Liquid Crystal Display Television
Service Manual

Chassis： MST6E16JS

Product Type；LCD19V87/LCD22V87

Ver 1.0

Hisense Electric Co.，Ltd.

December, 2009

Contents

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 no 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. Factory/Service OSD Menu and Adjustment

2.1 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.
4. Press “M” button exit factory mode in the factory OSD menu.

When TV outgoing factory,user can not enter factory OSD menu with Factory Remote

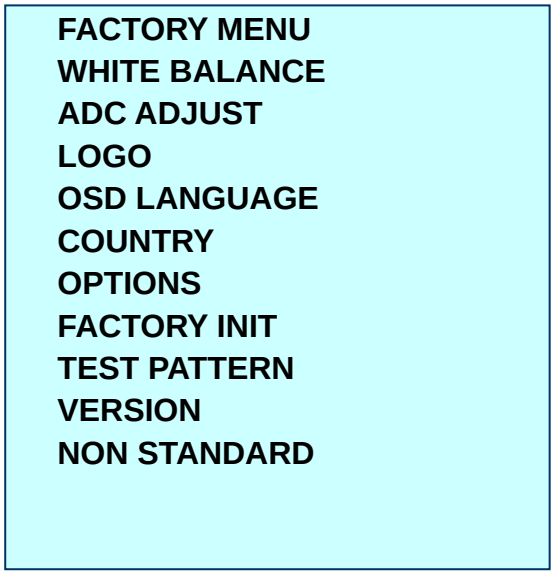
b. With user’s RC

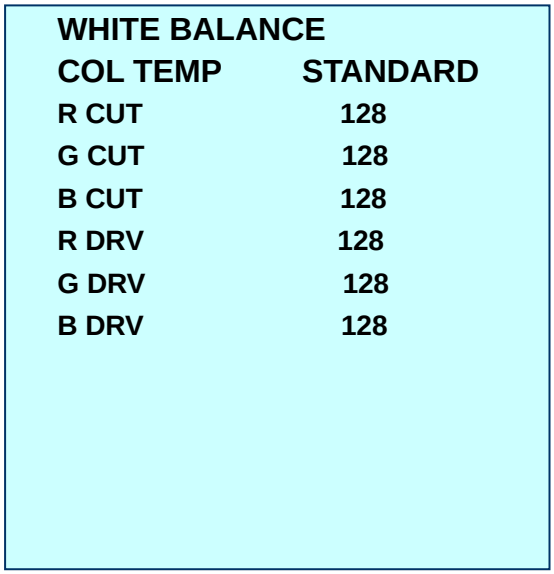
1. Power TV On
2. Press Menu button and call up User OSD Menu
3. Select Sound-> Balance
4. When Balance value is “0”,Enter 0->5->3 ->2 in sequence.
   Note: If necessary, re-do number keys.
5. Factory OSD appears.
6. Press the standby button then AC turn off and restart the TV, which can exit factory OSD menu.

2.2 Factory OSD Menu

The Factory OSD Menu comprises Factory Menu and Design Menu .

2.2.1、Factory Menu





ADC ADJUST

Only in component and VGA SOURCE ,The “ADC Adjust” Can be chosen.

LOGO

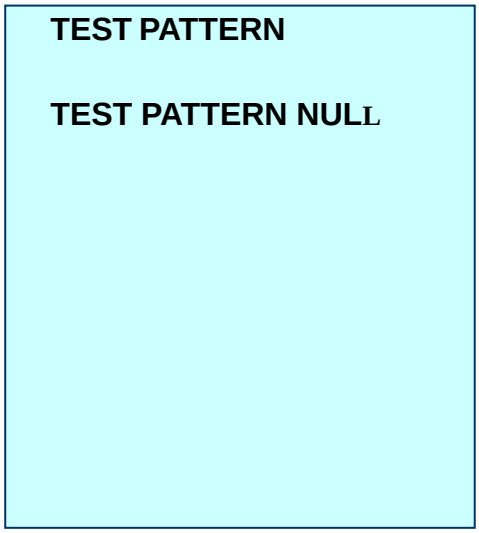
NULL
HISENSE
WELCOME

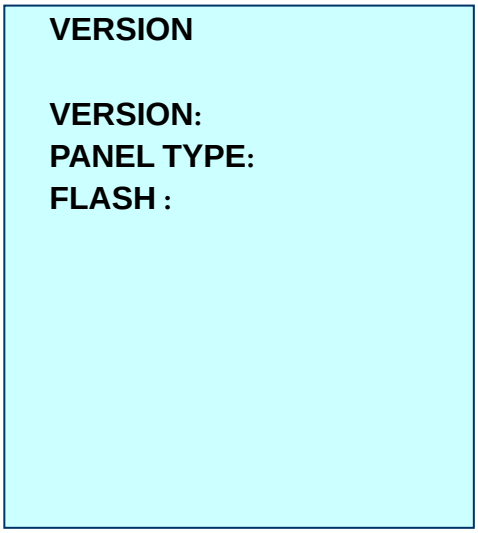
OPTION

SOURCE	TV
TOFAC	M
ATS	1
STARTUP MENU	1
Search Sensitive	1
RF NTSC	0
HDCP OUT OR IN	1

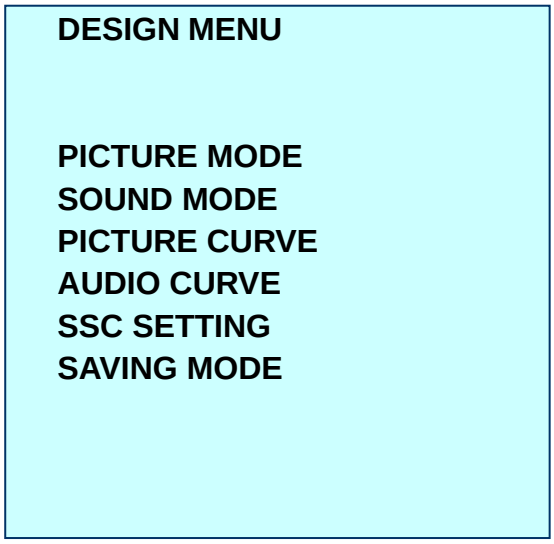
FACTORY INIT

QINGDAO
HUANGDAO
HUNGARY
FRANCE
AUSTRALIA
CLEAR PROTECTLY
CLEAR UNPROTECTLY





2.2.2、Design Menu



PICTURE MODE	
MODE	STANDARD
BRIGHTNESS	50
CONTRAST	50
COLOUR	50

SOUND MODE	
MODE	USER
120HZ	10
500HZ	10
1.5KHZ	10
5KHZ	10
10KHZ	10

PICTURE CURVE		
MODE		BRIGHTNESS
CURVE	0	97
CURVE	25	105
CURVE	50	120
CURVE	75	130
CURVE	100	141

AUDIO CURVE		
MODE		VOLUME
CURVE	0	0
CURVE	25	18
CURVE	50	22
CURVE	75	28
CURVE	100	36

SSC SETTING	
DDR SSC	2
DDR MCM	60
LVDS SSC	2
LVDS PCM	60

SAVING MODE
255

Note：

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

3. Software Upgrading

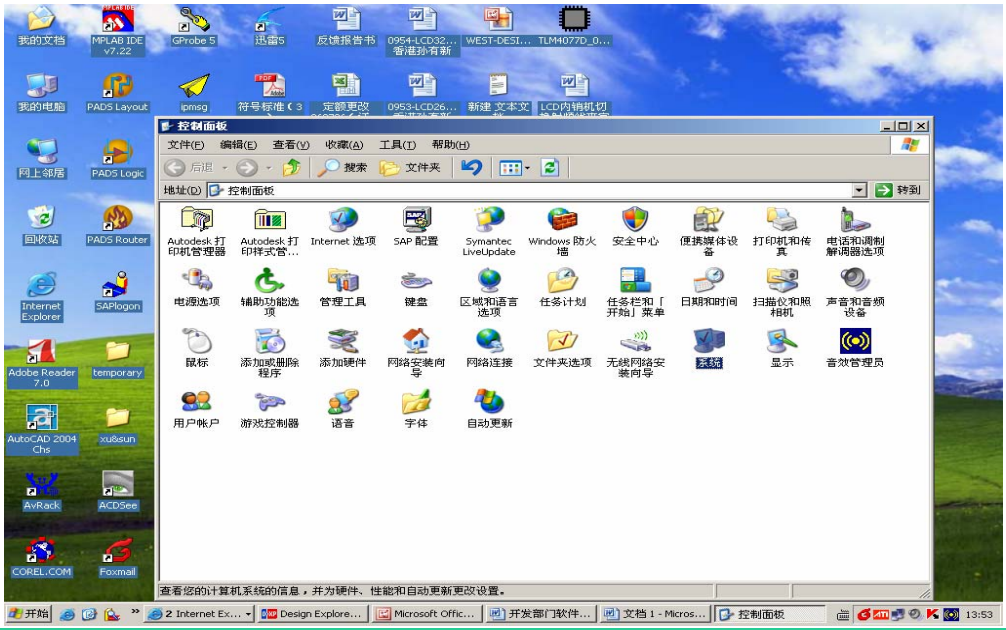
The software is upgraded by a burning tool- ISP_TOOL4.0.9, which can burn the program file “*．bin” to the main board of the unit

3.1 Get ready for upgrading

3.1.1 Install the ISP_TOOL4.0.9-------only for the first time update.

1、 Port Setting：

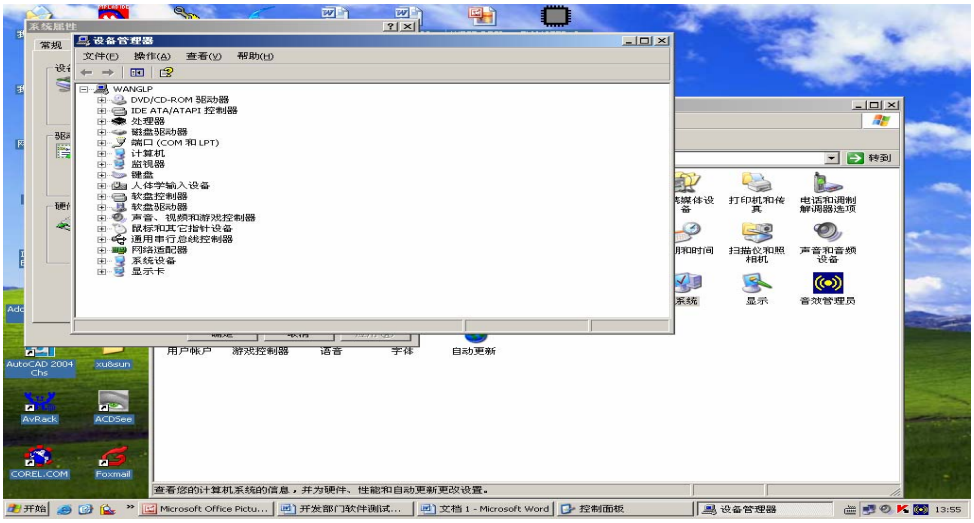
Choose “system”option from the “control panel”



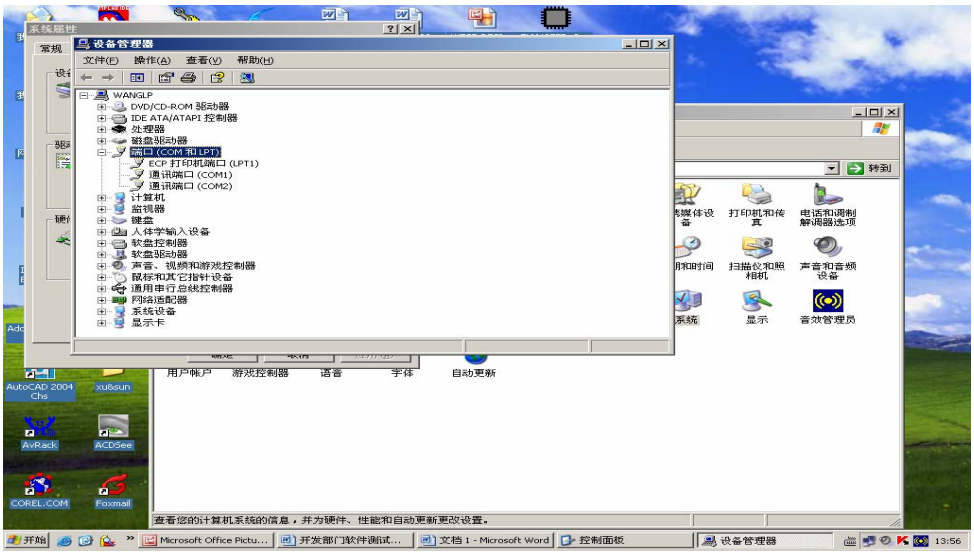
Click the “system” icon as the following

Choose the “hardware” option from the dialog window

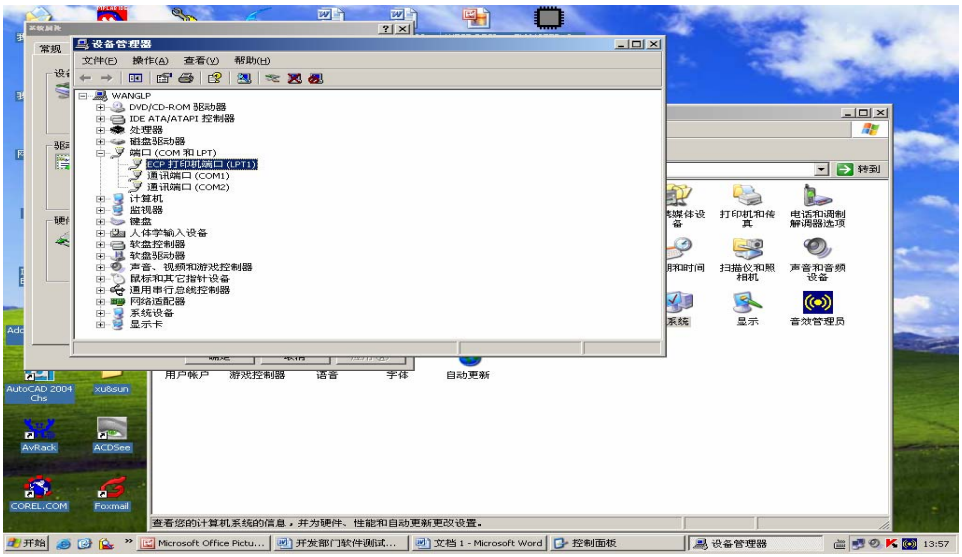
Click“device management” icon as the following



