LED Television
Service Manual

Chassis： **MT9603**

Version: V 1.0

Hisense Visual Technology Co.，Ltd.

REVISION HISTORY			
Version	Revise content	Reviser	Date
V1.00	First issued	Zhangxue	2023-10-16

Contents

Service Manual

1. Precautions and notices

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

USE ONLY MANUFACTURER SPECIFIED REPLACEMENT PARTS WHEN SERVICING.

USE OF NON-AUTHORIZED PARTS WILL VOID THE MANUFACTURE'S WARRANTY

Proper service and repair is important to the safe, reliable operation of all Hisense 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 and pose risk of personal injury

. It is also important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Service should only be performed by an experienced electronics

techician trained in the proper Television safety and service methods and procedures Hereafter throughout this manual.

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 non-manufacturer's recommended parts may create shock, fire, or other hazards. Under no circumstances should the original design be modified or altered without written permission from RCA. Hisense Eassumes no liability, express or implied, arising out of any unauthorized modification of design. Servicetech assumes all liability.

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, be sure to use anti-static table mats and properly use a grounding wrist stra. Keep components and tools also at this same potential.

IMPORTANT:

Always disconnect the power cord from AC outlet before replacing parts or modules.

1.1.3

To prevent electrical shock, use only a properly grounded 3 prong outlet or extension cord.

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 and will void the manufacturer's warranty.

1.1.5

Safety regulations require that after a repair the set must be returned in its original condition. In addition, prior to closing set, check that:

-Note:

>All wire harnesses and flex cables are properly routed and secured with factory tape and/or mounted cable clamps.

> All cables and connectors are properly insulated and do not have any bare wires/lead exposed

1.1.6

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

(2) Do not use this product:

   > High humidity areas

   > In an area where any water could enter or splash into the unit.

High humidity and water could damage the product and cause fire.

(3) 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.

(4) 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.

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

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

(7) 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.

(8) 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.

(9) 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 may trip the main 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.

• 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.

• 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 service personnel to important safety information in the service literature. .

