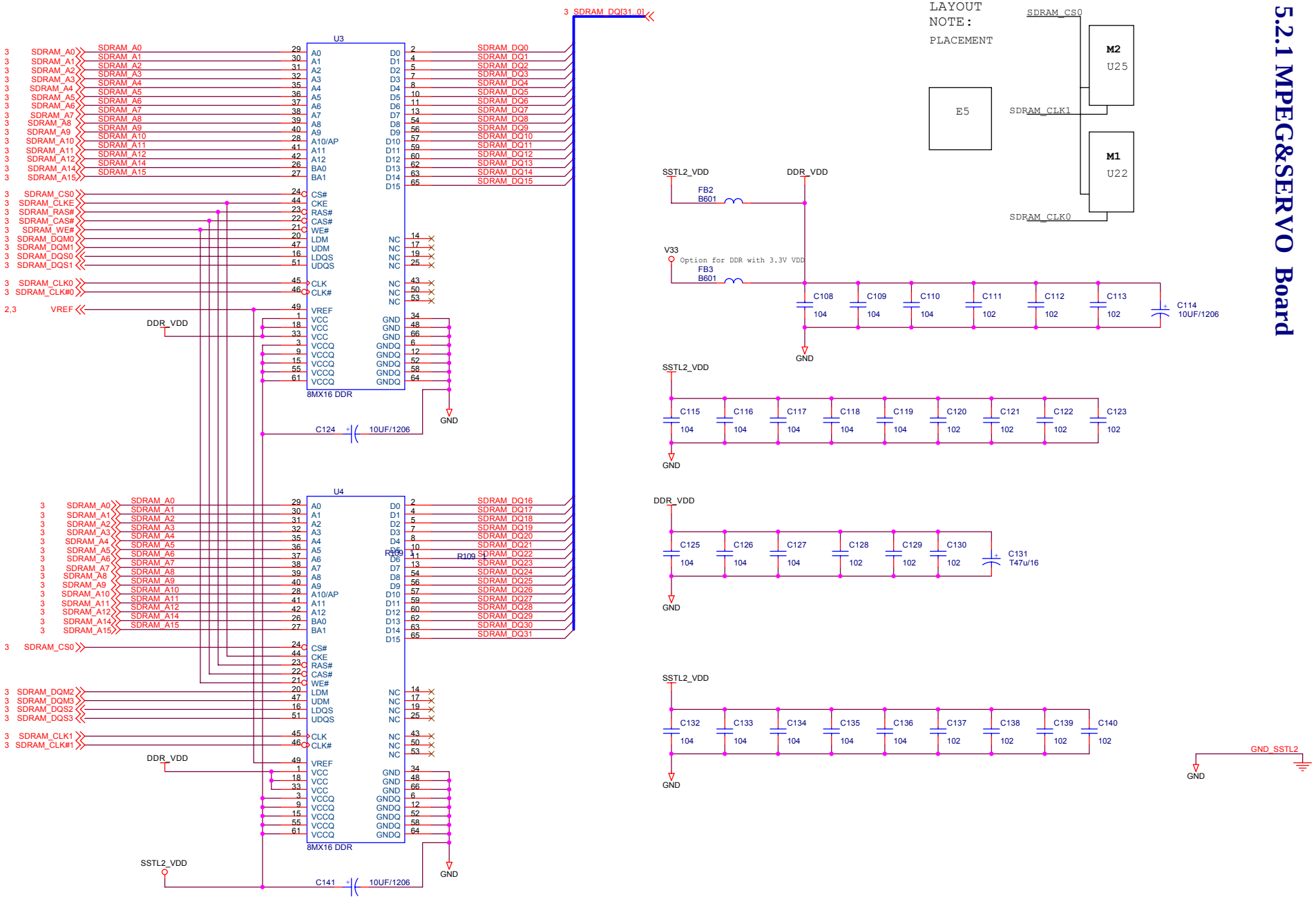


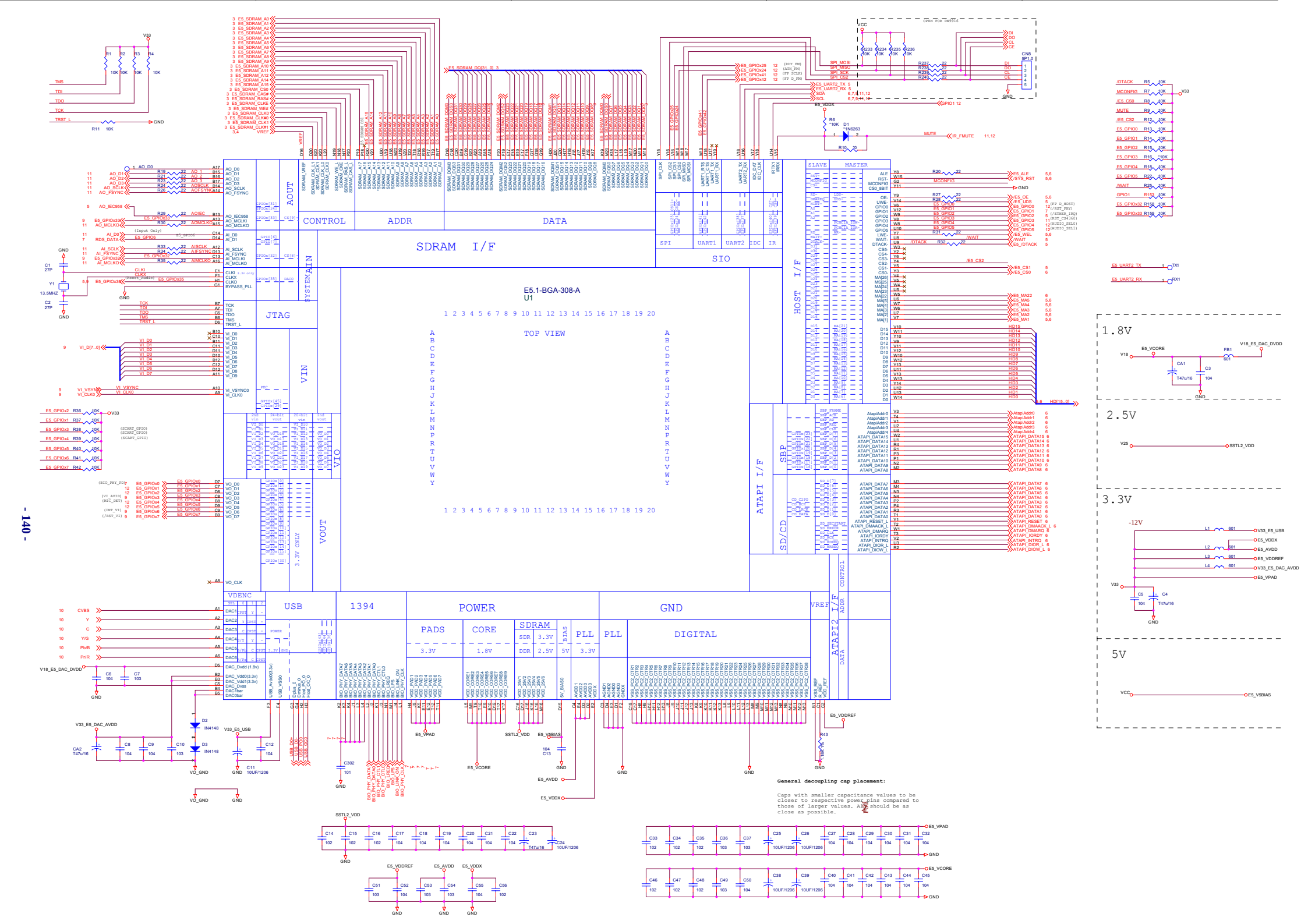
5.1.7 MIC Board

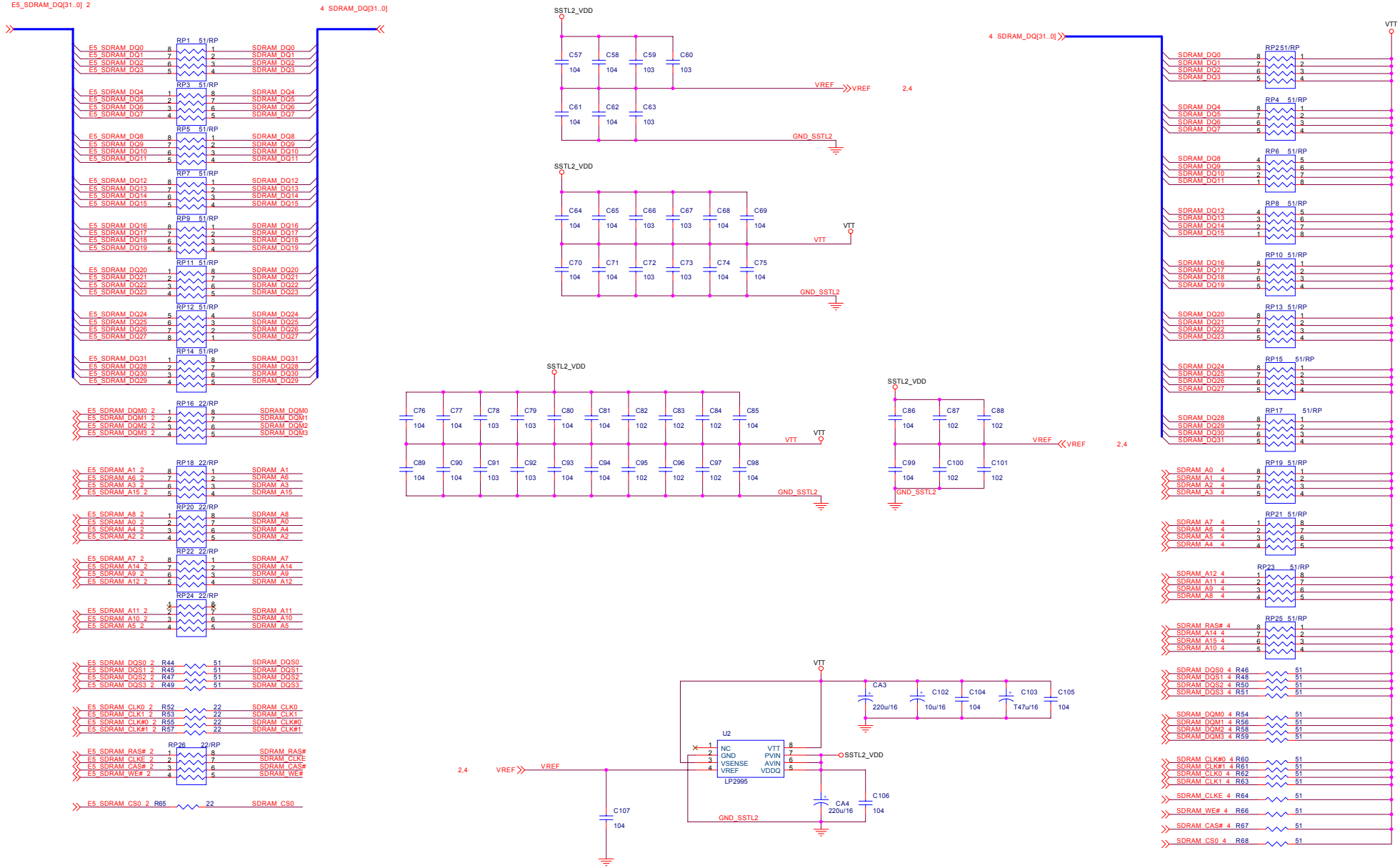


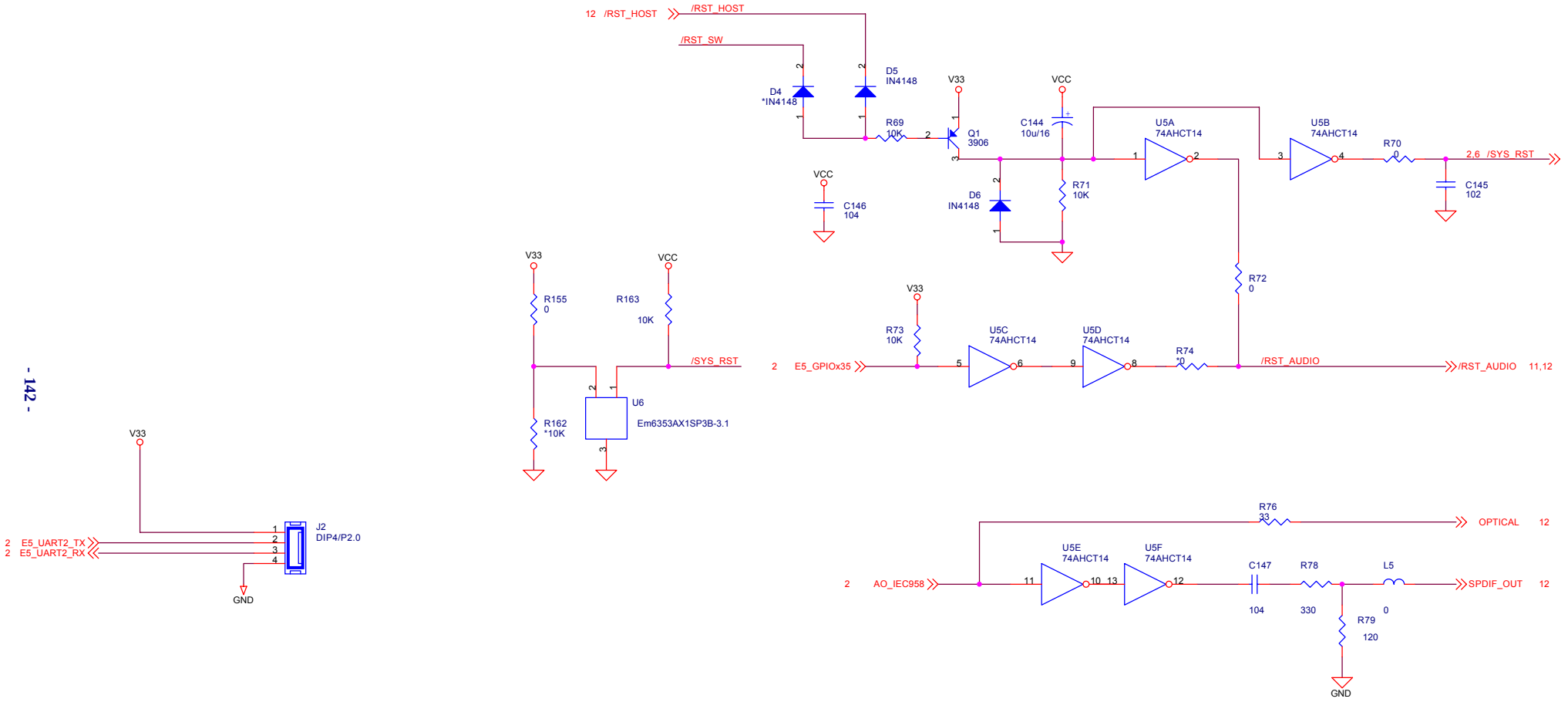
5.1.8 POWER Board



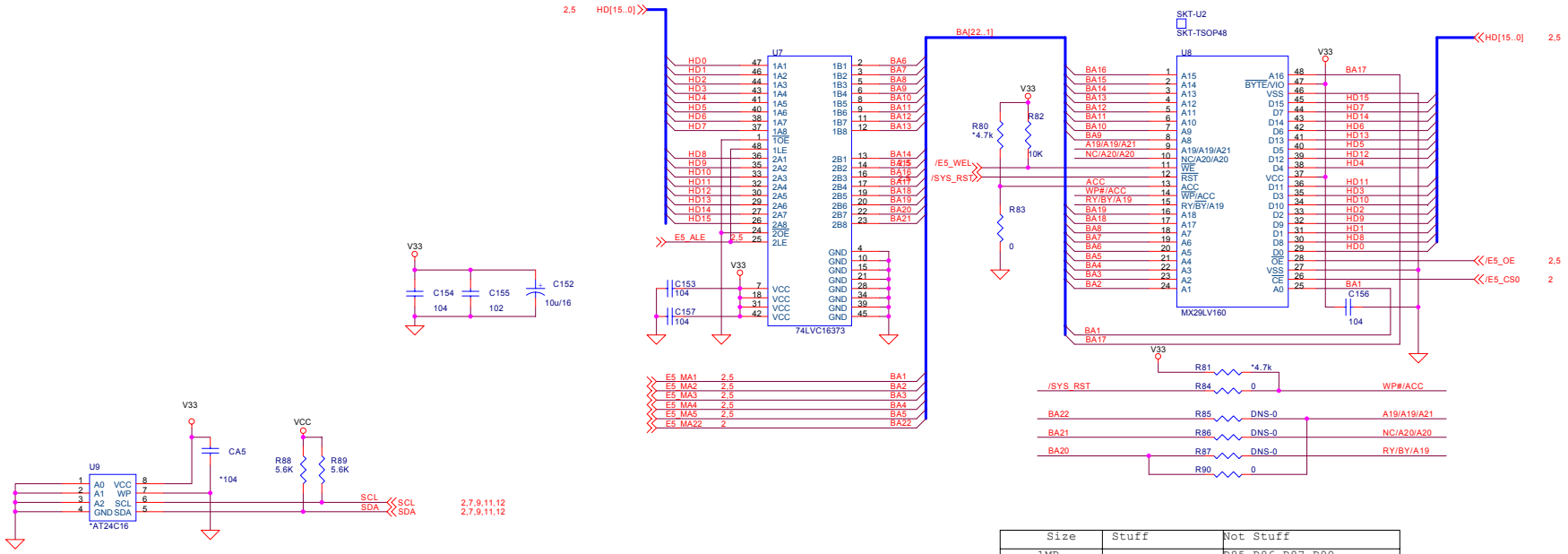

3 SDRAM_DQ[31..0]
U3
8MX16 DDR
U4
8MX16 DDR
DDR_VDD
SSTL2_VDD
GND
C124 10UF/1206
C141 10UF/1206
LAYOUT NOTE:
PLACEMENT
E5
SDRAM_CS0
SDRAM_CLK1
SDRAM_CLK0
M2
U25
M1
U22
FB2 B601
FB3 B601
V33
Option for DDR with 3.3V VDD
C108 104
C109 104
C110 104
C111 102
C112 102
C113 102
C114 10UF/1206
C115 104
C116 104
C117 104
C118 104
C119 104
C120 102
C121 102
C122 102
C123 102
C125 104
C126 104
C127 104
C128 102
C129 102
C130 102
C131 T47u/16
C132 104
C133 104
C134 104
C135 104
C136 104
C137 102
C138 102
C139 102
C140 102
GND_SSTL2


SDRAM I/F
SIO
HOST I/F
ATAPI I/F
SD/CD
SBP
AOUT
CONTROL
ADDR
DATA
SPI
UART1
UART2
IDC
IR
SLAVE
MASTER
JTAG
SYSTEMAIN
VIN
VOUT
VIO
USB
1394
POWER
GND
PADS
CORE
SDRAM
BIAS
PLL
DIGITAL
E5.1-BGA-308-A
U1
TOP VIEW
1.8V
2.5V
3.3V
5V
-12V
E5_VCORE
V18_E5_DAC_DVDD
SSTL2_VDD
V33_E5_USB
E5_VDDX
E5_AVDD
E5_VDDREF
E5_VPAD
E5_VBSBIAS
General decoupling cap placement:
Caps with smaller capacitance values to be closer to respective power pins compared to those of larger values. A2.2u should be as close as possible.