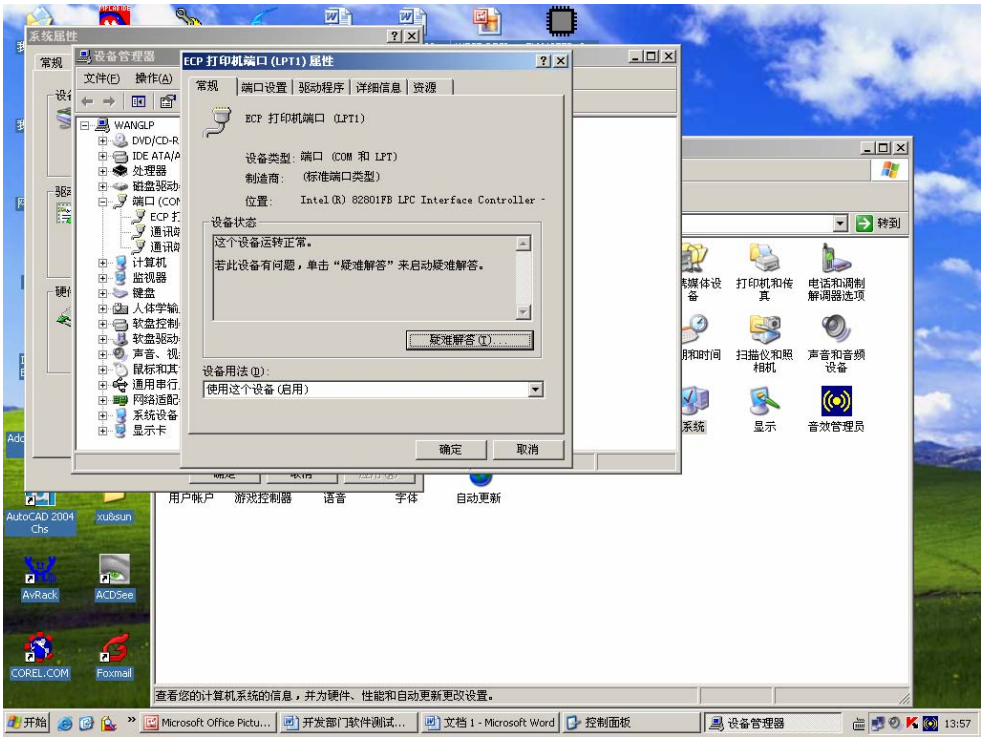
Choose the port (COM and LPT1)



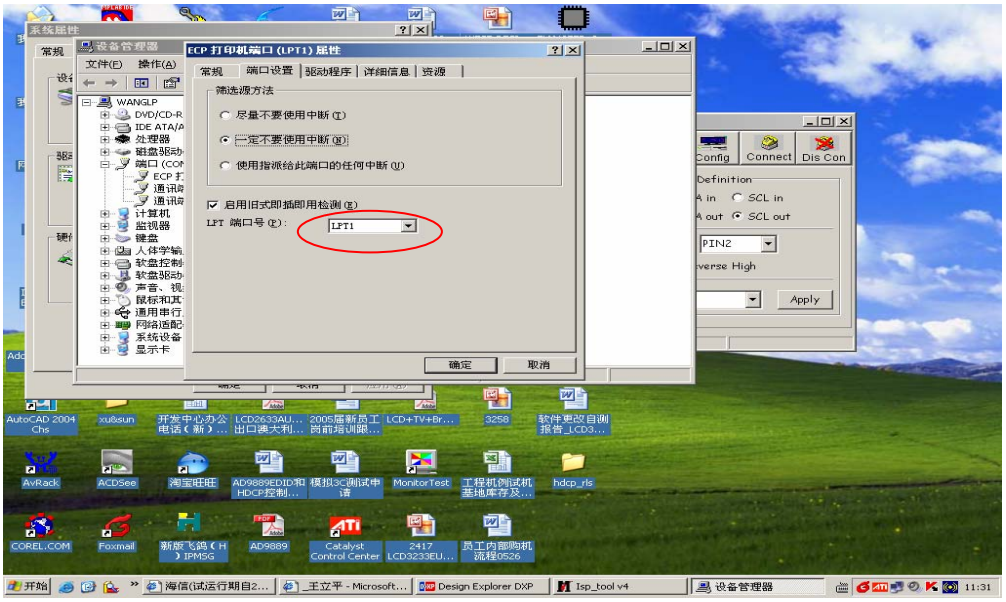
Choose the ECP print port (LPT1）



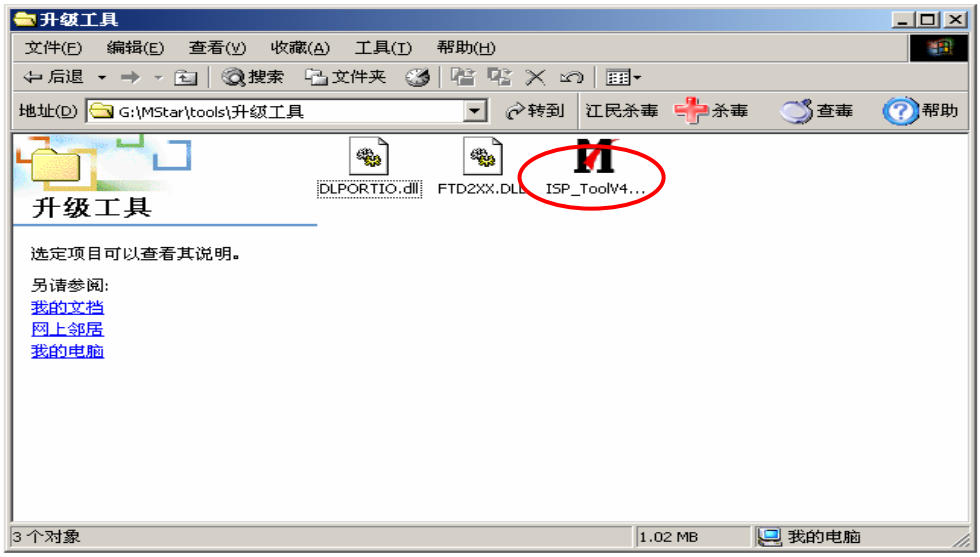
Click the port of print （LPT1）as the following



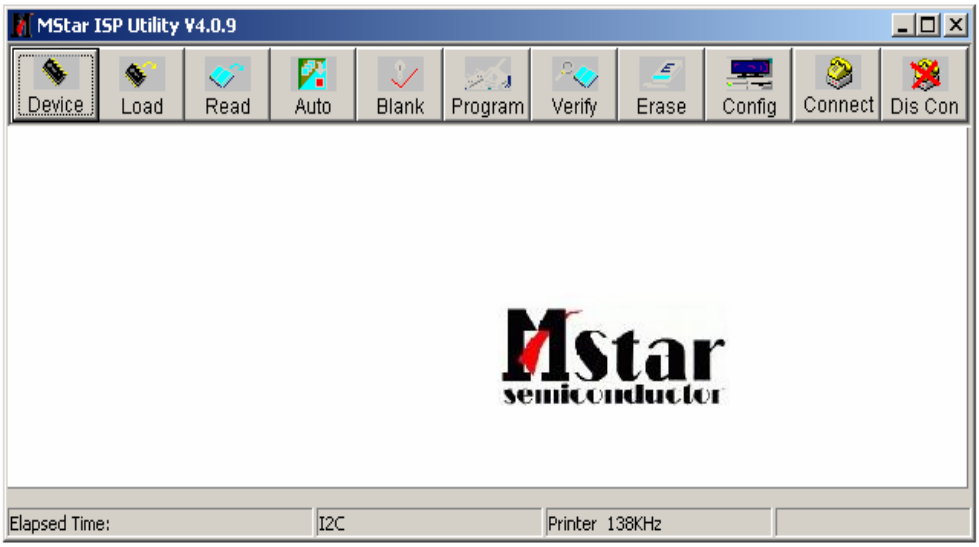
Choose “port setting”option as the following



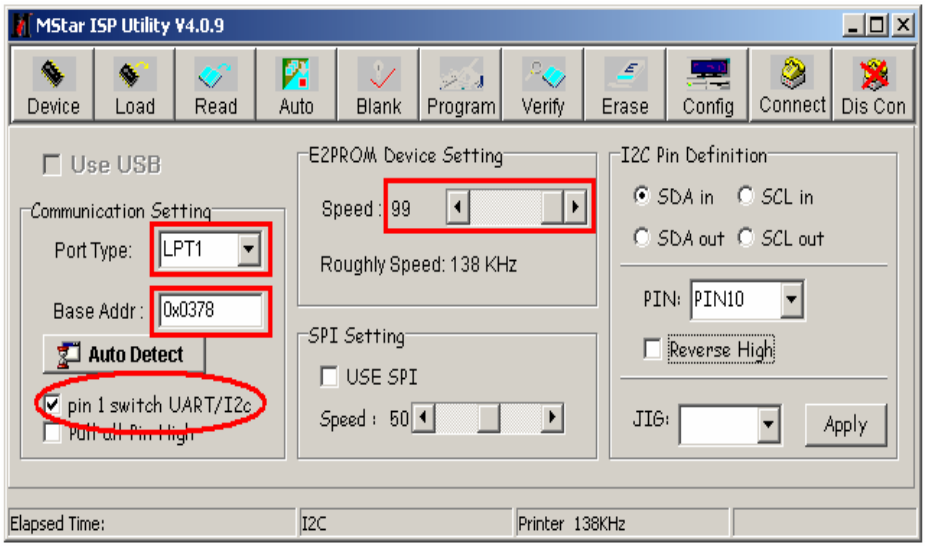
2、 Find the folder where the ISP_TOOL4.0.9 lies in.
There are three folders/files in this folder together.
DLPORTIO.dll and FTD2XX.DLL must be in the same folder



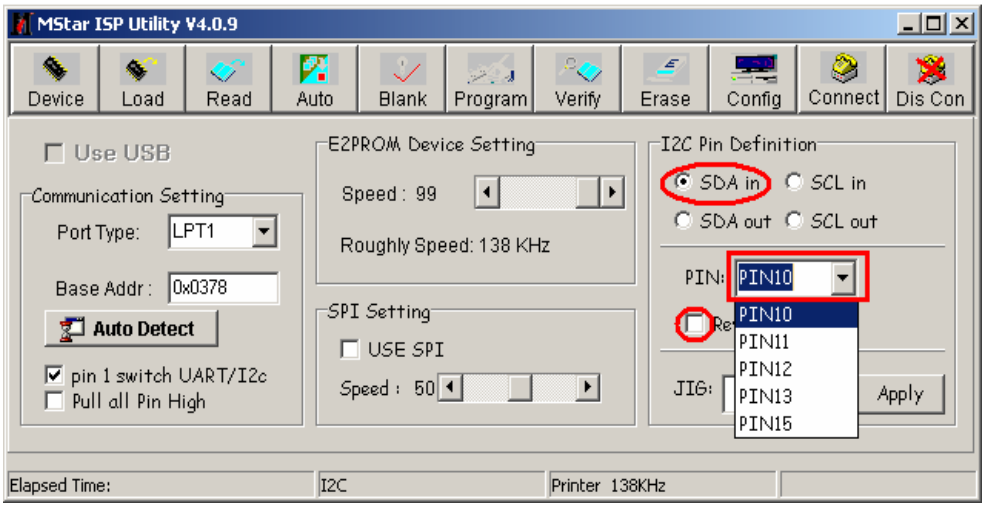
Double click the ISP_TOOL4.0.9 icon, and then a dialog window will show as below.



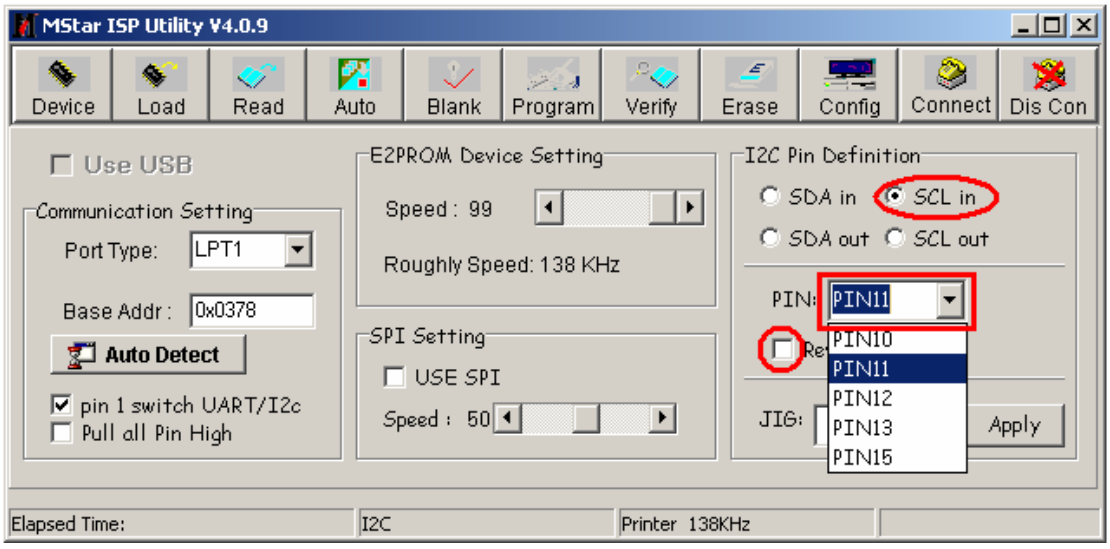
Click the **Config** button. And then a dialog window will show as below.
Port Type setting is LPT1
Base Addr setting is 0x378
Draw ✔ on the front of “pin 1 switch UART/I2c”
Speed setting is 99
As following



Choose“SDA in”and setting “PIN” is “PIN10”。
Notes:
Do not draw ✔ on the front of “Reverse High”。
As following