2. TV boards:

2.1 Main board layout

2.1.1 The top of main board (RSAG7.820.10588/ROH)
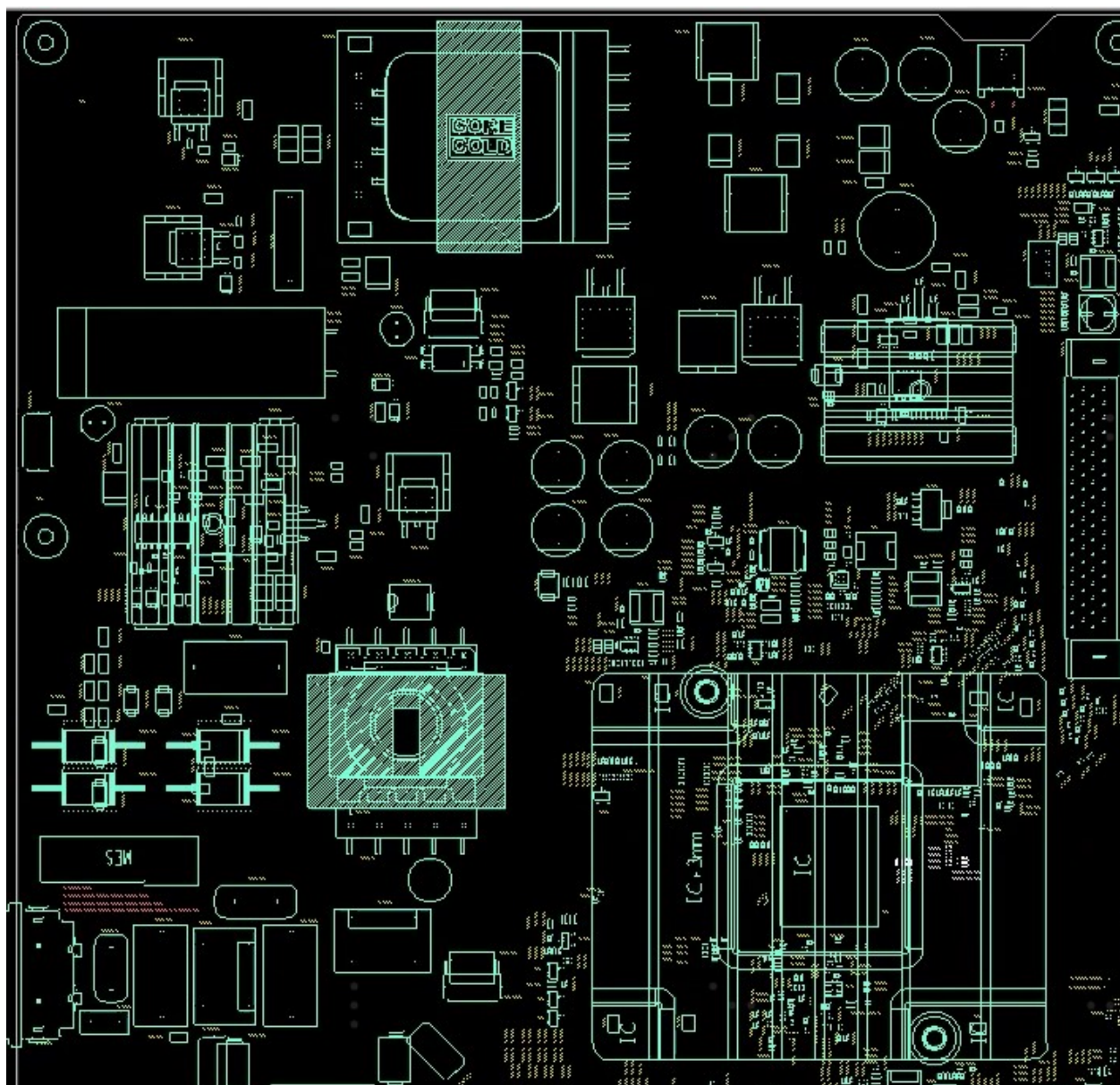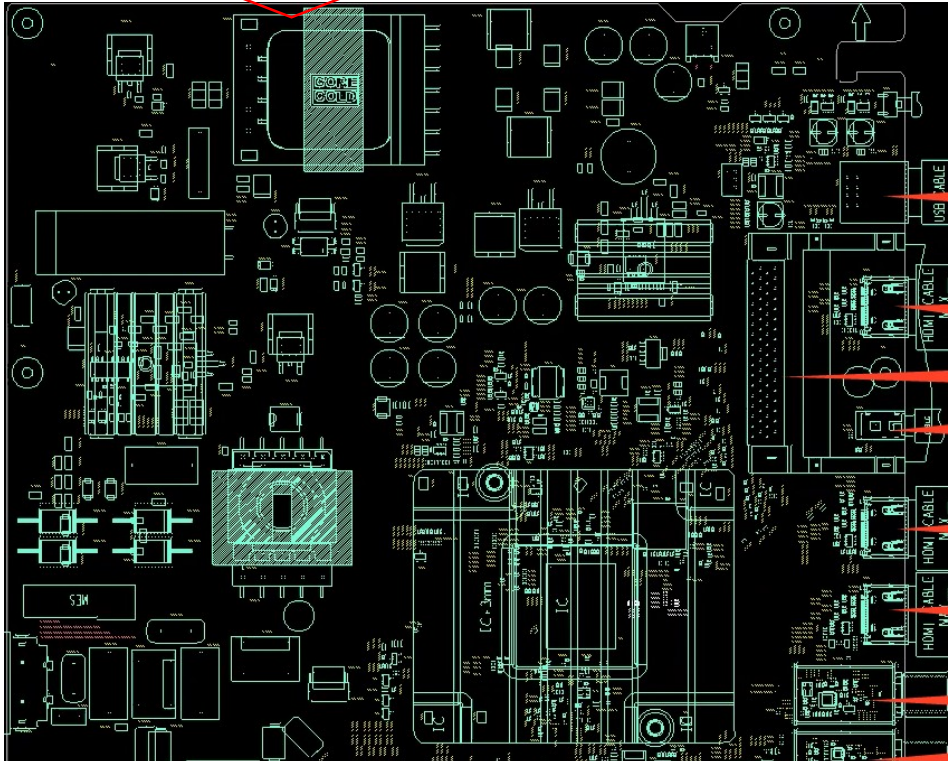
2.2 Wiring diagram(example for 55E70LEVS):
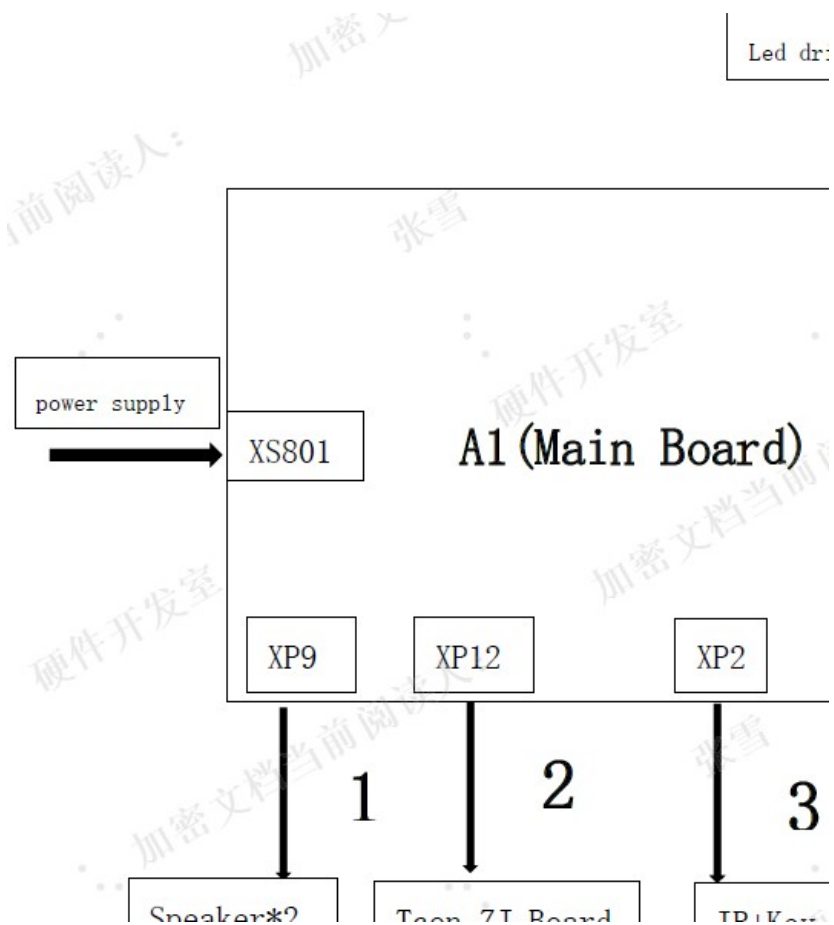
XP2： Power for main board jacket

