



LCD Television Service Manual

Chassis: MTK8223L

Product Type: LEDN24K15P、LEDN24K16P、LEDN23K11P.....

Ver 1.0

Hisense Electric Co., Ltd.

May, 2011

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Service Manual

1. Precautions and notices

BEFORE SERVICING THE LCD TV, READ THE SAFETY PRECAUTIONS IN THIS MANUAL.

WHEN REPLACEMENT PARTS ARE REQUIRED, BE SURE TO USE REPLACEMENT PARTS SPECIFIED BY THE MANUFACTURER.

Proper service and repair is important to the safe, reliable operation of all Hisense Electric Co., Ltd Equipment. The service procedures recommended by Hisense and described in this Service Guide are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It is also important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Hisense could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Hisense has not undertaken any such broad evaluation. Accordingly, a serviceman that uses a service procedure or tools,

which are not recommended by Hisense, must first satisfy himself thoroughly that neither his safety nor the safe of the equipment will be jeopardized by the service method selected.

Hereafter throughout this manual, Hisense Electric Co., Ltd will be referred to as Hisense.

1.1 Warning

1.1.1

Critical components having special safety characteristics are identified with a ▲ by the Ref. No. in the parts list. Use of substitute replacement parts, which do not have the same specified safety characteristics, may create shock, fire, or other hazards.

Under no circumstances should the original design be modified or altered without written permission from Hisense. Hisense assumes no liability, express or implied, arising out of any unauthorized modification of design. Serviceman assumes all liability.

DANGER CAUTION

TO ENSURE THE CONTINUED RELIABILITY OF THIS PRODUCT, USE ONLY ORIGINAL MANUFACTURER'S REPLACEMENT PARTS, WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THIS SERVICE GUIDE.

1.1.2.

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure

that you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.

1. Never replace modules or other components while the unit is switched on.

2. When making settings, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

1.1.3

To prevent electrical shock, do not use this polarized ac plug with an extension cord, receptacle, or the outlet unless the blades can be fully inserted to prevent blade exposure.

To prevent electrical shock, match wide blade or plug to wide slot, fully insert.

1.1.4

When replacement parts are required, be sure to use replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

1.1.5

Safety regulations require that after a repair the set must be returned in its original condition. In particular attention should be paid to the following points.

- Note: The wire trees should be routed correctly and fixed with the mounted cable clamps.

- The insulation of the mains lead should be checked for external damage.

1.1.6

- (1) Do not touch Signal and Power Connector while this product operates. Do not

touch EMI ground part and Heat Sink of Film Filter.

(2) Do not supply a voltage higher than that specified to this product. This may damage the product and may cause a fire.

(3) Do not use this product in locations where the humidity is extremely high, where it may be splashed with water, or where flammable materials surround it. Do not install or use the product in a location that does not satisfy the specified environmental conditions. This may damage the product and may cause a fire.

(4) If a foreign substance (such as water, metal, or liquid) gets inside the panel module, immediately turn off the power. Continuing to use the product may cause fire or electric shock.

(5) If the product emits smoke, and abnormal smell, or makes an abnormal sound, immediately turn off the power. Continuing to use the product, it may cause fire or electric shock.

(6) Do not disconnect or connect the connector while power to the product is on. It takes some time for the voltage to drop to a sufficiently low level after the power has been turned off. Confirm that the voltage has dropped to a safe level before disconnecting or connecting the connector.

(7) Do not pull out or insert the power cable from/to an outlet with wet hands. It may cause electric shock.

(8) Do not damage or modify the power cable. It may cause fire or electric shock.

(9) If the power cable is damaged, or if the connector is loose, do not use the product:

otherwise, this can lead to fire or electric shock.

(10) If the power connector or the connector of the power cable becomes dirty or dusty, wipe it with a dry cloth. Otherwise, this can lead to fire.

(11) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

1.2 Notes

Notes on Safe Handling of the LCD panel and during service

The work procedures shown with the Note indication are important for ensuring the safety of the product and the servicing work. Be sure to follow these instructions.

- Before starting the work, secure a sufficient working space.
- At all times other than when adjusting and checking the product, be sure to turn OFF the POWER Button and disconnect the power cable from the power source of the TV during servicing.
- To prevent electric shock and breakage of PC board, start the servicing work at least 30 seconds after the main power has been turned off. Especially when installing and removing the power board, start servicing at least 2 minutes after the main power has been turned off.
- While the main power is on, do not touch any parts or circuits other than the ones specified. If any connection other than the one specified is made between the measuring

equipment and the high voltage power supply block, it can result in electric shock or activation of the leakage-detection circuit breaker.

- When installing the LCD module in, and removing it from the packing carton, be sure to have at least two persons perform the work.
- When the surface of the panel comes into contact with the cushioning materials, be sure to confirm that there is no foreign matter on top of the cushioning materials before the surface of the panel comes into contact with the cushioning materials. Failure to observe this precaution may result in, the surface of the panel being scratched by foreign matter.
- When handling the circuit board, be sure to remove static electricity from your body before handling the circuit board.
- Be sure to handle the circuit board by holding the large parts as the heat sink or transformer. Failure to observe this precaution may result in the occurrence of an abnormality in the soldered areas.
- Do not stack the circuit boards. Failure to observe this precaution may result in problems resulting from scratches on the parts, the deformation of parts, and short-circuits due to residual electric charge.
- Routing of the wires and fixing them in position must be done in accordance with the original routing and fixing configuration when servicing is completed. All the wires are routed far away from the areas that become hot (such as the heat sink). These wires are fixed in position with the wire clamps so that the wires do not move, thereby ensuring

that they are not damaged and their materials do not deteriorate over long periods of time. Therefore, route the cables and fix the cables to the original position and states using the wire clamps.

- Perform a safety check when servicing is completed. Verify that the peripherals of the serviced points have not undergone any deterioration during servicing. Also verify that the screws, parts and cables removed for servicing purposes have all been returned to their proper locations in accordance with the original setup.



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated dangerous voltage within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the set.

2. Product Function Specifications

2.1 Product Function

Model Name		LEDN24K15P	LEDN32K15
Dimension (W×H×D)(mm)	Without stand	564×370×44	772.3×495×46.5
	With stand	564×471×207	772.3×560.2×220.6
Weight(kg)	Without stand	4.4	8.7
	With stand	4.6	9.2
LCD Panel Minimum size(diagonal)		60	81
Screen† resolution		1920×1080	1366×768
Power consumption		Refer to rating label	
Audio power		2W+2W	8W+8W
Power supply		Refer to rating label	
Receiving systems	RF	PAL, SECAM, B/G/D/K/L/L'	
	AV	PAL, SECAM, NTSC	
Component Input		480I、480P、576I、576P 720P/50Hz、720P/60Hz、1080I/50Hz、1080I/60Hz	
VGA Input		VGA (640×480 60Hz) 、 SVGA (800×600 60Hz) XGA (1024×768 60Hz)	
HDMI Input		RGB/60Hz (640×480、800×600、1024×768) YUV/50Hz (576P、720P、1080I) YUV/60Hz (480I、480P、720P、1080I)	

NOTE:

**Specifications and design are subject to possible modifications without notice
Due to improvements.**

3. Factory/Service OSD Menu and Adjustment

3.1 To enter the Factory OSD Menu

- a. With factory RC (remote control)
 - 1. Press “M” button and enter factory mode.
 - 2. Press “Menu” button and enter factory OSD menu.
 - 3. Press “CH+”/“CH-” button select the function menu, press “VOL+”/“VOL-” enter the selected function menu. Press “VOL+”/“VOL-” button adjust values in the menu.
- b. With user’s RC
 - 1. Power TV On
 - 2. Press Menu button and call up User OSD Menu
 - 3. Select Audio-> Balance0
 - 4. Enter 1->9->6 ->9 in sequence.
Note: If necessary, re-do number keys.
 - 5. Factory OSD appears.
 - 6. Press Menu again and leave factory OSD.

3.2 Factory OSD Menu

3.2.1 White Balance

Note: Different source has different WB values. Before adjusting, please change to desired source.

3.2.2 Factory Option

Item 0	Item 1	Note
White Balance	R DRV	Red Driver adjust
	G DRV	Green Driver adjust
	B DRV	Blue Driver adjust
	R CUT	Red Cut adjust
	G CUT	Green Cut adjust
	B CUT	Blue Cut adjust
Note: Before adjusting, please change to desired source. Different source has different WB values.		
Set Channel	Zhong Shi	Qingdao Jiangxi Road factory
	Huang Dao	Huangdao Industrial Park
Color Temp	Color Temp	Standard\cool\warm
	R Gain	
	G Gain	
	B Gain	
Video cruve		
Factory Option	To FAC	M-Can enter factory mode with factory RC or user RC. U-Can enter factory mode only with user's RC.
	Logo Option	Logo Selection
	OSD Language	English
MODE “M” is only used for factory production.		
Version Info		
	Version:	Current Software version

	Date:	The date of current version
Note: Software version info of the TV, readable only.		
Clean Protected		Clean data except WB data and Auto Color data
Clean All		Clean all data

Note: The factory menu date varies according to different sources. In case changing the factory data by error, you can choose to “Clean Protected”, by which you can resume the default value.

To clear the EEPROM:

- Select the item “Clean All”.
- Press VOL+ button to clear the EEPROM data.
- Close the OSD menu after 5 seconds.
- Restart the TV.

3.3 Designer Menu

Item 0	Item 1	Item 2	Note
Designer Menu	Video Curve	Brightness Min	Min Brightness
		Brightness Mid	Mid Brightness
		Brightness Max	Max Brightness
		Contrast Min	Min Contrast
		Contrast Mid	Mid Contrast
		Contrast Max	Max Contrast s
		Saturation Min	Min Saturation
		Saturation Mid	Mid Saturation
		Saturation Max	Max Saturation
	Picture Mode	SOURCE	The current program source
		VIVID Brightness	Brightness of VIVID mode
		VIVID Contrast	Contrast of VIVID mode
		VIVID Saturation	Saturation of VIVID mode
		STD Brightness	Brightness of STD mode
		STD Contrast	Contrast of STD mode
		STD Saturation	Saturation of STD mode

Sound Mode		MOVIE Brightness	Brightness of Movie mode
		MOVIE Contrast	Contrast of Movie mode
		MOVIE Saturation	Saturation of Movie mode
	Volume Curve	Volume Min	When value is 1 Think about the Audio out power before adjusting
		Volume 25	When value is 25 Think about the Audio out power before adjusting
		Volume Mid	When value is 50 Think about the Audio out power before adjusting
		Volume 75	When value is 75 Think about the Audio out power before adjusting
		Volume Max	When value is 100 Think about the Audio out power before adjusting
	Audio Mode	Audio Mode	Standard 、 user 、 Music 、 Speech, Music
		120HZ	Different frequencies for different Audio Mode
		500HZ	
		1.5kHz	
		5kHz	
		10kHz	

The above “Factory/Service OSD Menu” are reference only, please refer to the actual units to determine the appearances.

4 Software Upgrading

The first upgrading method:

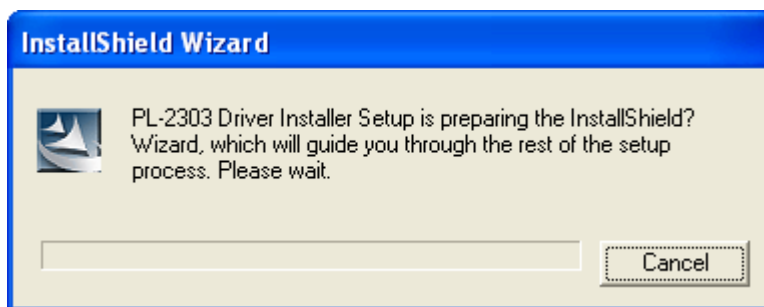
The software is upgraded by a burning tool-MtkTool, which can burn the program file *.bin to the main board of the unit.

4.1 Get ready for upgrading

4.1.1 Install the driver



Double click the icon(PL-2303 or CP210X), install the driver.



Select the default value, the driver will be installed step by step.