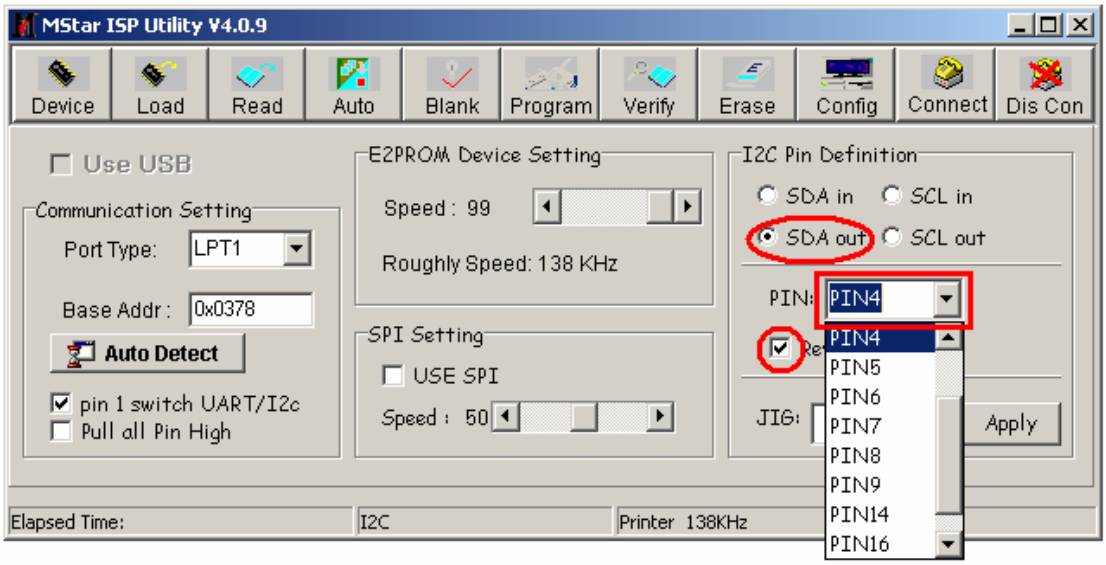


Choose “SCL in”and setting “PIN” is “PIN11”。
Notes:
Do not draw ✔ on the front of “Reverse High”。
As following

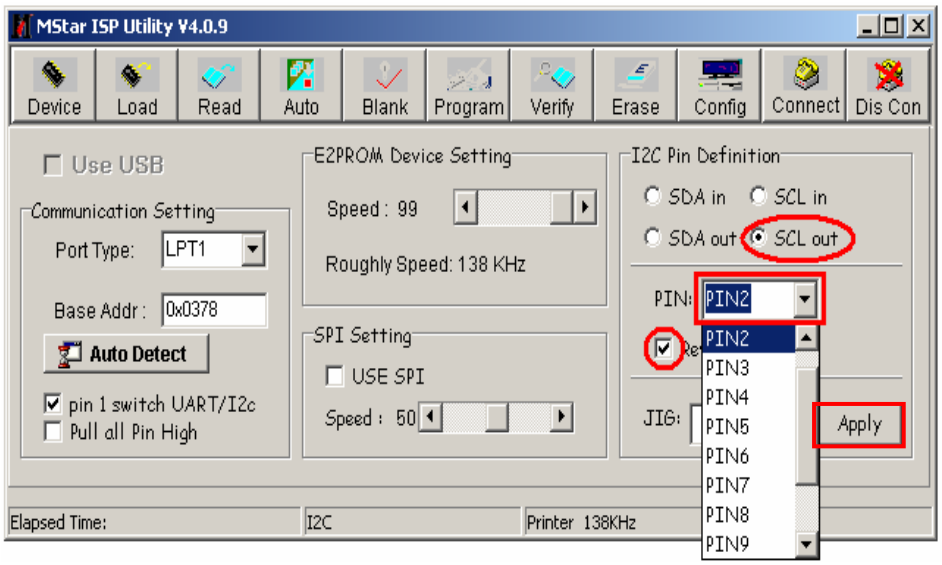


Choose “SDA out”and setting “PIN” is “PIN4”
Notes:

Draw ✔ on the front of “Reverse High”。
As following。



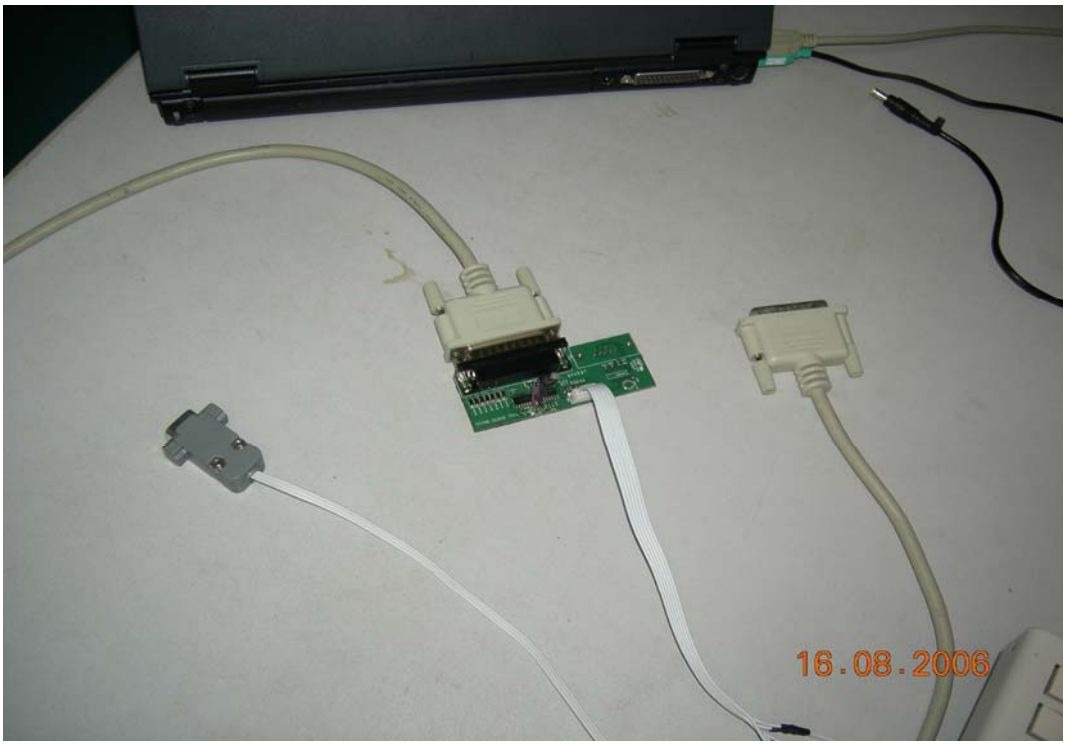
Choose “SCL out”and setting “PIN” is “PIN2”
Notes:
Draw ✔ on the front of “Reverse High”
As following



After having finished all above, clicking the “Apply ”button to complete the configuration。

3.1.2 Hardware connecting

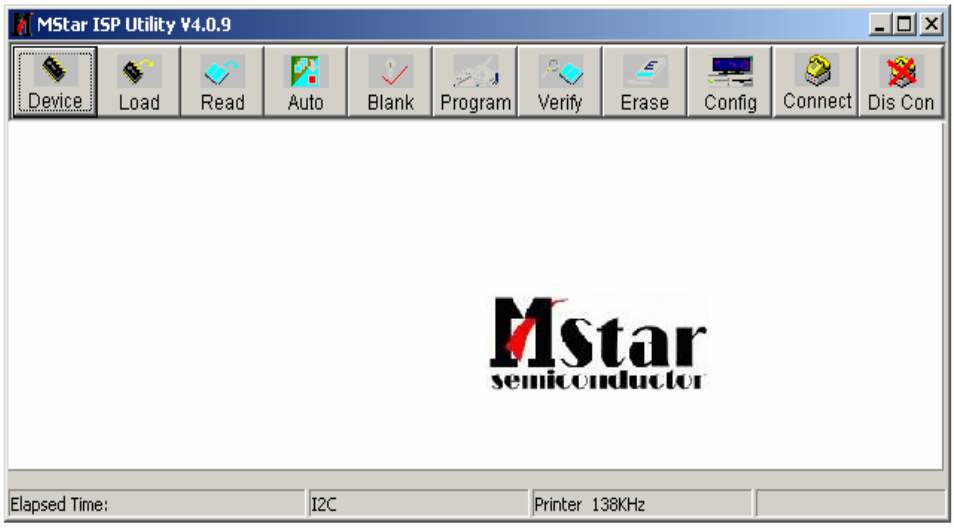
You can update the software through a special tool (as following)



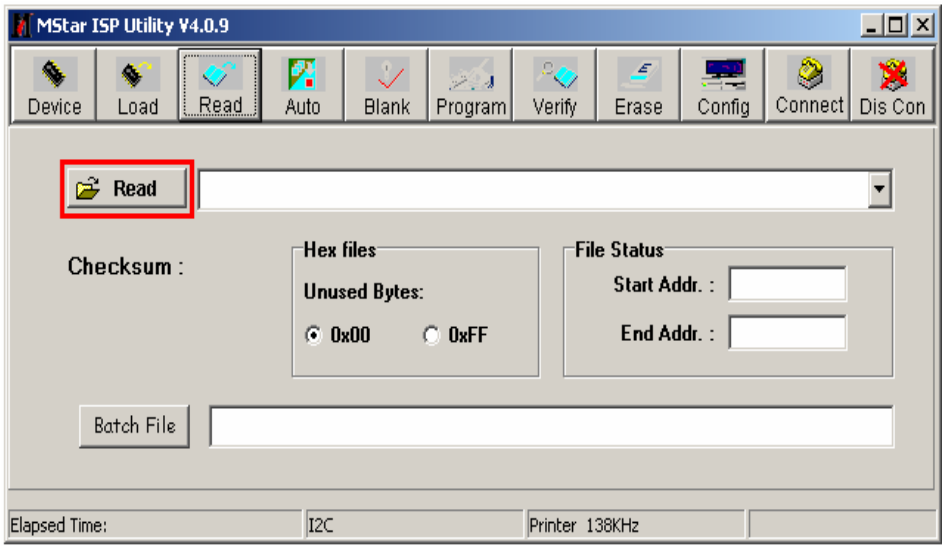
Connect the Debug board to the TV use VGA interface, the other parallel port to the computer, just as the following。

3.2 Upgrading with the ISP_TOOL4.0.9

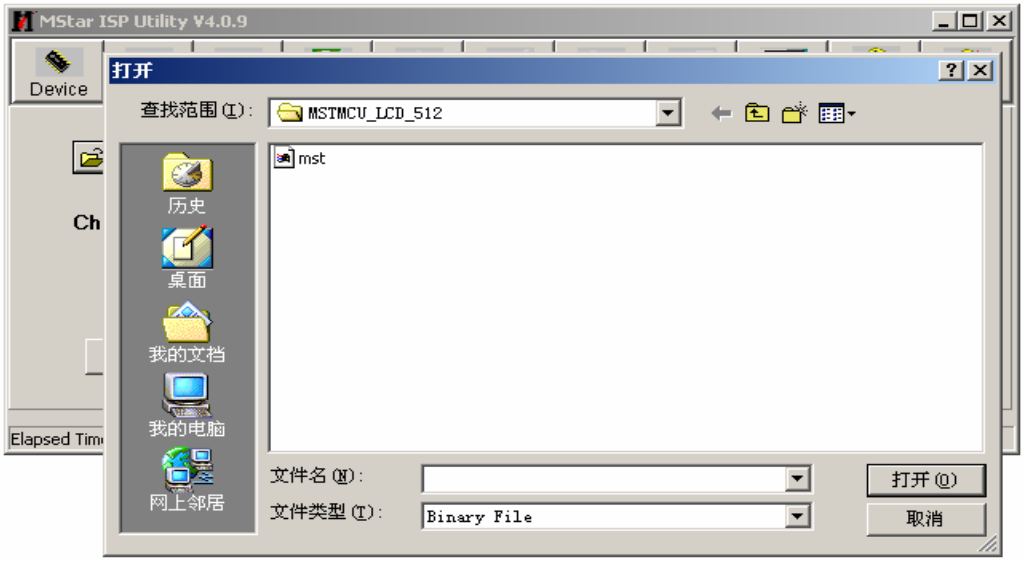
3.2.1 Double click the ISP_TOOL4.0.9 icon and a dialog window will show as following。