Main board terminal		Power board terminal	
Pin	definition	Pin	definition
1	IR_IN	1	IR_IN
2	GND	2	GND
3	LED	3	LED-1
4	3.3V_SENSOR2	4	3.3V
5	3.3Vstb	5	3.3Vstb
6	SCL	6	SCLR
7	SDA	7	SDA
8	KEY1	8	KEY0
9	GND	9	GND

10	LED_OFF	10	LED_2
11	GND		

XP12：68pin P2P jacket

Main board terminal jacket definition			Panel terminal jacket definition	
Pin	Definition	illustration	Pin	definition
1	CTRL7	Control pin	68	NC
2	CTRL6	Control pin	67	NC
3	CTRL5	Control pin	66	NC
4	CTRL4	Control pin	65	TEND
5	CTRL3	Control pin	64	VCE
6	CTRL2	Control pin	63	LC
7	CTRL1	Control pin	62	YDIO1
8	GND	Ground	61	GND
9	X0B_0P		60	P2P1P
10	X0B_0N		59	P2P1N
11	GND	Ground	58	GND
12	X0B_1P		57	P2P2P
13	X0B_1N		56	P2P2N
14	GND	Ground	55	GND
15	X0B_2P		54	P2P3P
16	X0B_2N		53	P2P3N
17	GND	Ground	52	GND
18	X0B_3P		51	P2P4P
19	X0B_3N		50	P2P4N
20	GND	Ground	49	GND
21	X0B_4P		48	P2P5P
22	X0B_4N		47	P2P5N
23	GND	Ground	46	GND
24	X0B_5P		45	P2P6P
25	X0B_5N		44	P2P6N
26	GND	Ground	43	GND
27	X0B_6P		42	P2P7P
28	X0B_6N		41	P2P7N
29	GND	Ground	40	GND
30	X0B_7P		39	P2P8P
31	X0B_7N		38	P2P8N
32	GND	Ground	37	GND