4.1.2 Hardware connecting

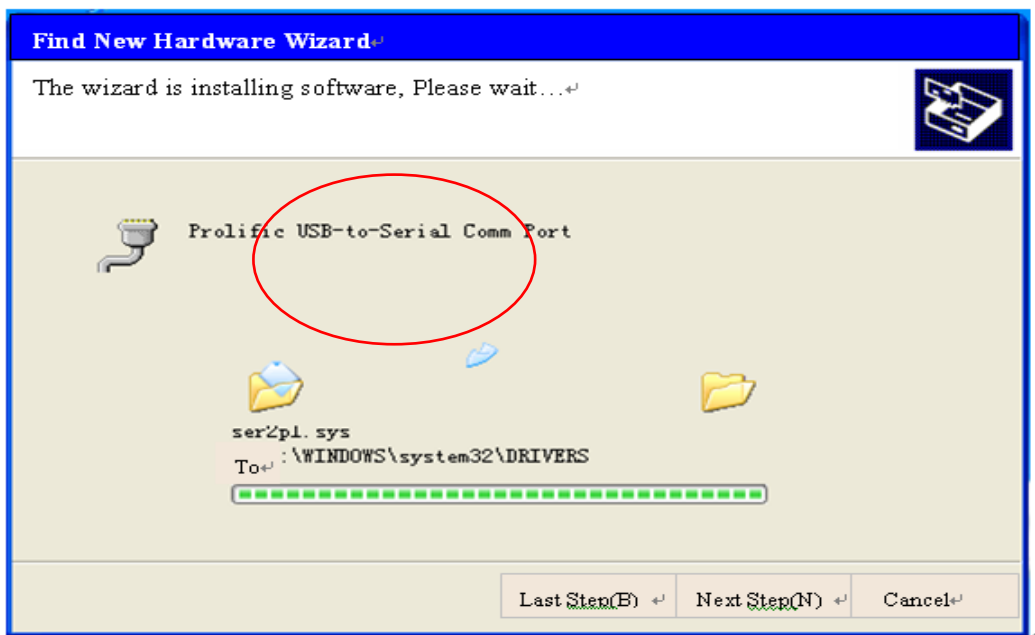
Connect the unit to your pc with a USB-to-serial port cable. USB port connects to your pc, and serial port to the TV's VGA port.

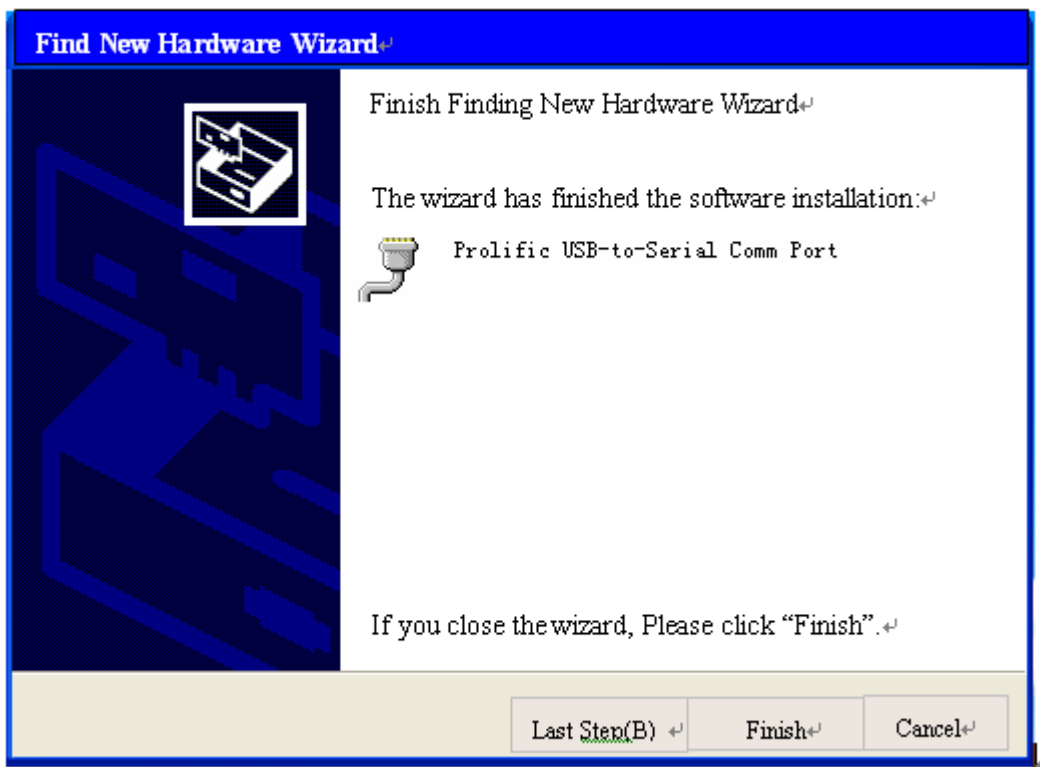
A speech bubble with a tail pointing towards the left, containing the text 'USB connector: to PC.'

A speech bubble with a tail pointing towards the left, containing the text 'Serial connector: to TV's VGA'



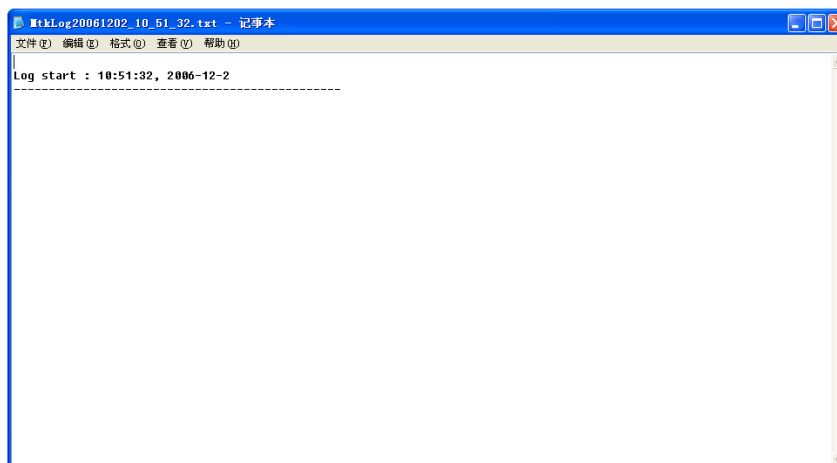
For the first connecting, the pc will recognize and automatically install the USB device. The process is just like the installation of a mini disk, see the following picture.





4.2 Upgrading with the MtkTool

MTKtool is a green program needing no installation. The MtkTool using log is restored in the MtkLog folder. It records the running time and date whenever the tool is used. The log will be a txt file named by the date and time.



After connecting the TV with your PC, double click MtkTool.exe icon, open the MtkTool.

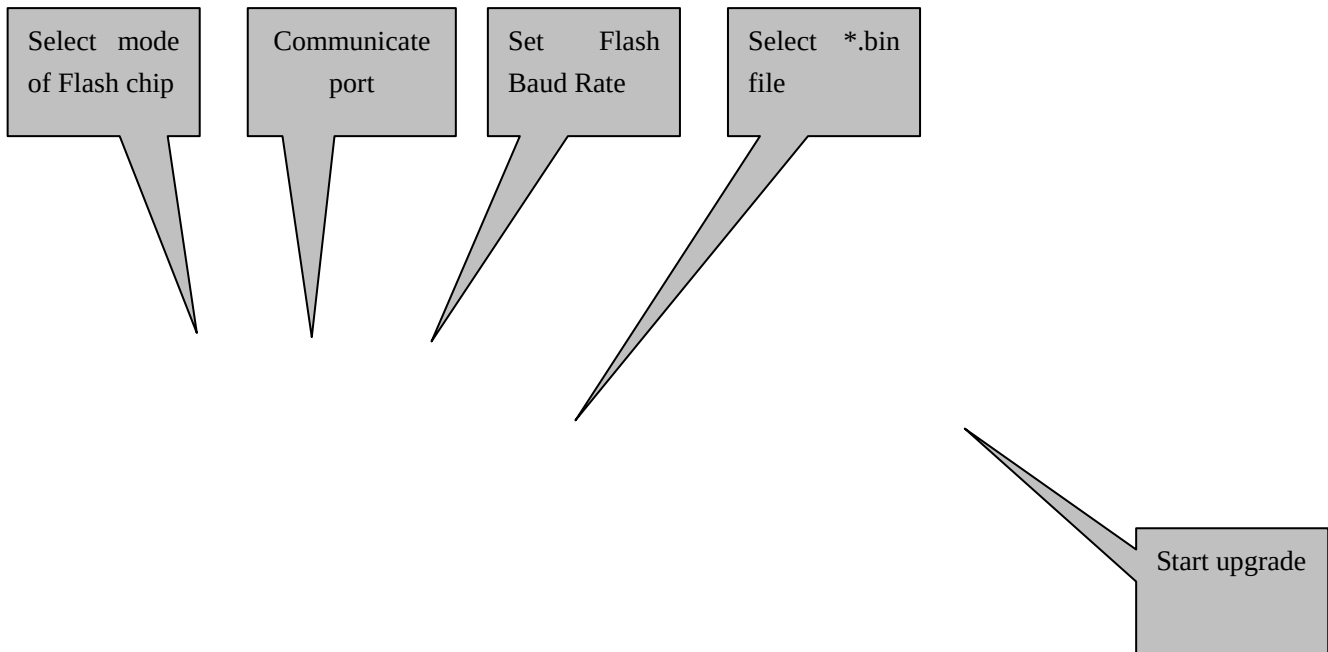
If following error appears, it means the related port is not be set properly.

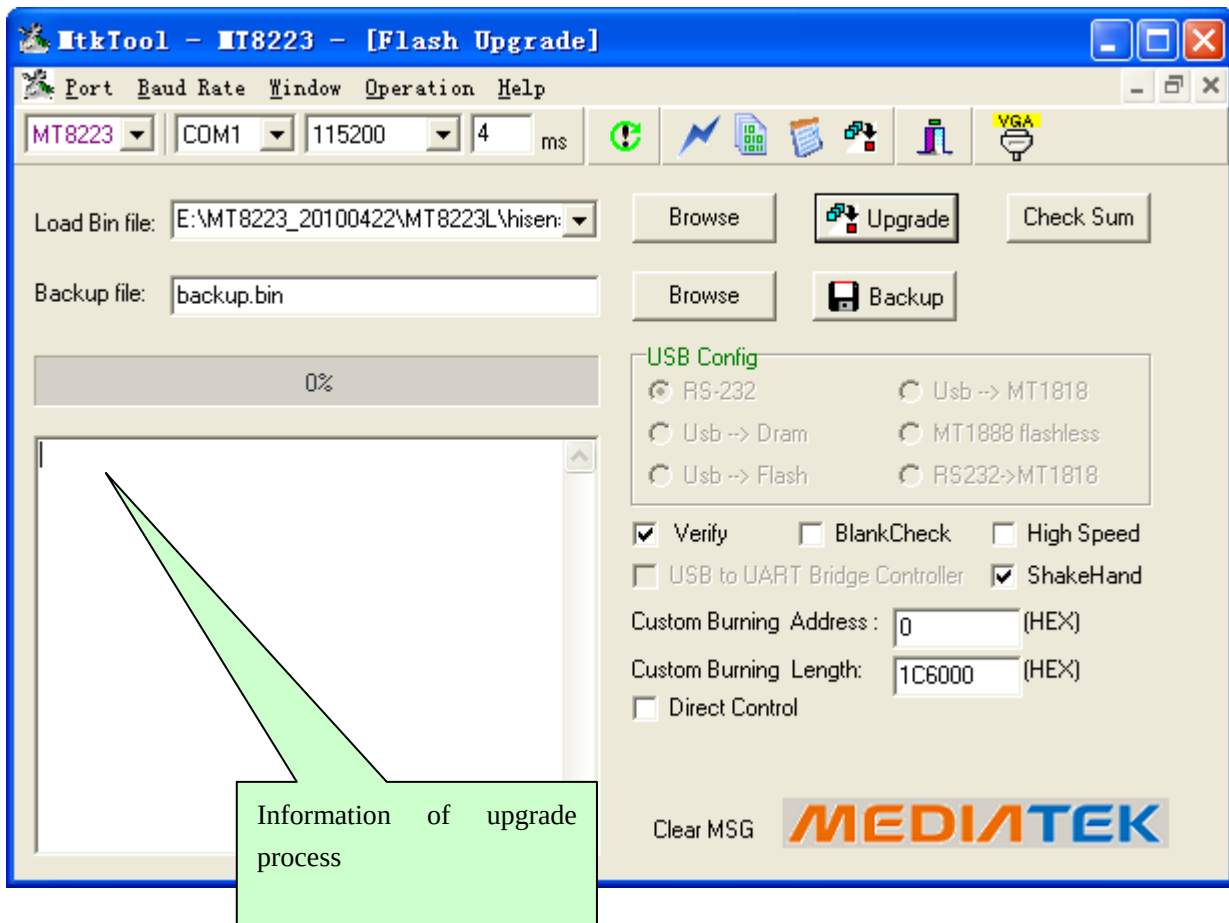
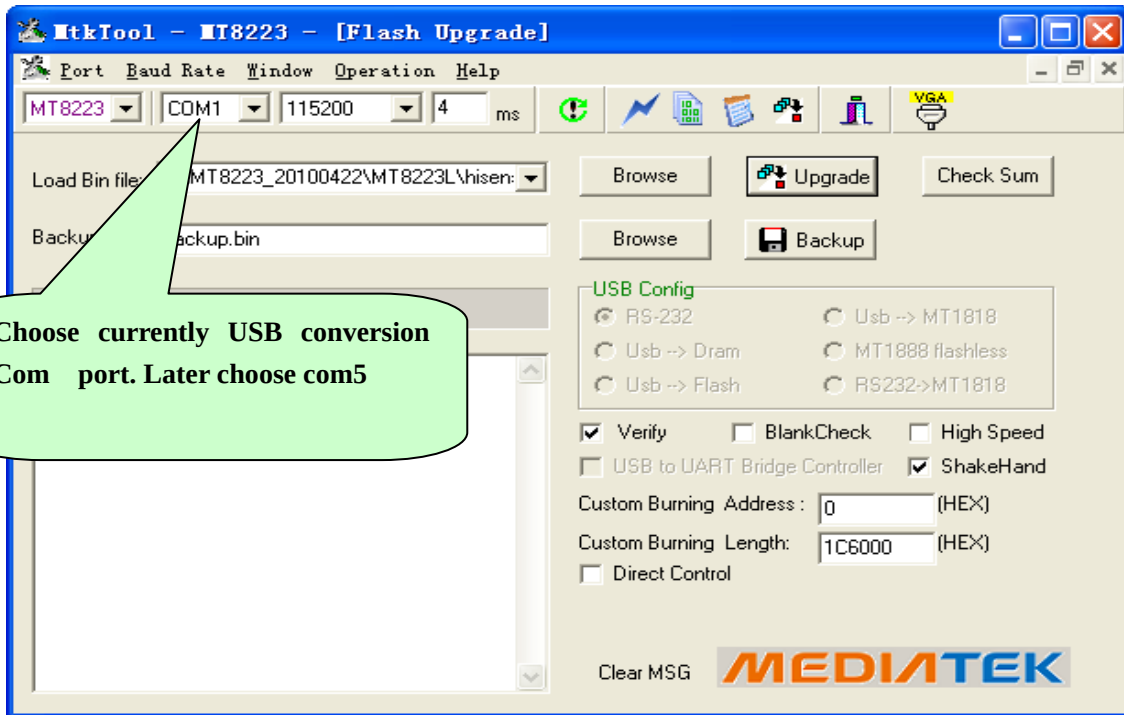