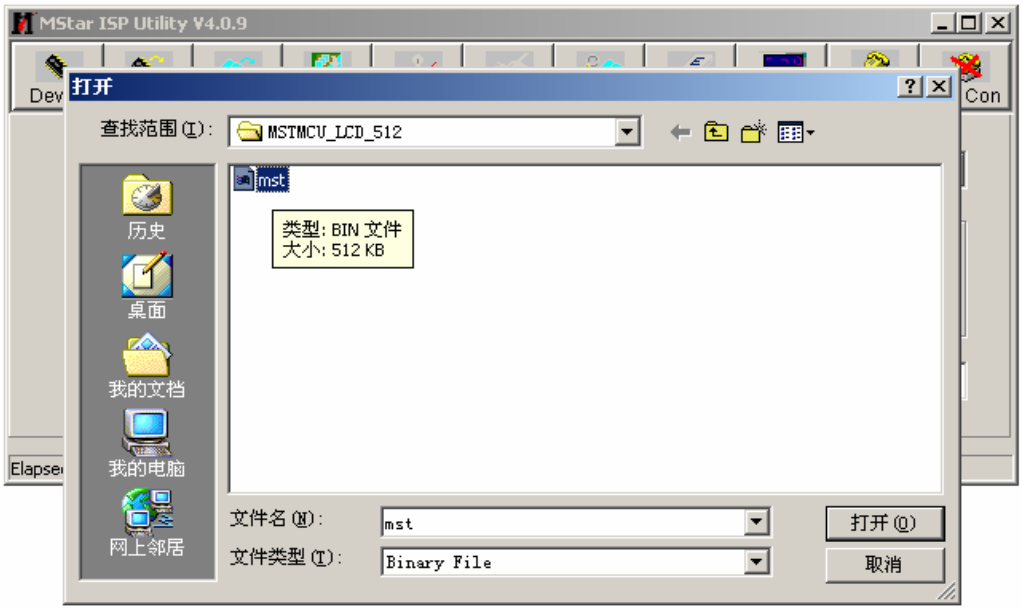


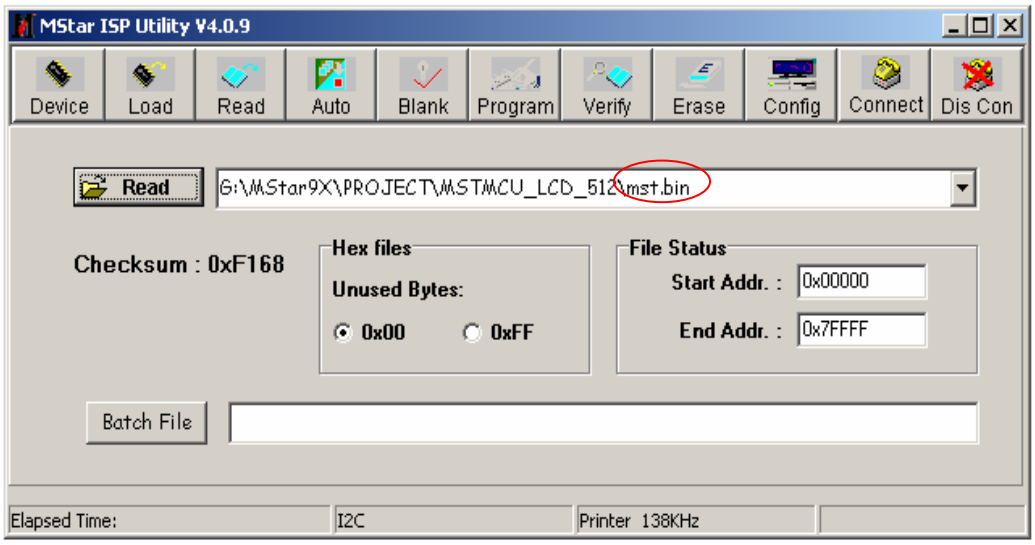
Click the“Read ”button。



Choose the update file from the folder。

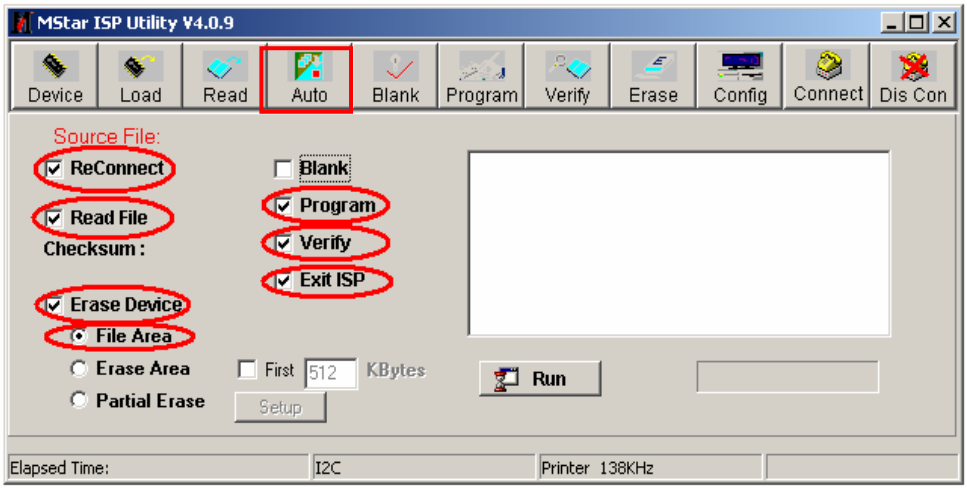




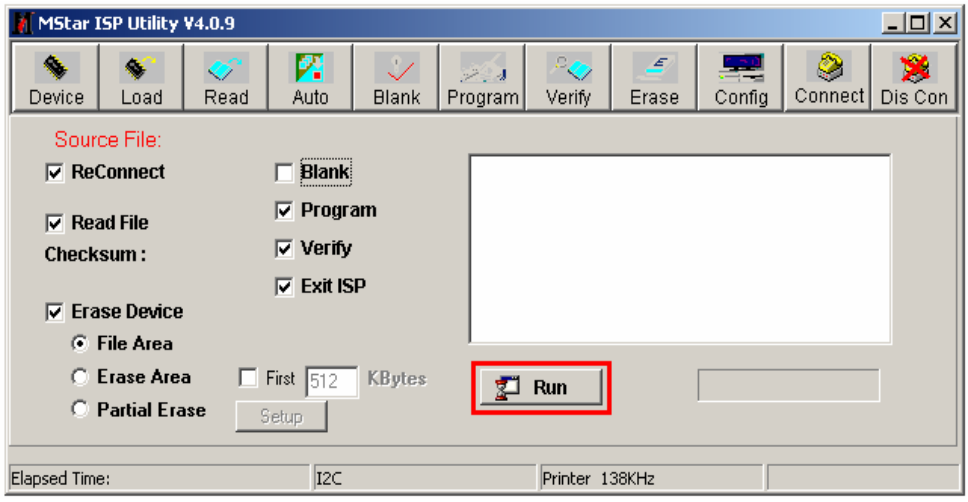


The update file has been chosen successfully。

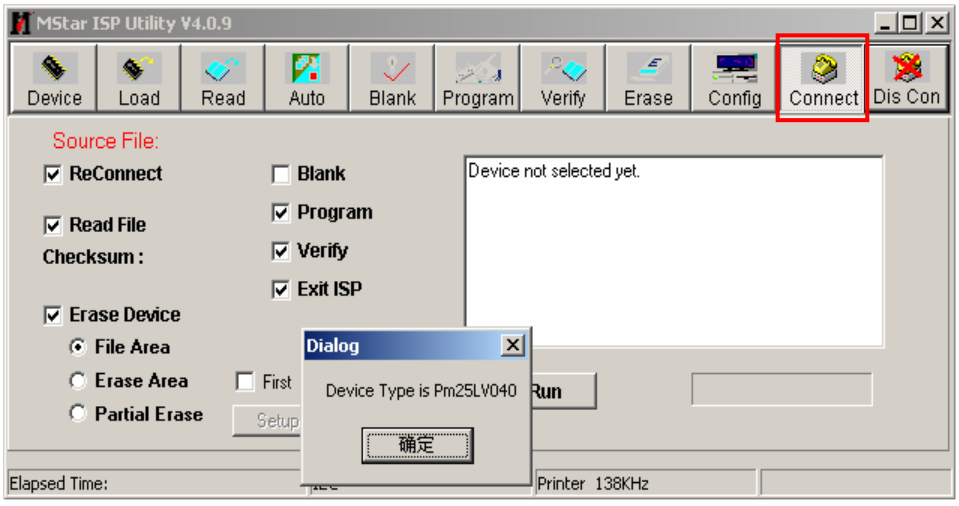
Click the“Auto”button and choose parameters as following。

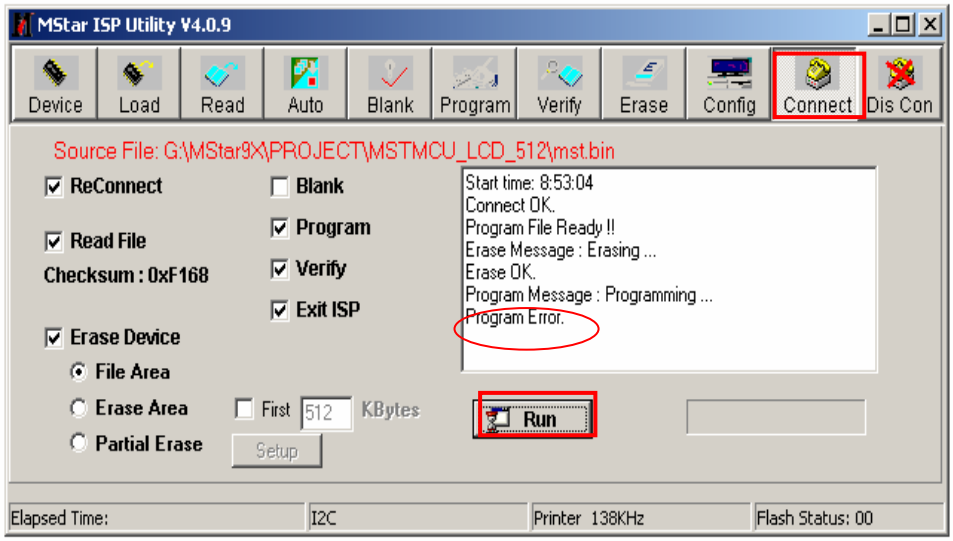


Click the“Run”button

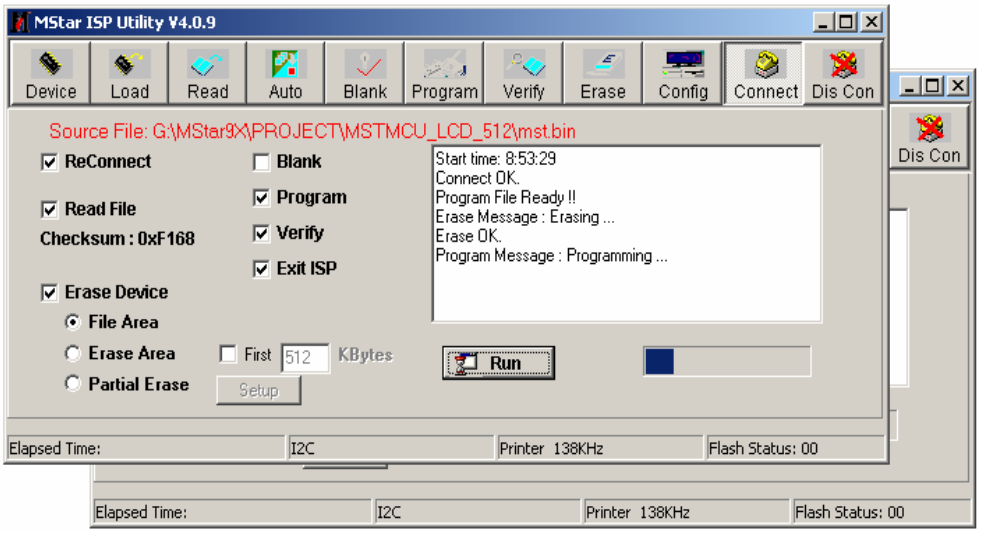


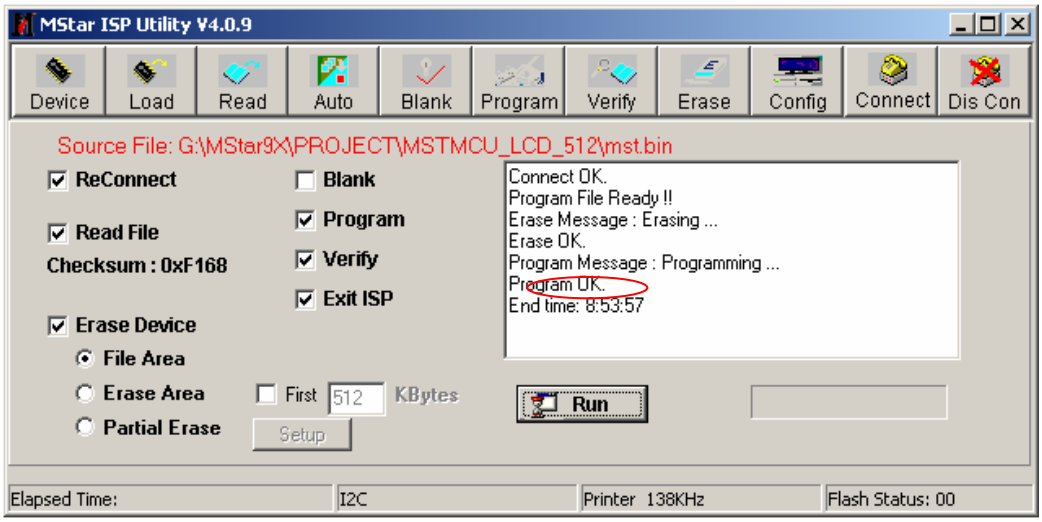
Click the“connect”button,then show a dialog box as following。





If show above then click the“Run”button again and again，till show the following dialog window。





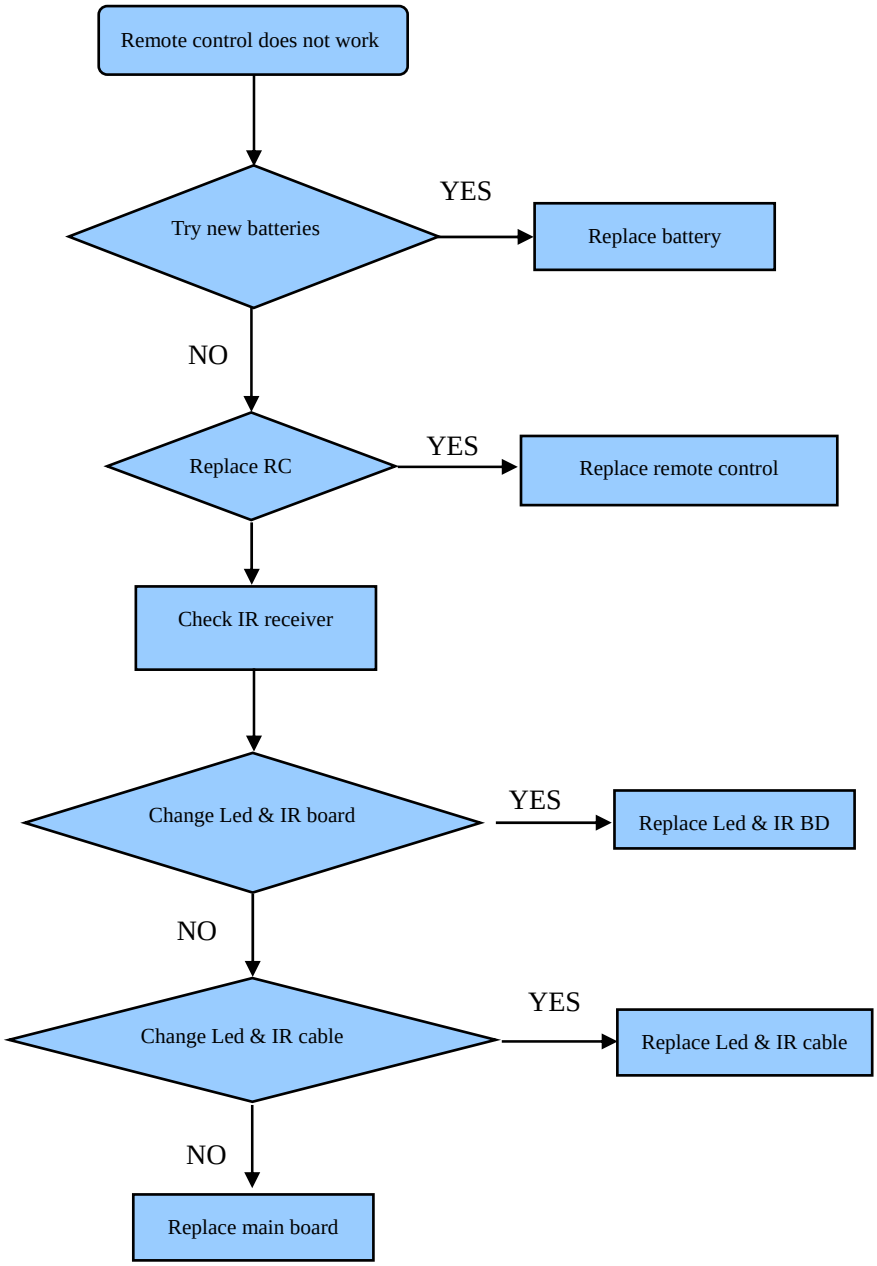
The above appears on the screen-the word “program ok”shows in the information displaying window,indicating upgrading is over。

3.2.2 After the update is over. Must Confirm the software Version in the Version Menu. If the update is successful, enter Factory Init Menu and select “Clear Unprotectly”