E5_SDRAM_DQ[31..0] 2
4 SDRAM_DQ[31..0]
RP1 51/RP
RP3 51/RP
RP5 51/RP
RP7 51/RP
RP9 51/RP
RP11 51/RP
RP12 51/RP
RP14 51/RP
RP16 22/RP
RP18 22/RP
RP20 22/RP
RP22 22/RP
RP24 22/RP
RP26 22/RP
E5_SDRAM_DQ0
E5_SDRAM_DQ1
E5_SDRAM_DQ2
E5_SDRAM_DQ3
E5_SDRAM_DQ4
E5_SDRAM_DQ5
E5_SDRAM_DQ6
E5_SDRAM_DQ7
E5_SDRAM_DQ8
E5_SDRAM_DQ9
E5_SDRAM_DQ10
E5_SDRAM_DQ11
E5_SDRAM_DQ12
E5_SDRAM_DQ13
E5_SDRAM_DQ14
E5_SDRAM_DQ15
E5_SDRAM_DQ16
E5_SDRAM_DQ17
E5_SDRAM_DQ18
E5_SDRAM_DQ19
E5_SDRAM_DQ20
E5_SDRAM_DQ21
E5_SDRAM_DQ22
E5_SDRAM_DQ23
E5_SDRAM_DQ24
E5_SDRAM_DQ25
E5_SDRAM_DQ26
E5_SDRAM_DQ27
E5_SDRAM_DQ31
E5_SDRAM_DQ28
E5_SDRAM_DQ30
E5_SDRAM_DQ29
E5_SDRAM_DQM0 2
E5_SDRAM_DQM1 2
E5_SDRAM_DQM2 2
E5_SDRAM_DQM3 2
E5_SDRAM_A1 2
E5_SDRAM_A6 2
E5_SDRAM_A3 2
E5_SDRAM_A15 2
E5_SDRAM_A8 2
E5_SDRAM_A0 2
E5_SDRAM_A4 2
E5_SDRAM_A2 2
E5_SDRAM_A7 2
E5_SDRAM_A14 2
E5_SDRAM_A9 2
E5_SDRAM_A12 2
E5_SDRAM_A11 2
E5_SDRAM_A10 2
E5_SDRAM_A5 2
E5_SDRAM_DQS0 2 R44
E5_SDRAM_DQS1 2 R45
E5_SDRAM_DQS2 2 R47
E5_SDRAM_DQS3 2 R49
E5_SDRAM_CLK0 2 R52
E5_SDRAM_CLK1 2 R53
E5_SDRAM_CLK#0 2 R55
E5_SDRAM_CLK#1 2 R57
E5_SDRAM_RAS# 2
E5_SDRAM_CLKE 2
E5_SDRAM_CAS# 2
E5_SDRAM_WE# 2
E5_SDRAM_CS0 2 R65
SDRAM_DQM0
SDRAM_DQM1
SDRAM_DQM2
SDRAM_DQM3
SDRAM_A1
SDRAM_A6
SDRAM_A3
SDRAM_A15
SDRAM_A8
SDRAM_A0
SDRAM_A4
SDRAM_A2
SDRAM_A7
SDRAM_A14
SDRAM_A9
SDRAM_A12
SDRAM_A11
SDRAM_A10
SDRAM_A5
SDRAM_DQS0
SDRAM_DQS1
SDRAM_DQS2
SDRAM_DQS3
SDRAM_CLK0
SDRAM_CLK1
SDRAM_CLK#0
SDRAM_CLK#1
SDRAM_RAS#
SDRAM_CLKE
SDRAM_CAS#
SDRAM_WE#
SDRAM_CS0
SSTL2_VDD
C57 104
C58 104
C59 103
C60 103
C61 104
C62 104
C63 103
VREF
GND_SSTL2
2,4
C64 104
C65 104
C66 103
C67 103
C68 104
C69 104
C70 104
C71 104
C72 103
C73 103
C74 104
C75 104
VTT
C76 104
C77 104
C78 103
C79 103
C80 104
C81 104
C82 102
C83 102
C84 102
C85 104
C89 104
C90 104
C91 103
C92 103
C93 104
C94 104
C95 102
C96 102
C97 102
C98 104
C86 104
C87 102
C88 102
C99 104
C100 102
C101 102
U2
NC
GND
VSENSE
VREF
VTT
PVIN
AVIN
VDDQ
LP2995
CA3 220u/16
C102 10u/16
C104 104
C103 T47u/16
C105 104
CA4 220u/16
C106 104
C107 104
RP25 51/RP
RP4 51/RP
RP6 51/RP
RP8 51/RP
RP10 51/RP
RP13 51/RP
RP15 51/RP
RP17 51/RP
RP19 51/RP
RP21 51/RP
RP23 51/RP
SDRAM_A0 4
SDRAM_A1 4
SDRAM_A2 4
SDRAM_A3 4
SDRAM_A7 4
SDRAM_A6 4
SDRAM_A5 4
SDRAM_A4 4
SDRAM_A12 4
SDRAM_A11 4
SDRAM_A9 4
SDRAM_A8 4
SDRAM_RAS# 4
SDRAM_A14 4
SDRAM_A15 4
SDRAM_A10 4
SDRAM_DQS0 4 R46
SDRAM_DQS1 4 R48
SDRAM_DQS2 4 R50
SDRAM_DQS3 4 R51
SDRAM_DQM0 4 R54
SDRAM_DQM1 4 R56
SDRAM_DQM2 4 R58
SDRAM_DQM3 4 R59
SDRAM_CLK#0 4 R60
SDRAM_CLK#1 4 R61
SDRAM_CLK0 4 R62
SDRAM_CLK1 4 R63
SDRAM_CLKE 4 R64
SDRAM_WE# 4 R66
SDRAM_CAS# 4 R67
SDRAM_CS0 4 R68
51

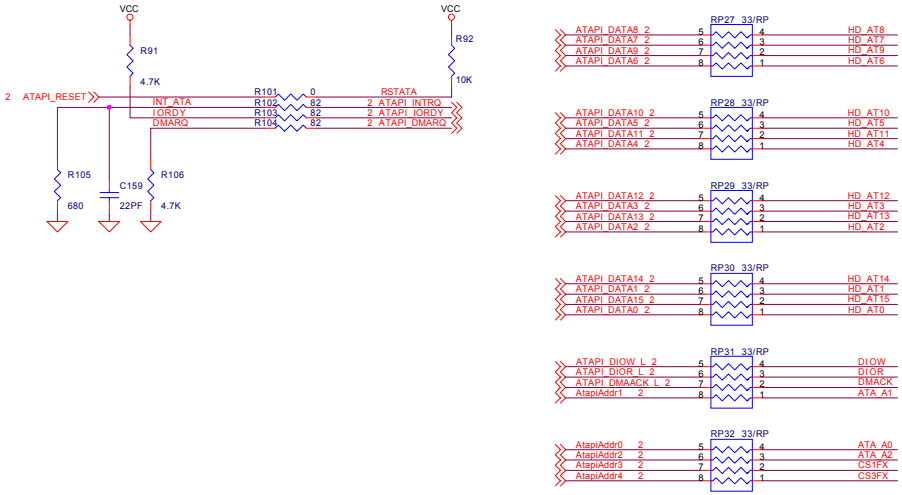

12 /RST_HOST
/RST_HOST
/RST_SW
D4
*IN4148
D5
IN4148
R69
10K
Q1
3906
V33
VCC
C144
10u/16
U5A
74AHCT14
U5B
74AHCT14
R70
0
2,6 /SYS_RST
C145
102
C146
104
D6
IN4148
R71
10K
R72
0
R155
0
R163
10K
/SYS_RST
U6
Em6353AX1SP3B-3.1
R162
*10K
R73
10K
U5C
74AHCT14
U5D
74AHCT14
R74
*0
2 E5_GPIOx35
/RST_AUDIO
/RST_AUDIO 11,12
R76
33
OPTICAL 12
U5E
74AHCT14
U5F
74AHCT14
C147
104
R78
330
L5
0
R79
120
2 AO_IEC958
SPDIF_OUT 12
GND
J2
DIP4/P2.0
2 E5_UART2_TX
2 E5_UART2_RX
GND

FLASH MEMORY(2 or 4 or 8 Mb)

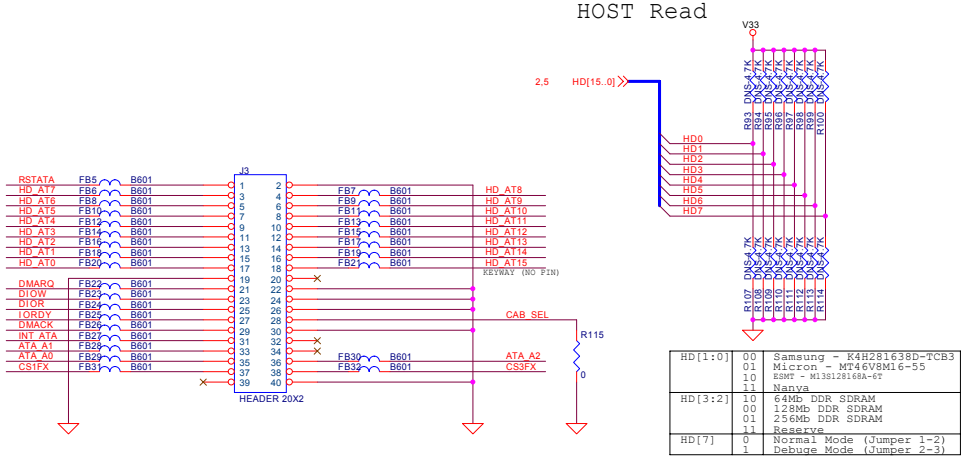


Size	Stuff	Not Stuff
1MB		R85,R86,R87,R90
2MB(Default)	R90	R85,R86,R87
4MB	R86,R90	R85,R87
8MB	R85,R86,R87	R90

DEDICATED ATAPI INTERFACE

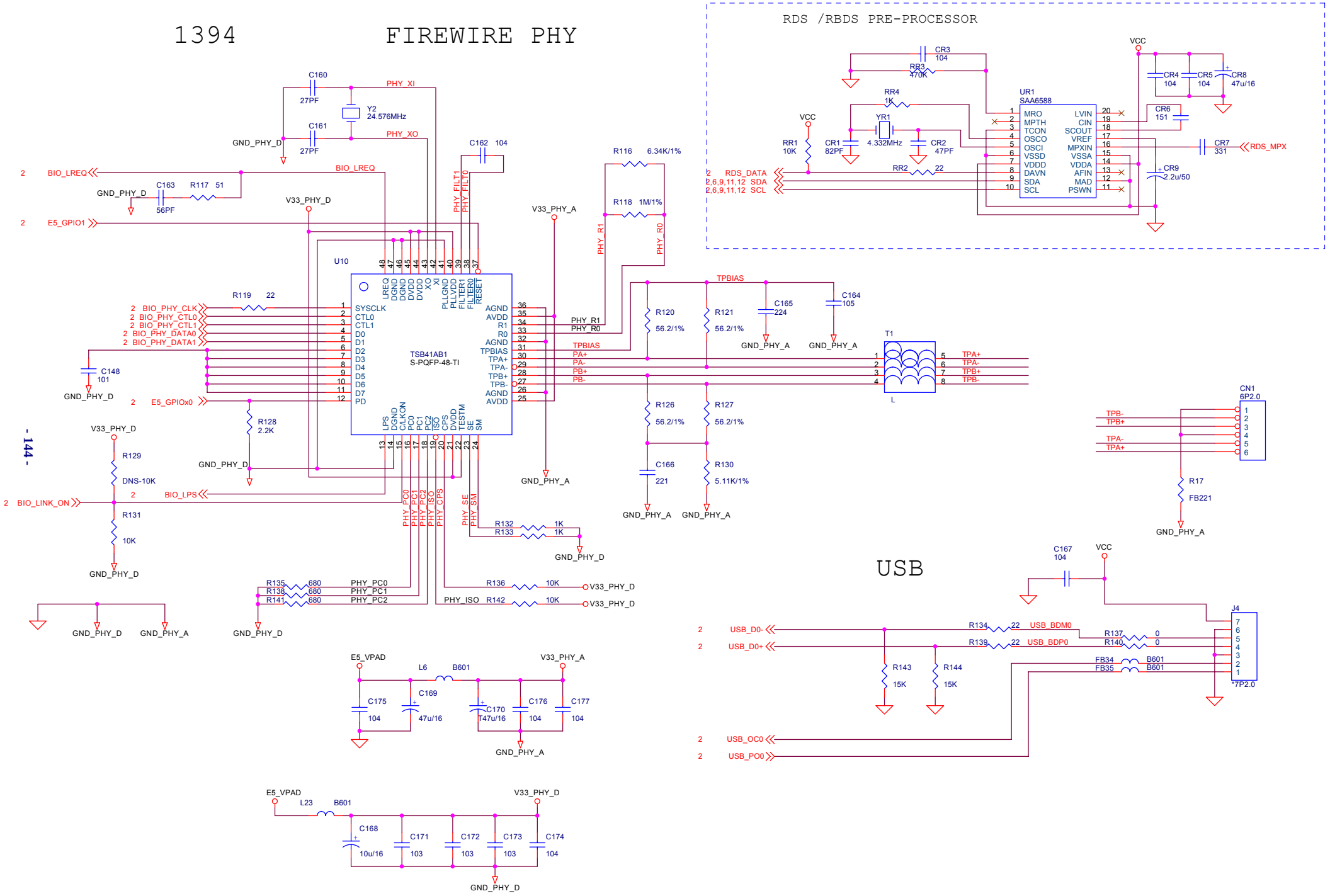


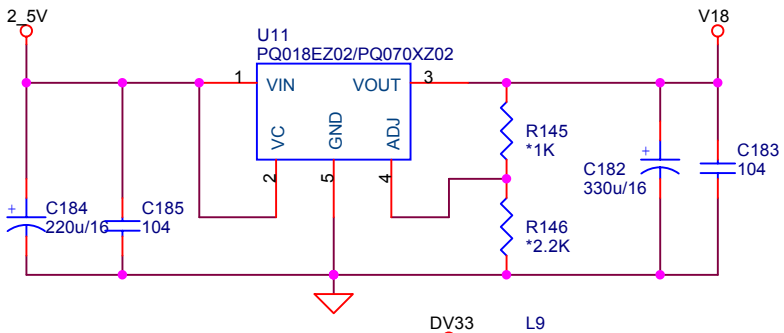
HOST Read

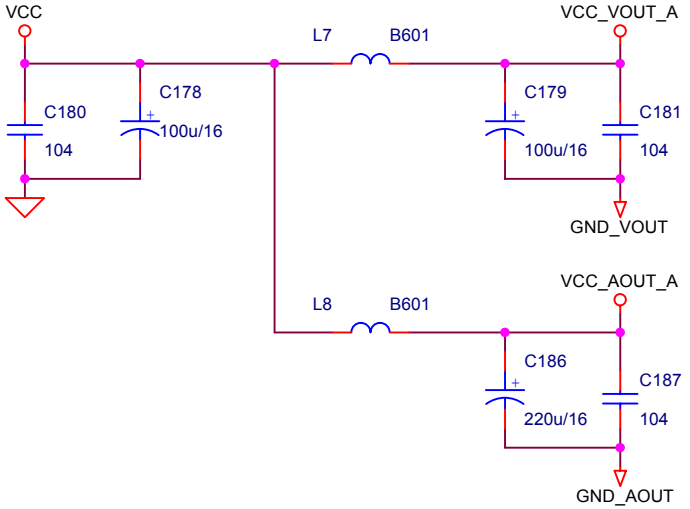


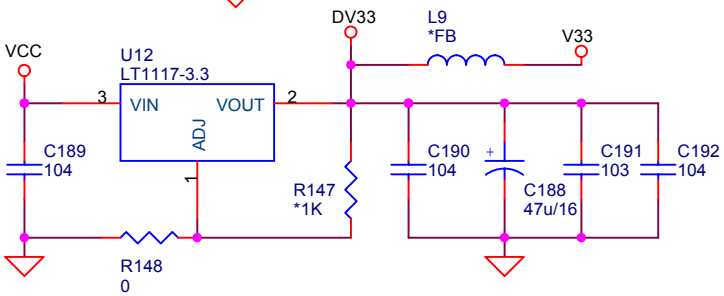
HD[1:0]	00	Samsung - K4H281638D-TCB3
	01	Micron - MT46V8M16-55
	10	ESMT - M13S128168A-6T
	11	Nanya
HD[3:2]	10	64Mb DDR SDRAM
	00	128Mb DDR SDRAM
	01	256Mb DDR SDRAM
	11	Reserve
HD[7]	0	Normal Mode (Jumper 1-2)
	1	Debuge Mode (Jumper 2-3)

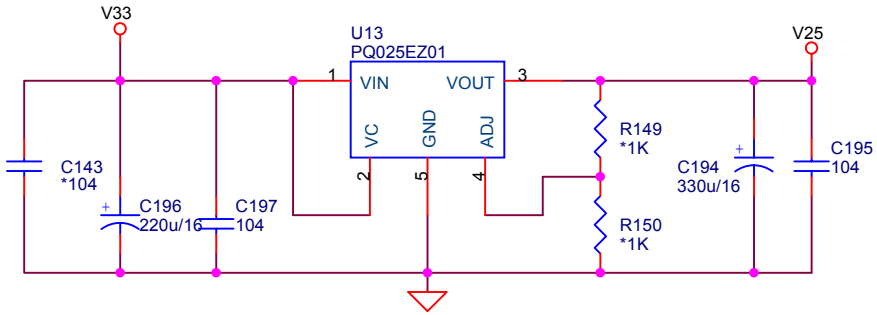
1394 FIREWIRE PHY




2_5V
U11
PQ018EZ02/PQ070XZ02
VIN
VOUT
VC
GND
ADJ
1
2
3
4
5
V18
R145
*1K
R146
*2.2K
C182
330u/16
C183
104
C184
220u/16
C185
104


VCC
L7
B601
VCC_VOUT_A
C180
104
C178
100u/16
C179
100u/16
C181
104
GND_VOUT
L8
B601
VCC_AOUT_A
C186
220u/16
C187
104
GND_AOUT