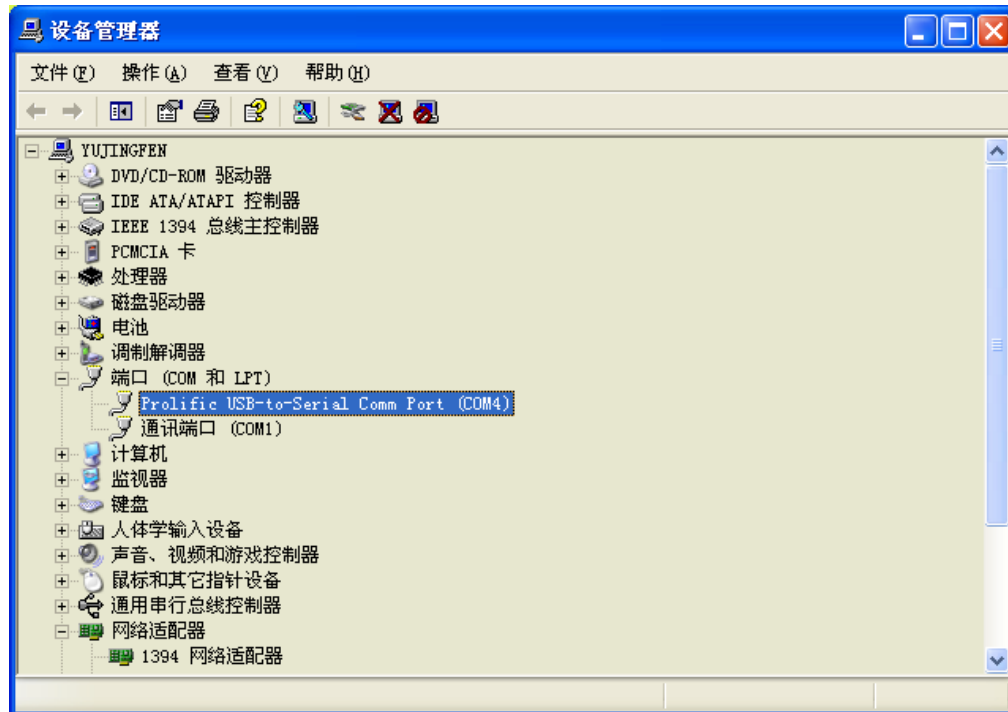
Ignore these errors, click “Confirm” and enter the MtkTool main interface, see the following picture. Flash chip model

Please refer to follow steps to update the software:

- 1—Select mode of Flash chip to MT8223 as the below picture.
- 2—Refer to the next page instruction to select the communicate port.
- 3—Press the icon beside the baud rate and make sure it is green as the below picture.
- 4—Set the flash baud rate to 115200 as the below picture.
- 5—Click the browse button to select the *.bin file that will be updated.
- 6—Click the “Upgrade” button to update software.

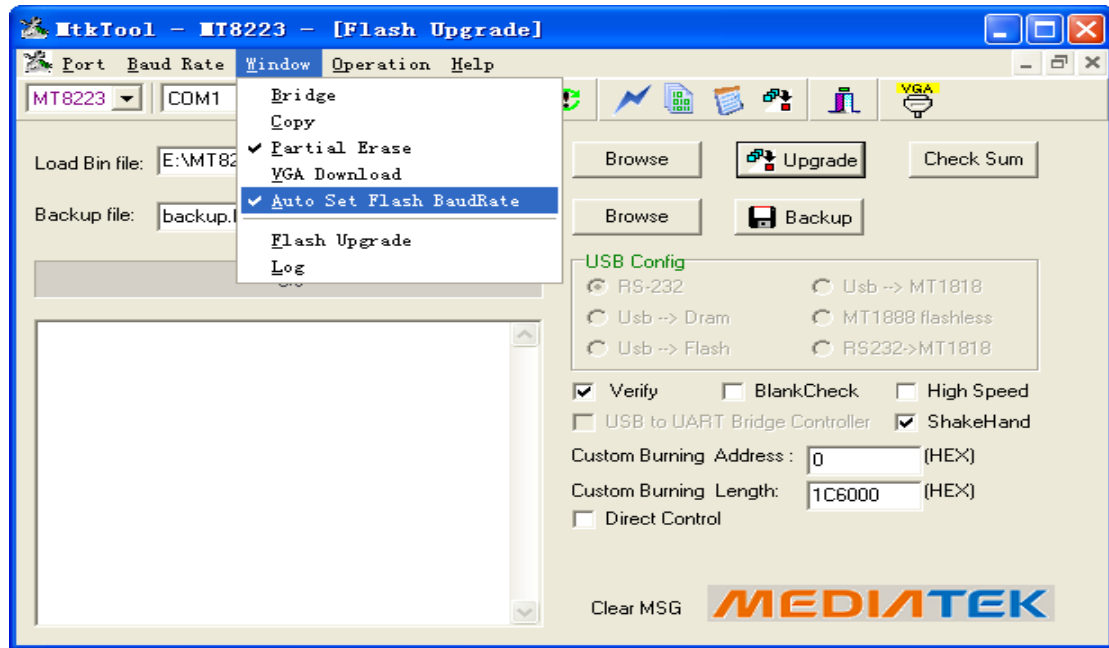






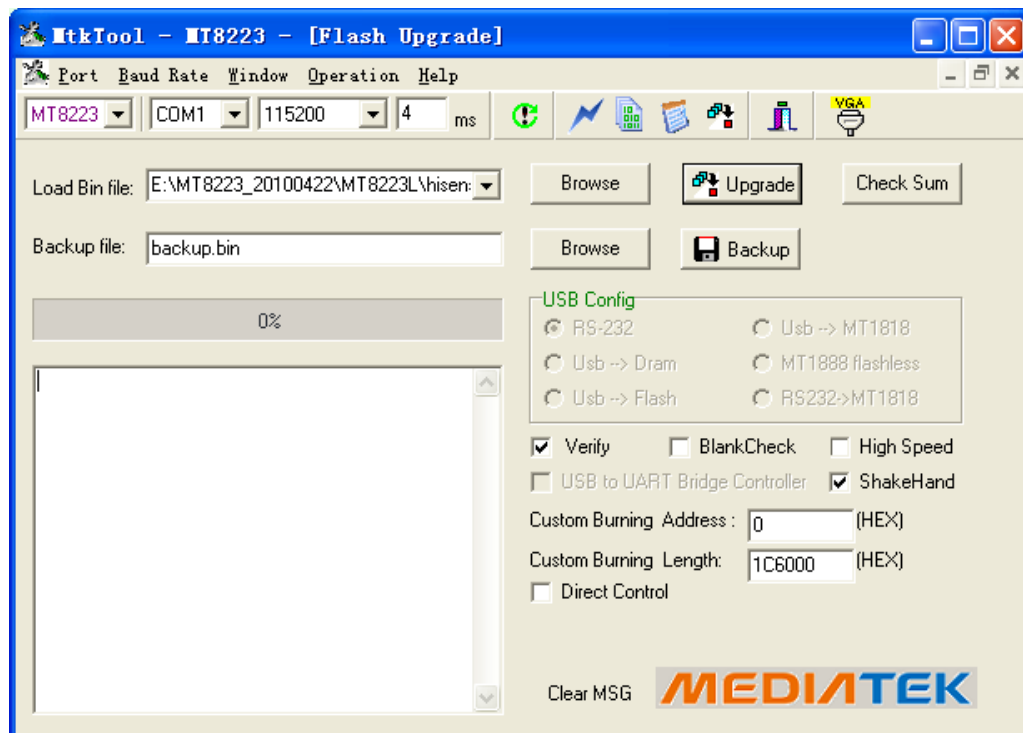
Open “Device Manager” and find which port is connected with the TV. In this operation, COM5 is connected to the TV; so, select “COM5” in the MtkTool main interface. Select the right baud rate according to chip model. For this unit(chip model is MT8223), select 115200..So choose “Auto Set Flash BaudRate”

Note: Whether or not click the “Auto Set Flash Baud Rate” in the “window” menu depends on the chip type. If the flash chip does not support high speed transport, do not select this option; otherwise, reserve the selected mood.



Click “Browse” button, find the upgrading program file, and select it. Press “Upgrade” button and start upgrading.

The following interface appears on the screen, indicating upgrading successfully.



4.3 Update with USB directly

4.3.1 Update with USB directly (by DMP Source)

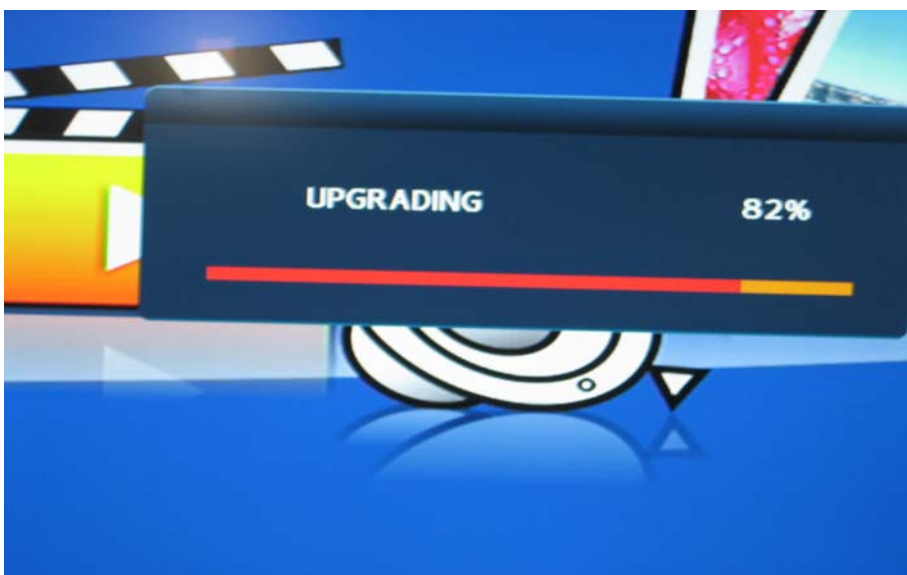
MTK8223 Series can update with USB, the software named HISENSE.bin. The Updating Steps is set the Source to "DMP interface", insert the USB (HISENSE.bin. should be in root directory),The TV automatic identify the upgrading software. step by step, according as the informations of the upgrading process.