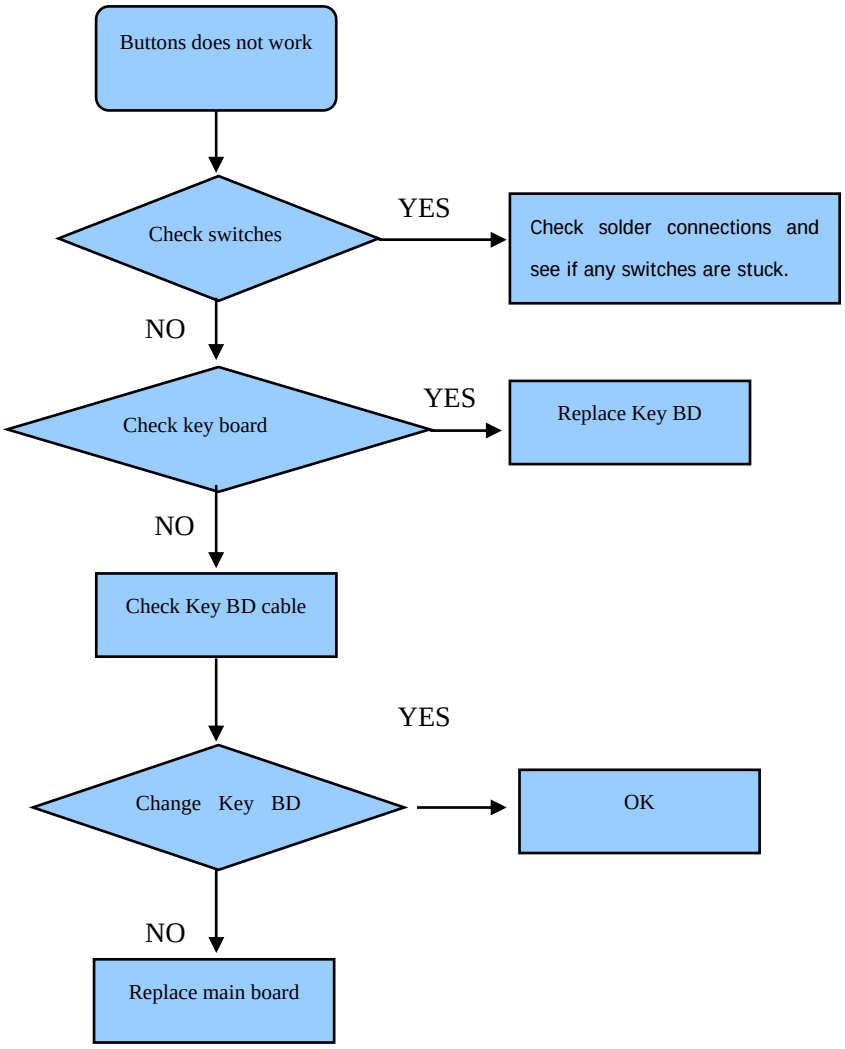
a. Press VOL+ button to clear the EEPROM data.
b. When the “Clear Unprotectly ” button becomes white, turn off the power.
c. Restart the TV.