DV33
L9
*FB
V33
VCC
U12
LT1117-3.3
VIN
VOUT
ADJ
3
2
1
C189
104
R147
*1K
C190
104
C188
47u/16
C191
103
C192
104
R148
0


V33
U13
PQ025EZ01
VIN
VOUT
VC
GND
ADJ
1
2
3
4
5
V25
R149
*1K
R150
*1K
C194
330u/16
C195
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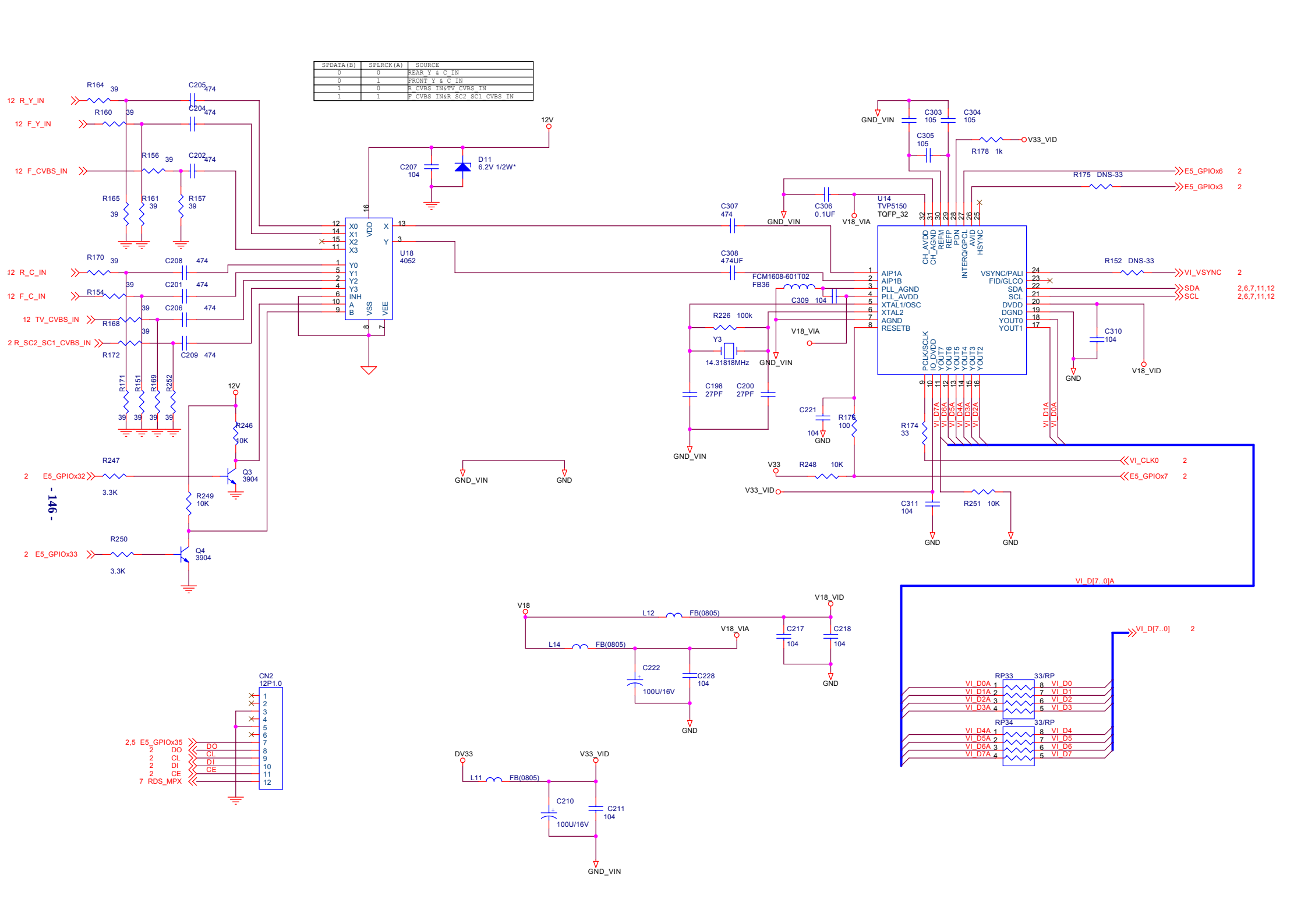
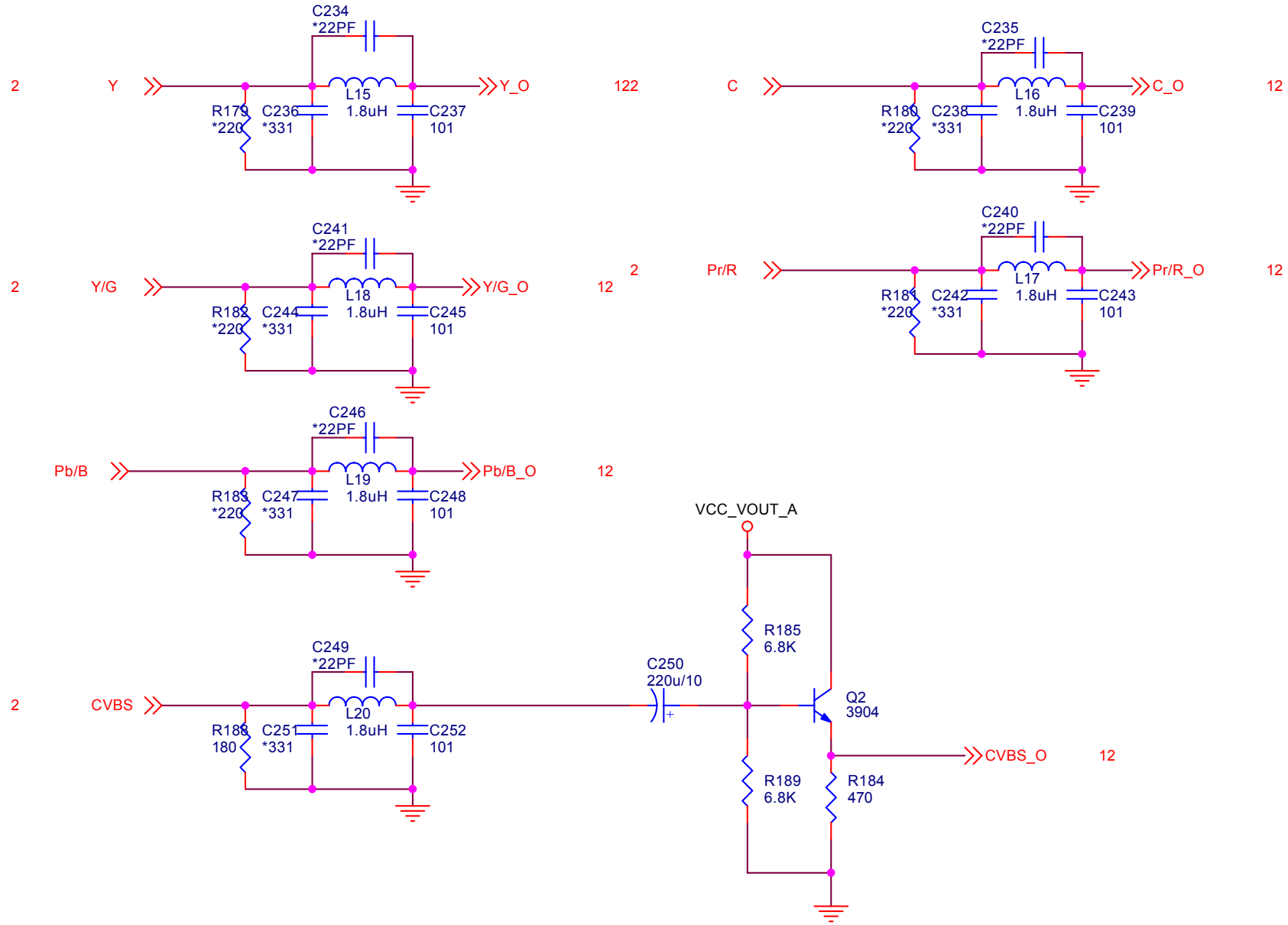
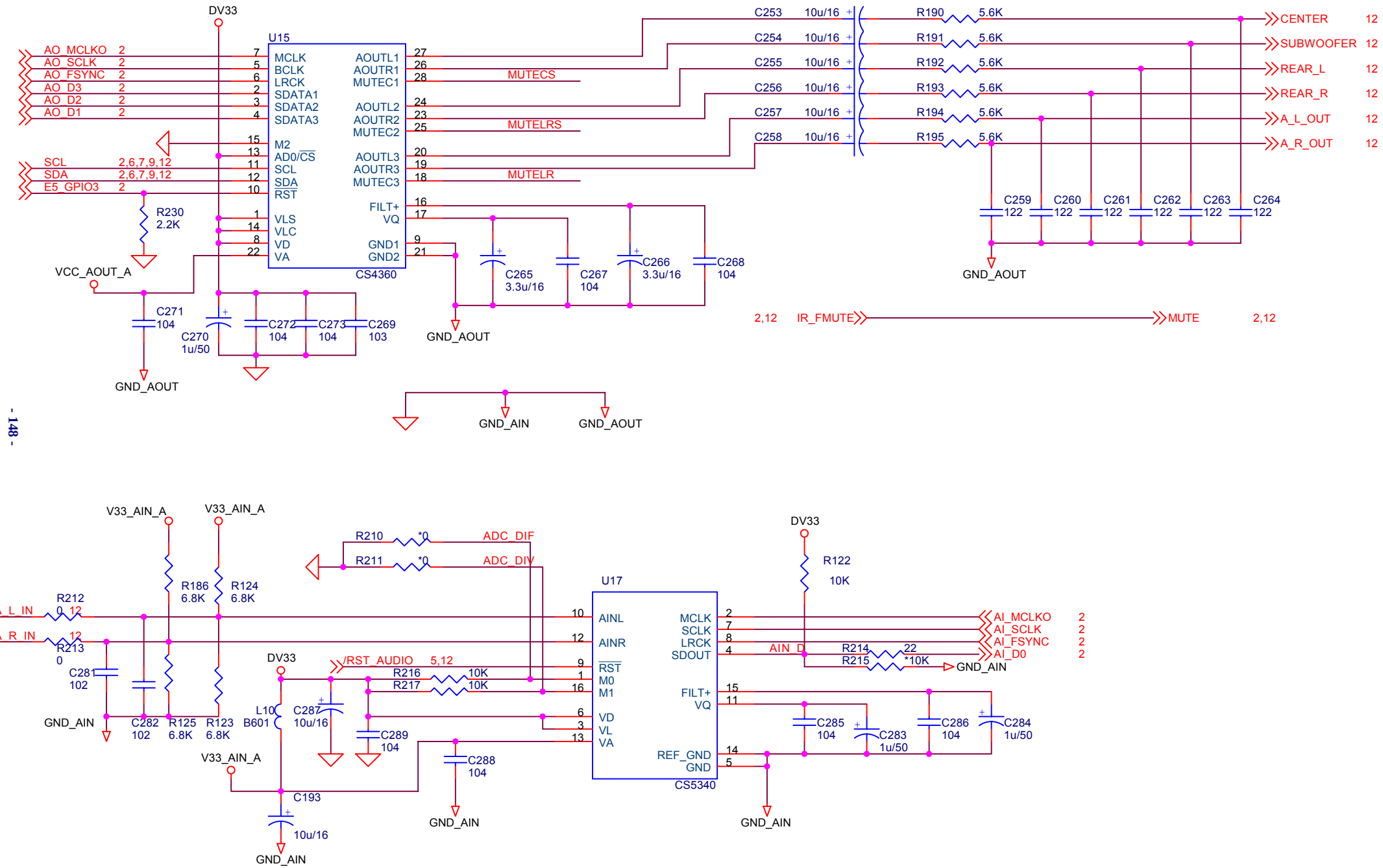
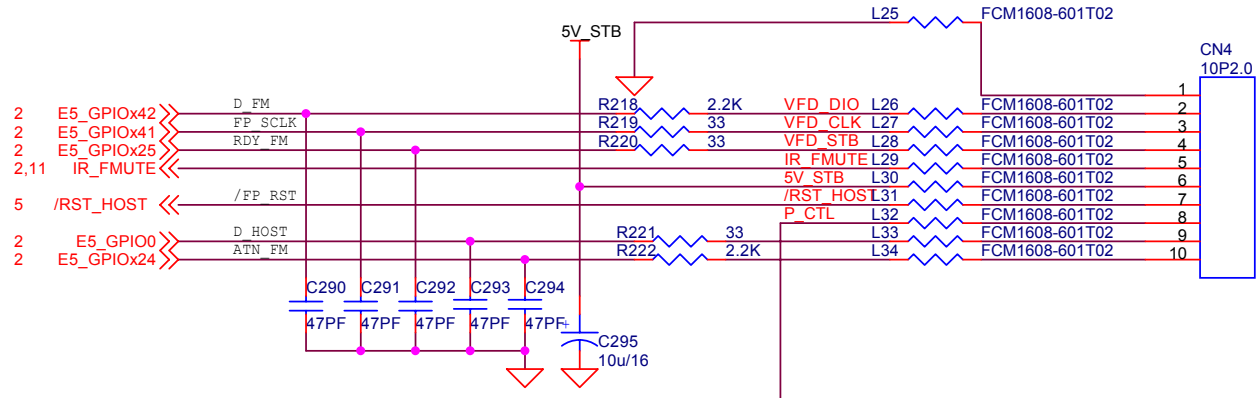
C143
*104
C196
220u/16
C197
104

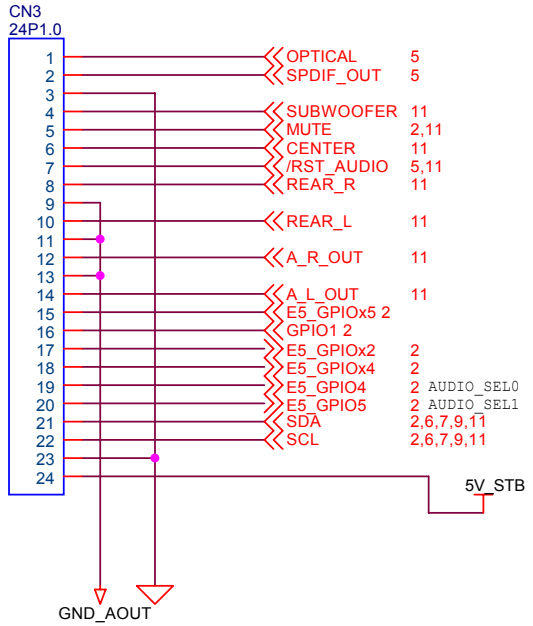

SPDATA(B) SPLRCK(A) SOURCE
0 0 REAR Y & C IN
0 1 FRONT Y & C IN
1 0 R CVBS IN&TV CVBS IN
1 1 F CVBS IN&R SC2 SC1 CVBS IN
12 R_Y_IN
12 F_Y_IN
12 F_CVBS_IN
12 R_C_IN
12 F_C_IN
12 TV_CVBS_IN
2 R_SC2_SC1_CVBS_IN
R164 39
R160 39
R156 39
R165 39
R161 39
R157 39
R170 39
R154 39
R168 39
R172 39
R171 39
R151 39
R169 39
R252 39
C205 474
C204 474
C202 474
C208 474
C201 474
C206 474
C209 474
12V
D11
6.2V 1/2W*
C207 104
U18
4052
C307 474
C308 474UF
GND_VIN
C306 0.1UF
V18_VIA
U14
TVP5150
TQFP_32
C303 105
C304 105
C305 105
V33_VID
R178 1k
R175 DNS-33
E5_GPIOx6 2
E5_GPIOx3 2
R152 DNS-33
VI_VSYNC 2
SDA 2,6,7,11,12
SCL 2,6,7,11,12
FCM1608-601T02
FB36
C309 104
R226 100k
Y3
14.31818MHz
C198 27PF
C200 27PF
C310 104
GND
V18_VID
C221 104
R176 100
R174 33
VI_D7A
VI_D6A
VI_D5A
VI_D4A
VI_D3A
VI_D2A
VI_D1A
VI_D0A
VI_CLK0 2
E5_GPIOx7 2
V33
R248 10K
V33_VID
C311 104
R251 10K
R246 10K
R247
2 E5_GPIOx32
3.3K
Q3
3904
R249 10K
R250
2 E5_GPIOx33
3.3K
Q4
3904
- 146 -
V18
L12 FB(0805)
L14 FB(0805)
C217 104
C218 104
C222
100U/16V
C228 104
CN2
12P1.0
2,5 E5_GPIOx35
2 DO
2 CL
2 DI
2 CE
7 RDS_MPX
DV33
L11 FB(0805)
C210
100U/16V
C211 104
VI_D[7..0]A
VI_D[7..0] 2
RP33 33/RP
RP34 33/RP
VI_D0
VI_D1
VI_D2
VI_D3
VI_D4
VI_D5
VI_D6
VI_D7

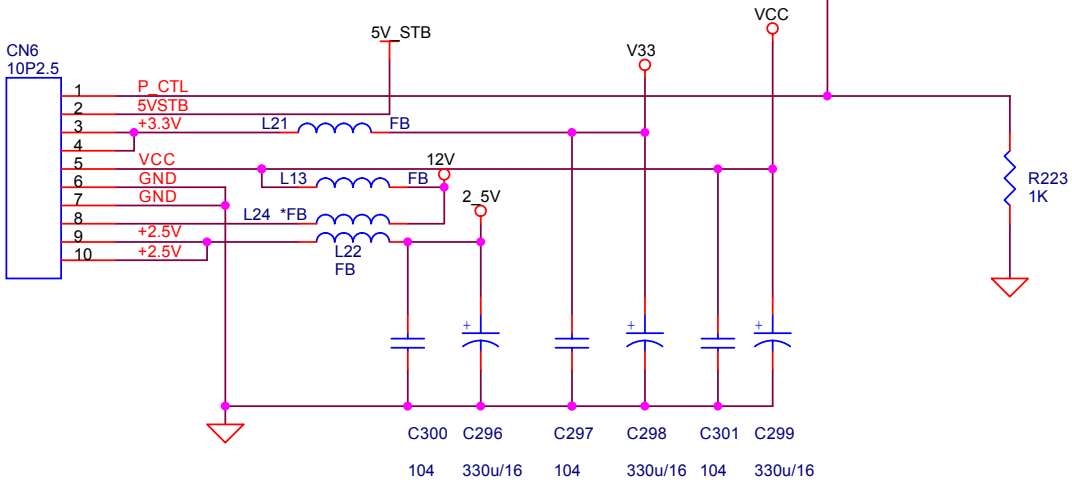

C234
*22PF
2
Y
L15
1.8uH
R179
*220
C236
*331
C237
101
Y_O
122
C235
*22PF
C
L16
1.8uH
R180
*220
C238
*331
C239
101
C_O
12
C241
*22PF
2
Y/G
L18
1.8uH
R182
*220
C244
*331
C245
101
Y/G_O
12
2
Pr/R
C240
*22PF
L17
1.8uH
R181
*220
C242
*331
C243
101
Pr/R_O
12
C246
*22PF
2
Pb/B
L19
1.8uH
R183
*220
C247
*331
C248
101
Pb/B_O
12
VCC_VOUT_A
C249
*22PF
2
CVBS
L20
1.8uH
R186
180
C251
*331
C252
101
C250
220u/10
R185
6.8K
Q2
3904
CVBS_O
12
R189
6.8K
R184
470

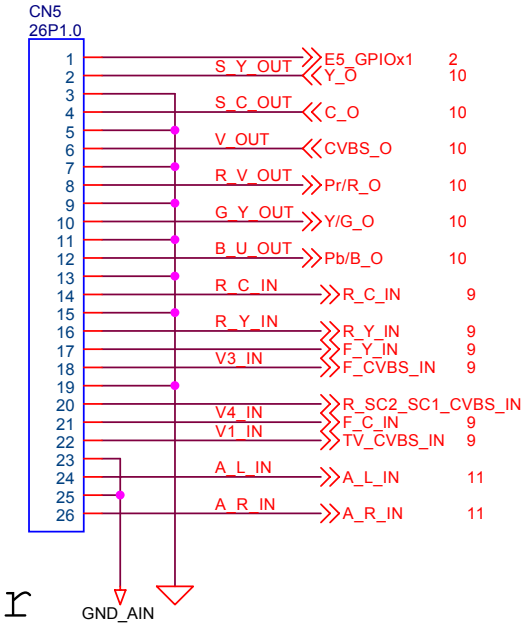

DV33
U15
AO_MCLKO 2
AO_SCLK 2
AO_FSYNC 2
AO_D3 2
AO_D2 2
AO_D1 2
MCLK
BCLK
LRCK
SDATA1
SDATA2
SDATA3
M2
AD0/CS
SCL
SDA
RST
VLS
VLC
VD
VA
AOUTL1
AOUTR1
MUTEC1
AOUTL2
AOUTR2
MUTEC2
AOUTL3
AOUTR3
MUTEC3
FILT+
VQ
GND1
GND2
CS4360
SCL 2,6,7,9,12
SDA 2,6,7,9,12
E5_GPIO3 2
R230 2.2K
VCC_AOUT_A
C271 104
C270 1u/50
C272 104
C273 104
C269 103
GND_AOUT
MUTECS
MUTELRS
MUTELR
C253 10u/16
C254 10u/16
C255 10u/16
C256 10u/16
C257 10u/16
C258 10u/16
C265 3.3u/16
C267 104
C266 3.3u/16
C268 104
R190 5.6K
R191 5.6K
R192 5.6K
R193 5.6K
R194 5.6K
R195 5.6K
C259 122
C260 122
C261 122
C262 122
C263 122
C264 122
CENTER 12
SUBWOOFER 12
REAR_L 12
REAR_R 12
A_L_OUT 12
A_R_OUT 12
2,12 IR_FMUTE
MUTE 2,12
GND_AIN
- 148 -
V33_AIN_A
R210 *0 ADC_DIF
R211 *0 ADC_DIV
R186 6.8K
R124 6.8K
R212 0 12
A_L_IN
A_R_IN 12
R213 0
C281 102
C282 102
R125 6.8K
R123 6.8K
L10 B601
C287 10u/16
C289 104
C288 104
C193
10u/16
/RST_AUDIO 5,12
R216 10K
R217 10K
U17
AINL
AINR
RST
M0
M1
VD
VL
VA
REF_GND
GND
CS5340
MCLK
SCLK
LRCK
SDOUT
FILT+
VQ
R122 10K
AIN_D
R214 22
R215 *10K
AI_MCLKO 2
AI_SCLK 2
AI_FSYNC 2
AI_D0 2
C285 104
C283 1u/50
C286 104
C284 1u/50