(USB to the Main board directly , the figure is only for reference)



Select "OK" on the Remote control



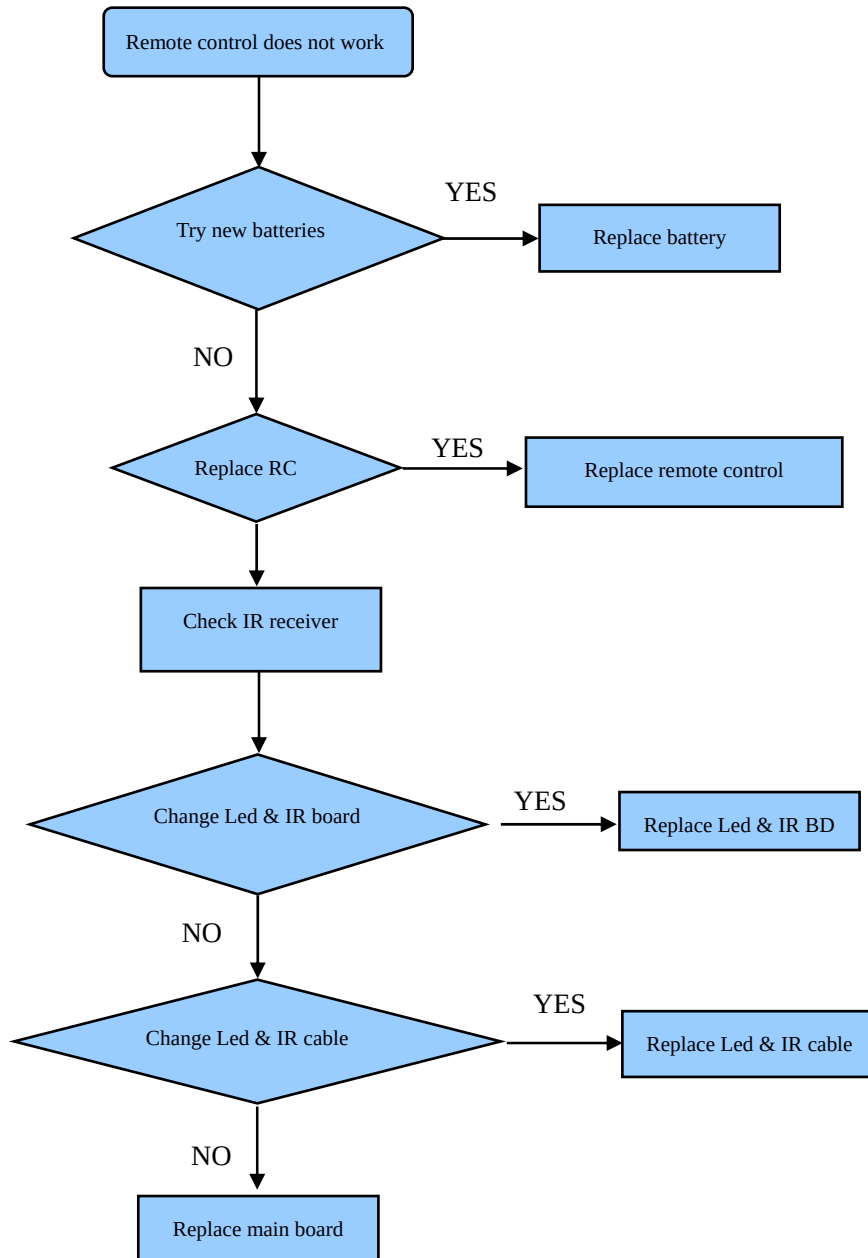
After upgrading, TV can automatically restart .you must confirm the software in the Factory Menu and you'd better "CLEAR ALL".

5. Troubleshooting

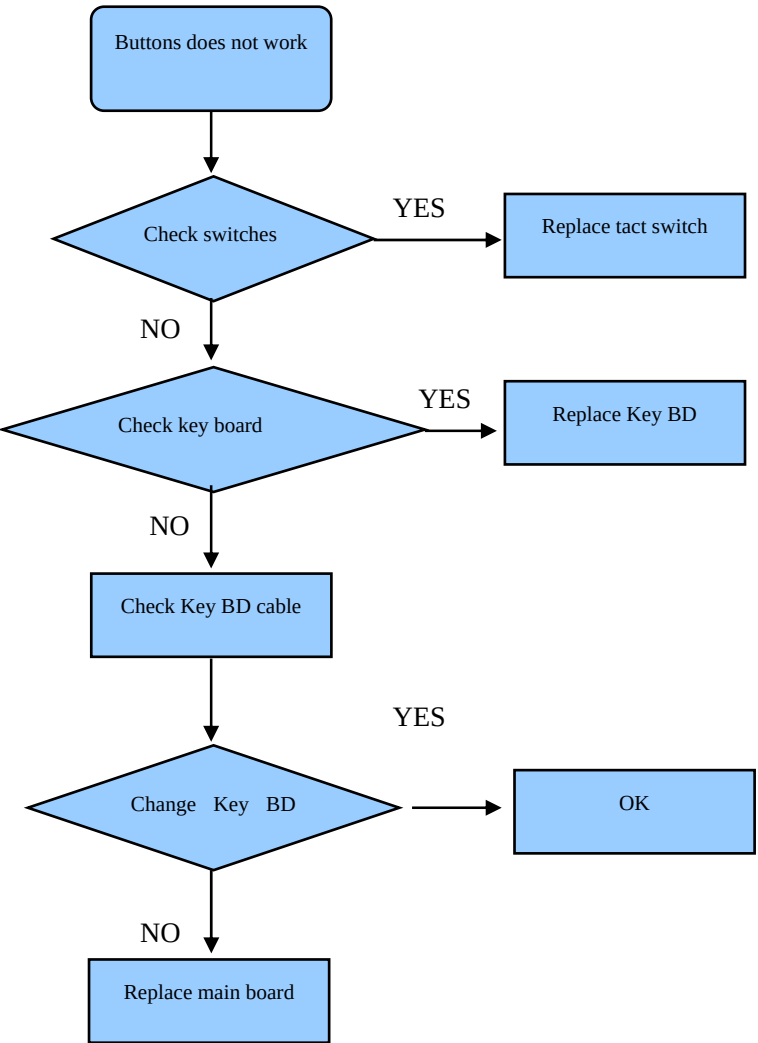
When there is something wrong with you TV, you can try turning off the TV and then restart it. You can also operate according to the following chart.

No sound or picture	1. Check if the power line is in the outlet and if it has electricity. 2. Check if you have pressed Power button on the TV or Power button on the remote control. 3. Check the setting of picture brightness and contrast. 4. Check the volume.
The picture is normal but there is no sound	1. Check the volume. 2. Check if Mute mode is set.
No picture and white or black picture	1. Adjust Picture Setting. 2. Check Color System.
The sound and picture are interfered	1. Try to find the appliance affecting TV set, and move it far away from the TV set. 2. Try to insert the power plug of the TV set into another outlet.
Unclear picture or picture with snow	1. Check the direction, position and connection of your antenna. 2. Adjust the direction of your antenna or reset or fine tune the channel.
The remote control does not work	1. Change the batteries in the remote control. 2. Clean the upper side of the remote control (radiating window) 3. Check the contacting points of the batteries. 4. Check if there is obstruction between the remote control and the monitor. 5. Check if the batteries are correctly installed.
H/V strip or the picture shaking	Check if there is interfering source nearby, such as appliance or electric tools.
The cabinet of the TV makes "Click" sound	makes "Click" sound"Sometimes the room temperature change can cause the television cabinet to inflate or contra, which makes the sound. This does not mean the TV breaks down.