4. Troubleshooting

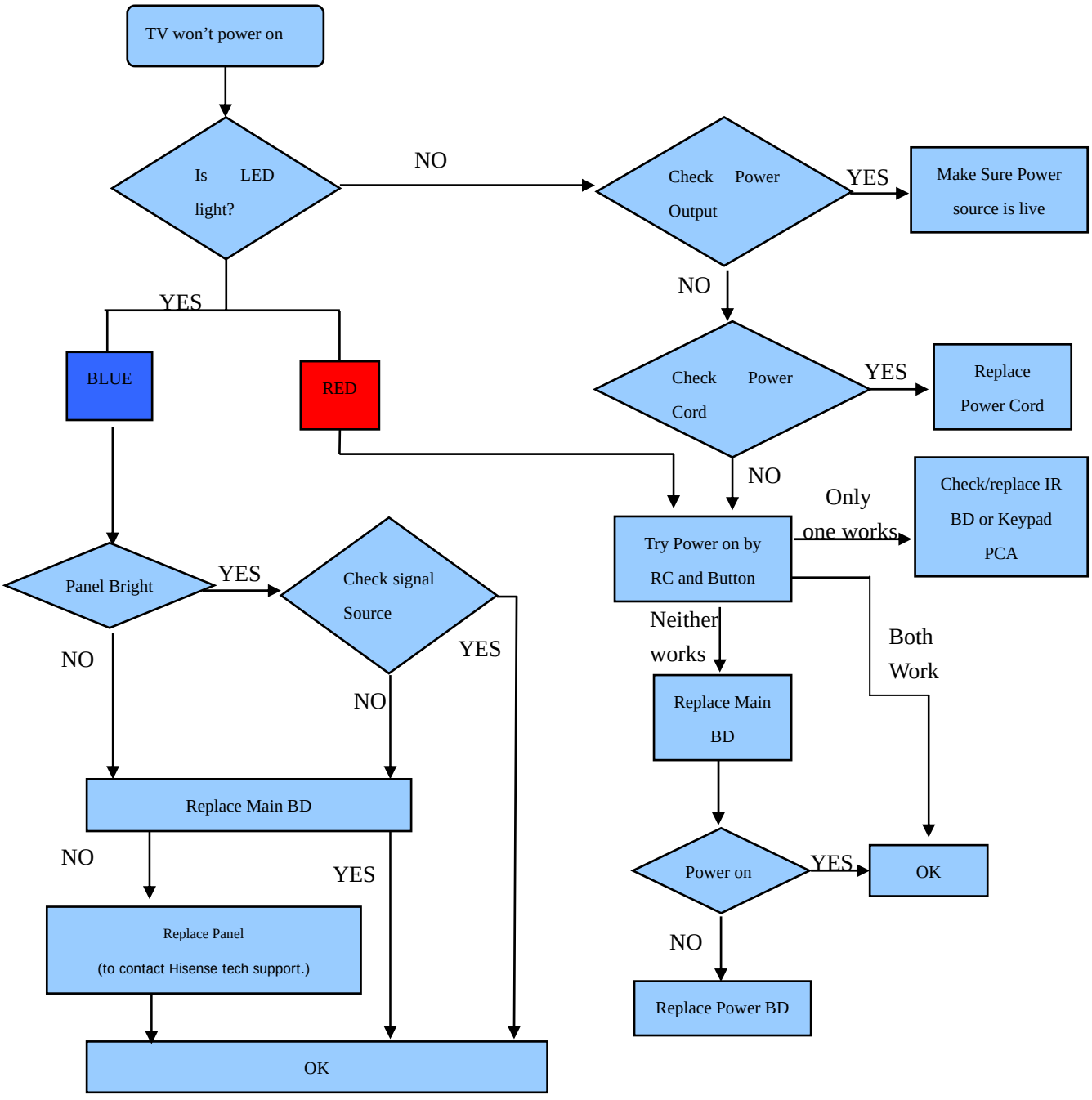
4.1 Troubleshooting for Remote Control



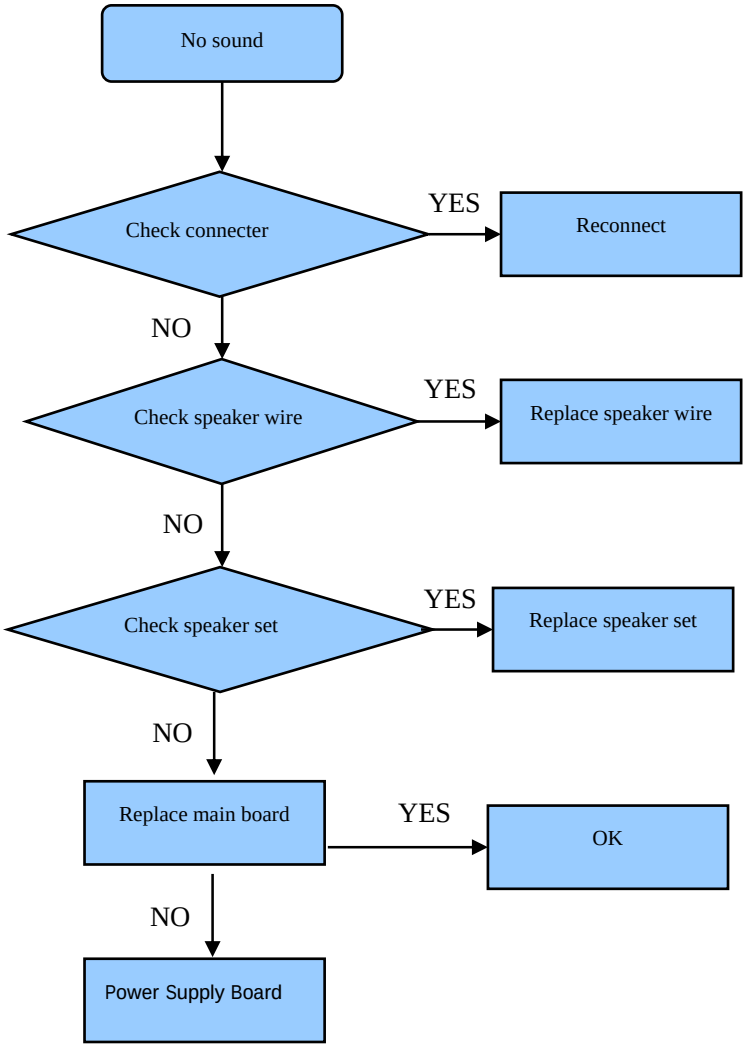
4.2 Troubleshooting for Function Key



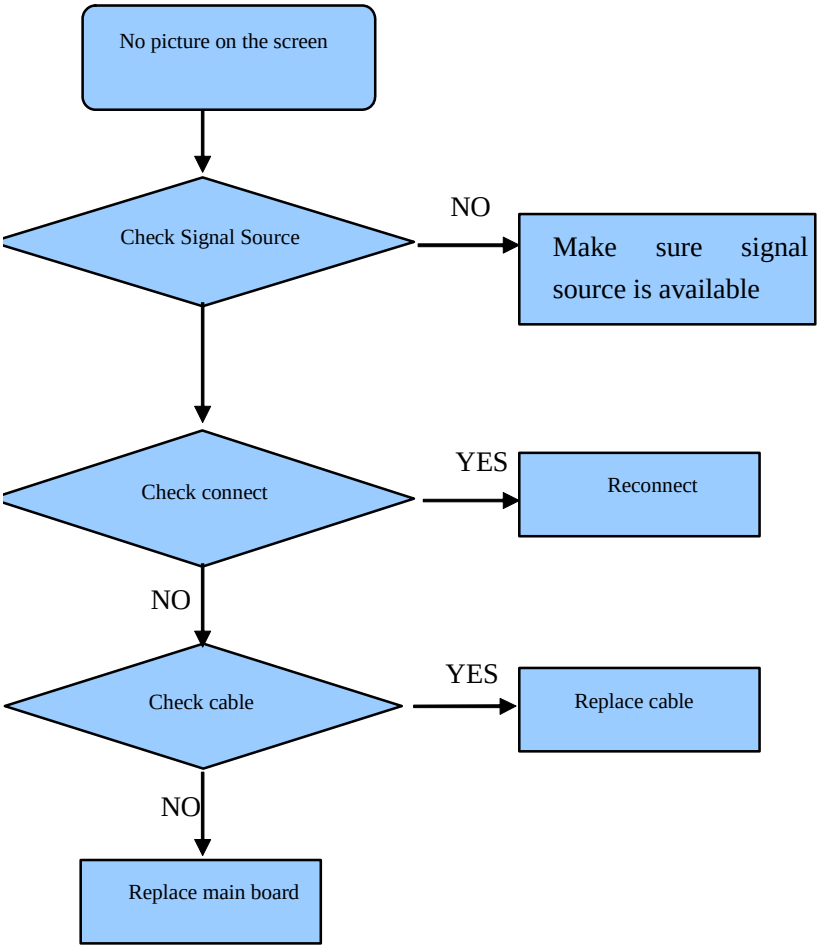
4.3 TV won’t Power On



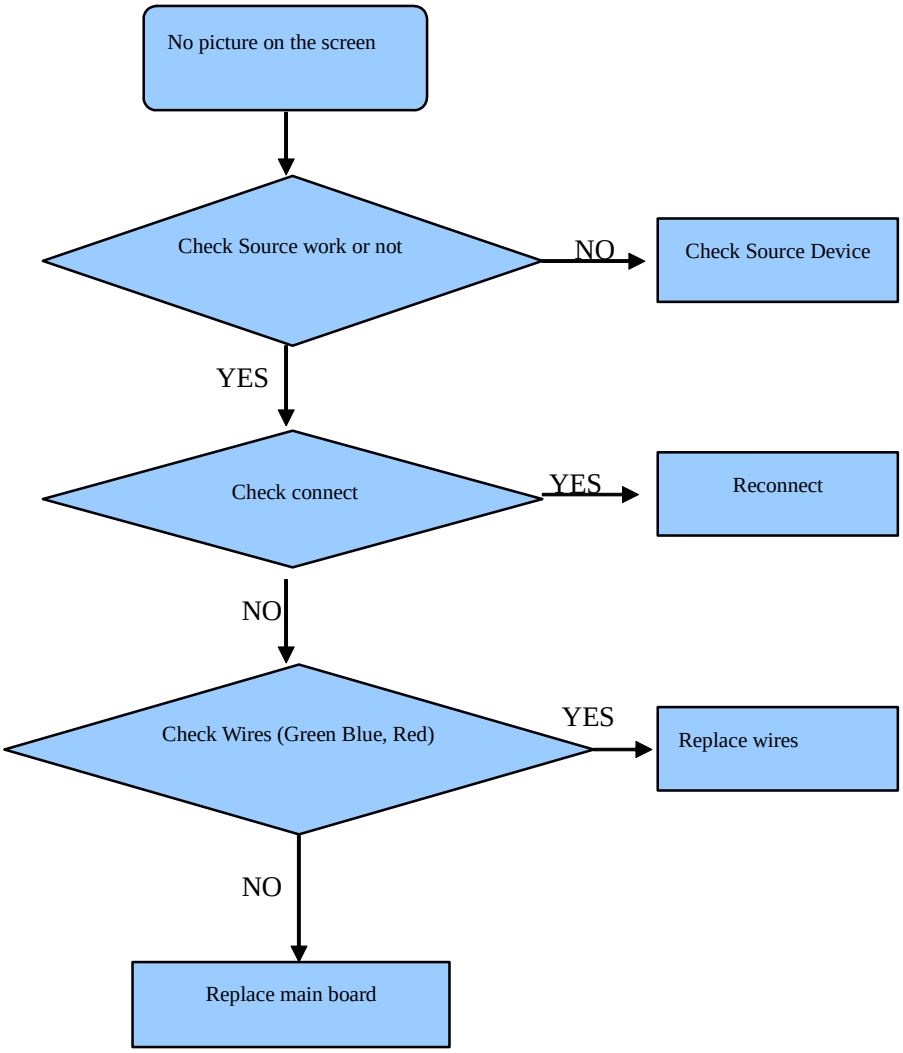
4.4 Troubleshooting for Audio



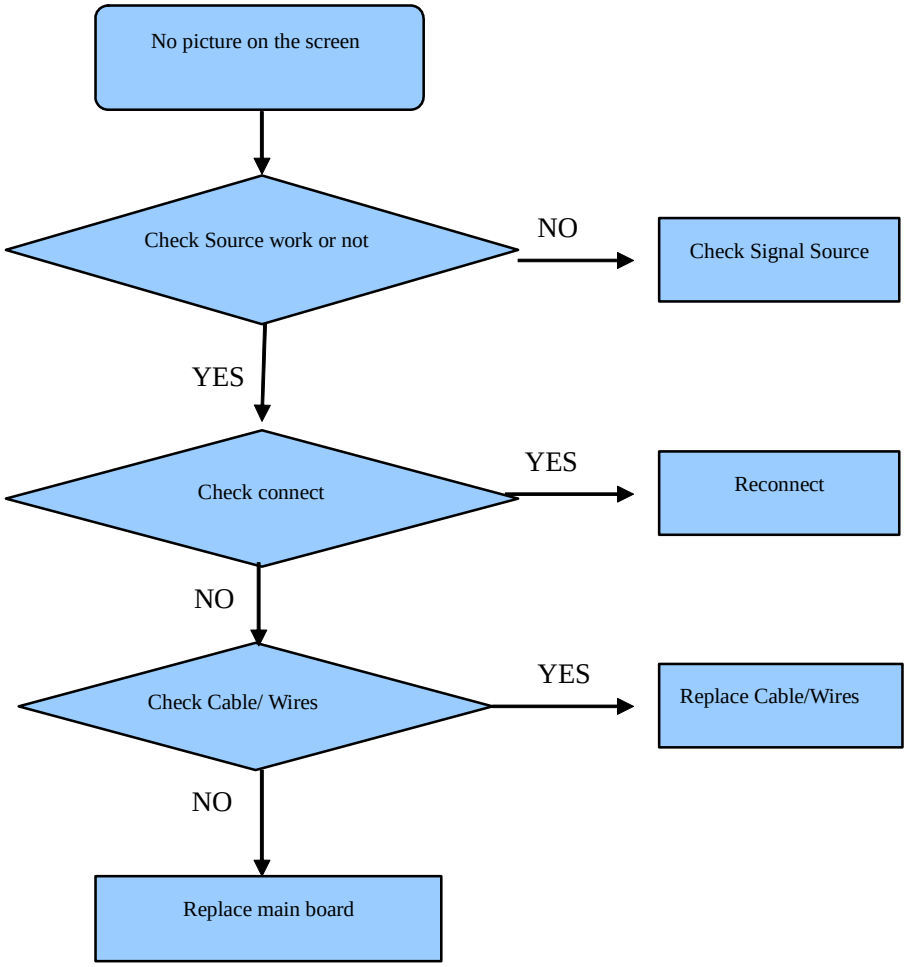
4.5 Troubleshooting for TV/VGA/HDMI input



4.6 Troubleshooting for YPbPr input

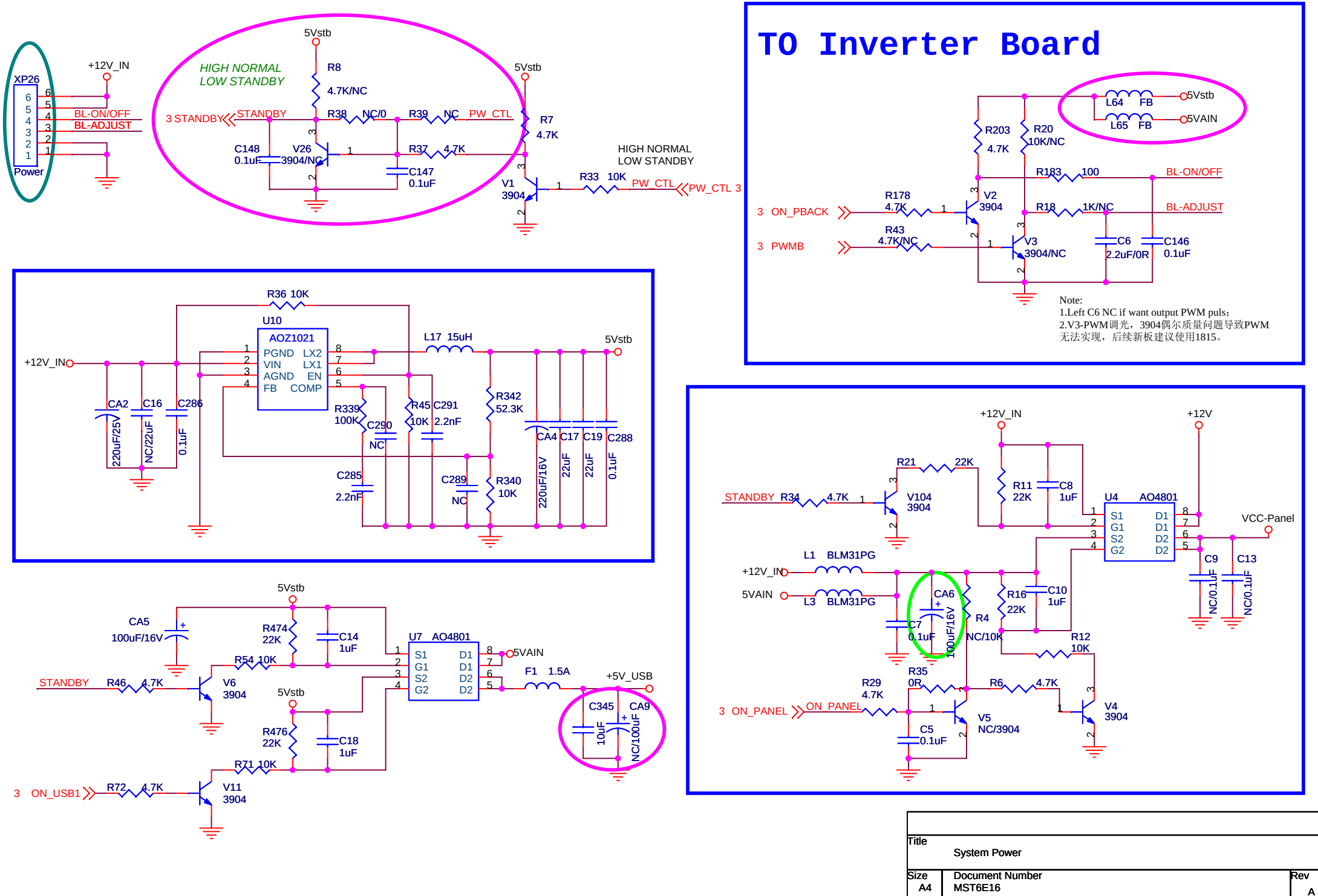


4.7 Troubleshooting for Video/S-Video input



5. Explode View

6. Schematic circuit diagram



Title	System Power	
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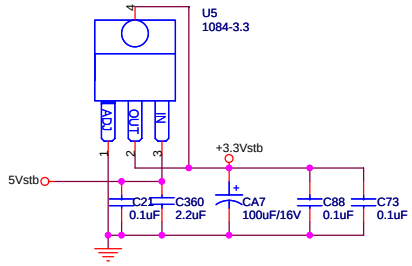
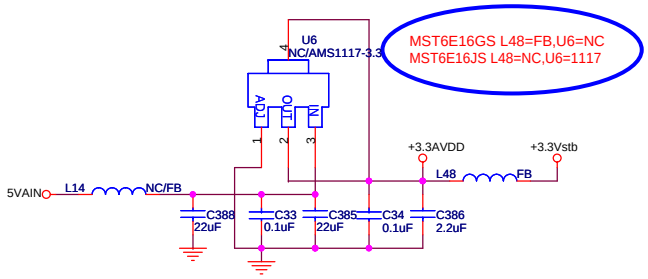
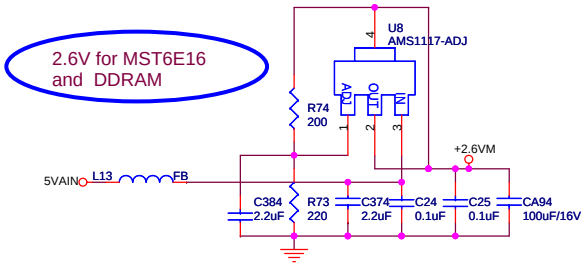
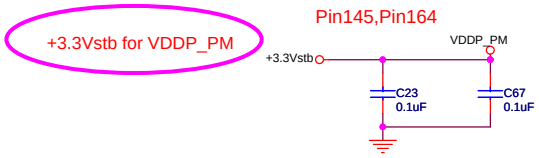
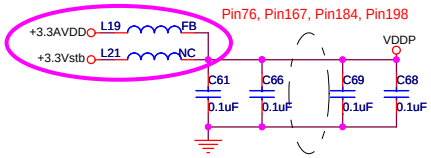