FRONT PANEL INTERFACE

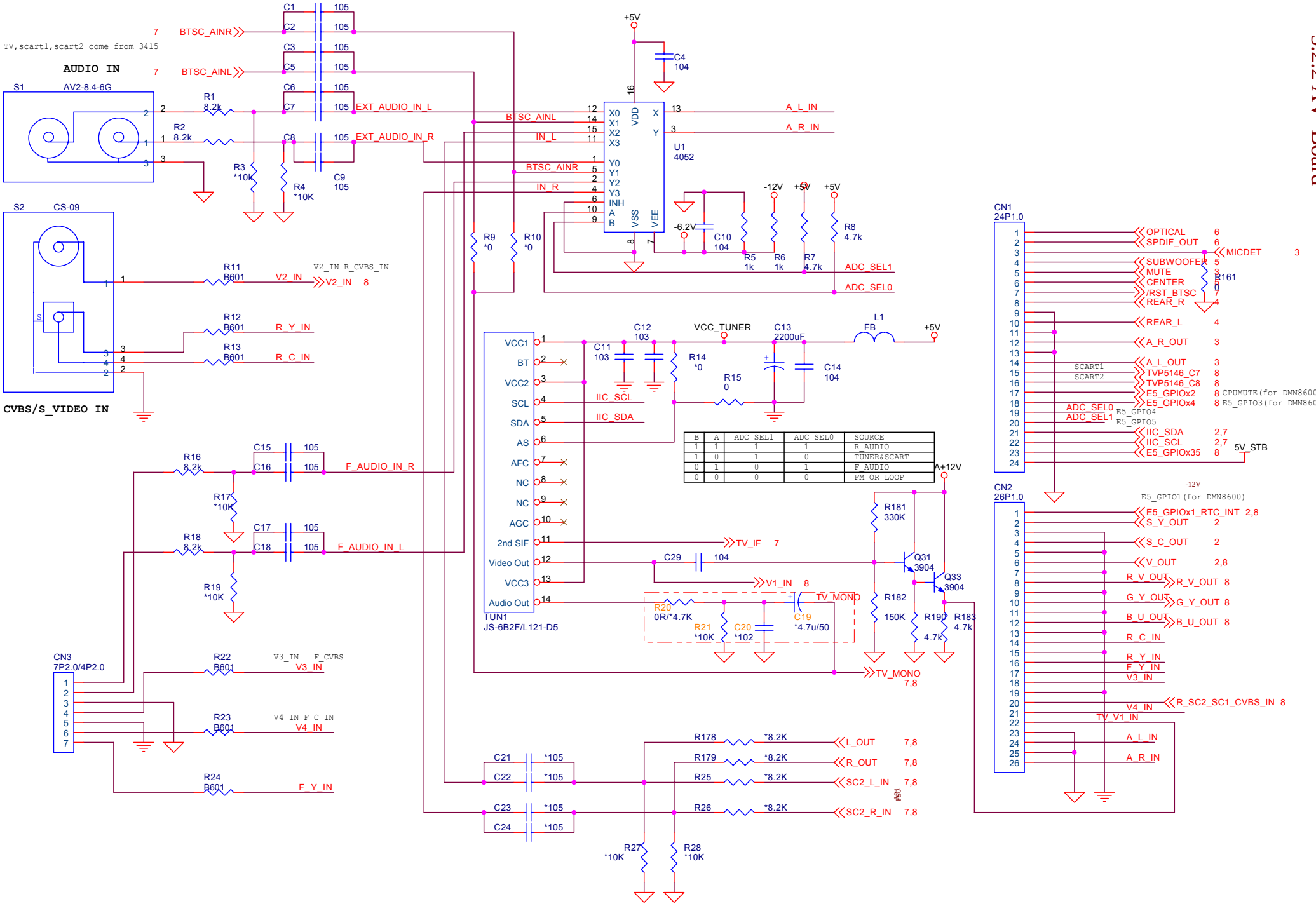




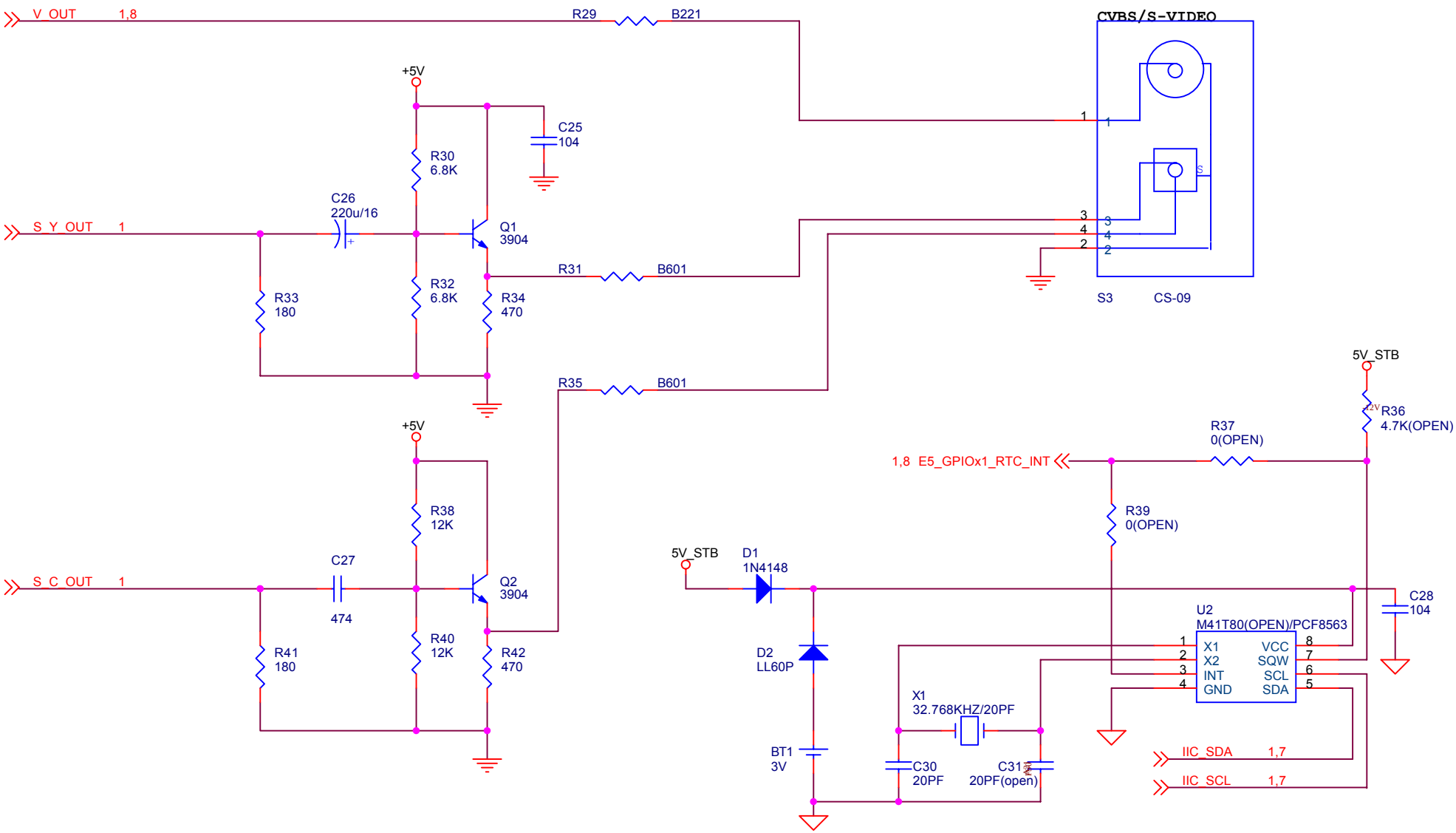


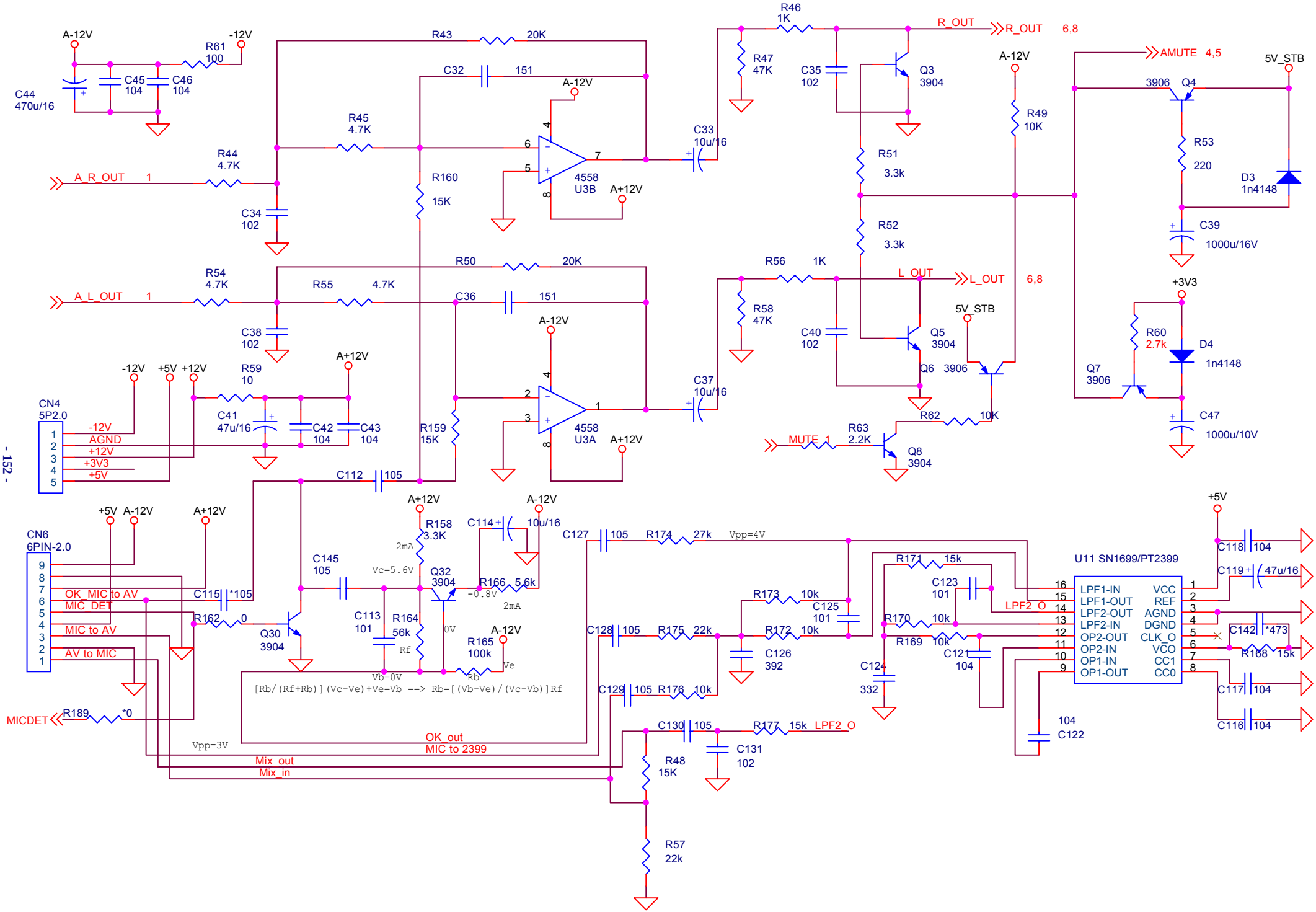


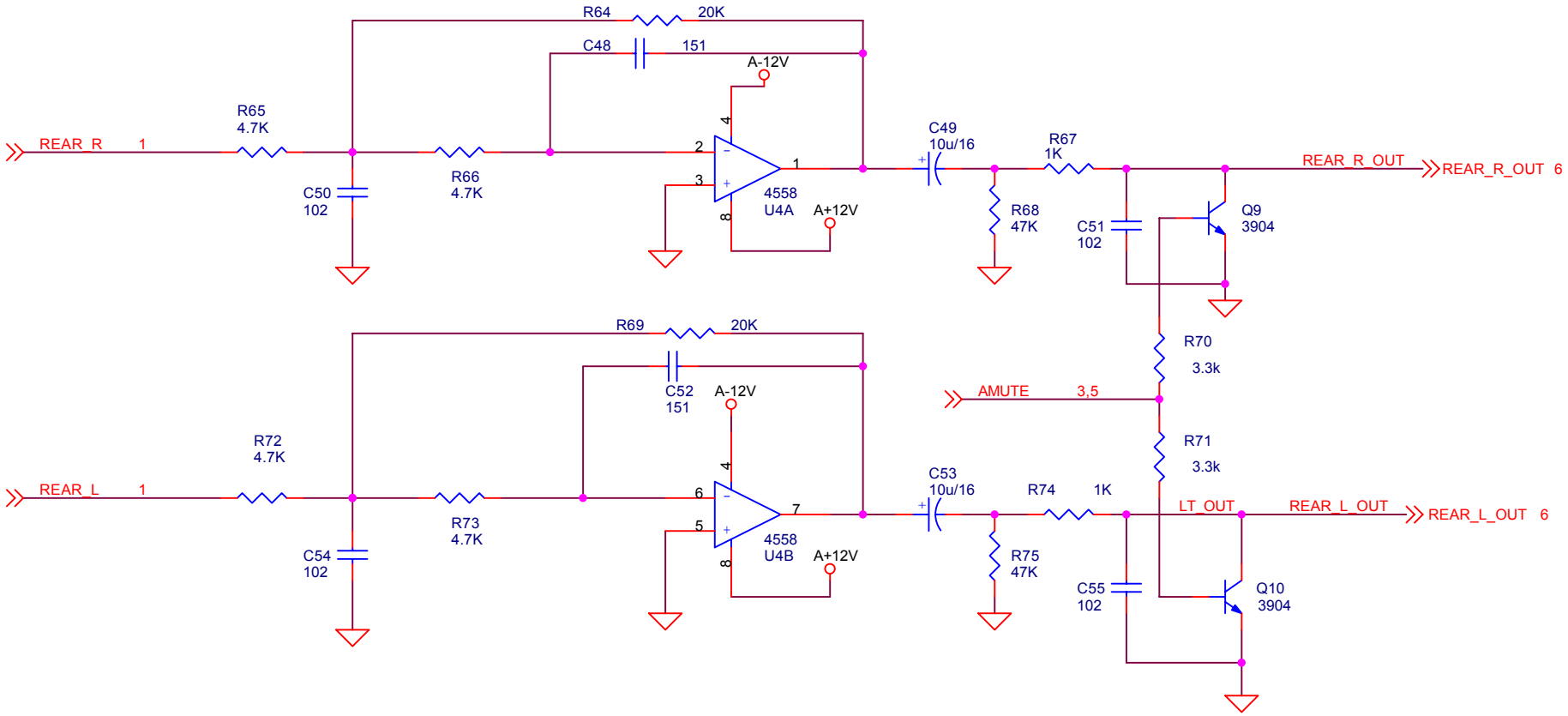
A/V I/O Connector

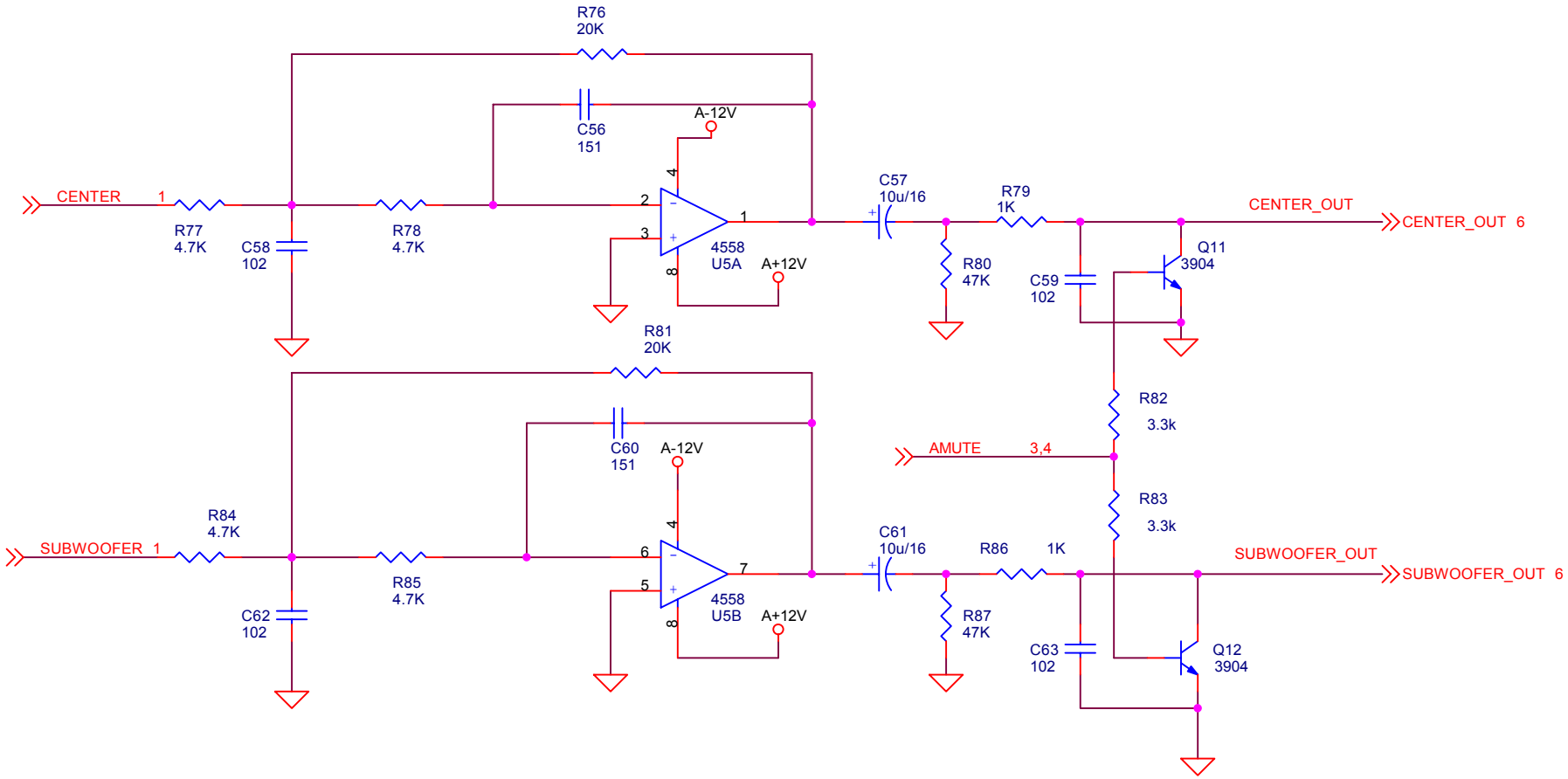


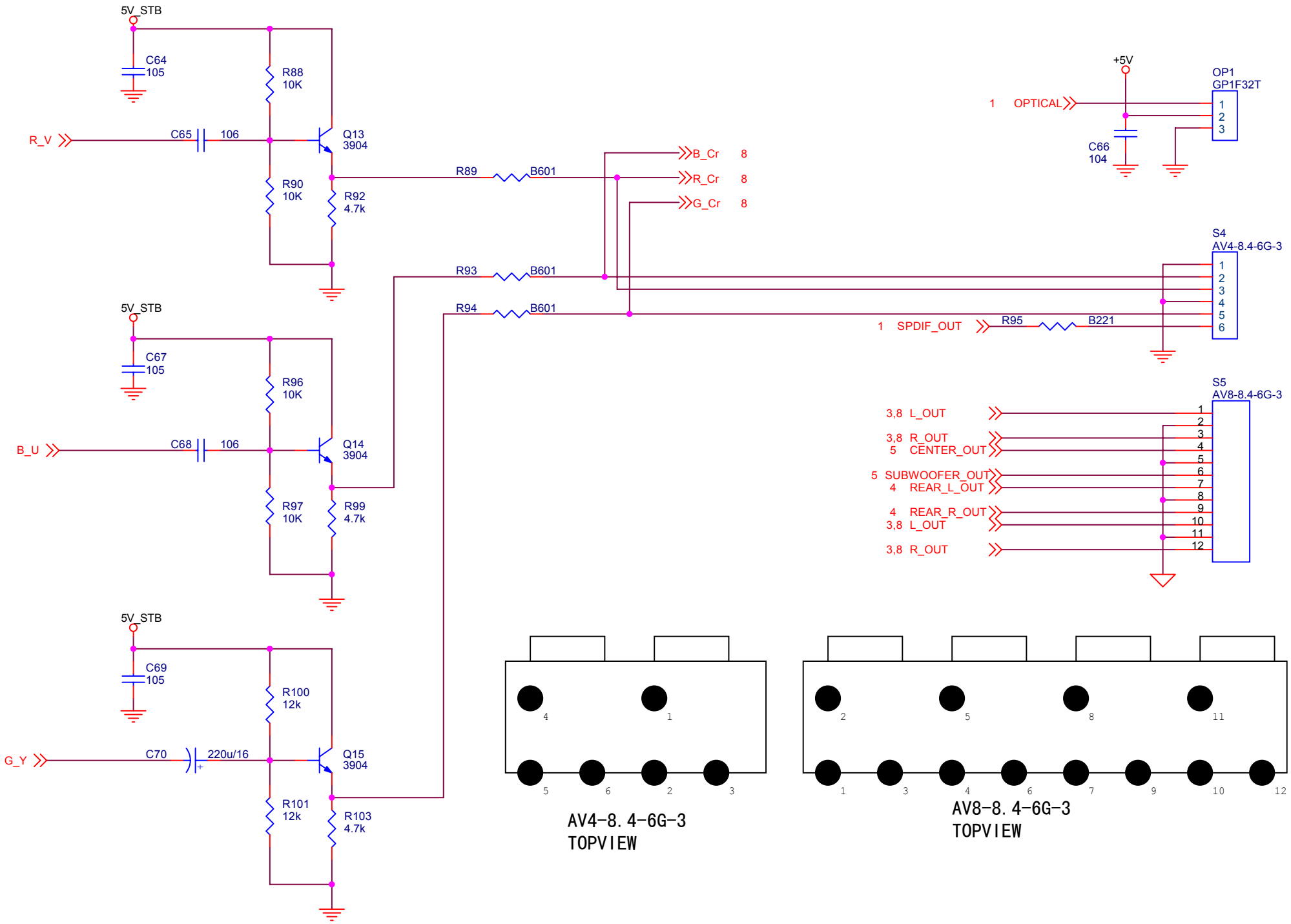
B	A	ADC_SEL1	ADC_SEL0	SOURCE
1	1	1	1	R_AUDIO
1	0	1	0	TUNER&SCART
0	1	0	1	F_AUDIO
0	0	0	0	FM_OR_LOOP