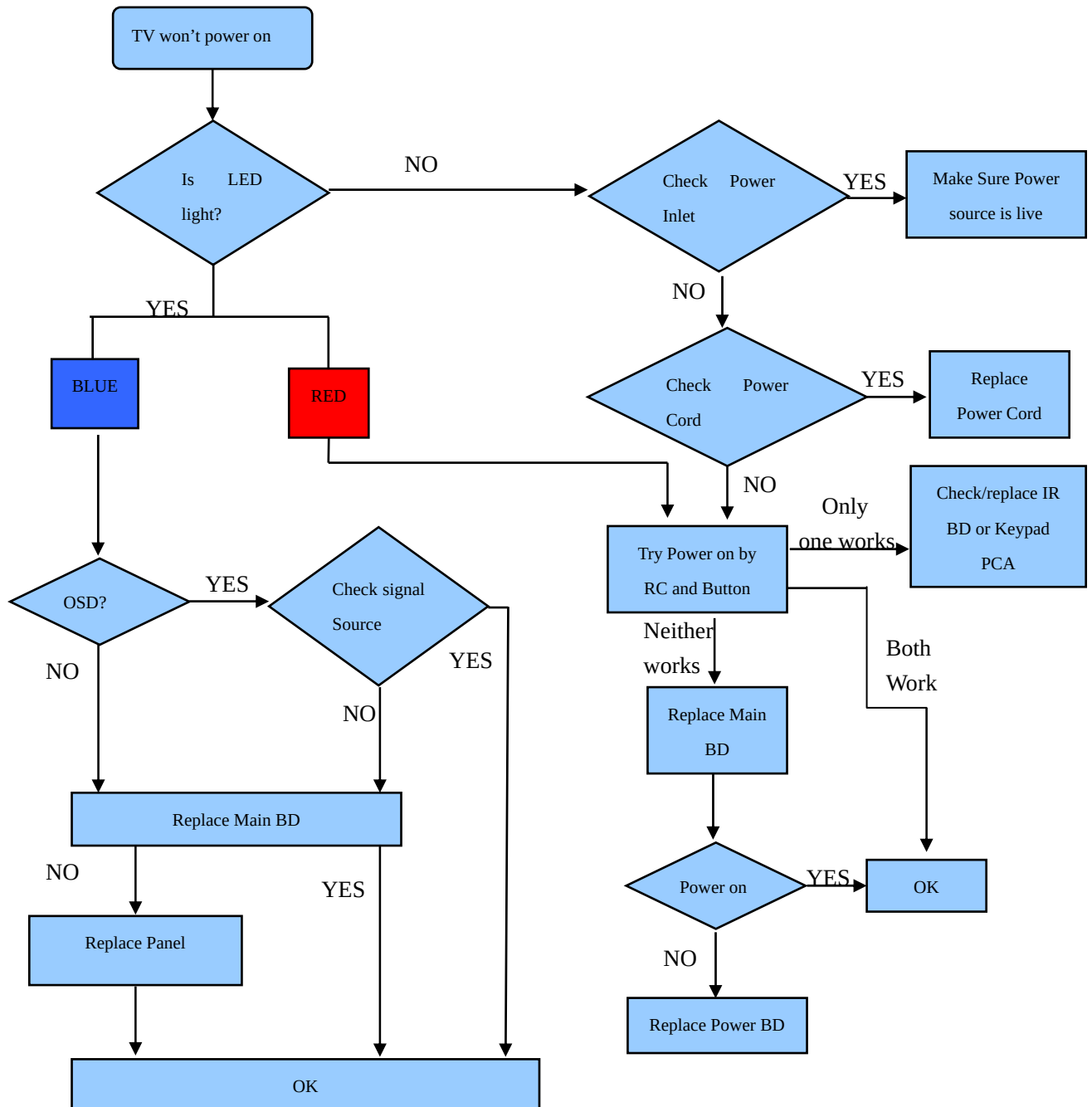
5.1 Troubleshooting for Remote Control



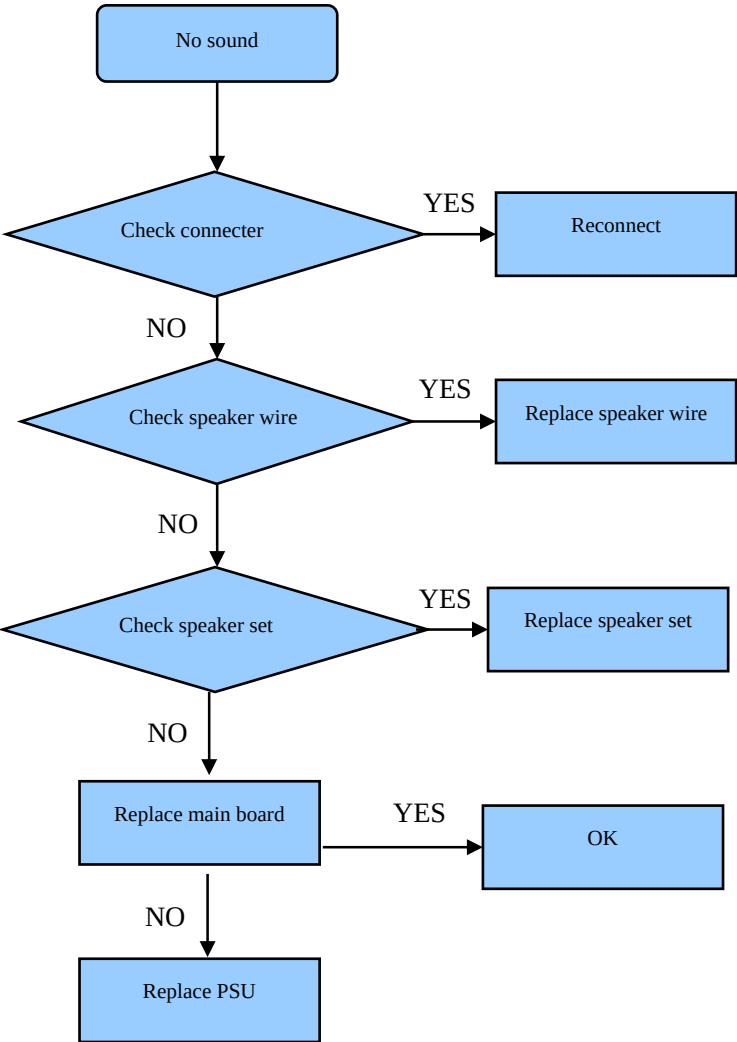
5.2 Troubleshooting for Function Key



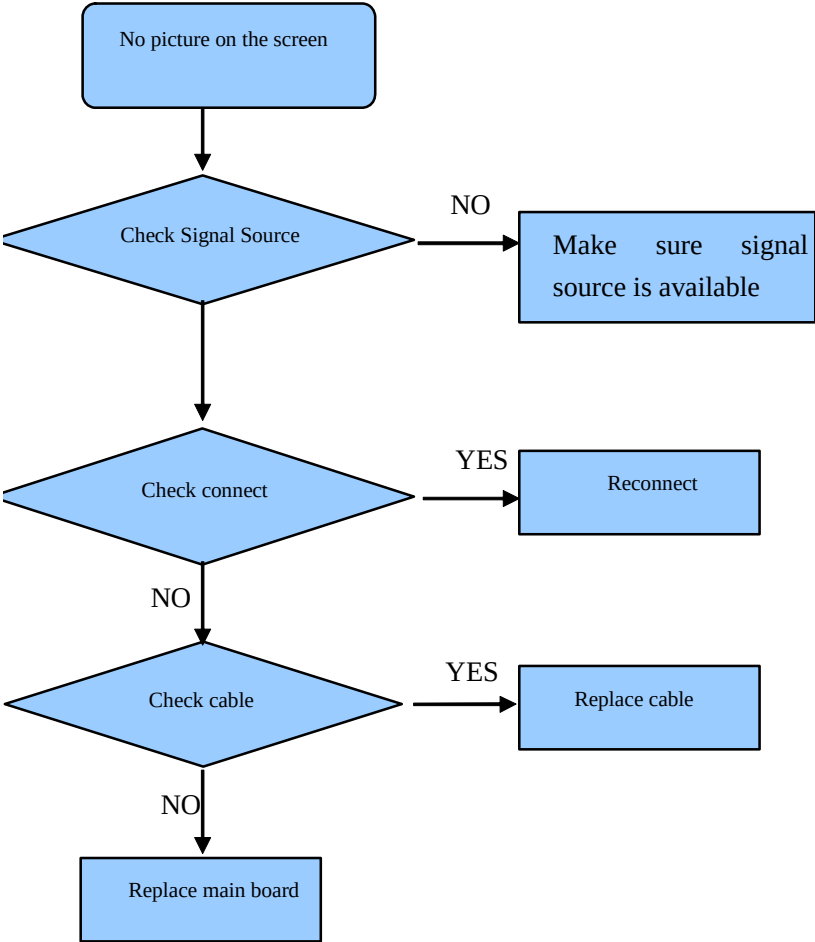
5.3 TV won't Power On



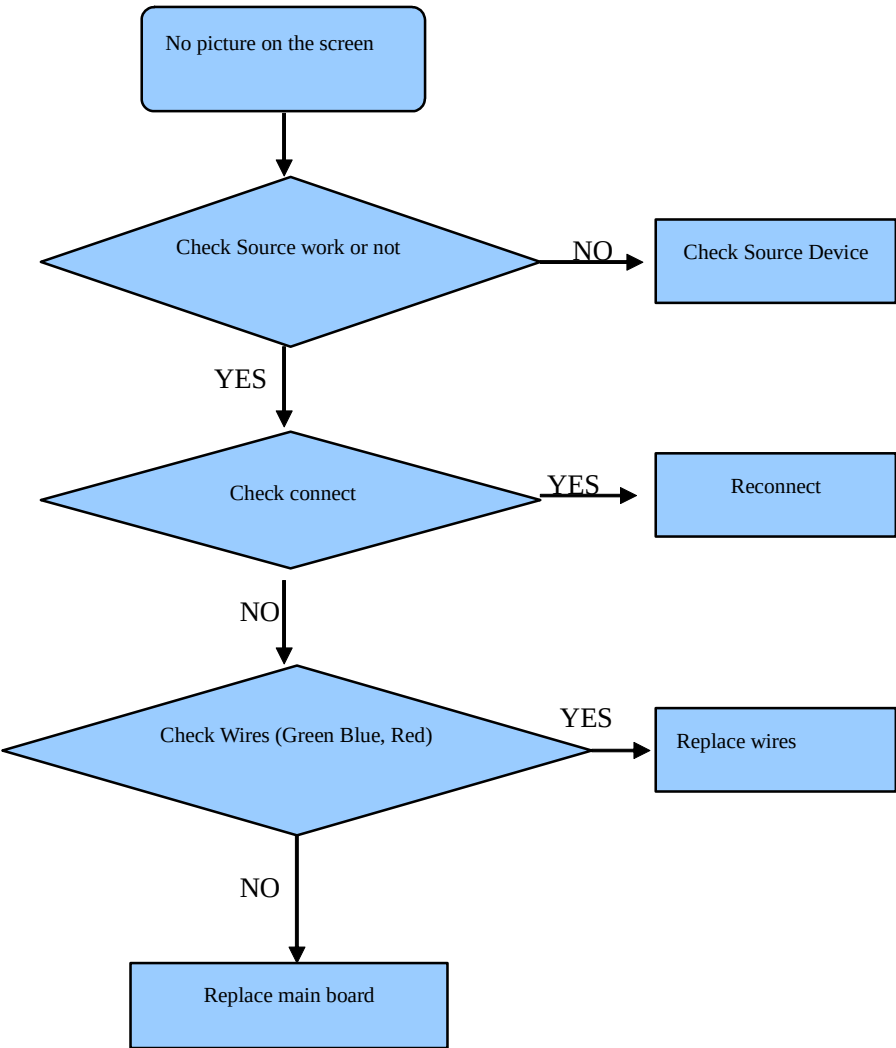
5.4 Troubleshooting for Audio



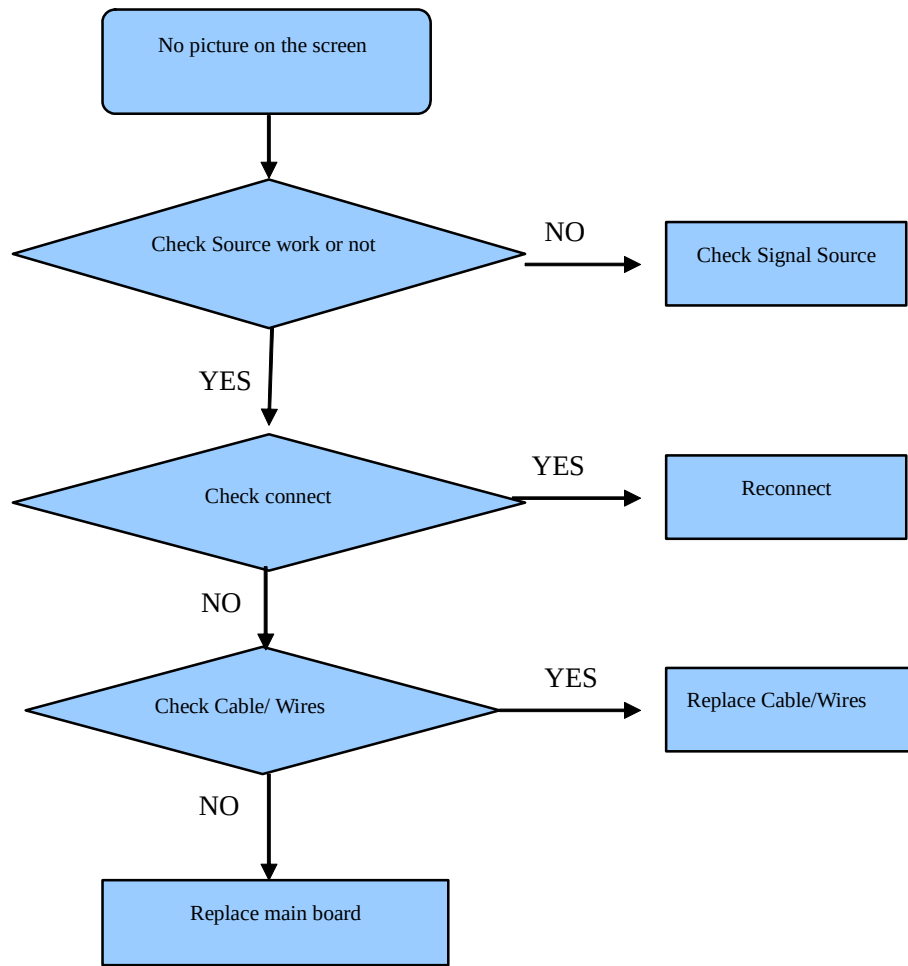
5.5 Troubleshooting for TV/VGA/HDMI input



5.6 Troubleshooting for YPbPr input



5.7 Troubleshooting for Video input

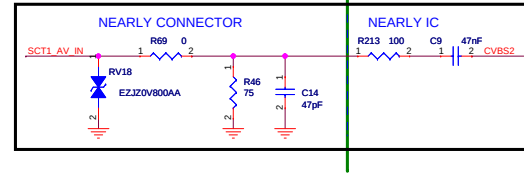


6. Schematic circuit diagram

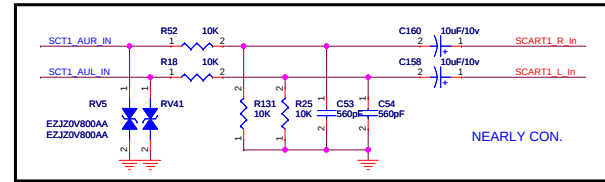
7. Explode view

YC:Y-CVBS,C-SCT1_R_IN

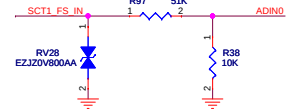
SCART CVBS Input



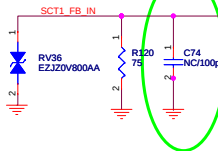
SCART Audio Input



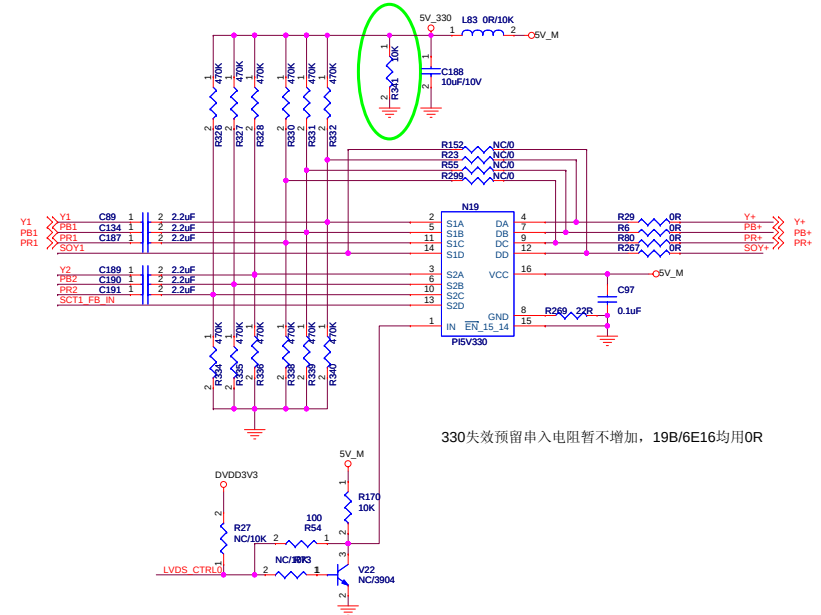
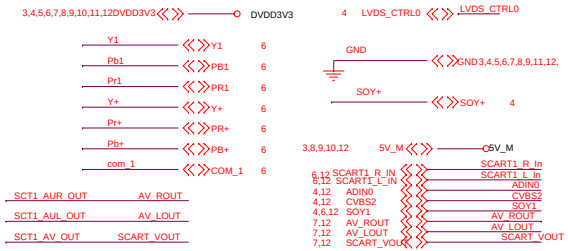
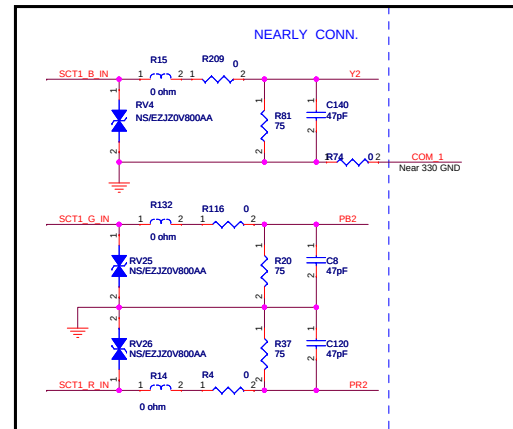
SCART FS