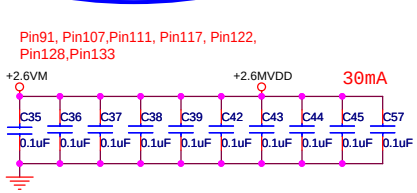


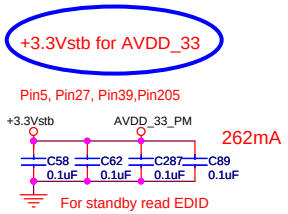


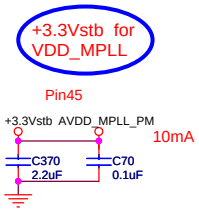
FOR use DDR,+2.6VM must be 2.6V

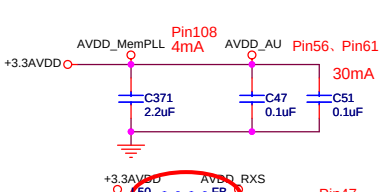


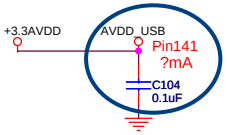


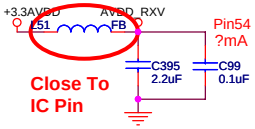




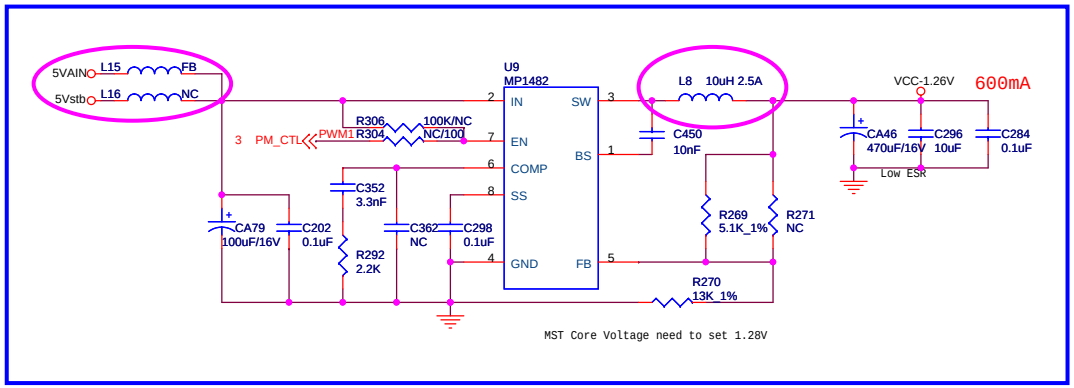


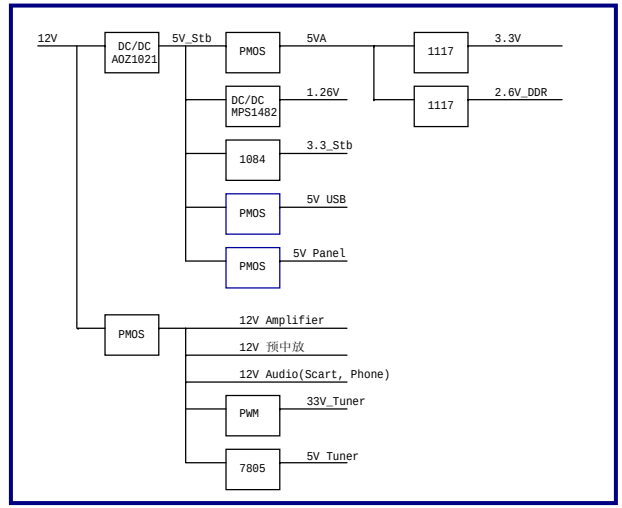


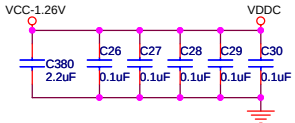




Vcc 1.26V for MST6E16 Core power







1.32V>VDDC>1.26V,最好在IC PIN脚有1.26V以上

Pin78, Pin89, Pin151, Pin171, Pin202

注意：L7电流要大，直流电阻要小，
保证VDDC到MST6E16GS的电压在1.26V

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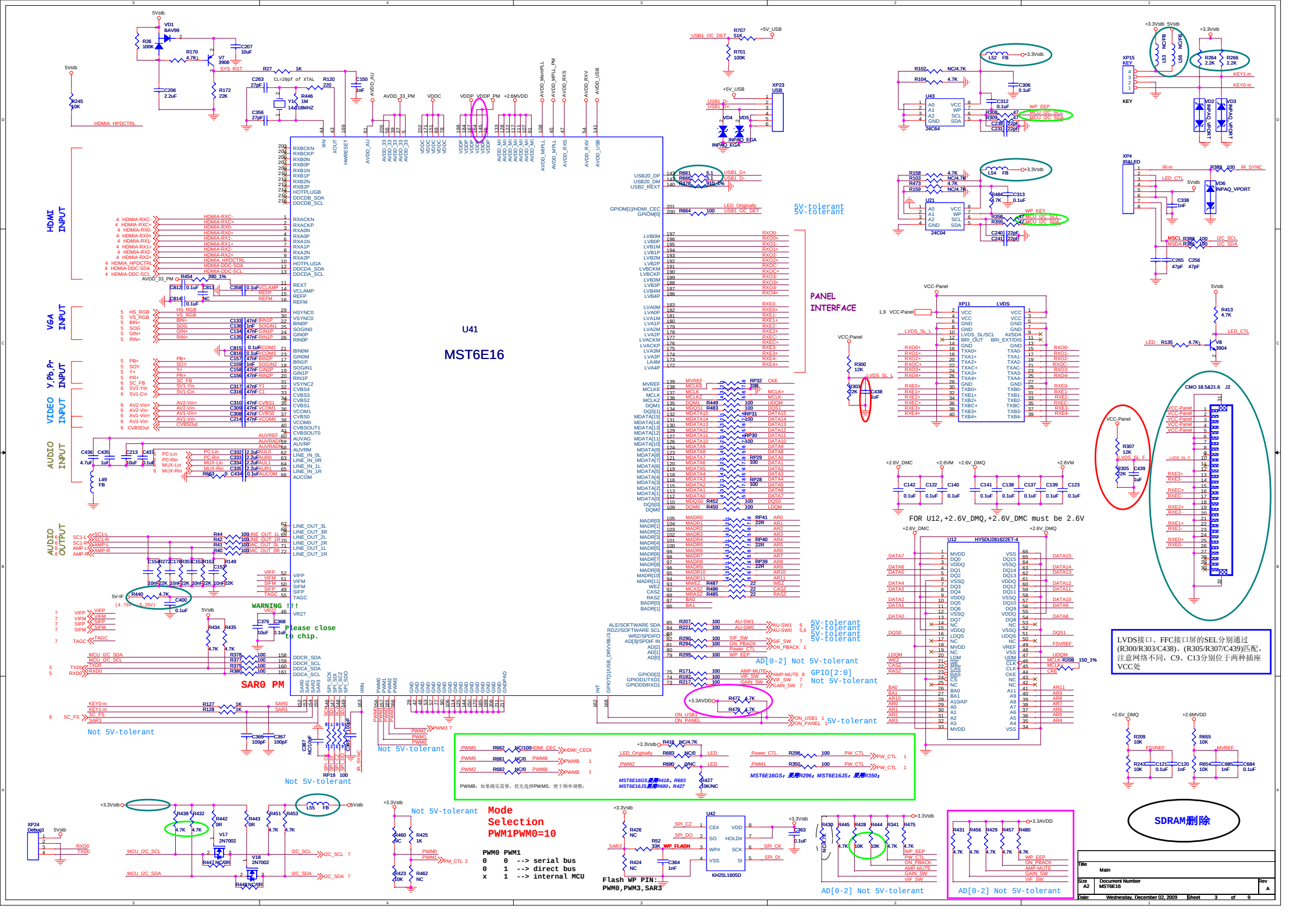
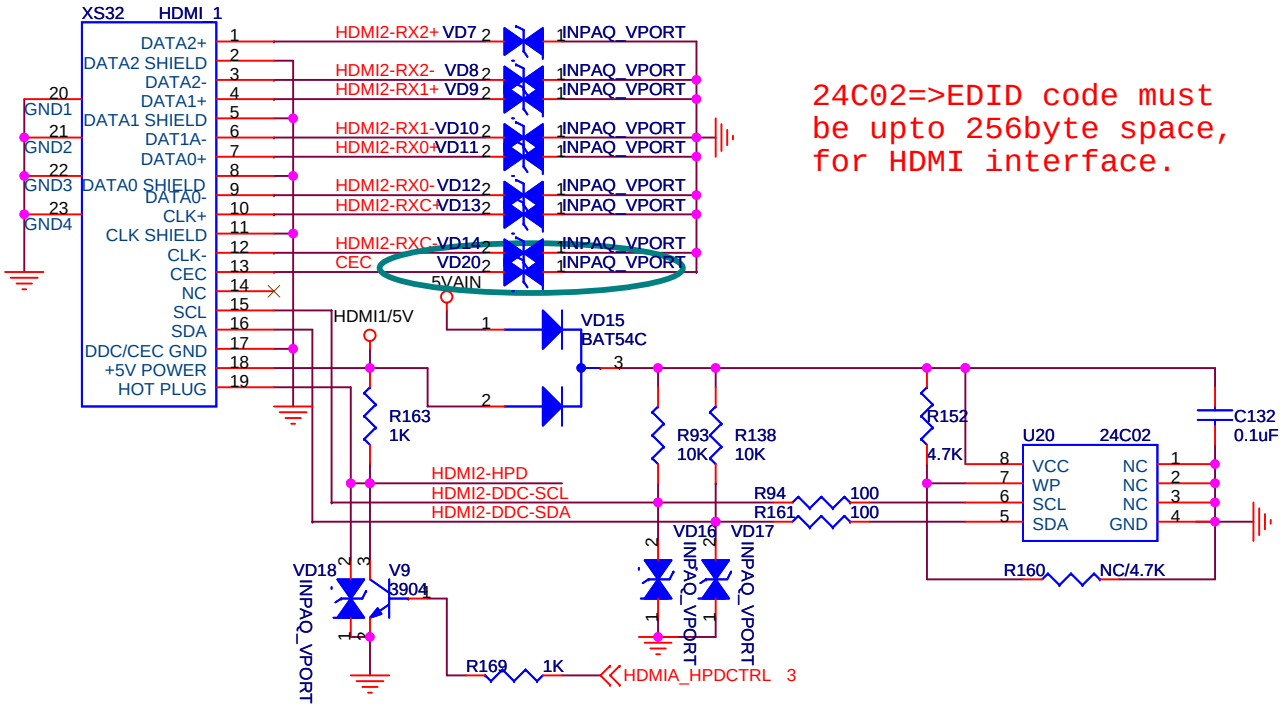
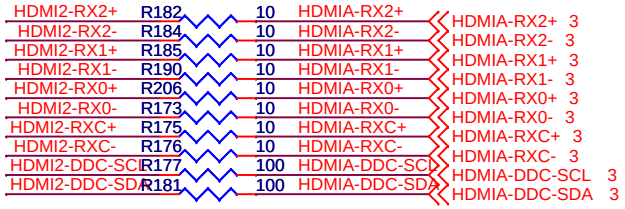
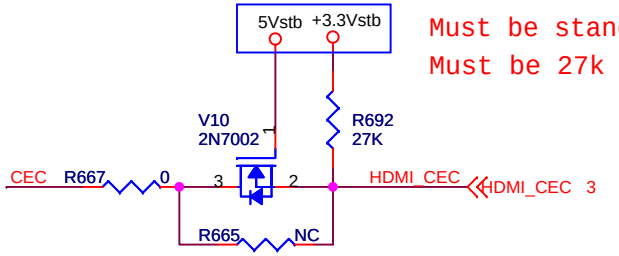

U41
MST6E16
HDMI INPUT
VGA INPUT
Y,Pb,Pr INPUT
VIDEO INPUT
AUDIO INPUT
AUDIO OUTPUT
PANEL INTERFACE
SAR0 PM
WARNING !!!
Please close to chip.
Not 5V-tolerant
5V-tolerant
AD[0-2] Not 5V-tolerant
GPIO[2:0] Not 5V-tolerant
FOR U12,+2.6V_DMQ,+2.6V_DMC must be 2.6V
LVDS接口、FFC接口屏的SEL分别通过(R300/R303/C438)、(R305/R307/C439)匹配，注意网络不同，C9、C13分别位于两种插座VCC处
SDRAM删除
Mode Selection
PWM1PWM0=10
PWM0 PWM1
0 0 --> serial bus
0 1 --> direct bus
x 1 --> internal MCU
Flash WP PIN:
PWM0,PWM3,SAR3
PWMB: 如果确实需要，优先选择PWM0，便于频率调整;
MST6E16GS,采用R418、R683
MST6E16JS,采用R680、R427
MST6E16GS，采用R296；MST6E16JS，采用R350;
Title Main
Size A2 Document Number MST6E16 Rev A
Date: Wednesday, December 02, 2009 Sheet 3 of 9



24C02=>EDID code must be upto 256byte space, for HDMI interface.



For CEC Leakage Protect



Must be standby power
Must be 27k

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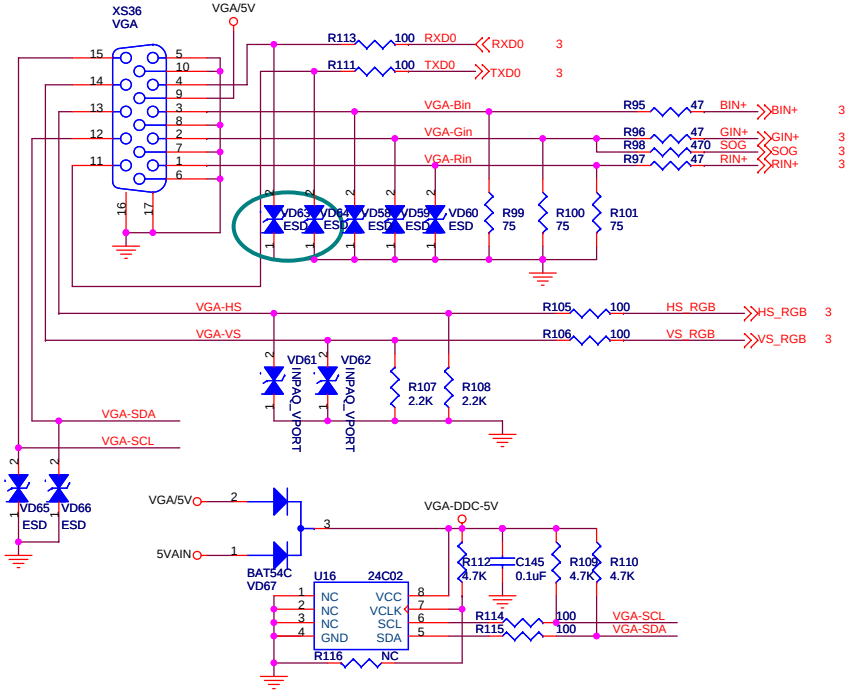
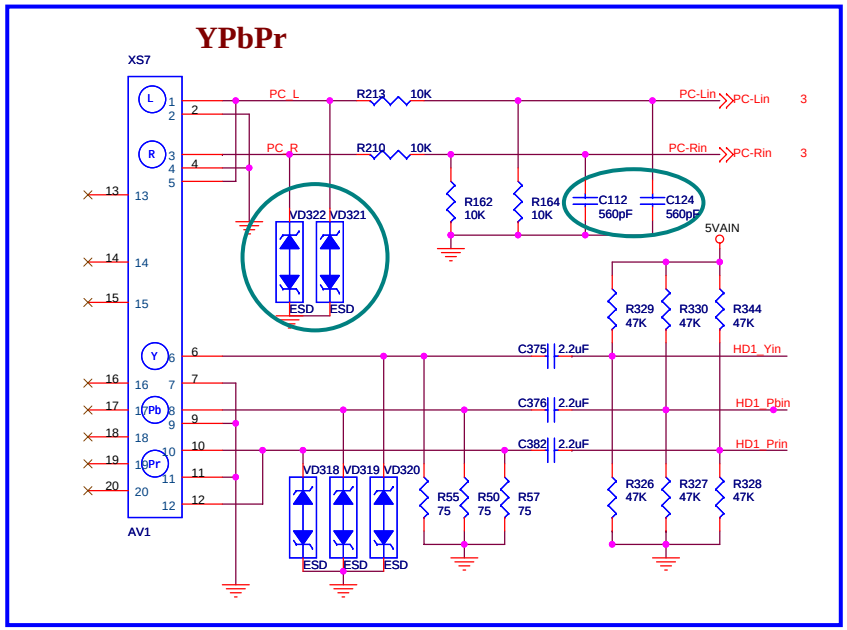
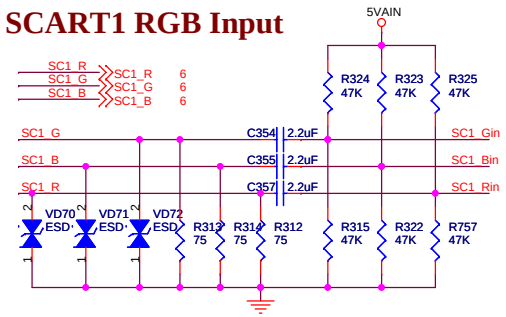
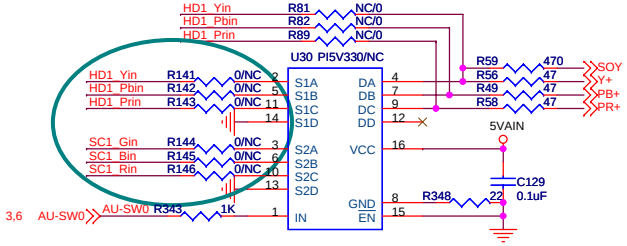
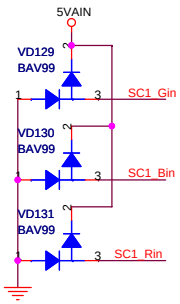
Title: HDMI		
Size: A4	Document Number: MST6E16	Rev: A
Date: Saturday, April 25, 2009	Sheet 4 of 9	

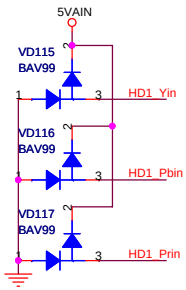












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Title: VGA&Component		
Size: A3	Document Number: MST6E16	Rev: A
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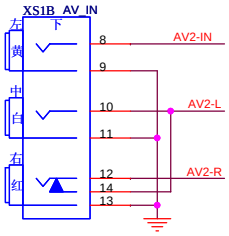
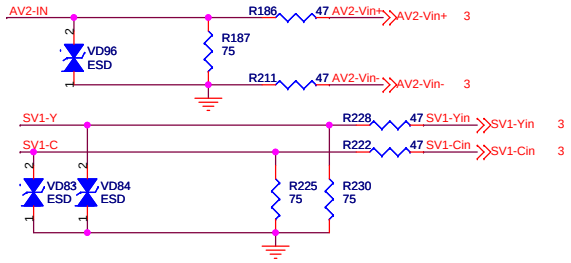
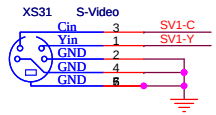
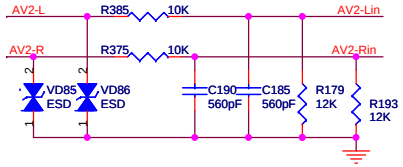
AV2 Input