33	X0B_8P		36	P2P9P
34	X0B_8N		35	P2P9N
35	GND	Ground	34	GND
36	X0B_9P		33	P2P10P
37	X0B_9N		32	P2P10N
38	GND	Ground	31	GND
39	X0B_10P		30	P2P11P
40	X0B_10N		29	P2P11N
41	GND	Ground	28	GND
42	X0B_11P		27	P2P12P
43	X0B_11N		26	P2P12N
44	GND	Ground	25	GND
45	P2P_LOCK		24	P2P_LOCK
46	GND	Ground	23	GND
47	MSPI1_MISO	LDC_DATA_I	22	NC
48	MSPI1_MOSI	LDC_DATA_O	21	NC
49	MSPI1_SCK	LDC_CLK	20	NC
50	MSPI1_SCZ	DENURA_CS	19	NC
51	GND	Ground	18	GND
52	T_nWR	Write protect	17	nWR
53	T_SCL	I2C CLK	16	SCL
54	T_SDA	I2C DATA	15	SDA
55	GND	Ground	14	GND
56	GND	Ground	13	GND
57	GND	Ground	12	GND
58	GND	Ground	11	GND
59	GND	Ground	10	GND
60	NC		9	NC
61	12V_PANEL	Power Supply Input Voltage	8	VCC_PANEL
62	12V_PANEL	Power Supply Input Voltage	7	VCC_PANEL
63	12V_PANEL	Power Supply Input Voltage	6	VCC_PANEL
64	12V_PANEL	Power Supply Input Voltage	5	VCC_PANEL
65	12V_PANEL	Power Supply Input Voltage	4	VCC_PANEL
66	12V_PANEL	Power Supply Input Voltage	3	VCC_PANEL

67	12V_PANEL	Power Supply Input Voltage	2	VCC_PANEL
68	12V_PANEL	Power Supply Input Voltage	1	VCC_PANEL

XP9：Speaker jacket

Pin	definition	illustration	Wire color
1	L+	Left speaker positive wire	Red
2	L-	Left speaker negative wire	White
3	R-	right speaker negative wire	White
4	R+	Right speaker positive wire	Black

2.3 Ties,clamps and tapes:

to show the positions where ties and clamps and tapes should be, for checking after servicing, Before disassemble the TV ,besure to take photes for the TV assembly example for 55E70LEVS.

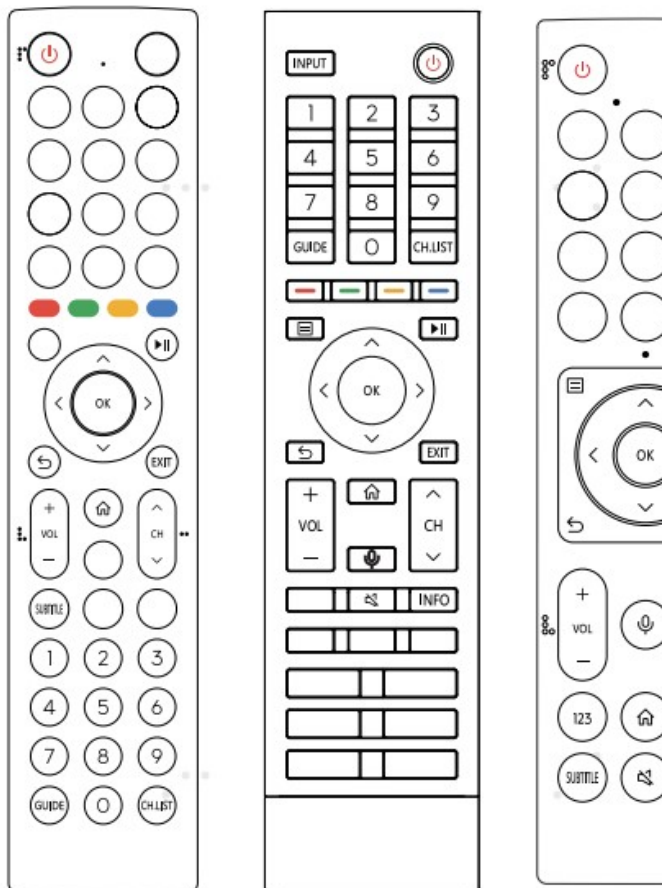## 2.2 TV boards part list

Main board	Boards function difference	Main chassis type	For Series

| RSAG2.908.13696-01	1. Lateral terminal and vertical terminal. 2. TCON part on the board.	MT9603	55E70LEVS