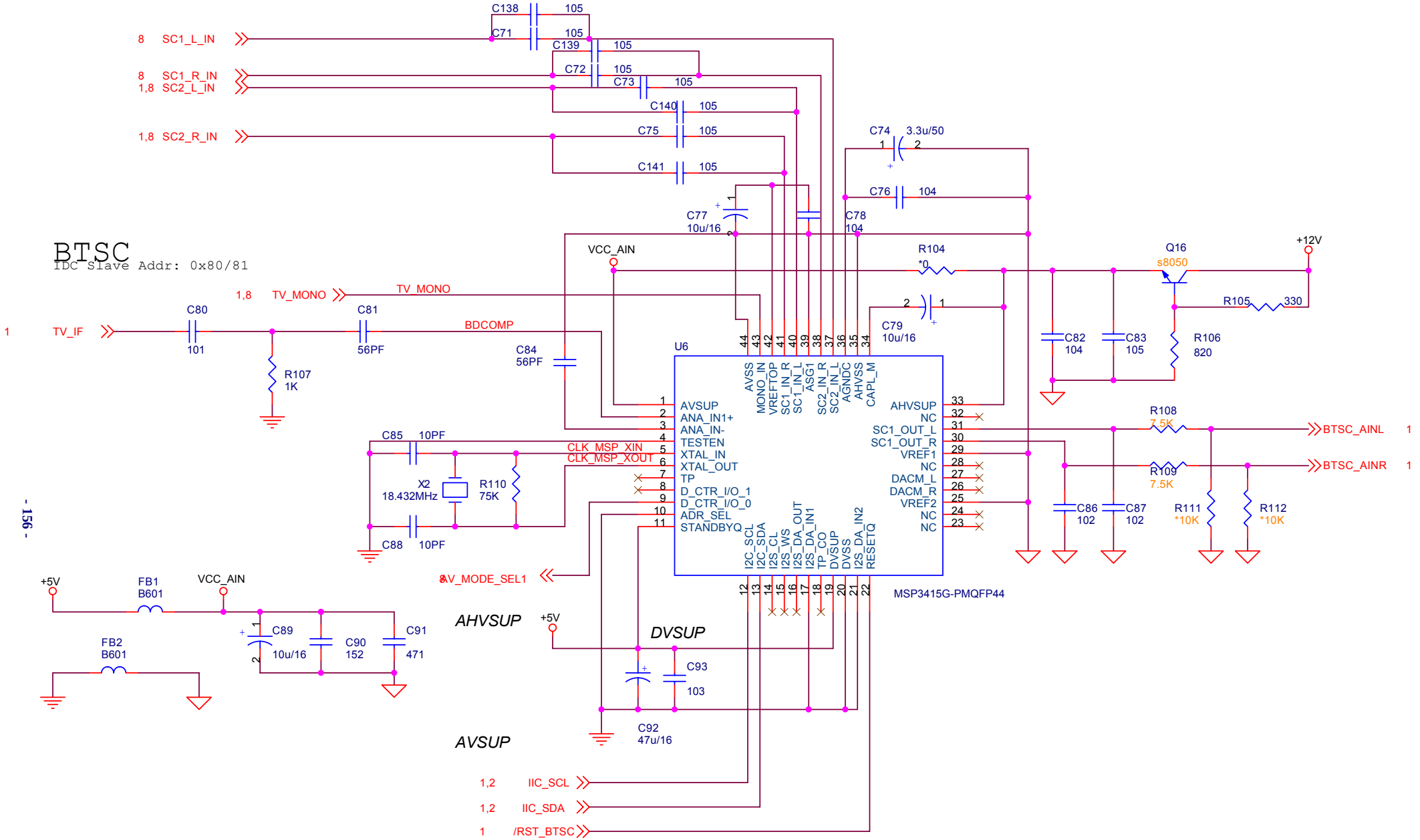

V_OUT 1,8
R29
B221
CVBS/S-VIDEO
S3 CS-09
+5V
C25
104
R30
6.8K
C26
220u/16
S_Y_OUT 1
Q1
3904
R31
B601
R32
6.8K
R33
180
R34
470
R35
B601
+5V
R38
12K
C27
474
S_C_OUT 1
Q2
3904
R40
12K
R41
180
R42
470
5V_STB
R36
4.7K(OPEN)
R37
0(OPEN)
1,8 E5_GPIOx1_RTC_INT
R39
0(OPEN)
5V_STB
D1
1N4148
D2
LL60P
BT1
3V
X1
32.768KHZ/20PF
C30
20PF
C31
20PF(open)
U2
M41T80(OPEN)/PCF8563
X1
X2
INT
GND
VCC
SQW
SCL
SDA
C28
104
IIC_SDA 1,7
IIC_SCL 1,7

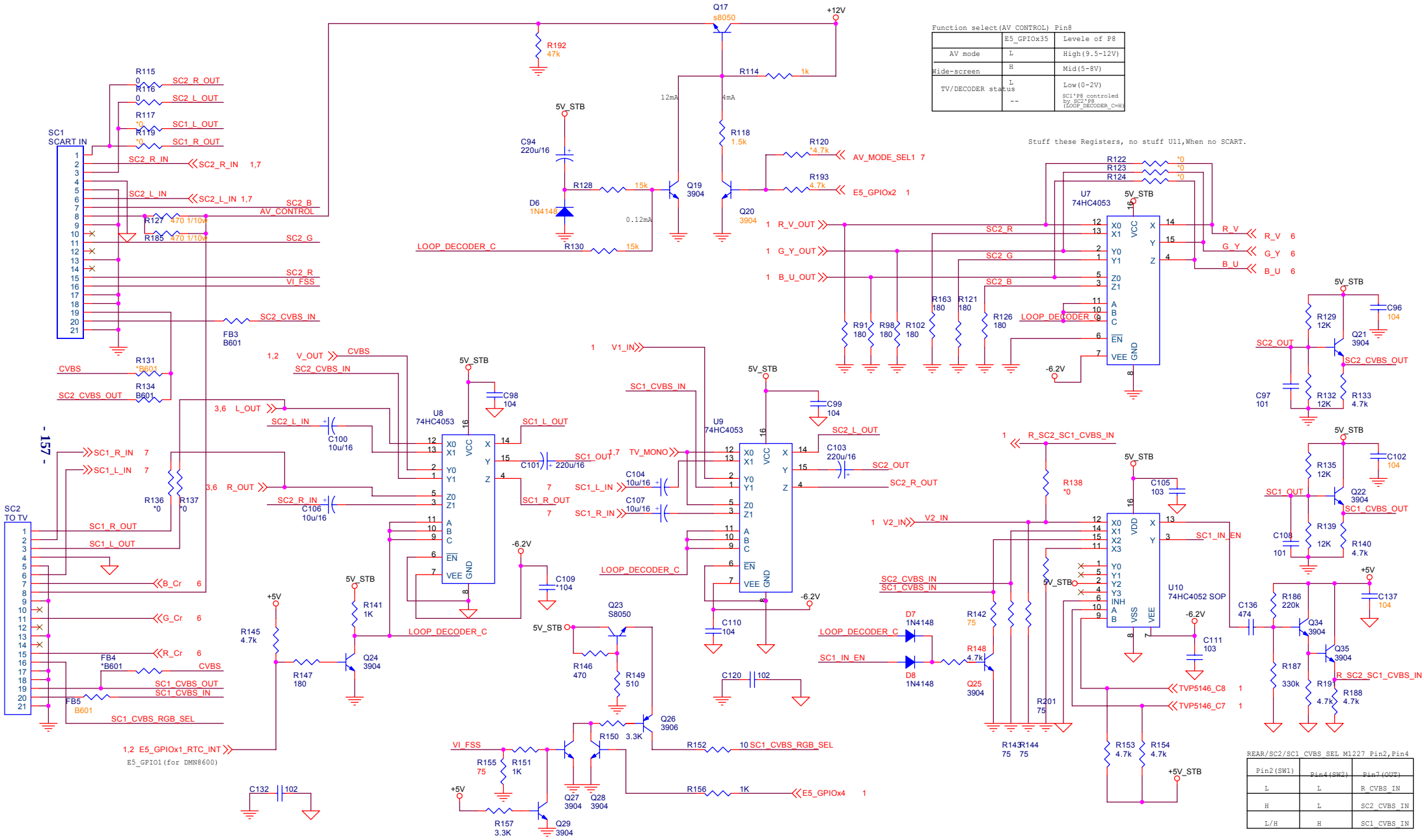

A-12V
-12V
R61 100
C44 470u/16
C45 104
C46 104
R43 20K
C32 151
R45 4.7K
R44 4.7K
A_R_OUT 1
C34 102
R160 15K
4558 U3B
A+12V
C33 10u/16
R46 1K
R47 47K
C35 102
Q3 3904
R_OUT
R_OUT 6,8
R49 10K
R51 3.3k
R52 3.3k
AMUTE 4,5
5V_STB
3906 Q4
R53 220
D3 1n4148
C39 1000u/16V
+3V3
R60 2.7k
D4 1n4148
Q7 3906
C47 1000u/10V
R50 20K
R54 4.7K
R55 4.7K
A_L_OUT 1
C36 151
C38 102
R56 1K
L_OUT
L_OUT 6,8
R58 47K
C40 102
Q5 3904
Q6 3906
5V_STB
R62 10K
R63 2.2K
MUTE_1
Q8 3904
C37 10u/16
4558 U3A
R59 10
-12V +5V +12V
A+12V
CN4 5P2.0
C41 47u/16
C42 104
C43 104
R159 15K
-12V
AGND
+12V
+3V3
+5V
C112 105
- 152 -
CN6 6PIN-2.0
+5V A-12V A+12V
OK_MIC to AV
MIC_DET
MIC to AV
AV to MIC
C115 *105
R162 0
Q30 3904
C145 105
R158 3.3K
2mA
Vc=5.6V
Q32 3904
C114 10u/16
R166 5.6k
-0.8V
2mA
C113 101
R164 56k
Rf
0V
R165 100k
Ve
Vb=0V
Rb
[Rb/(Rf+Rb)](Vc-Ve)+Ve=Vb ==> Rb=[(Vb-Ve)/(Vc-Vb)]Rf
MICDET
R189 *0
Vpp=3V
OK_out
MIC to 2399
Mix_out
Mix_in
C127 105
R174 27k
Vpp=4V
C128 105
R175 22k
C129 105
R176 10k
R173 10k
C125 101
R172 10k
C126 392
C124 332
R171 15k
C123 101
R170 10k
R169 10k
C121 104
LPF2_O
C130 105
R177 15k
LPF2_O
C131 102
R48 15K
R57 22k
104 C122
U11 SN1699/PT2399
LPF1-IN
LPF1-OUT
LPF2-OUT
LPF2-IN
OP2-OUT
OP2-IN
OP1-IN
OP1-OUT
VCC
REF
AGND
DGND
CLK_O
VCO
CC1
CC0
C118 104
C119 47u/16
C142 *473
R168 15k
C117 104
C116 104


R64
20K
C48
151
A-12V
REAR_R
1
R65
4.7K
C50
102
R66
4.7K
4558
U4A
A+12V
C49
10u/16
R67
1K
R68
47K
C51
102
Q9
3904
REAR_R_OUT
REAR_R_OUT 6
R69
20K
C52
151
A-12V
AMUTE
3,5
R70
3.3k
R71
3.3k
R72
4.7K
REAR_L
1
R73
4.7K
C54
102
4558
U4B
A+12V
C53
10u/16
R74
1K
LT_OUT
REAR_L_OUT
REAR_L_OUT 6
R75
47K
C55
102
Q10
3904


R76
20K
C56
151
A-12V
CENTER
1
R77
4.7K
C58
102
R78
4.7K
4558
U5A
A+12V
C57
10u/16
R79
1K
CENTER_OUT
CENTER_OUT 6
R80
47K
C59
102
Q11
3904
R81
20K
R82
3.3k
C60
151
A-12V
AMUTE
3,4
R83
3.3k
R84
4.7K
SUBWOOFER 1
R85
4.7K
C62
102
4558
U5B
A+12V
C61
10u/16
R86
1K
SUBWOOFER_OUT
SUBWOOFER_OUT 6
R87
47K
C63
102
Q12
3904


5V_STB
C64
105
R88
10K
R_V
C65
106
Q13
3904
R90
10K
R92
4.7k
R89
B601
B_Cr 8
R_Cr 8
G_Cr 8
5V_STB
C67
105
R96
10K
B_U
C68
106
Q14
3904
R97
10K
R99
4.7k
R93
B601
R94
B601
5V_STB
C69
105
R100
12k
G_Y
C70
220u/16
Q15
3904
R101
12k
R103
4.7k
+5V
OP1
GP1F32T
1 OPTICAL
C66
104
S4
AV4-8.4-6G-3
1 SPDIF_OUT
R95
B221
S5
AV8-8.4-6G-3
3,8 L_OUT
3,8 R_OUT
5 CENTER_OUT
5 SUBWOOFER_OUT
4 REAR_L_OUT
4 REAR_R_OUT
3,8 L_OUT
3,8 R_OUT
AV4-8.4-6G-3
TOPVIEW
AV8-8.4-6G-3
TOPVIEW


BTSC
IDC Slave Addr: 0x80/81
8 SC1_L_IN
8 SC1_R_IN
1,8 SC2_L_IN
1,8 SC2_R_IN
C138 105
C71 105
C139 105
C72 105
C73 105
C140 105
C75 105
C141 105
C74 3.3u/50
C76 104
C77 10u/16
C78 104
C79 10u/16
VCC_AIN
R104 *0
Q16 s8050
+12V
R105 330
R106 820
C82 104
C83 105
1,8 TV_MONO
TV_MONO
1 TV_IF
C80 101
C81 56PF
BDCOMP
C84 56PF
R107 1K
U6
AVSUP
ANA_IN1+
ANA_IN-
TESTEN
XTAL_IN
XTAL_OUT
TP
D_CTR_I/O_1
D_CTR_I/O_0
ADR_SEL
STANDBYQ
AVSS
MONO_IN
VREFTOP
SC1_IN_R
SC1_IN_L
ASG1
SC2_IN_R
SC2_IN_L
AGNDC
AHVSS
CAPL_M
AHVSUP
NC
SC1_OUT_L
SC1_OUT_R
VREF1
NC
DACM_L
DACM_R
VREF2
NC
NC
I2C_SCL
I2C_SDA
I2S_CL
I2S_WS
I2S_DA_OUT
I2S_DA_IN1
TP_CO
DVSUP
DVSS
I2S_DA_IN2
RESETQ
MSP3415G-PMQFP44
C85 10PF
C88 10PF
X2 18.432MHz
R110 75K
CLK_MSP_XIN
CLK_MSP_XOUT
R108 7.5K
R109 7.5K
BTSC_AINL 1
BTSC_AINR 1
C86 102
C87 102
R111 *10K
R112 *10K
8AV_MODE_SEL1
+5V
FB1 B601
VCC_AIN
FB2 B601
C89 10u/16
C90 152
C91 471
AHVSUP
DVSUP
C93 103
C92 47u/16
AVSUP
1,2 IIC_SCL
1,2 IIC_SDA
1 /RST_BTSC



Function select(AV CONTROL) Pin8

	E5_GPIOx35	Levele of P8
AV mode	L	High(9.5-12V)
Wide-screen	H	Mid(5-8V)
TV/DECODER status	L	Low(0-2V) SC1'P8 controled by SC2'P8 (LOOP_DECODER_C=H)
	--	

REAR/SC2/SC1 CVBS SEL M1227 Pin2,Pin4

Pin2(SW1)	Pin4(SW2)	Pin7(OUT)
L	L	R_CVBS_IN
H	L	SC2_CVBS_IN
L/H	H	SC1_CVBS_IN

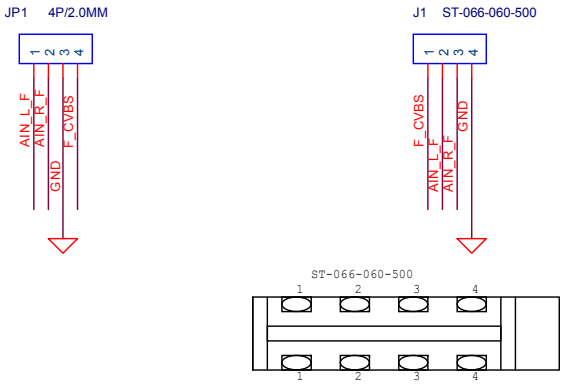
Fast Blanking Pin16

High(1~3V)	RGB
Low(0~0.4V)	Composite

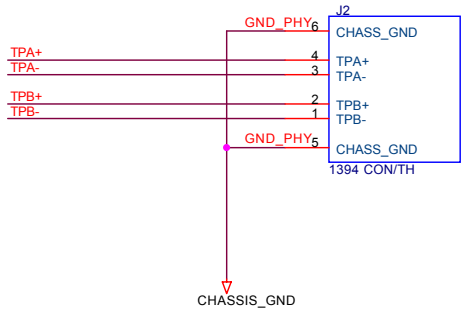
SCART LOOP AND DECODER Function

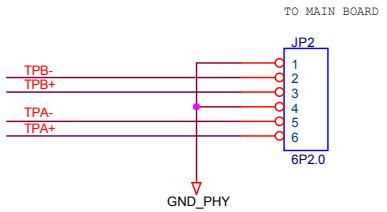
NET / STATE	LOOP_DECODER_OFF_C	E5_GPIOx1_RTC_INT	SC1_AUDIO_OUT	SC2_AUDIO_OUT	SC1_CVBS_OUT	SC1_RGB	SC2_CVBS_OUT
STANDBY/DECODER_OFF	H	POWER_OFF	SC2_AUDIO_IN	SC1_AUDIO_IN	SC2_CVBS_IN	SC2_RGB	SC1_CVBS_IN
POWER_ON/DECODER_ON	L	H	RW_AUDIO_OUT	TV_MONO	RW_CVBS_OUT	RW_RGB_OUT	TUNER_CVBS_IN
POWER_ON/DECODER_OFF	H	L	SC2_AUDIO_IN	SC1_AUDIO_IN	SC2_CVBS_IN	RW_RGB_OUT	SC1_CVBS_IN