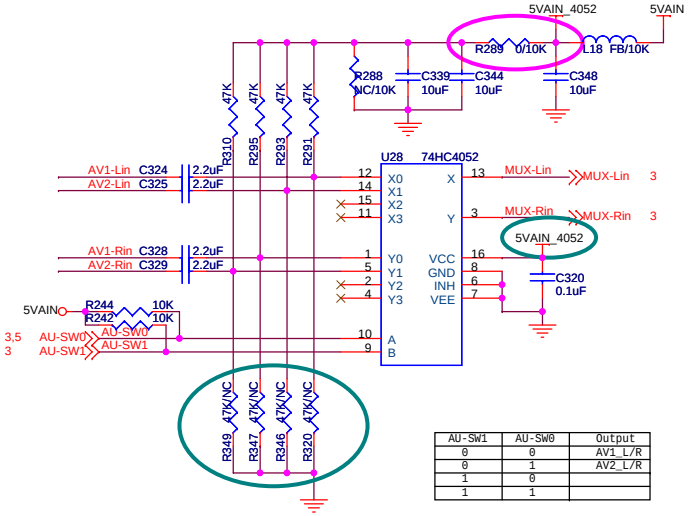




S-Video Input

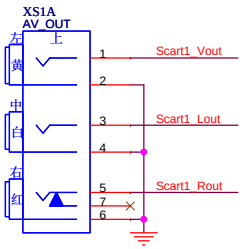




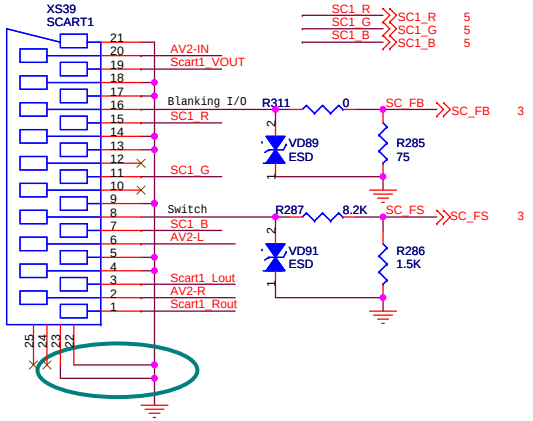


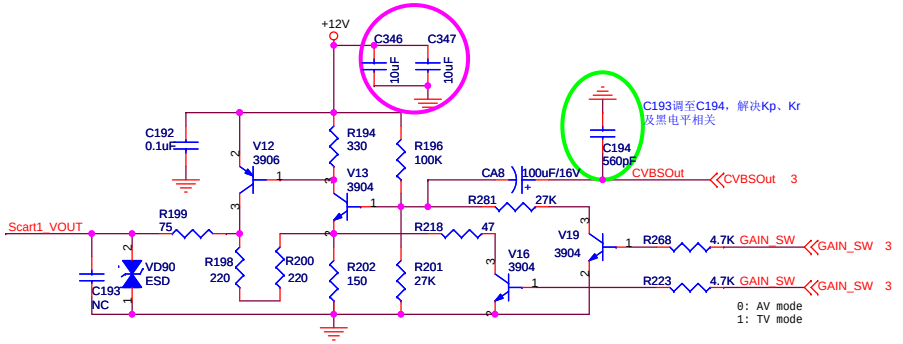
AU-SW1	AU-SW0	Output
0	0	AV1_L/R
0	1	AV2_L/R
1	0	
1	1	

AV Output

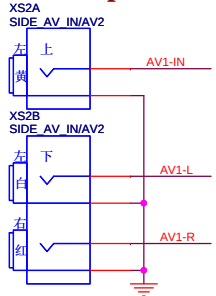


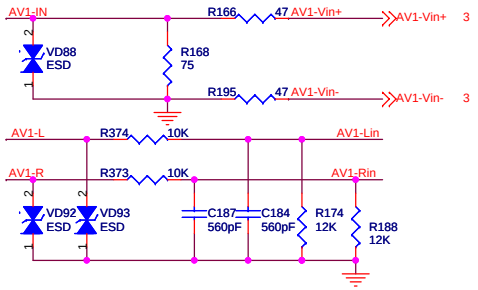
SCART1 Input

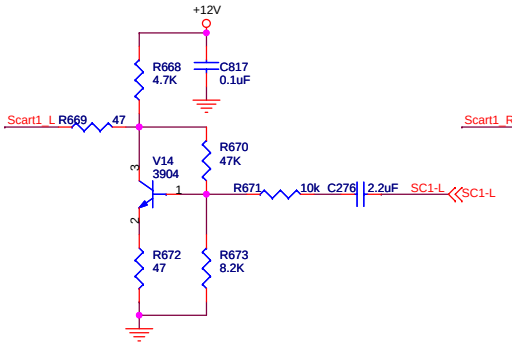


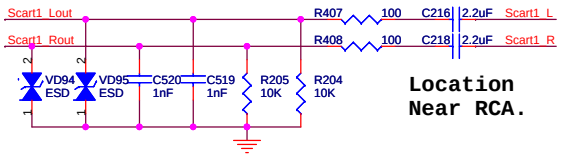


AV1 Input









Location Near RCA.

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Title	Video input	
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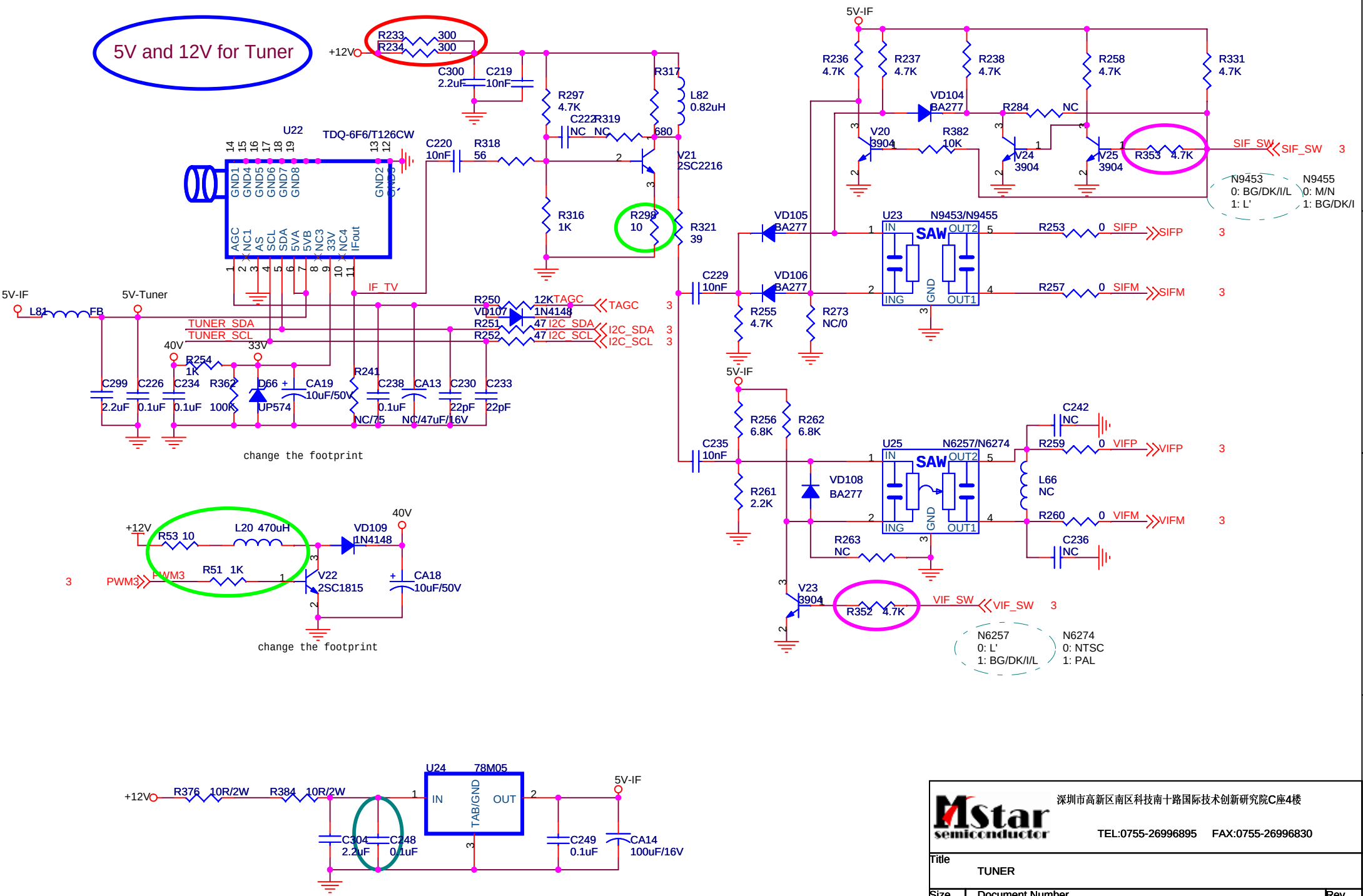

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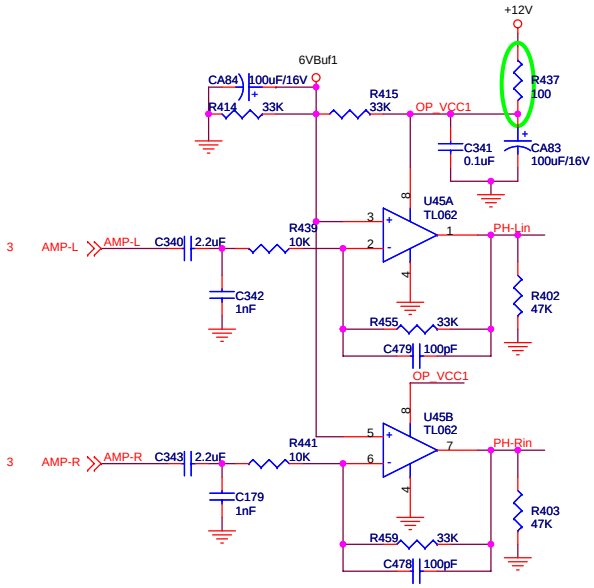
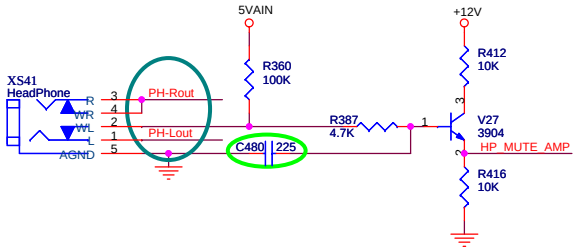
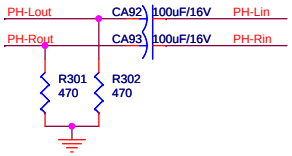
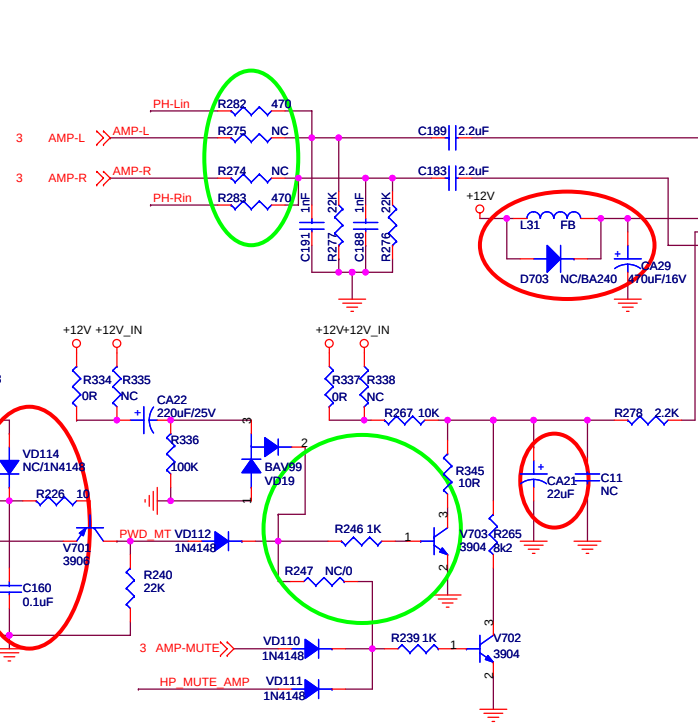
Title: TUNER		
Size: A4	Document Number: MST6E16	Rev: A
Date: Tuesday, May 05, 2009	Sheet 7 of 9	

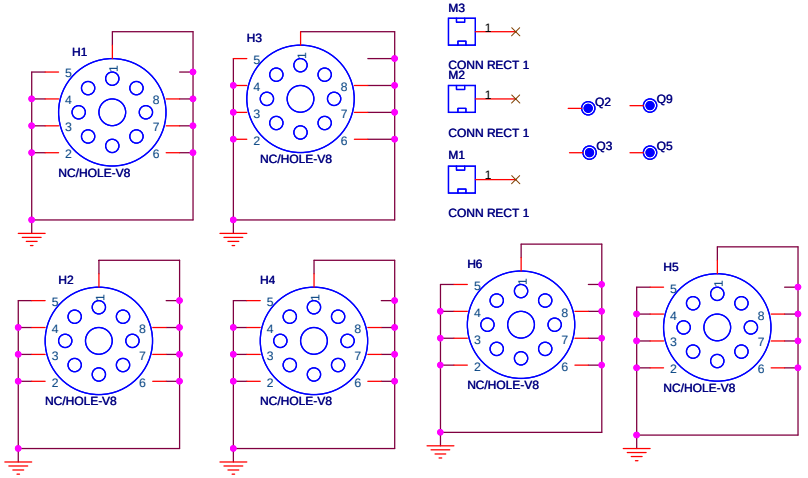
TPA1517(可兼容TDA1517P,10、11NC即可)

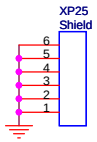












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Title	Amplifier	
Size A3	Document Number MST6E16	Rev A
Date: Monday, April 27, 2009	Sheet 8 of 9	

Version A:在LCD22W57DEU_ZB_1701_C的基础上更改。

Page1
1、STANDBY部分待机低功耗IC电路，注意采用原芯片增加R37、R38 0R；
2、BL_ON/OFF、BL_ADJUST上拉电压预留；
3、USB滤波电容位置预留；
Page2
1、DCDC部分待机低功耗IC电路，L8物料更换（成本），注意采用原芯片增加L16、更换L8；
2、VDDP、VDDP_PM调整，注意涉及电容排布，建议丝印依照原理图；
Page3
1、LED、PWMB、HDMI_CEC等网络调整，注意采用原芯片增加R683；
2、ON_USB1、ON_PANEL上拉增加；
3、PW_CTL调整，注意IC差异；
4、部分GPIO上拉电压更改，参照紫红标注部分；
Page6
1、4052 VCC电路优化，兼容原板增加R289 0R；
2、CVBSout VCC滤波电容，增加C346、C347；
Page4-6
压敏电阻封装更改为0402，注意兼容原板定额更改；
Page7
增加R352、R353，注意兼容原板定额更改。

Version B:在MST6E16JS_ZB_1861_A的基础上更改。

Page1
1、CA6位置调整，避免部分屏掉电残影等问题；
Page2
1、删除L19、L21；//改板方便，不再更改；
Page3
1、删除R456、R480；//改板方便，不再更改；
2、调整LED网络，删除R684,增加R427；
3、PCB增加主芯片散热焊盘；
Page6
1、增加C194；

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