3. Factory/Service OSD Menu and Adjustment

3.1 Remote Control

Remote Control

▶ Buttons of remote control

BUTTON	DESCRIPTION
⏻	Power on/Standby
INPUT / ⤵	Select input sources
Number button / 123	Select a channel or input numbers
Four colour buttons / ▰▰	Special function buttons
GUIDE	Display the Electronic Program Guide (DTV mod
CH.LIST	Display the Channel List on the screen
▶ǁ	Playpad keys
▤ / ≡	Press to enter Menu
∧ / ∨ / < / >	D-pad (up/down/left/right navigation buttons)
OK	Confirmation button
↩	Under the Menu or App, return to the previous pl
⌂	Display the Home screen
VOL	Volume (up/down)
CH	Channel (up/down)
⊿	Mute and restore sound
EXIT	Exit the menu or exit the application
ψ	Activate the microphone
INFO	Display the current program information*
SUBTITLE	Activate or deactivate the subtitle mode
MEDIA	Enter the MEDIA
▦ / APPS	Fast access to all applications
APP	Quick access buttons to APP
TEXT/TXT	Turn on/off the teletext function**
BROWSER	Enter into BROWSER
☑ / ♡₊	Custom button to launch input or apps quickly

▶ Installing Batteries in the Remote Control
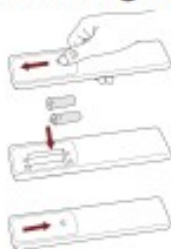
1. Slide the back cover to open the battery compartment control.

2. Insert two AA or AAA size batteries. Make sure to match -) ends of the batteries with the (+) and (-) ends in battery compartment.

3. Close the battery compartment with the cover.

⊞ NOTE

· Product image is only for reference, actual product may vary in appearanc

· Dispose of your batteries in a designated disposal area.

· Do not mix battery types or combine used batteries with new ones.

· Remove depleted batteries immediately to prevent battery acid from le: battery compartment.

· If you do not intend to use the remote control for a long time, remove the b

· Leaving a battery in an extremely high temperature surrounding environ result in an explosion or the leakage of flammable liquid or gas.

· Battery chemicals can cause a rash. If the batteries leak, clean the battery with a cloth. If chemicals touch your skin, wash immediately.

· Risk of fire or explosion if the battery is replaced by an incorrect type.

· Disposal of a battery into fire or a hot oven, or mechanically crushing c battery, that can result in an explosion.

· A battery subjected to extremely low air pressure that may result in an ex leakage of flammable liquid or gas.

▶ Pairing the Remote Control (only for Bluetooth remote cont

Pair the remote to the TV after you power it on. Keep the remote control w from the TV. Press any button (except power and mic button) to pair.

⊞ NOTE

· In special cases, press and hold [▤ / ≡] button to pair.

· If an unknown error occurred with the remote, then it could have bee interference. Try to remove what's causing the interference and pair it agair

· If an unknown error occurred in the remote control while the battery pov you can take out the batteries, press any key for 1~2 seconds, and inse Then the remote control will work normally.

· The remote cannot be paired to the TV while the TV is in standby mode.