SCART FB

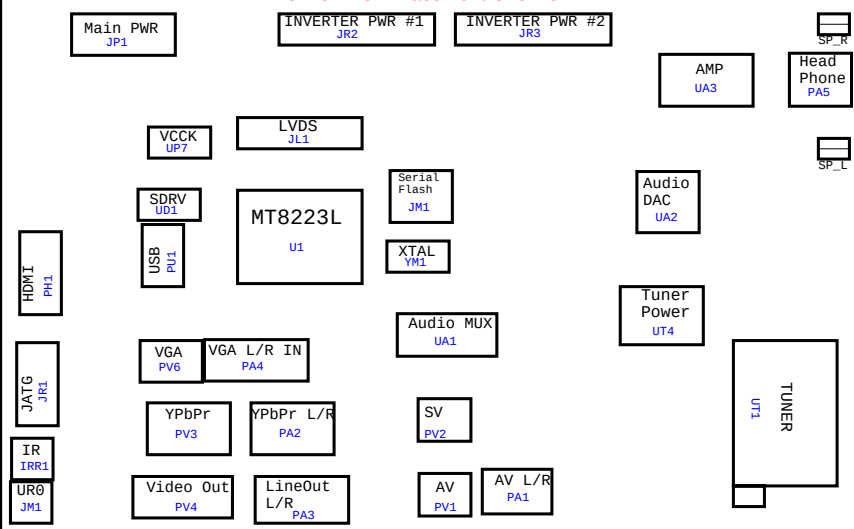


SCART RGB Format Video Input

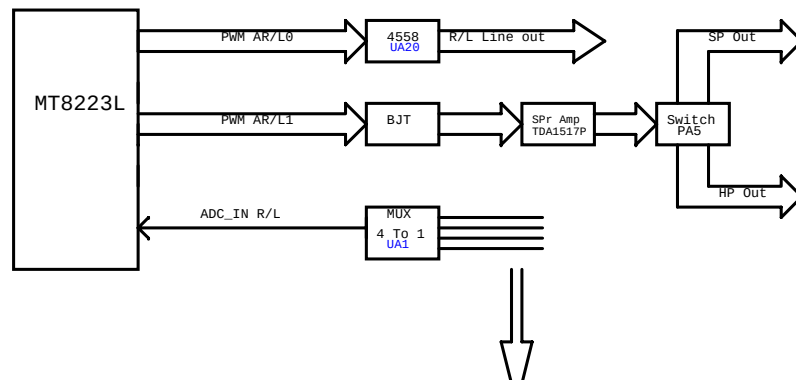


330失效预留串入电阻暂不增加, 19B/6E16均用0R

MT8223L PCB Placement Overview

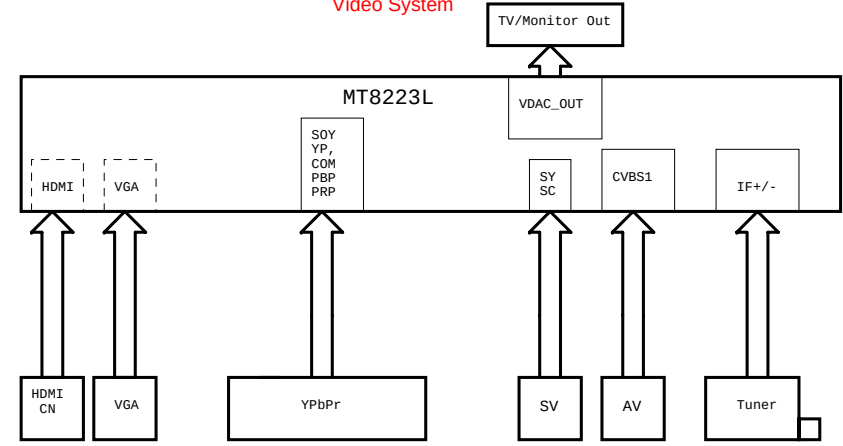


Audio System



Audio Source	U1TX	U1RX
AV1/S-V	H	H
YPBPR	L	H
VGA	L	L

Video System



MediaTek Confidential

MediaTek Inc. No.1-2, Innovation Rd.1, S&P, Hsin-Chu City 300
TEL: 09 867-0766 FAX: 09 878-7610

Placement/Sys Flow

Size	Document Number	Drawn	Rev
C	MT8223LM1V1 EVB	Max Yang	0.1
Date:	Wednesday, September 29, 2010	Sheet	1 of 12

遥控红蓝灯
遥控红蓝灯

○○
○○

Rev	History	P#	DATE
V0.1	INITIAL VERSION		
V0.2	AV out部分 1、C25由NS/47pF==>NS/100pF 2、C5由47pF==>330pF 3、R301 0ohm删掉，直接连铜线 YPbPr/VGA input部分： 1、R176、166、164由0ohm==>80ohm/100MHz 2、R236、214、206由0ohm==>80ohm/100MHz Tuner_5V: 1、增加C121=4.7uF 2、增加R264=100ohm/100Mhz Tuner_30V: 1、增加预留C128=NS/4.7uF Tuner 部分： 1、C121、C134_10nF_去掉 2、R271\R282 由 20ohm 变为 0ohm 3、C6由NS变为0.1uF 4、C1由NS变为4.7uF 5、C79、C56由39pF变成56pF 6、增加C59=NS/0.1uF 电源部分： R304删除		
V0.3	BPF update 1、C75、C72由10ohm==>33ohm 2、C187=390pF变成R323=68ohm 3、C81、C89符号变成电阻R324、R325=NS 4、R307、R315由27ohm==>33ohm 5、D50 82nh==>100nh		

Tuner引脚顺序

增加嵌位电路 20100107 PI5V330部分更改如下：
1、R143\270\40\76\90\13\24\152 更改为电容符号 C89、134、187、189、190、191、=0.1uF，0603封装
2、增加嵌位电路R326、327、328、330、331、332、334、335、336、338、339、340=NS/10K； R270、143=NS/1K

更改遥控头插座5Pin==>8Pin,add R341/R342/D108/D142

更改按键插座3Pin==>4Pin,add R13/R24,add R76/R90

遥控指示灯处增加R40

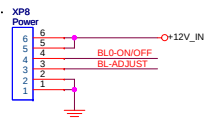
D77删除,连接导线

add R152

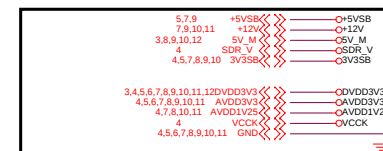
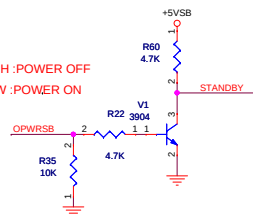
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MediaTek Inc.		No.1-2, Innovation Rd.1, S58P, Hsin-Chu City 300 TEL: 09 867-0766 FAX: 09 878-7610	
		GPIO Config/Modify List	
Size	Document Number	Drawn	Rev
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Main power & Amplifier



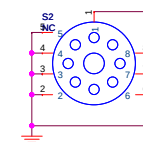
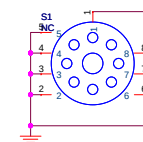
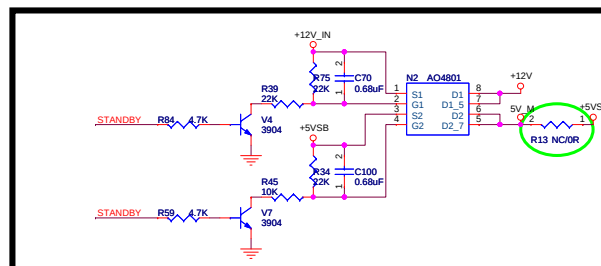
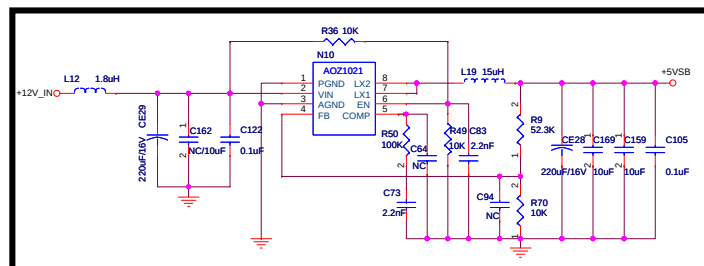
Q1 HIGH :POWER OFF
Q1 LOW :POWER ON



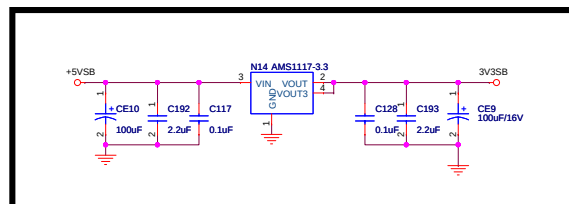
Control interface



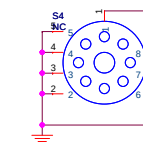
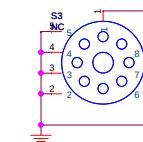
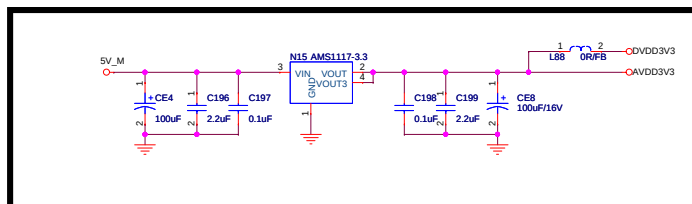
5V STANDBY



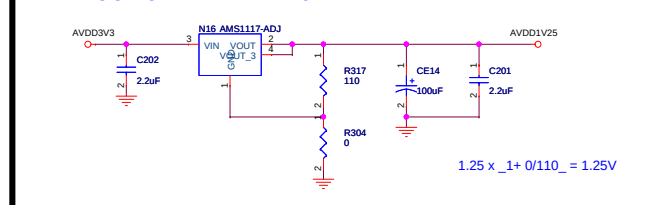
3V3 STANDBY



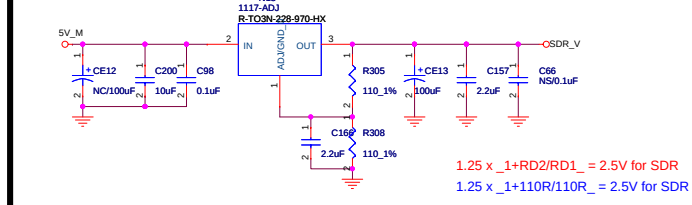
ANALOG POWER AVDD3V3



ANALOG POWER AVDD1V25

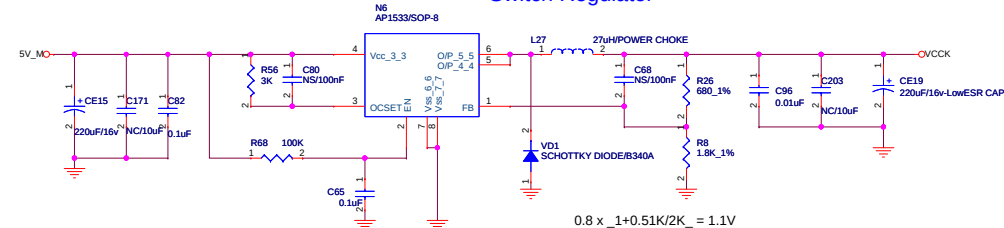


DRAM POWER



Core Power 1.0V

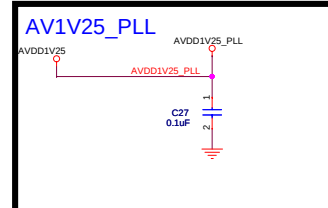
Switch Regulator

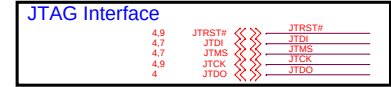
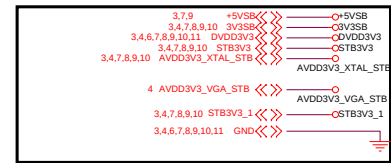
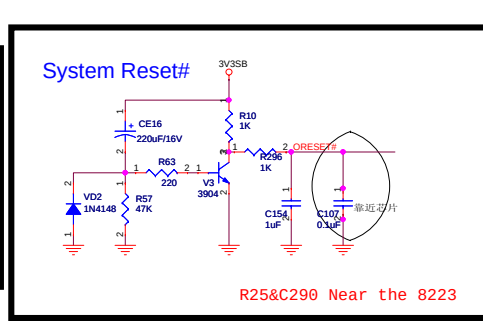
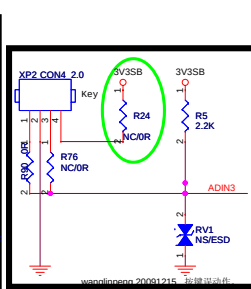
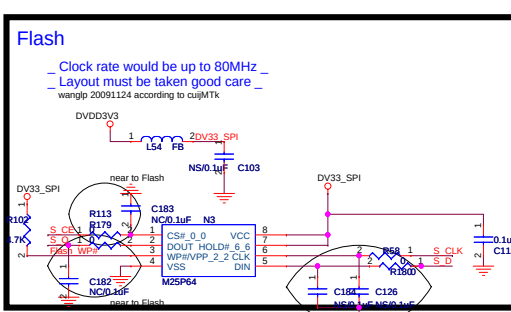
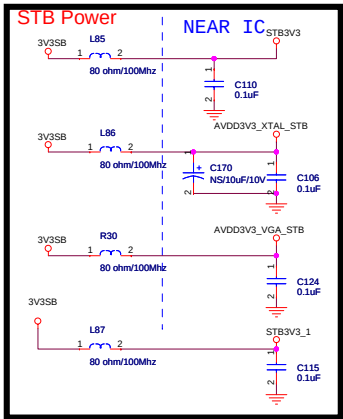