To AVIO Board

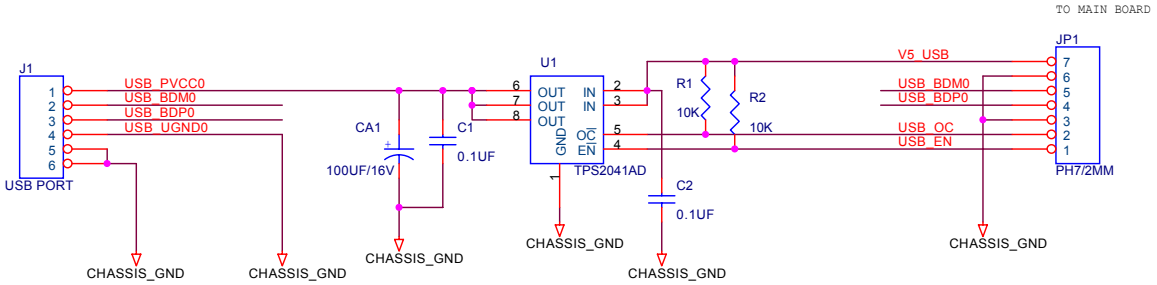


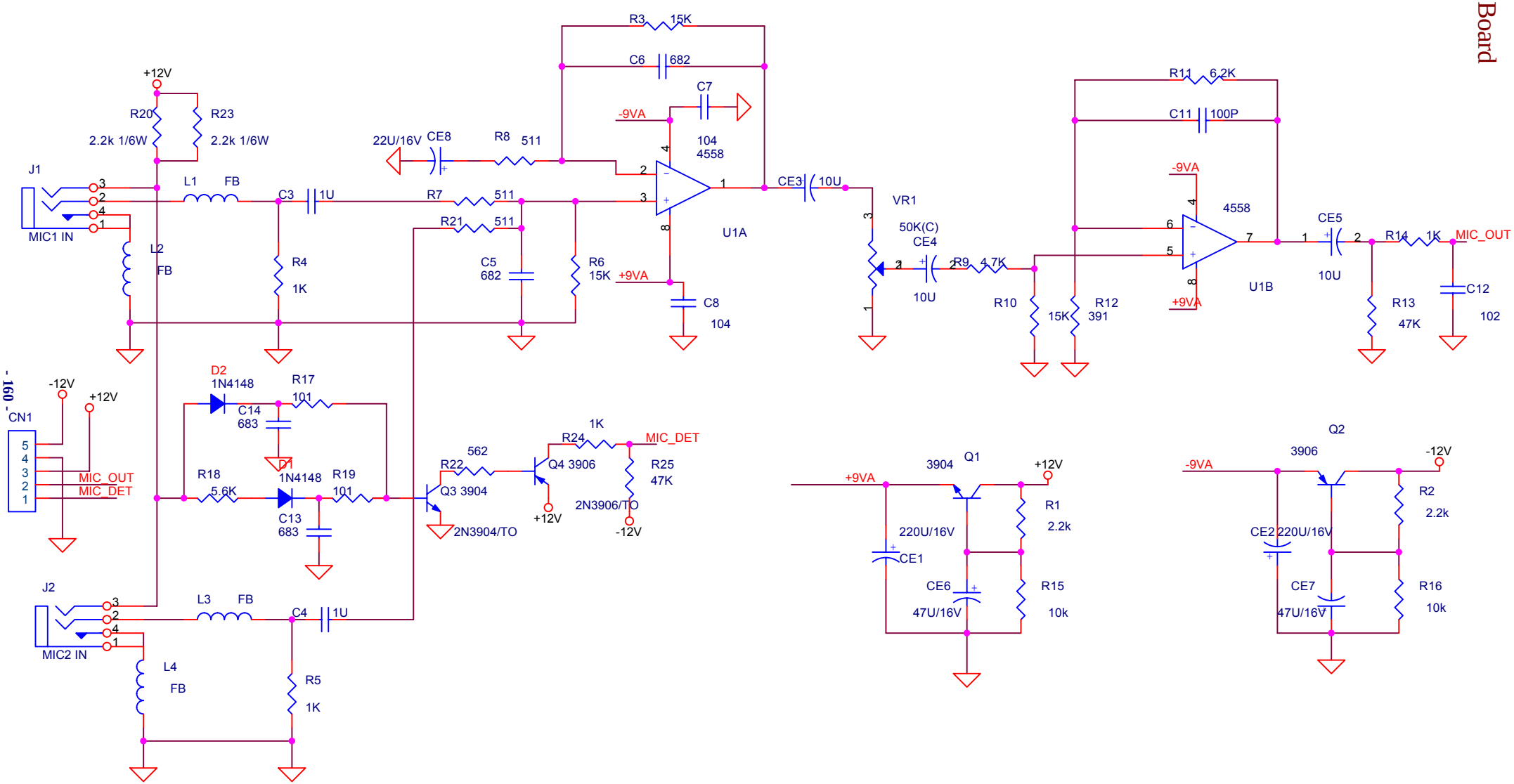
FIREWIRE Interface

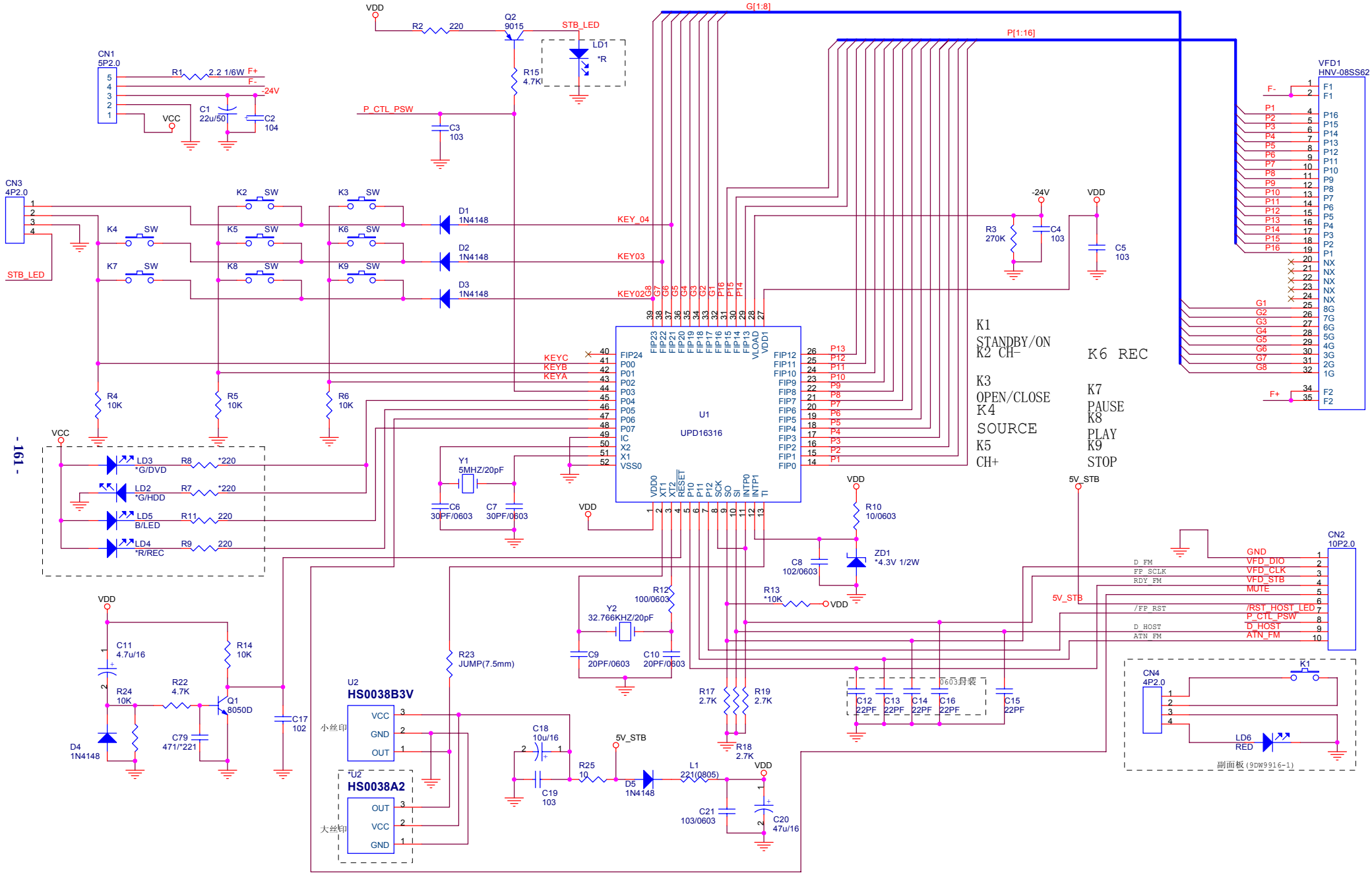




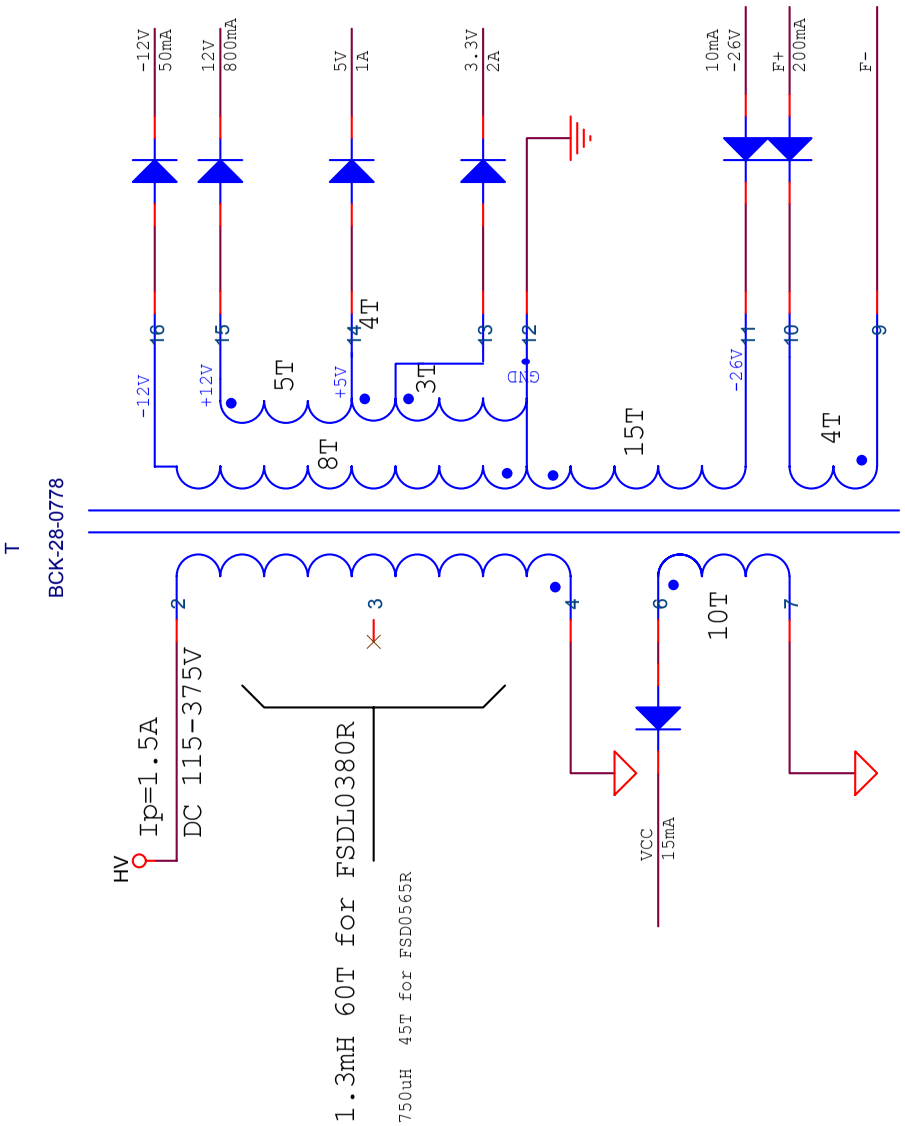
USB Interface

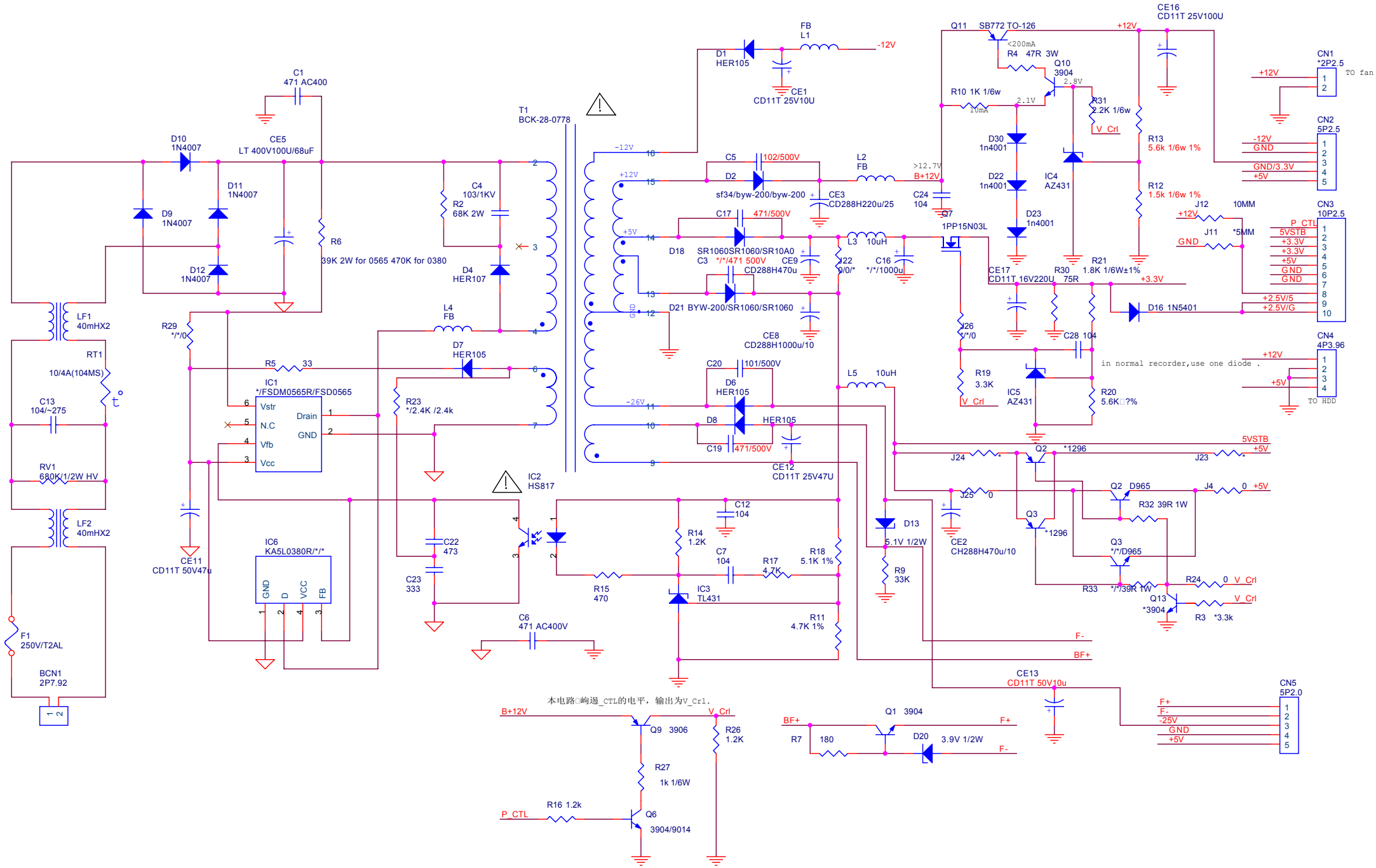



+12V
R20
2.2k 1/6W
R23
2.2k 1/6W
J1
MIC1 IN
L1
FB
C3
1U
L2
FB
R4
1K
22U/16V
CE8
R8
511
R3
15K
C6
682
C7
-9VA
104
4558
R7
511
R21
511
C5
682
R6
15K
+9VA
C8
104
U1A
CE3
10U
VR1
50K(C)
CE4
10U
R9
4.7K
R10
R11
6.2K
C11
100P
15K
R12
391
4558
U1B
CE5
10U
R14
1K
MIC_OUT
R13
47K
C12
102
- 160 -
CN1
-12V
+12V
MIC_OUT
MIC_DET
D2
1N4148
C14
683
R17
101
R18
5.6K
D1
1N4148
C13
683
R19
101
R22
562
Q3 3904
2N3904/TO
R24
1K
Q4 3906
+12V
2N3906/TO
-12V
R25
47K
MIC_DET
J2
MIC2 IN
L3
FB
C4
1U
L4
FB
R5
1K
Q1
3904
+9VA
+12V
CE1
220U/16V
R1
2.2k
CE6
47U/16V
R15
10k
Q2
3906
-9VA
-12V
CE2
220U/16V
R2
2.2k
CE7
47U/16V
R16
10k


VDD
R2 220
Q2 9015
STB_LED
LD1 *R
R15 4.7K
G[1:8]
P[1:16]
CN1 5P2.0
R1 2.2 1/6W F+ F-
-24V
C1 22u/50
C2 104
VCC
P_CTL_PSW
C3 103
VFD1 HNV-08SS62
CN3 4P2.0
STB_LED
K2 SW
K3 SW
K4 SW
K5 SW
K6 SW
K7 SW
K8 SW
K9 SW
D1 1N4148
D2 1N4148
D3 1N4148
KEY_04
KEY03
KEY02
R3 270K
C4 103
C5 103
K1 STANDBY/ON
K2 CH-
K3 OPEN/CLOSE
K4 SOURCE
K5 CH+
K6 REC
K7 PAUSE
K8 PLAY
K9 STOP
U1 UPD16316
KEYC
KEYB
KEYA
R4 10K
R5 10K
R6 10K
LD3 *G/DVD R8 *220
LD2 *G/HDD R7 *220
LD5 B/LED R11 220
LD4 *R/REC R9 220
Y1 5MHZ/20pF
C6 30PF/0603
C7 30PF/0603
R10 10/0603
ZD1 *4.3V 1/2W
C8 102/0603
R13 *10K
5V_STB
CN2 10P2.0
D_FM
FP_SCLK
RDY_FM
/FP_RST
D_HOST
ATN_FM
GND
VFD_DIO
VFD_CLK
VFD_STB
MUTE
/RST_HOST_LED
P_CTL_PSW
D_HOST
ATN_FM
R12 100/0603
Y2 32.766KHZ/20pF
C9 20PF/0603
C10 20PF/0603
C11 4.7u/16
R14 10K
R24 10K
R22 4.7K
Q1 8050D
D4 1N4148
C79 471/*221
C17 102
R23 JUMP(7.5mm)
U2 HS0038B3V
小丝印
U2 HS0038A2
大丝印
R17 2.7K
R19 2.7K
R18 2.7K
C18 10u/16
C19 103
R25 10
D5 1N4148
L1 221(0805)
C21 103/0603
C20 47u/16
0603封装
C12 22PF
C13 22PF
C14 22PF
C16 22PF
C15 22PF
CN4 4P2.0
K1
LD6 RED
副面板(9DW9916-1)

5.2.7 POWER Board




C1
471 AC400
D10
1N4007
CE5
LT 400V100U/68uF
D11
1N4007
D9
1N4007
D12
1N4007
R6
39K 2W for 0565 470K for 0380
C4
103/1KV
R2
68K 2W
D4
HER107
T1
BCK-28-0778
LF1
40mHX2
RT1
10/4A(104MS)
C13
104/~275
RV1
680K/1/2W HV
LF2
40mHX2
F1
250V/T2AL
BCN1
2P7.92
R29
//0
R5
33
IC1
*/FSDM0565R/FSD0565
Vstr
N.C
Vfb
Vcc
Drain
GND
L4
FB
D7
HER105
R23
*/2.4K /2.4k
CE11
CD11T 50V47u
IC6
KA5L0380R/*/*
GND
D
VCC
FB
C22
473
C23
333
C6
471 AC400V
IC2
HS817
C12
104
R14
1.2K
C7
104
R17
4.7K
R18
5.1K 1%
R15
470
IC3
TL431
R11
4.7K 1%
D1
HER105
FB
L1
-12V
CE1
CD11T 25V10U
C5
102/500V
D2
sf34/byw-200/byw-200
CE3
CD288H220u/25
L2
FB
C17
471/500V
D18
SR1060SR1060/SR10A0
C3
//471 500V
CE9
CD288H470u
L3
10uH
J22
0/0/*
C16
//1000u
D21 BYW-200/SR1060/SR1060
CE8
CD288H1000u/10
C20
101/500V
D6
HER105
D8
HER105
C19
471/500V
CE12
CD11T 25V47U
L5
10uH
D13
5.1V 1/2W
R9
33K
CE2
CH288H470u/10
Q11
SB772 TO-126
<200mA
R4
47R 3W
Q10
3904
2.8V
2.1V
R10 1K 1/6w
10mA
R31
2.2K 1/6w
V_Crl
D30
1n4001
D22
1n4001
IC4
AZ431
D23
1n4001
Q7
1PP15N03L
>12.7V
B+12V
C24
104
CE16
CD11T 25V100U
R13
5.6k 1/6w 1%
R12
1.5k 1/6w 1%
CE17
CD11T 16V220U
R30
75R
R21
1.8K 1/6W±1%
+3.3V
D16 1N5401
J26
//0
R19
3.3K
V_Crl
IC5
AZ431
R20
5.6K□?%
C28 104
in normal recorder,use one diode .
5VSTB
+5V
Q2
*1296
J24
J23
J25
0
Q2 D965
J4
0 +5V
R32 39R 1W
Q3
*1296
Q3
//D965
R33
//39R 1W
R24
0 V_Crl
Q13
*3904
V_Crl
R3
*3.3k
F-
BF+
CE13
CD11T 50V10u
CN1
*2P2.5
TO fan
+12V
CN2
5P2.5
-12V
GND
GND/3.3V
+5V
CN3
10P2.5
J12
10MM
J11
*5MM
+12V
GND
P_CTL
5VSTB
+3.3V
+3.3V
+5V
GND
GND
+2.5V/5
+2.5V/G
CN4
4P3.96
+12V
+5V
TO HDD
CN5
5P2.0
F+
F-
-25V
GND
+5V
本电路□岣逶_CTL的电平，输出为V_Crl.
B+12V
V_Crl
Q9
3906
R26
1.2K
R27
1k 1/6W
P_CTL
R16 1.2k
Q6
3904/9014
BF+
R7
180
Q1
3904
D20
3.9V 1/2W
F+
F-

Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
DW9918K(RU) SILVER [8602]			
AV BOARD	5448138		
0090001	SMD RESISTOR	1/16W 0O±5% 0603	R115,R116,R161,R15,R162
0090003	SMD RESISTOR	1/16W 10O±5% 0603	R59,R152
0090006	SMD RESISTOR	1/16W 75O±5% 0603	R142,R143,R144,R155
0090007	SMD RESISTOR	1/16W 180O±5% 0603	R33,R41,R91,R98,R102,R147
0090008	SMD RESISTOR	1/16W 220O±5%	R53
0090022	SMD RESISTOR	1/16W 8.2K±5%	R1,R2,R16,R18
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R105
0090011	SMD RESISTOR	1/16W 470O±5% 0603	R34,R42,R146
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R61,R196
0090046	SMD RESISTOR	1/10W 470O±5% 0805	R185,R127
0090249	SMD RESISTOR	1/16W 510O±5% 0603	R149
0390025	SMDMAGNETIC BEADS	BGH2012B601L	R11,R12,R13,R22,R23,R24,R29,R31,R35,R89,R93,R94,R95,R134,FB1,FB2,FB3,FB5
0090235	SMD RESISTOR	1/16W 820O±5% 0603	R106
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R5,R6,R107,R114,R151,R156,R141
0090016	SMD RESISTOR	1/16W 1.5K±5% 0603	R118,R46,R56,R67,R74,R79,R86
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R63
0090018	SMD RESISTOR	1/16W 3.3K±5% 0603	R157,R150,R51,R52,R70,R71,R82,R83,R158,R60
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R7,R8,R44,R45,R54,R55,R65,R66,R72,R73,R77,R78,R84,R85,R92,R99,R103,R120,R133,R140,R145,R153,R154,R183,R188,R190,R191,R148
0090021	SMD RESISTOR	1/16W 6.8K±5% 0603	R30,R32
0090186	SMD RESISTOR	1/16W 7.5K±5% 0603	R108,R109
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R49,R62,R169,R170,R172,R173,R176,R88,R90,R96,R97
0090187	SMD RESISTOR	1/16W 12K±5%	R38,R40,R100,R101,R129,R132,R135,R139
0090225	SMD RESISTOR	1/16W 5.6K±5% 0603	R166
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R128,R130,R171,R175,R177,R168,R48,R159,R160
0090025	SMD RESISTOR	1/16W 20K±5% 0603	R43,R50,R64,R69,R76,R81
0090026	SMD RESISTOR	1/16W 22K±5% 0603	R57

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R47,R58,R68,R75,R80,R87
0090030	SMD RESISTOR	1/16W 56K±5% 0603	R164
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R165
0090197	SMD RESISTOR	1/16W 150K±5% 0603	R182
0090201	SMD RESISTOR	1/16W 220K±5% 0603	R186
0090205	SMD RESISTOR	1/16W 330K±5% 0603	R187,R181
0090242	SMD RESISTOR	1/16W 75K±5% 0603	R110
0881080	IC	PCF8563T SO8	U2
02607139	CD	CD11T 16V220U±20%6×12 C5 BELT	C44
02604379	CD	CD11 16V10U±20%5×11C5 BELT	C33,C37,C49,C53,C57,C61,C77,C79,C89,C100,C104,C106,C107,C114
02606499	CD	CD11 10V1000U±20%8×16 C5 BELT	C47
02600029	CD	CD11 16V47U±20%5×11 C5 BELT	C41,C92,C119
02603859	CD	CD11 16V470U±20%8×12 C5 BELT	C39
02601819	CD	CD11 16V220U±20%6×12 C5 BELT	C26,C70,C94,C101,C103
02607629	CD	CD11 50V3.3U±20%5×11 C5 BELT	C74
0260303	CD	CD11 16V2200u±20%10×30 5	C13
0310047	SMD CAPACITOR	50V 101 ±5% NPO 0603	C80,C97,C108,C113
0310048	SMD CAPACITOR	50V 151 ±5% NPO 0603	C32,C36,C48,C52,C56,C60
0310066	SMD CAPACITOR	50V 102 ±10% 0603	C34,C35,C38,C40,C50,C51,C54,C55,C58,C59,C62,C63,C86,C87,C120,C131,C132
0310067	SMD CAPACITOR	50V 152 ±10% 0603	C90
0310072	SMD CAPACITOR	50V 103 ±10% 0603	C11,C12,C93,C105,C111
0310188	SMD CAPACITOR	50V 10P ±5% NPO 0603	C88,C85
0310085	SMD CAPACITOR	50V 20P ±5% NPO 0603	C30
0310192	SMD CAPACITOR	50V 56P ±5% NPO 0603	C84,C81
0310196	SMD CAPACITOR	50V 471 ±10% 0603	C91
0310323	SMD CAPACITOR	50V 392 ±10% X7R 0603	C126
0310119	SMD CAPACITOR	50V 332 ±5% X7R 0603	C124
0310197	SMD CAPACITOR	50V 561 ±10% X7R 0603	C125,C123
0310216	SMD CAPACITOR	10V 105 +80%-20% 0603	C2,C5,C7,C9,C16,C18,C64,C67,C69,C83,C1,C3,C6,C8,C15,C17,C73,C75,C71,C72,C138,C139,C140,C141,C112,C127,C128,C129,C130,C145
0310207	SMD CAPACITOR	50V104 ±20% 0603	C4,C10,C14,C25,C28,C29,C42,C43,C45,C46,C66,C76,C78,C82,C109,C96,C99,C102,C110,C116,C117,C118,C121,C122,C137,C98

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0310379	SMD CAPACITOR	25V 474 +80%-20% Y5V 0603	C27,C136 ①
0310542	SMD CAPACITOR	16V 474±10% 0603	C27,C136 ①
0780085	SMD TRIODE	8050D	Q23,Q16,Q17
0310389	SMD CAPACITOR	10V 106 +80%-20% Y5V 0805	C65,C68
0680057	SMD SCHOTTKY DIODE	LL60P MINI-MELF	D2
0090027	SMD RESISTOR	1/16W 27K±5% 0603	R174
0700007	SMD DIODE	1N4148	D1,D3,D4,D6,D7,D8
0780040	SMD TRIODE	3904(100-300) SOT-23	Q1,Q2,Q3,Q5,Q8,Q9,Q10,Q11,Q12,Q15,Q19,Q20,Q21,Q22,Q24,Q25,Q27,Q28,Q29,Q30,Q31,Q33,Q34,Q35,Q32,Q13,Q14
0780041	SMD TRIODE	3906(100-300) SOT-23	Q4,Q6,Q7,Q26
0881693	IC	TL 74HC4052D SOP	U1,U10 ②
0881965	IC	MAX4052A SOP	U1,U10 ②
0881226	IC	RC4558D SOP	U3,U4,U5
0881842	IC	MSP3415G QFP	U6
0881992	IC	HC4053M SOIC	U7,U8,U9
0881659	IC	SN1699 DIP	U11
0960238	CRYSTAL OSCILLATOR	18.432MHz±10PPM 49-S	X2
0960017	CRYSTAL OSCILLATOR	32.768KHz 3×9	X1
1020071	TUNER	TCSM0601DD25A	TUN1
1090009	ELECTRO-OPTICTRANSFORMER	GP1F32T	OP1 ③
1090024	ELECTRO-OPTICTRANSFORMER	TX179AT	OP1 ③
1633045	PCB	7DW9918K-1	
1860122	SCART SOCKET	DOUBLE DECK FEMALE SEAT B LINK BODY,FLEX INSERT	SC1
1910159	TERMINAL SOCKET	CS TERMINAL DASW-02	S3,S2
1910062	TERMINAL SOCKET	AV2-8.4--6G	S1
1910078	TERMINAL SOCKET	AV4-8.4-6G-3	S4
1910079	TERMINAL SOCKET	AV8-8.4-6G-3	S5
0390052	MAGNETIC BEADS INDUCTOR	FB	L1
1940024	SOCKET	5P 2.0mm	CN4,CN6
1940022	SOCKET	4P 2.0mm	CN3(CLOSE TO AL ON RIGHT SIDE OF SOCKET)
1940120	CABLE SOCKET	13P1.0mm DUAL LINE TOUCH POINT DUAL LINE STRAIGHT PLUG	CN2

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1940161	CABLE SOCKET	12P 1.0mm DUAL RANK TOUCH POINT,DUAL RANK STRAIGHT INSERT	CN1
3630281	BATTEMETAL OXIDE FILM RESISTOR HOLDER	1403G7-GBK4B	BT1 ④
3630185	BATTEMETAL OXIDE FILM RESISTOR HOLDER	1403G6-GBK4B	BT1 ④
DW9918K(RU) SILVER [8602]			
DECODE BOARD	2DW9916-6	1.5/4.1	
0090001	SMD RESISTOR	1/16W 0O±5% 0603	L5,R72,R83,R84,R90,R101,R115,R137, R140,R148,R212,R213,R17,R155
0090004	SMD RESISTOR	1/16W 22O±5% 0603	R19,R20,R21,R23,R24,R26,R27,R28,R29, R30,R31,R32,R33,R34,R35,R52,R53,R55, R57,R65,R119,R134,R139,R214
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R76,R174,R175,R219,R220,R221
0090237	SMD RESISTOR	1/16W 39O±5% 0603	R164,R165,R160,R161,R156,R157,R170, R171,R168,R154,R151,R172,R169,R252
0090220	SMD RESISTOR	1/16W 51O±5% 0603	R44,R45,R46,R47,R48,R49,R50,R51,R54, R56,R58,R59,R60,R61,R62,R63,R64,R66, R67,R68,R117
0090291	SMD RESISTOR	1/16W 56O±5% 0603	R120,R121,R126,R127
0090273	SMD RESISTOR	1/16W 82O±5% 0603	R102,R103,R104
3580117	HEAT RADIATION BOARD	28×28×12 BBK9906(HK) WITH CARD CLASP	FOR U1 HEAT RADIATION
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R176
0090221	SMD RESISTOR	1/16W 120O±5% 0603	R79
0090007	SMD RESISTOR	1/16W 180O±5% 0603	R188
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R78
0090011	SMD RESISTOR	1/16W 470O±5% 0603	R184
0090013	SMD RESISTOR	1/16W 680O±5% 0603	R105,R135,R138,R141
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R132,R133,R223,R178
0090175	PRECISION SMD RESISTOR	1/10W 1.18K±1% 0805	R43
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R128,R218,R222,R230
0090018	SMD RESISTOR	1/16W 3.3K±5% 0603	R247,R250
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R91,R106
0090020	SMD RESISTOR	1/16W 5.1K±5% 0603	R130
0090225	SMD RESISTOR	1/16W 5.6K±5% 0603	R190,R191,R192,R193,R194,R195,R88,R89
0090185	SMD RESISTOR	1/16W 6.2K±5% 0603	R116
0090021	SMD RESISTOR	1/16W 6.8K±5% 0603	R185,R189,R186,R123,R124,R125

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R1,R2,R3,R4,R5,R7,R8,R11,R12,R13, R14,R15,R18,R22,R25,R36,R37,R38,R39, R40,R41,R69,R71,R73,R82,R92,R131, R136,R142,R216,R217,R122, R158, R159,R153,R163,R246, R249,R248,R251,R9
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R143,R144
0090034	SMD RESISTOR	1/16W 100K±5% 0603	R226
0090109	SMD RESISTOR	1/16W 1MO±5% 0603	R118
0100028	SMD RESISTOR NETWORK	1/16W 22O±5% 8P	RP16,RP18,RP20,RP22,RP24,RP26
0100019	SMD RESISTOR NETWORKS	1/16W 33O±5% 8P	RP27,RP28,RP29,RP30,RP31,RP32,RP33, RP34
0100030	SMD RESISTOR NETWORK	1/16W 51O±5% 8P	RP1,RP2,RP3,RP4,RP5,RP6,RP7,RP8,RP9,RP10,RP11,RP12,RP13,RP14,RP15,RP17,RP19,RP21,RP23,RP25
0260033	CD	CD11 25V3.3U±20%5×11 2	C265,C266
0260019	CD	CD11 16V10U±20%5×11 2	C102,C144,C168,C193,C210,C253, C254,C255,C256,C257,C258,C287,C295, C270
0260025	CD	CD11 16V47U±20%5×11 2	C169,C188
0260570	CD	CD11T 16V47U±20%5×11 2	C4,C23,C103,C131,C170,CA1,CA2
0260027	CD	CD11 16V100U±20%6×12 2.5	C178,C179,C222
0260028	CD	CD11 16V220U±20%6×12 2.5	CA3,CA4,C184,C186,C196,C250
0260214	CD	CD11 16V330U±20%8×12 3.5	C182,C194,C296,C298, C299
0310043	SMD CAPACITOR	50V 22P ±5% NPO 0603	C159
0310190	SMD CAPACITOR	50V 27P ±5% NPO 0603	C1,C2,C160,C161,C198,C200
0310045	SMD CAPACITOR	50V 47P ±5% NPO 0603	C290,C291,C292,C293, C294
0310192	SMD CAPACITOR	50V 56P ±5% NPO 0603	C163
0310047	SMD CAPACITOR	50V 101 ±5% NPO 0603	C237,C239,C243,C245, C248,C252,C148
0310049	SMD CAPACITOR	50V 221 ±5% NPO 0603	C166
0310066	SMD CAPACITOR	50V 102 ±10% 0603	C14,C15,C16,C33,C34,C35,C46,C47,C48,C56, C82,C83,C84,C87,C88,C95,C96,C97,C100,C101,C111,C112,C113,C120,C121,C122,C123,C128,C129,C130,C137,C138,C139,C140,C145, C155,C281,C282
0310231	SMD CAPACITOR	50V 122 ±10% 0603	C259,C260,C261,C262,C263,C264
0310072	SMD CAPACITOR	50V 103 ±10% 0603	C7,C10,C36,C37,C49,C51,C53,C54,C59,C60, C63,C66,C67,C72,C73,C78,C79,C91,C92,C171,C172,C173,C191,C269
0310505	SMD CAPACITOR	25V 224 +80%-20% 0603	C165 ⑤
0310112	SMD CAPACITOR	16V 224 ±10% 0603	C165 ⑤
0310362	SMD CAPACITOR	16V474 +80%-20% 0603	C205,C204,C202,C201,C209,C208, C307,C308,C206

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0310207	SMD CAPACITOR	50V104 ±20% 0603	C3,C5,C6,C8,C9,C12,C13,C17~C22,C27,C28,C29,C31,C32,C40~C45,C50,C52,C55,C57,C58,C61,C62,C64,C65,C68~C71,C74~C77,C80,C81,C85,C86,C89,C90,C93,C94,C98,C99,C104~C110,C115~C119,C125,C126,C127,C132~C136,C146,C147,C153,C154,C156,C157,C162,C167,C174~C177,C180,C181,C183,C185,C187,C189,C190,C192,C195,C197,C211,C217,C218,C221,C228,C267,C268,C271,C272,C273,C285,C286,C288,C289,C297,C300,C301,C207,C306,C309,C310,C311
0310505	SMD CAPACITOR	25V 224 +80%-20% 0603	C165 ⑤
0310112	SMD CAPACITOR	16V 224 ±10% 0603	C165 ⑤
0310362	SMD CAPACITOR	16V474 +80%-20% 0603	C205,C204,C202,C201,C209,C208,C307,C308,C206
0310216	SMD CAPACITOR	10V 105 +80%-20% 0603	C283,C284,C303,C304,C305,C164
0310219	SMD CAPACITOR	16V 106 +80%-20% 1206	C11,C24,C25,C26,C38,C39,C114,C124,C141,C152
1940023	SOCKET	7P 2.0mm	J4
0390052	MAGNETIC BEADS INDUCTOR	FB	L21,L22
0390096	SMD INDUCTOR	1.8UH ±10% 1608	L15,L16,L17,L18,L19,L20
0881127	IC	RT9164-33CG SOT-223	U12
0390028	SMDMAGNETIC BEADS	BGH3216B601LT	L13
0390142	SMDMAGNETIC BEADS	FCM1608-601T02	FB1,FB2,FB5,FB6,FB7,FB8,FB9,FB10,FB11,FB12,FB13,FB14,FB15,FB16,FB17,FB18,FB19,FB20,FB21,FB22,FB23,FB24,FB25,FB26,FB27,FB28,FB29,FB30,FB31,FB32,FB34,FB35,L6,L7,L8,L10,L11,L12,L14,L1,L2,L3,L4,L23,L25~L34,FB36
0700007	SMD DIODE	1N4148	D2,D3,D5,D6
0780041	SMD TRIODE	3906(100-300) SOT-23	Q1
0780040	SMD TRIODE	3904(100-300) SOT-23	Q2,Q3,Q4
0100034	SMD RESISTOR NETWORKS	1/16W 0O±5% 0603×4 8P	T1
0881935	IC	DMN-8602 BGA	U1
0882839	IC	EM6353BX2SP3B-2.9V SOT23-3L	U6
0881814	IC	LP2995 SOP	U2
0881815	IC	M13S128168A-6T TSOP	U3,U4
0881816	IC	SN74HCT14PWR TSSOP	U5
0881818	IC	SN74ALVCH16373 TSSOP	U7
0881819	IC	TSB41AB1PHP QFP	U10
0881820	IC	PQ018EZ02ZP	U11

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0881693	IC	TL 74HC4052D SOP	U18
0881821	IC	PQ025EZ01ZP	U13
0882873	IC	LP2150A TQFP	U14
0881057	IC	CS4360 SSOP	U15
0882353	IC	CS5340 TSSOP	U17
0960171	CRYSTAL OSCILLATOR	13.50MHZ 49-S	Y1
0960169	CRYSTAL OSCILLATOR	24.576MHz 49-S	Y2
0960229	CRYSTAL OSCILLATOR	14.31818MHZ 49-S	Y3
1632853	PCB	2DW9916-6	
1940005	SOCKET	6P 2.0mm	CN1
1940046	SOCKET	10P 2.0mm	CN4
1940030	SOCKET	10P 2.5mm	CN6
1940161	CABLE SOCKET	12P 1.0mm DUAL RANK TOUCH POINT,DUAL RANK STRAIGHT INSERT	CN3
1940120	CABLE SOCKET	13P1.0mm DUAL LINE TOUCH POINT DUAL LINE STRAIGHT PLUG	CN5
1940337	CABLE SOCKET	34芯 0.5MM SMD,VERTICAL	J5
DW9918K(RU) SILVER [8602]			
DV BOARD+FRONT AV BOARD 5445230			
2150145	FLAT CABLE	6P350 2.0T2 2×2PSHIELD,WITH L NEEDLE,REVERSE	JP2 (TO MAIN BOARD CN1)
2121501	FLAT CABLE	4P360 2.0 2 PIN,WITH L NEEDLE, REVERSE 26# CORD	JP1(TO AV BOARD CN3)
1860040	1394 SOCKET	IEEE1394 4P/F DIP	J2
1980055	EARPHONE SOCKET	CKX-3.5-20A	J1
1631682	PCB	CDW9916-4	
DW9918K(RU) SILVER [8602]			
MAIN PANEL 5446248			
0090003	SMD RESISTOR	1/16W 10O±5% 0603	R10
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R12
0000381	CARBON FILM RESISTOR	1/6W2.2O±5% SHAPED 7.5	R1
0000118	CARBON FILM RESISTOR	1/6W10O±5% SHAPED 7.5	R25
0000488	CARBON FILM RESISTOR	1/6W220O±5% SHAPED 7.5	R2,R9,R11
0000133	CARBON FILM RESISTOR	1/6W4.7K±5% SHAPED 7.5	R15,R22
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	R4,R5,R6,R14,R24

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0000667	CARBON FILM RESISTOR	1/6W270K±5% SHAPED 7.5	R3
0310085	SMD CAPACITOR	50V 20P ±5% NPO 0603	C9,C10
0310191	SMD CAPACITOR	50V 30P ±5% NPO 0603	C6,C7
0310196	SMD CAPACITOR	50V 471 ±10% 0603	C79
0310066	SMD CAPACITOR	50V 102 ±10% 0603	C8
0000475	CARBON FILM RESISTOR	1/6W2.7K±5% SHAPED 7.5	R17,R18,R19
0310043	SMD CAPACITOR	50V 22P ±5% NPO 0603	C12,C13,C14,C16
0310072	SMD CAPACITOR	50V 103 ±10% 0603	C21
0200123	PORCELAINCAPACITOR	50V 102±10% 5mm	C17
0200032	PORCELAINCAPACITOR	50V 22P±5% NPO 5mm	C15
0200131	PORCELAINCAPACITOR	50V 103±10% 5mm	C3,C4,C5,C19 ⑥
0200132	PORCELAINCAPACITOR	50V 103±20% 5mm	C3,C4,C5,C19 ⑥
0200139	PORCELAINCAPACITOR	50V 104 +80%-20% 5mm	C2
0390095	SMDMAGNETIC BEADS	FCM1608K-221T05	L1
0260076	CD	CD11C 50V22U±20%6×7 2.5	C1
0260241	CD	CD11C 16V4.7U±20%4×7 1.5	C11
0260196	CD	CD11C 16V10U±20%4×7 1.5	C18
0260200	CD	CD11C 16V47U±20%5×7 2	C20
0620076	RADIATION DIODE	3B3HC COLORLESS WITH BLUE	LD5
0570006	DIODE	1N4148	D1~D5
0780033	TRIODE	9015C	Q2
0780050	TRIODE	S8050D	Q1
0881013	IC	D16316 QFP	U1
0960017	CRYSTAL OSCILLATOR	32.768KHz 3×9	Y2
0960114	CRYSTAL OSCILLATOR	5.00MHZ 49-S	Y1
1200610	DISPLAY SCREEN	HNV-08SS62	VFD1
1340003	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6×6×1	K2~K9
1632079	PCB	4DW9916-3	
2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	R23
2121480	FLAT CABLE	10P160 2.0 T2 WITH L NEEDLE, TOGETHER DIRECTION, MAGNETISM RING, 26# CORD	CN2 (TO MAIN BOARD CN4)
2121626	FLAT CABLE	5P450 2.0 2 PIN, WITH L NEEDLE, REVERSE	CN1 (TO POWER BOARD CN5)