▶ Remote Control Operation Range

1. The remote control can work at a distance of up to 8 metres in front of the TV set.

2. The remote control angle: taking the remote
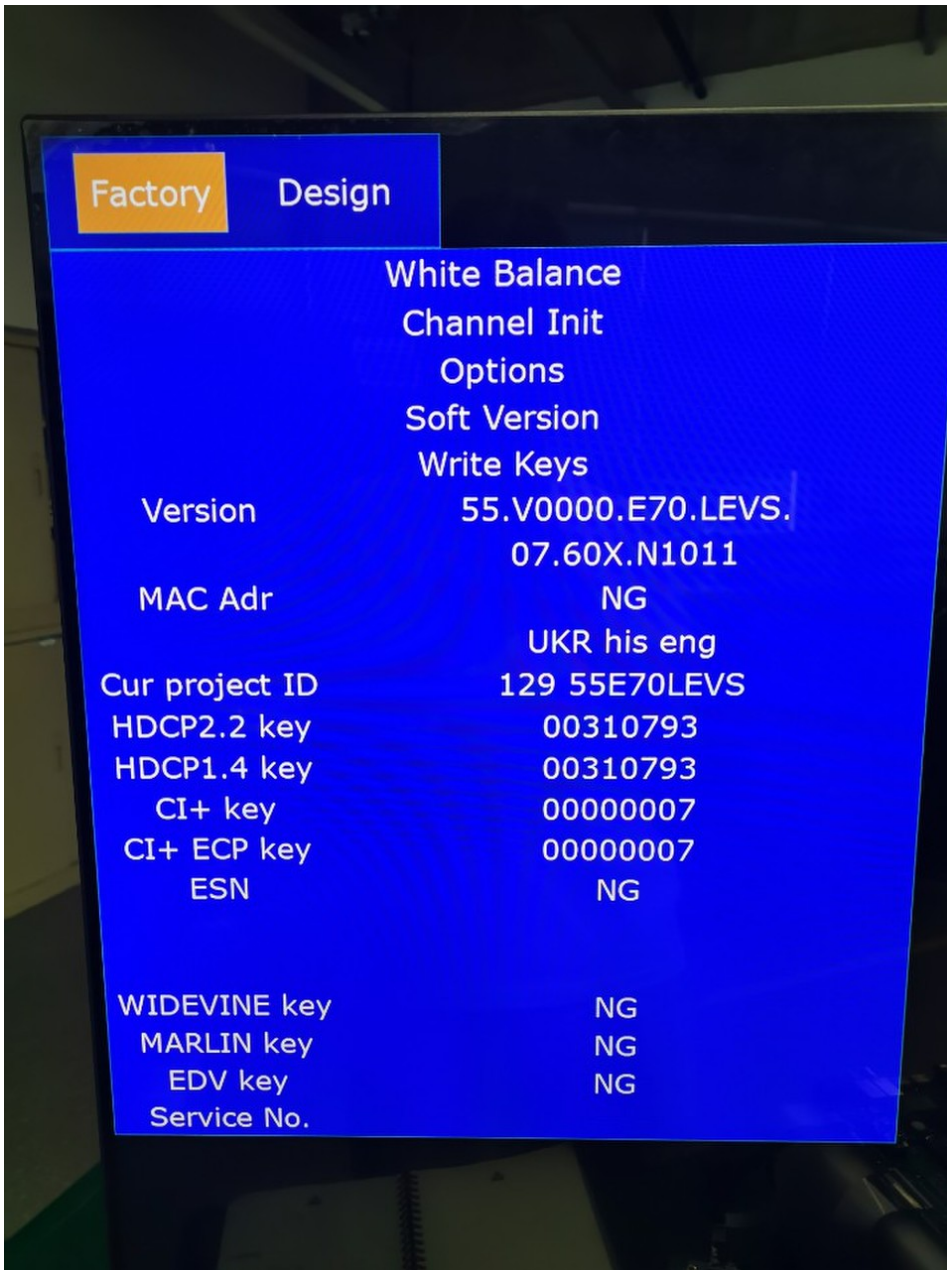
3.2 Factory OSD Menu

figure -1

Factory OSD menu list: if you want to learn more about TV, you'd better read it but would not adjust the value please. The Factory menu may be have difference for diverse market and customer. Take HE55A7000EUWTS for example.