$$0.8 \times _1 + 0.51K/2K_ = 1.1V$$

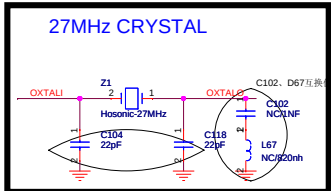
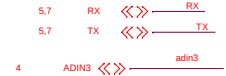
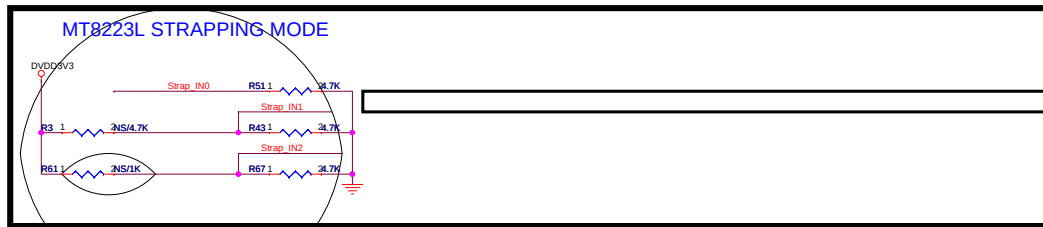
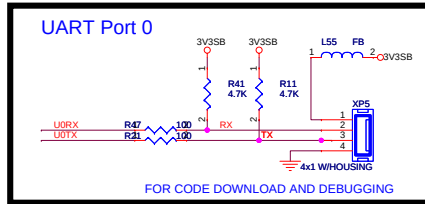
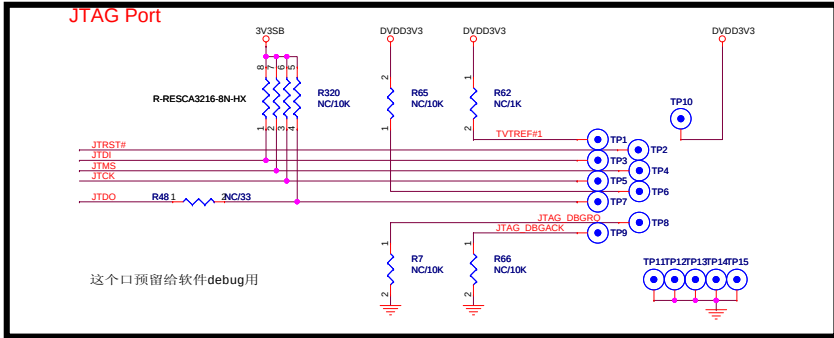
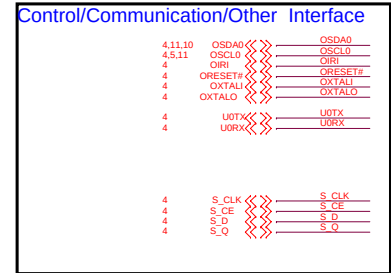
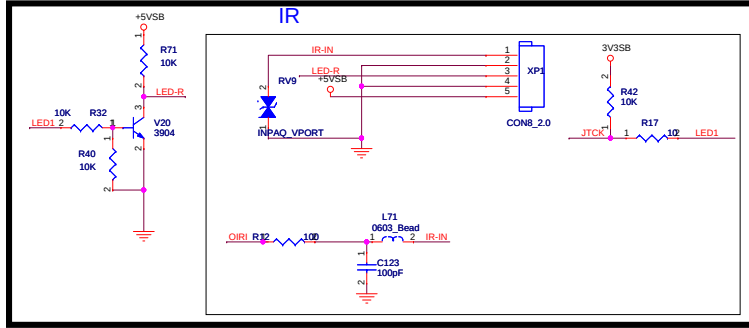
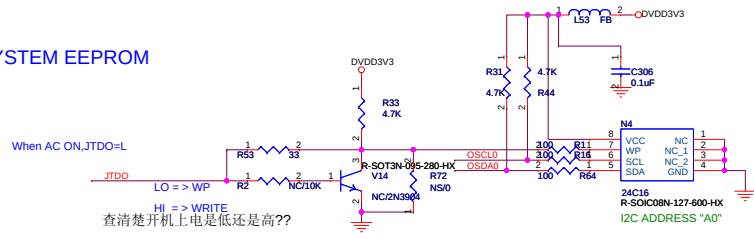
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TEL: 03 567-0766 FAX: 03 578-7810			
File			
System Power			
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SYSTEM EEPROM

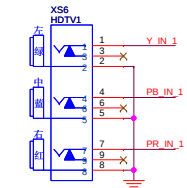


XTAL Dip/SMD Dual Layout

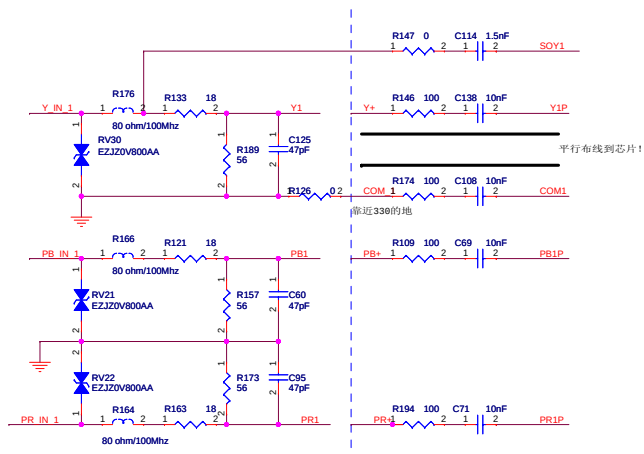
MediaTek Confidential

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Flash/XTAL/JTAG/UART		TEL: 03 587-0766 FAX: 03 578-7610	
Size	Document Number	Drawn	Rev
Customer	MT8223LM1V1 EVB	Max Yang	0.1
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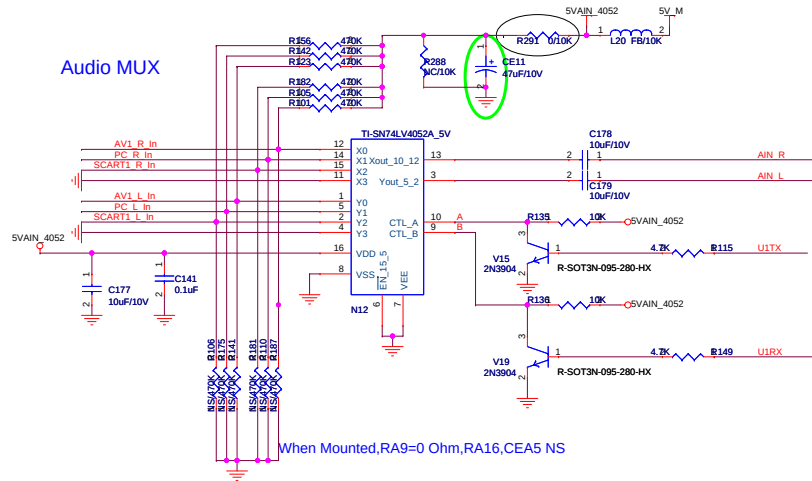
HDTV



YPbPr Video Input NEARLY YPBPR CON. NEARLY IC

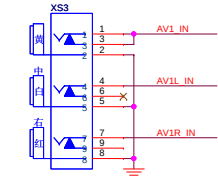


Audio MUX

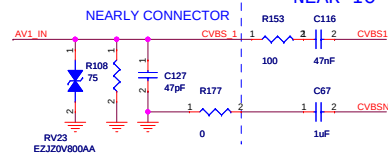


Audio Source	U1TX	U1RX
AV1/S-V	H	H
YPBPR	L	H
VGA	L	L

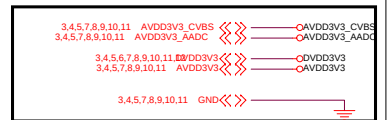
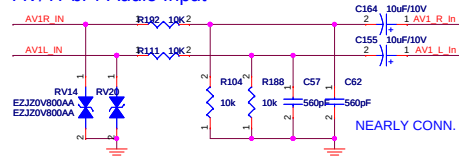
AV_input



AV Video Input



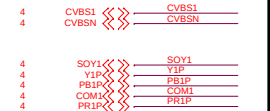
AV/YPbPr Audio Input



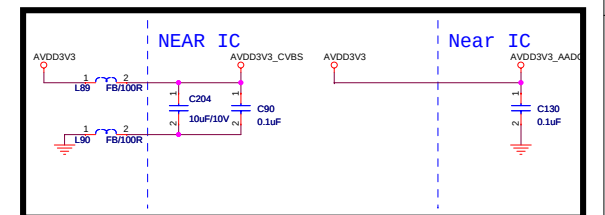
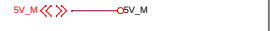
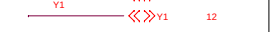
Audio



Video Input



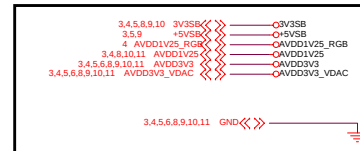
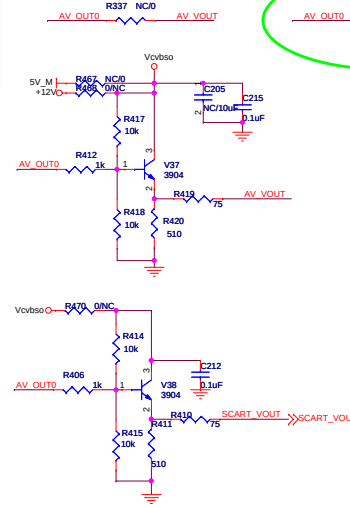
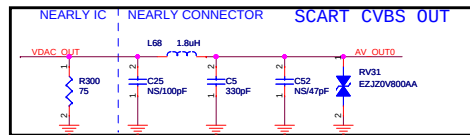
Audio Control



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AVIS-V/YPbPr/Audio MUX			
Size	Document Number	Drawn	Rev
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AV output



Audio

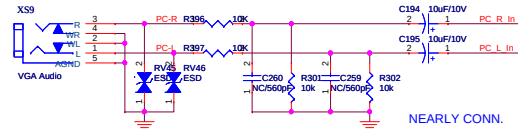
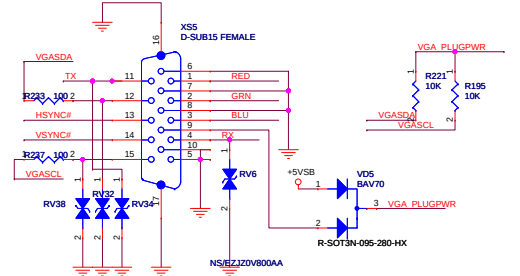
SCART Interface