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2121475	FLAT CABLE	4P 265 2.0 2 PIN, WITH L NEEDLE, REVERSE,26# CORD	CN3 (TO SUBSIDIARY PANEL CN4)
2110176	LEAD	20# 40mm BLACK,WITH WELD PIECE	GROUNDING WELDING PLATE CLOSE TO R13 REAR SIDE
2110166	LEAD	20# 80mm BLACK,WITH WELD PIECE	BETWEEN THE GROUNDING WELDING PLATE CLOSE TO REAR SIDE OF C20 AND SCREW ON MAIN BOARD LEFT CORNER
2360016	IR SENSOR	HS0038B3V	U2 ⑦
2360024	IR SENSOR	LTOP-4338	U2 ⑦
5231458	SOFT SPONGE SPACER	10×7×5 DOUBLE-FACED, HARD	UNDERLAY RECEIVER
5230060	SOFT SPONGE SPACER	10×12×3 DOUBLE-FACED,HARD	UNDERLAY DISPLAY SCREEN
5230055	SOFT SPONGE SPACER	10×5×11 DOUBLE-FACED,HARD	UNDERLAY LD5
DW9918K(RU) SILVER [8602]			
OK BOARD 5448181			
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R19
0090249	SMD RESISTOR	1/16W 510O±5% 0603	R7,R8,R21
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R4,R5,R12,R14,R17,R24
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R1,R2
0090104	SMD RESISTOR	1/16W 2.7K±5% 0603	R11
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R9
0090225	SMD RESISTOR	1/16W 5.6K±5% 0603	R18,R22
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R15,R16
0090024	SMD RESISTOR	1/16W 15K±5% 0603	R3,R6,R10
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R13,R25
0310047	SMD CAPACITOR	50V 101 ±5% NPO 0603	C11
0310066	SMD CAPACITOR	50V 102 ±10% 0603	C12
0310207	SMD CAPACITOR	50V104 ±20% 0603	C7,C8
0310379	SMD CAPACITOR	25V 474 +80%-20% Y5V 0603	C13,C14 ⑧
0310542	SMD CAPACITOR	16V 474±10% 0603	C13,C14 ⑧
0310216	SMD CAPACITOR	10V 105 +80%-20% 0603	C3,C4
0310071	SMD CAPACITOR	50V 682 ±10% X7R 0603	C5,C6
0390142	SMDMAGNETIC BEADS	FCM1608-601T02	L1,L2,L3,L4
0700007	SMD DIODE	1N4148	D1,D2
0780040	SMD TRIODE	3904(100-300) SOT-23	Q1,Q3
0780041	SMD TRIODE	3906(100-300) SOT-23	Q2,Q4

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0000132	CARBON FILM RESISTOR	1/6W2.2K±5% SHAPED 7.5	R20,R23
02604379	CD	CD11 16V10U±20%5×11C5 BELT	CE3,CE4,CE5
02600019	CD	CD11 16V22U±20%5×11 C5 BELT	CE8
02600029	CD	CD11 16V47U±20%5×11 C5 BELT	CE6,CE7
02601819	CD	CD11 16V220U±20%6×12 C5 BELT	CE1,CE2
0881226	IC	RC4558D SOP	U1
0160105	ROTATED POTENTIOMETER	WH09-1AL-B10K-F25±20%	VR1
1980018	MICROPHONE SOCKET	CK3-6.35-24	J1,J2
2100010	CONNECTED CORDS	F 0.6 SHAPED 5mm	J3,J4,J5
2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	J8,J9
2100006	CONNECTION CORDS	F 0.6 SHAPED 12.5mm	J6
2100007	CONNECTION CORDS	F 0.6 SHAPEN 15mm	J7
1564221	PCB	6DW9918K-2	
2121878	FLAT CABLE	5P360 2.0 2 PIN,WITH L NEEDLE,TOGETHER DIRECTION	CN1(CLOSE TO DIRECTION OF -12V)
2060002	GROUND CHIP	AB105KB	GND1,GND2
DW9918K(RU) SILVER [8602]			
POWER BOARD 5448174			
0000273	CARBON FILM RESISTOR	1/4W33O±5% SHAPED 10	R5
00000089	CARBON FILM RESISTOR	1/6W75O±5% BELT	R30
0000574	CARBON FILM RESISTOR	3W47O±5% MO SHAPED R 20×8	R4
00007279	CARBON FILM RESISTOR	1W 39O±5% BELT	R32,R22
00004069	CARBON FILM RESISTOR	1/6W180O±5% BELT	R7
00000169	CARBON FILM RESISTOR	1/6W470O±5% BELT	R15
00000229	CARBON FILM RESISTOR	1/6W1K±5% BELT	R10,R27
00000239	CARBON FILM RESISTOR	1/6W1.2K±5% BELT	R14,R16,R26
0010334	METAL FILM RESISTOR	1/6W1.5K±1%	R12
00003509	CARBON FILM RESISTOR	1/6W2.4K±5% BELT	R23
00000309	CARBON FILM RESISTOR	1/6W3.3K±5% BELT	R19
0010197	METAL FILM RESISTOR	1/6W5.6K±1% SHAPED 5	R13,R20
00000349	CARBON FILM RESISTOR	1/6W4.7K±5% BELT	R17
00000509	CARBON FILM RESISTOR	1/6W33K±5% BELT	R9
0070008	HIGH VOLTAGE RESISTOR	@1/2W680K±5% CQC	RV1

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0010209	METAL FILM RESISTOR	1/6W2K±1%	R21
0000026	CARBON FILM RESISTOR	1/6W2K±5%	R31
00103099	METAL FILM RESISTOR	1/6W5.1K±1% BELT	R18
0010126	METAL FILM RESISTOR	1/6W4.7K±1% SHAPED 7.5	R11
0010195	METAL OXIDE FILM RESISTOR	1/2W470K±5% SHAPED 12.5	R6
0010157	METAL OXIDE FILM RESISTOR	2W68K±5%SHAPED FLAT 15×7	R2
02003189	POLYPROPYLENECAPACITOR	50V 104±20% SHAPED 5mm BELT	C7,C12,C24,C28
0200232	PORCELAINCAPACITOR	500V 101±10% 5mm	C20
0200366	CERAMICCAPACITOR	@CT81 400VAC 471±10% 10 VDE	C6,C1
0200251	PORCELAINCAPACITOR	500V 102±10% 5mm	C5
0200255	PORCELAINCAPACITOR	1000V 103 +80%-20% SHAPED7.5mm	C4
0200377	PORCELAINCAPACITOR	500V 471±10% 5MM	C17,C19,C3
0260788	CD	CD288H 10V470U±20%8×12 C5	C16,CE9,CE2
02100919	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	63V 473±5% 5mm BELT	C22
02100249	TEMETAL OXIDE FILM RESISTORLENECAPACITOR	100V 333 ±10% 5mm BELT	C23
0210207	TERYLENECAPACITOR	@275V 104±20% 15mm VDE	C13
02607149	CD	CD11T 25V100U±20%6×12 C5 BELT	CE16
0260559	CD	CD11T 50V47u±20%6×12 2.5	CE12
02607429	CD	CD11T 50V10U±20%5×11 C5 BELT	CE13
0260659	CD	CD288H 35V220U±20%10×12 5	CE3
02607159	CD	CD11T 25V10U±10%5×11 C5 BELT	CE1
02606849	CD	CD11T 50V47u±20%6×12 C5 BELT	CE11
02607139	CD	CD11T 16V220U±20%6×12 C5 BELT	CE17
02607269	CD	CD288H 10V1000U±20%8×16 C5 BELT	CE8
0570045	DIODE	BYW29E-200 TO-220	D21
0260767	CD	KM 400V68U±20%18×25 C10	CE5
03900529	MAGNETIC BEADS INDUCTOR	FB BELT	L1,L2,L4
0410077	CHOKE COIL	VERTICAL 10UH 3A 5mm	L3,L5
0460591	SWITCH POWER TRANSFORMER	@BCK-28-0778 VDE	T1
0570077	DIODE	SF34 DO-27 SHAPED R 17.5×8	D2

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
05700059	DIODE	1N4007 BELT	D9,D10,D11,D12
0570007	DIODE	1N5401	D16
05700139	DIODE	HER105 BELT	D1,D6,D7,D8
05700149	DIODE	HER107 BELT	D4
0680048	SCHOTTKY DIODE	SR1060 TO-220	D18
05800069	VOLTAGE REGULATOR DIODE	5.1V±5% 1/2W BELT	D13
0570003	DIODE	1N4001	D23,D22,D30
05800469	VOLTAGE REGULATOR DIODE	3.6V±5% 1/2W BELT	D20
07800249	TRIODE	2N3906 BELT	Q9
07800239	TRIODE	2N3904(100-300) TO-92 BELT	Q1,Q6,Q10
0780328	TRIODE	D965 TO-92	Q2,Q3
0790024	SMD FIELD EFFECT TRANSISTOR	1PP14N03L TO-220	Q7 ⑨
0790025	SMD FIELD EFFECT TRANSISTOR	AP40N03P TO-220	Q7 ⑨
0790028	SMD FIELD EFFECT TRANSISTOR	1PP15N03L TO-220	Q7 ⑨
0780327	TRIODE	B772 TO-126	Q11
0780023	TRIODE	2N3904(100-300) TO-92	Q12
08805819	IC	TL431C TO-226AA(LP) BELT	IC3
0882462	IC	AZ431AZ-A TO-92	IC4,IC5
0880765	IC	5L0380R YDTU	IC6
1000045	FILTER OF POWER NET	UT-20 33mH 10×13 115T	LF2
1050012	HEAT SENSITIVITY RESISTOR	@NTC SCK-104MS±20% CQC	RT1
1564217	PCB	@5DW9918K-1 UL	
1940045	SOCKET	2P 8.0mm 2#	BCN1
1940004	SOCKET	5P 2.5mm	CN2
1940024	SOCKET	5P 2.0mm	CN5
1940030	SOCKET	10P 2.5mm	CN3
1940037	SOCKET	4P 3.96mm	CN4
1080032	PHOTOELECTRIC COUPLER	@HS817 VDE	IC2
3580165	HEAT RADIATION BOARD	25×15×6 DW9927	IC6
3580219	HEAT RADIATION BOARD	34×17×25 DW9918K	Q7
3580218	HEAT RADIATION BOARD	23.8×17×25 DW9918K	D21,D18
2300048	FUSE	@T2AL 250V WITH LEAD FEET VDE	F1

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
2100009	CONNECTION CORDS	F 0.6 SHAPEN 8mm	J4,J14,J15,J19
2060002	GROUND CHIP	AB105KB	FG1,FG2
2100003	CONNECTED CORDS	F 0.6 SHAPED 7.5mm	J24,J21,J1,J3,R24,R29,J6
2100011	CONNECTION CORDS	F 0.6 SHAPEN 7mm	J9,J27,J17,J20
2100004	CONNECTED CORDS	F 0.6 SHAPED 10mm	J25,J26,J16
2100006	CONNECTION CORDS	F 0.6 SHAPED 12.5mm	J18
2100010	CONNECTED CORDS	F 0.6 SHAPED 5mm	J8,J25,J10
4000073	TAPPING SCREW	BT 3×8 BLACK	FOR FIXING IC6,D21,Q7,D18 HEAT RADIATION BOARD
DW9918K(RU) SILVER [8602]			
SERVO BOARD 5447967			
0310112	SMD CAPACITOR	16V 224 ±10% 0603	C0406
0310047	SMD CAPACITOR	50V 101 ±5% NPO 0603	C0101,C0311
0310207	SMD CAPACITOR	50V104 ±20% 0603	C0102,C0104,C0105,C0106,C0108,C0109,C0201,C0204,C0205,C0206,C0208,C0301,C0302,C0303,C0304,C0305,C0306,C0307,C0308,C0403,C0404,C0405,C0412,C0414,C0419,C0424,C0425,C0426,C0427,C0428,C0429,C0430,C0431,C0432,C0433,C0434,C0435,C0436,C0437,C0438,C0439,C0440,C0441,C0442,C0446,C0447,C0448,C0449,C0450,C0602,C0603,C0605,C0607,C0610,C0615
0310216	SMD CAPACITOR	10V 105 +80%-20% 0603	C0608,C0614
0310049	SMD CAPACITOR	50V 221 ±5% NPO 0603	C0107
0310205	SMD CAPACITOR	50V 473 ±10% 0603	C0202,C0407,C0409,C0410, C0411
0310072	SMD CAPACITOR	50V 103 ±10% 0603	C0203,C0309,C0454
0310202	SMD CAPACITOR	50V 223 ±10% 0603	C0310
0260254	CD	CD11C 10V100U±20%6×5 2.5	C0316
0310198	SMD CAPACITOR	50V 472 ±10% X7R 0603	C0312
0310042	SMD CAPACITOR	50V 15P ±5% NPO 0603	C0402,C0401
0310066	SMD CAPACITOR	50V 102 ±10% 0603	C0408
0310197	SMD CAPACITOR	50V 561 ±10% X7R 0603	C0413
0310215	SMD CAPACITOR	50V 821 ±10% X7R 0603	C0420,C0415
0310119	SMD CAPACITOR	50V 332 ±5% X7R 0603	C0416,C0417
0310048	SMD CAPACITOR	50V 151 ±5% NPO 0603	C0422,C0421
0310188	SMD CAPACITOR	50V 10P ±5% NPO 0603	C0601
0090001	SMD RESISTOR	1/16W 0O±5% 0603	R0440,R0454,R0482

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090272	SMD RESISTOR	1/16W 1O±5% 0603	R0308,R0309,R0311,R0312,R0415
0090005	SMD RESISTOR	1/16W 33O±5% 0603	R0443
0090230	SMD RESISTOR	1/16W 47O±5% 0603	R0426,R0428,R0445
0090273	SMD RESISTOR	1/16W 82O±5% 0603	R0606
0090181	SMD RESISTOR	1/16W 100O±5% 0603	R0101
0090232	SMD RESISTOR	1/16W 150O±5% 0603	R0425,R0435,R0437,R0446,R0456, R0457,R0480
0100033	SMD RESISTOR NETWORK	1/16W 150O±5% 0603×4 8P	RP0401,RP0402,RP0403,RP0404,RP0405,RP0406, RP0407
0090008	SMD RESISTOR	1/16W 220O±5%	R0422,R0453
0090009	SMD RESISTOR	1/16W 330O±5% 0603	R0304
0090013	SMD RESISTOR	1/16W 680O±5% 0603	R0603
0090014	SMD RESISTOR	1/16W 1K±5% 0603	R0302
0090634	PRECISION SMD RESISTOR	1/16W 1.5K±1% 0603	R0609
0090746	PRECISION SMD RESISTOR	1/16W 4.7K±1% 0603	R0610
0090017	SMD RESISTOR	1/16W 2.2K±5% 0603	R0424,R0430
0090104	SMD RESISTOR	1/16W 2.7K±5% 0603	R0455,R0410
0090018	SMD RESISTOR	1/16W 3.3K±5% 0603	R0407,R0408,R0411,R0412
0090028	SMD RESISTOR	1/16W 33K±5% 0603	R0203
0090019	SMD RESISTOR	1/16W 4.7K±5% 0603	R0409
0090225	SMD RESISTOR	1/16W 5.6K±5% 0603	R0402
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R0301,R0303,R0315,R0316,R0317,R0413,R0414,R0416,R0418,R0421,R0423,R0427,R0444, R0461,R0478,R0479,R0481,R0600,R0601,R0604,R0605,R0602
0090288	PRECISION SMD RESISTOR	1/16W 12K±1% 0603	R0306
0090676	PRECISION SMD RESISTOR	1/16W 820O±1% 0603	R0613
0090492	PRECISION SMD RESISTOR	1/16W 18K±1% 0603	R0307
0090188	SMD RESISTOR	1/16W 18K±5% 0603	R0204
0090029	SMD RESISTOR	1/16W 47K±5% 0603	R0314
0090747	PRECISION SMD RESISTOR	1/16W 1.8K±1% 0603	R0614
0090109	SMD RESISTOR	1/16W 1MO±5% 0603	R0401
0090227	SMD RESISTOR	1/16W 270O±5%	R0608
0090039	SMD RESISTOR	1/10W 10O±5% 0805	R0611,R0612
0090541	PRECISION SMD RESISTOR	1/16W 2.2K±1% 0603	R0403
0090530	PRECISION SMD RESISTOR	1/16W 24K±1% 0603	R0405

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090465	PRECISION SMD RESISTOR	1/16W 47K±1% 0603	R0205,R0404,R0305
0100019	SMD RESISTOR NETWORKS	1/16W 33O±5% 8P	RP0602,RP0603,RP0604,RP0605
0100023	SMD RESISTOR NETWORK	1/16W 82O±5% 8P	RP0606,RP0607,RP0608
0100021	SMD RESISTOR NETWORK	1/16w 10k±5% 8P	RP0601
0700007	SMD DIODE	1N4148	D0101
0780085	SMD TRIODE	8050D	Q0601
0390027	SMDMAGNETIC BEADS	BGH2012B601LB	L0605,L0604
0390095	SMDMAGNETIC BEADS	FCM1608K-221T05	L0102,L0103,L0104,L0105,L0106,L0201,L0402 ,L0403,L0404,L0602
0390028	SMDMAGNETIC BEADS	BGH3216B601LT	L0301,L0302,L0303,L0603,L0601
0390170	SMD INDUCTOR	10UH±10% 1608	L0101
0882752	IC	TZA1050 QFP	U0201
0882753	IC	SA56203 TSOP	U0301
0882751	IC	PNX7860 BGA	U0402
0882139	IC	IS42S16100A1-6T TSOP	U0403
0881969	IC	IP1117-ADJ SOT-223	U0602
0882322	IC	AZ431-2.5V SOT-23	U0601
0260199	CD	CD11C 16V22U±20%4×7 1.5	C0451,C0609,C0612
0260201	CD	CD11C 16V100U±20%6×7 2.5	C0313,C0604,C0606,C0611,C0613
0260200	CD	CD11C 16V47U±20%5×7 2	C0314,C0452
0260419	CD	CD11E 6.3V47U±20%5×5 2	C0207
0960009	CRYSTAL OSCILLATOR	16.9344MHz 49-S	G0401
1940154	CABEL SOCKET	45P 0.5mm SMD,SUBMIT MEET WITH CLASP	J0101
1940328	CABEL SOCKET	17芯 1.0mm DUAL RANK,TOUCH POINT,SMD,HORIZONTAL	J0305
1940095	SOCKET	4P 2.0mm STRAIGHT CURVING WITH LEAF	J0402,J0401
1940320	CABLE SOCKET	34P 0.5mm SMD,SUBMIT MEET WITH CLASP	J603
1940160	SOCKET	5P 2.0mm STRAIGHT FLEX	J0303
1940012	SOCKET	4P 2.5mm STRAIGHT CURVING	J602
1632851	PCB	3DW9927-1	
DW9918K(RU) SILVER [8602]			
SUBSIDIARY PANE 5444653			
1562990	PCB	9DW9916-1	

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1340003	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6×6×1	K1
1940141	SOCKET	4P 2.0mm STRAIGHT FLEX	CN4
0620106	RADIATION DIODE	3R 4HD RED,CASUE FEET WITHOUT LIMIT PLACE	LD6 (FOLD FROM BOTTOM PART 90-DEGREE)
2110198	LEAD	20# 60mm BLACK,WITH WELD PIECE	GND
5232453	SOFT SPONGE SPACER	6×6×3 DOUBLE-FACED,HARD	UNDERLAY LD6
DW9918K(RU) SILVER [8602]			
USB BOARD 5448173			
0090023	SMD RESISTOR	1/16W 10K±5% 0603	R1,R2
0260027	CD	CD11 16V100U±20%6×12 2.5	CA1
0310207	SMD CAPACITOR	50V104 ±20% 0603	C1,C2
2150285	FLAT CABLE	7P380 2.0 T2 2×2P SHIELD WITH L NEEDLE,TOGETHER DIRECTION,	JP1
1633059	PCB	CDW9918K-0	
0882507	IC	TPS2013A SOP	U1
1860047	USB SOCKET	CAM-B85-4Pin	J1
0090001	SMD RESISTOR	1/16W 0O±5% 0603	R4
DW9918K(RU) SILVER [8602]			
ROM9918KRU-0(16M) 0911605			
0881236	IC	SST39VF160-70-4C-EK TSOP	MAIN BOARD U8
ROM66.33-0S（16M） 0911578			
0882048	IC	M29W160ET-70N6 TSOP	SERVO BOARD U0401