Options:
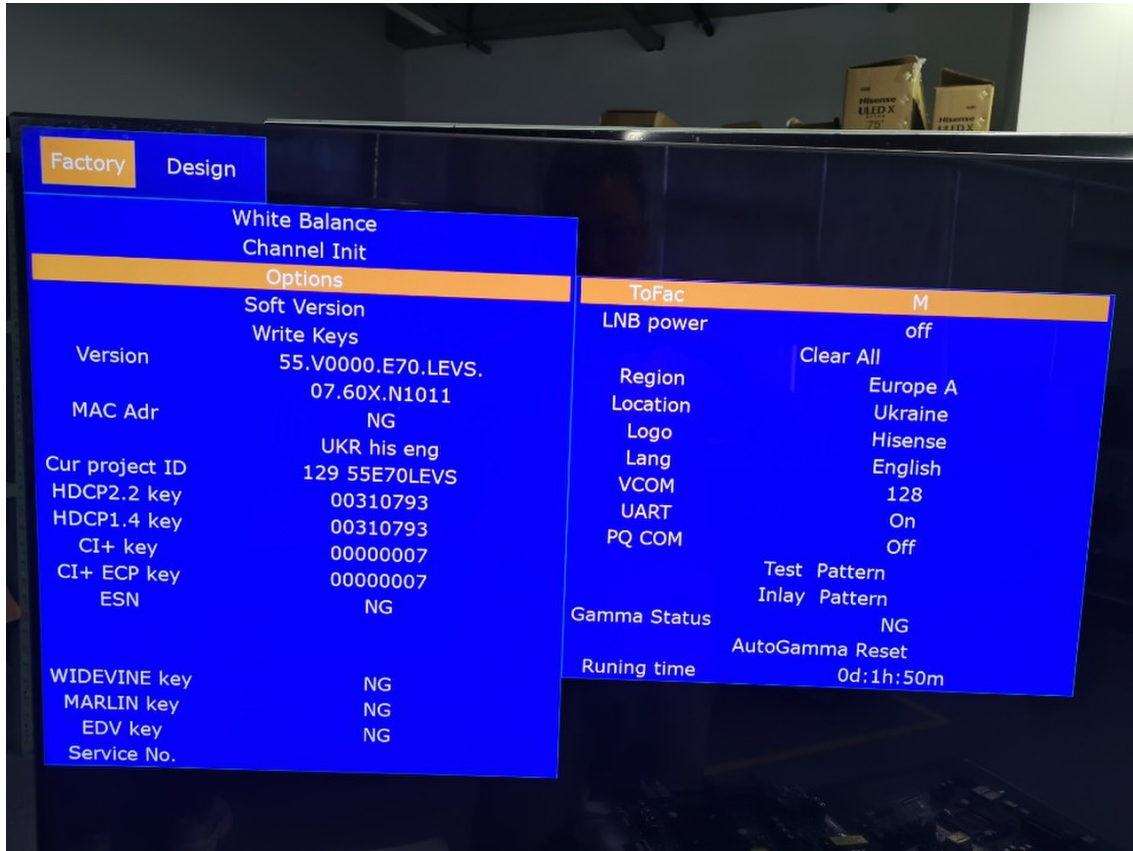
Write keys:
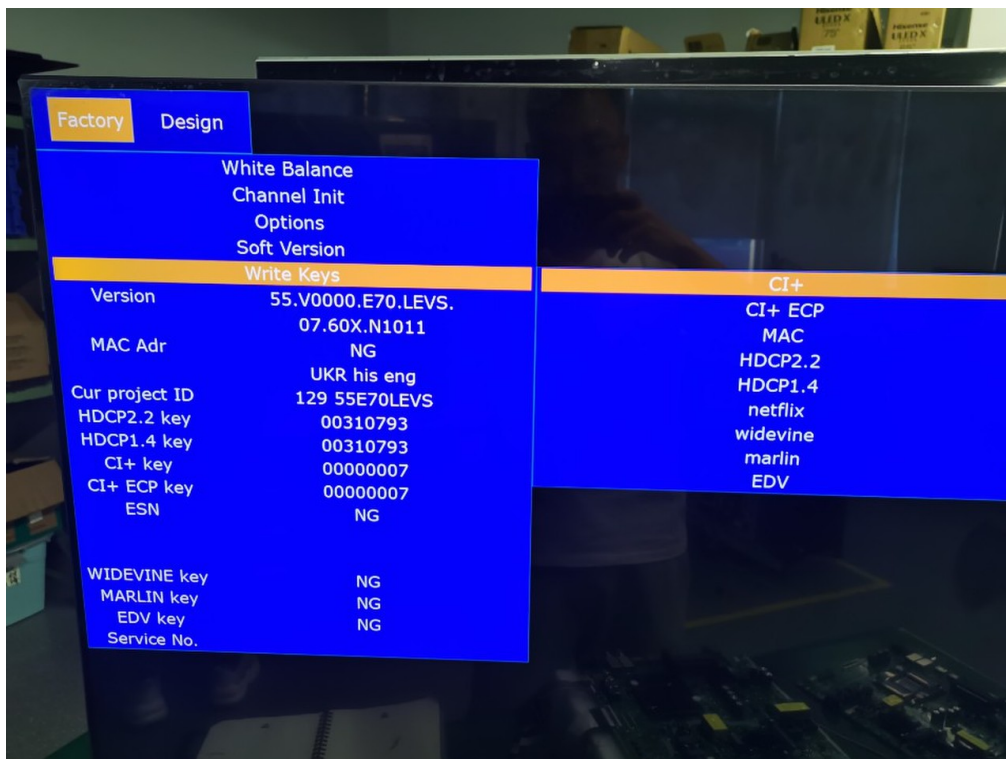
Note:

Check whether the Key information under the current Version is OK, if appears "NG" or such as following red surround irregular information then need rewrite the key.