Audio Mute Control

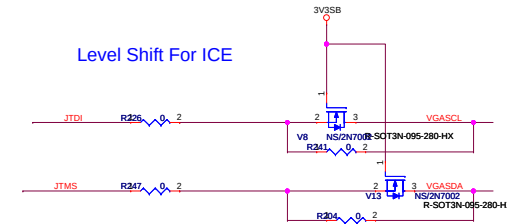
VGA Input

VGA CONNECTOR

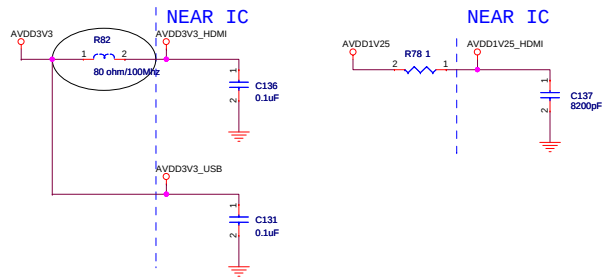
增加VGA升级口\VGA采用薄型新端子



Level Shift For ICE

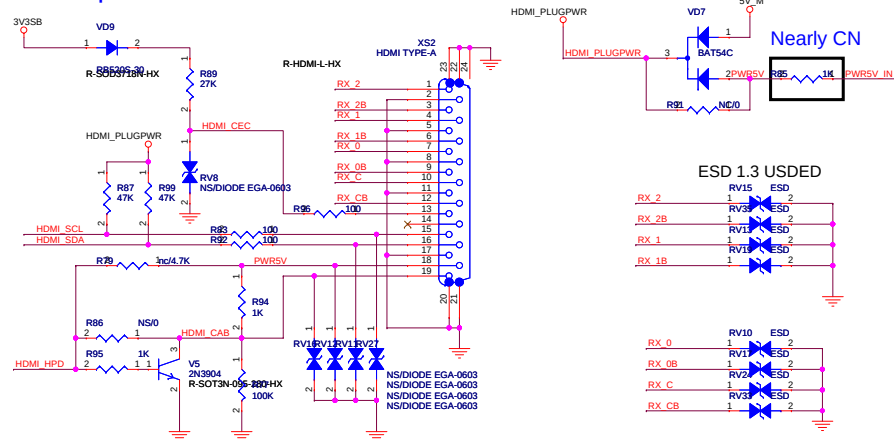


HDMI/USB Power

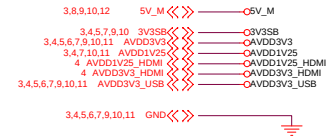


R82由0ohm电阻更改为80ohm/100Mhz磁珠;改善noise干扰HDMI jitter; : wanglp 20091124 according to cuijMTk

HDMI port



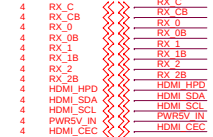
Internal EDID,Sink_HPD_True of
CDF File Select "Power On"



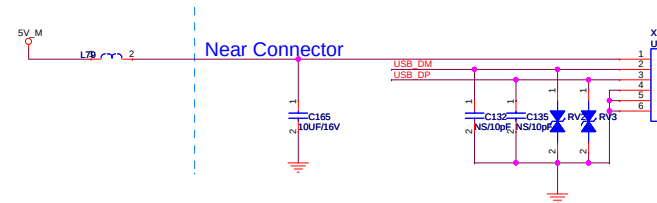
USB Interface



HDMI Interface

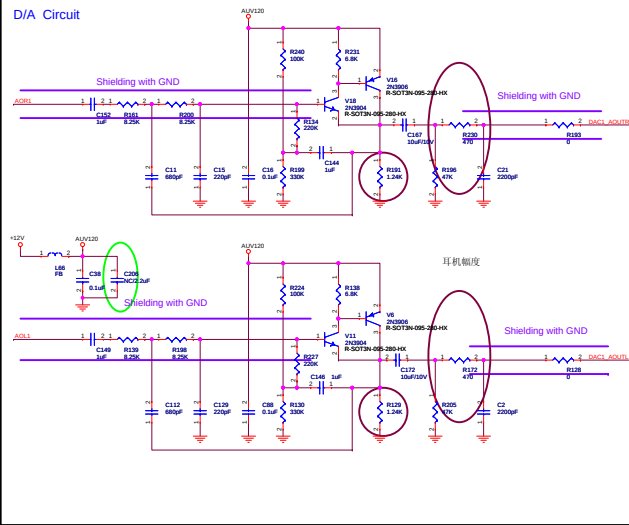


USB PORT

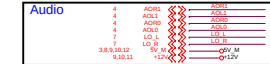
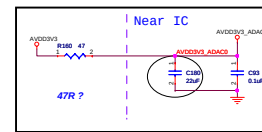
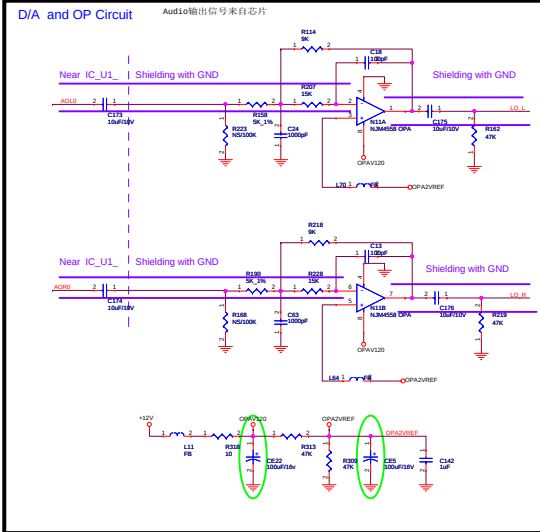


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D/A Circuit

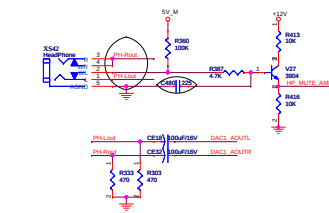
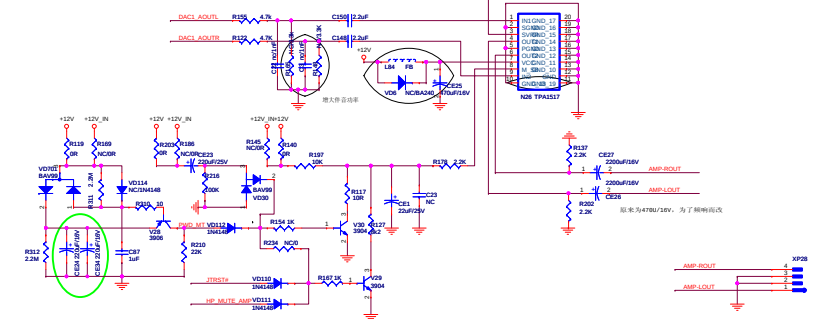


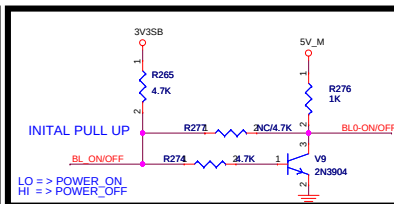
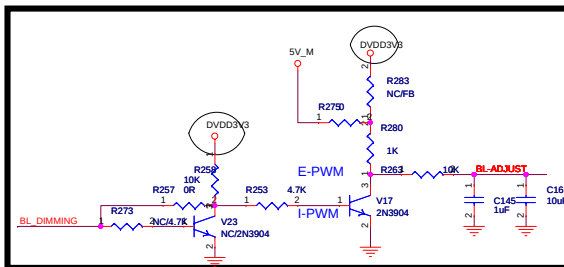
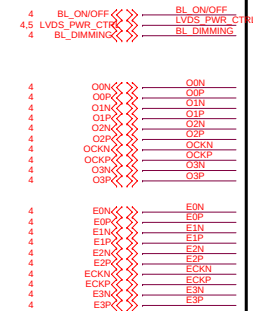
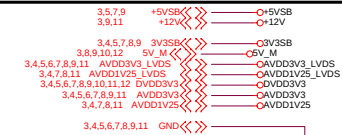
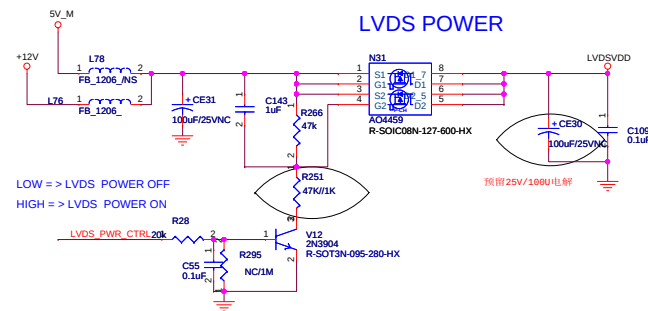
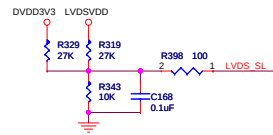
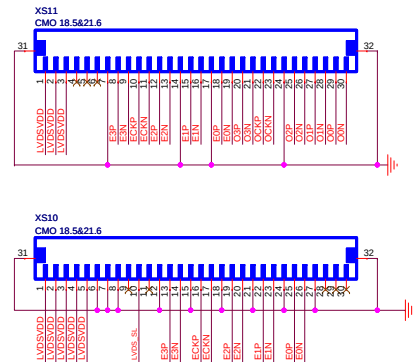
D/A and OP Circuit



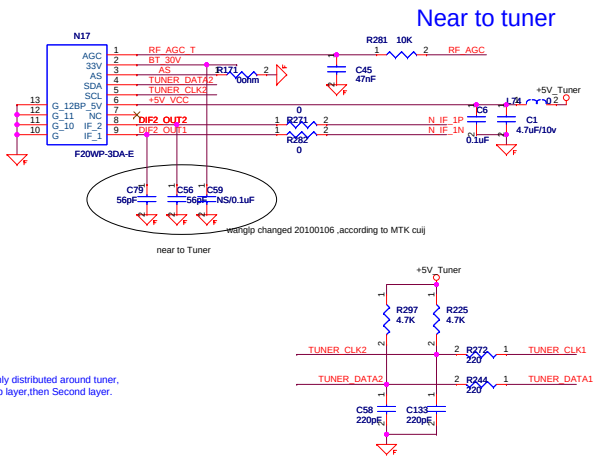
AUDIO - SPEAKER&HP 19、22小尺寸

TPA1517_可兼容TDA1517P、10、11NC即可_



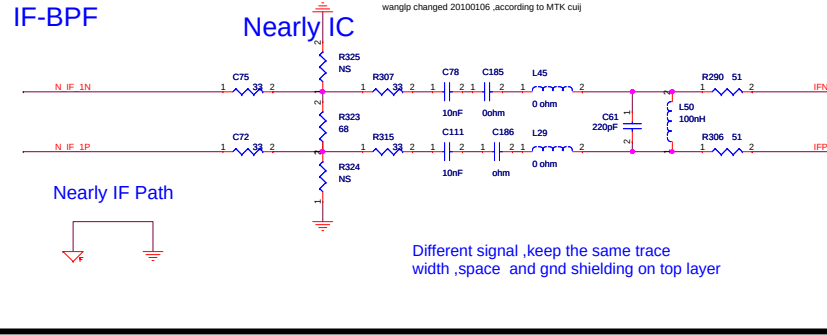


Tuner

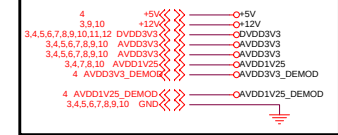


IF-BPF

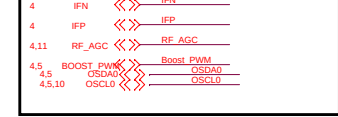
Nearly IC



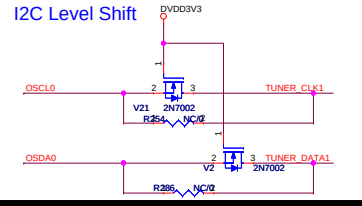
POWER



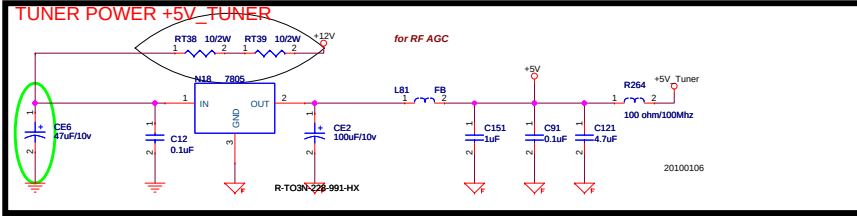
Tuner/Demod



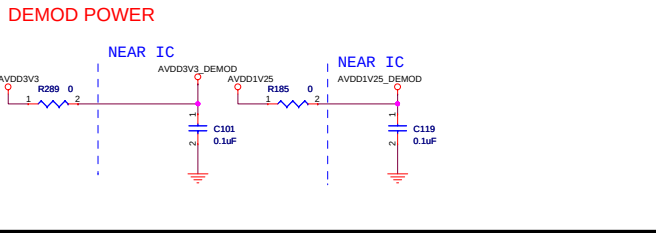
I2C Level Shift



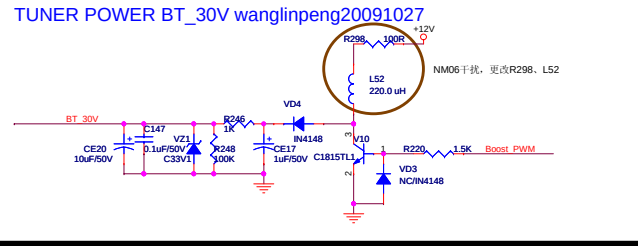
TUNER POWER +5V_TUNER



DEMOD POWER



TUNER POWER BT_30V wanglinpeng20091027



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Title		TEL: 03-567-0706 FAX: 03-578-7010	
Tuner			
Size	Document Number	Drawn	Rev
Customer	MT8223LM1V1 EVB	Max Yang	0.1
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