	Factory menu	Description	Remark
Menu	**White Balance**	White Balance data adjusting, different source has different WB values. Before adjusting, please change to desired source.	
	channel init	TV Produce signal preset, during the factory produce using.	
	Option	Items can choose	
	Clear all	initial the TV，EEPROM reset	
	Soft version	current software version information	
	Version	**S**oftware Version information	
	MAC Adr	MAC address information	
	HDCP2.2 key	HDCP2.2 key information	
	ESN	The TV's electronic Serial number	
	WIDEVINE key	**WIDEVINE** key code	
	Service No.	LTDNXXXXXXY-P0001	

White Balance	BIN B1 ⬌	can choose B1/B2/B3/B4/B5/B6
	R Gain 128	High Brightness Red
	G Gain 128	High Brightness Green
	B Gain 128	High Brightness Blue
	R Offset 128	Low Brightness Red
	G Offset 128	Low Brightness Green
	B Offset 128	Low Brightness Blue

Channel init	huangdao old	
	Qing Dao	TV Produce signal preset, during the factory produce using.
	huangdao new	
	……	

Option	ToFAC M/U	"M" used in factory product. "U" used in user state.
	LNB power	13/14;18/19;Power off
	Region	North America
	country	Country choose
	Logo	Customer logo choose
	Language	Language choose
	VCOM	Panel voltage,
	UART	On/off (when choose "on" then can serial port connect with Tool successfully)
	PQ COM	On/off
Write keys	CI+	
	MAC	If MAC key code lost, you can write.
	HDCP2.2	If HDCP key code lost, you can write .
	Netflix	If Netflix key code lost, you can write .
	Widevine	If Widevine key code lost, you can write .

Note:

The Factory menu may be have difference for diverse market and customer, above Factory menu only for reference.

The factory menu data varies according to different sources. Incase changing the factory data by error, you can choose to "Clear all", by which you can resume the default value.

To clean the EEPROM:

a.   Select the item "**Option**"--"**Clear all**" in Factory mode.

b.   Press ⟩ button to clear the EEPROM data.

c. Close the OSD menu after 5 seconds.

d. Restart the TV.

e   Also the Keys information must been checked, if appear "NG", then must rewrite key code.

4. Software Upgrading

4.1 USB Upgrade

Main software upgrade directly with USB

The main software can be upgraded with USB disk. It includes two modes: user mode、 factory mode. Take 50A683FEvS for example.

4.1.1 TV in user mode：

a. Decompress NOVATEK_DEV_EU_pkg_YYYYMMDD.tar.gz (YYYYMMDD is the year/month/day when the software is being built, such as NOVATEK_DEV_EU_pkg_20201130.tar.gz) and copy usb_NOVATEK_DEV_EU.bin file to the USB root directory. Please make sure the USB disk format is Fat32，and there are no other "*.bin" files in the root directory of USB disk .

b. AC power off the TV, insert the USB disk to the USB 2.0 port, TV in standby status,next long press the "power key . If "Loading data……" is shown on TV, it means TV successfully enters upgrading status..

c. Waiting TV is trying to load the software and it will spend about 2 minutes. After that "UPGRADING SOFTWARE, PLEASE DO NOT TURN OFF" will be displayed and upgrade process bar will indicate the progress. It needs about s5 minutes to complete the whole software upgrade.

d. After upgrade, TV can automatically reboot.

e. Enter the Factory OSD Menu to check the main software version, and then choose "option"◊"Clear All" to do clean up.

4.1.2   TV in factory mode：

a. If TV is in Factory mode, only have difference from chapter 4.1.1 b. as following. others are same.

b. TV is in factory mode,   only AC power off TV and insert the USB disk, next AC power on, TV can identify automatically to update, till call up "Loading data……" interface , update process bar is 1%.

4.1.3   If the above USB upgrade methods fail,   you can rename the upgrade software to
usb_NOVATEK_DEV_EU.bin,next use serical "cu" to update

4.1.4   When upgrade successfully,   We must   ensure the   TV mode of running correctly.
Paths: Factory---Design –Project ID

Once choose another TV mode ,must AC power off   and power on the TV to reboot.
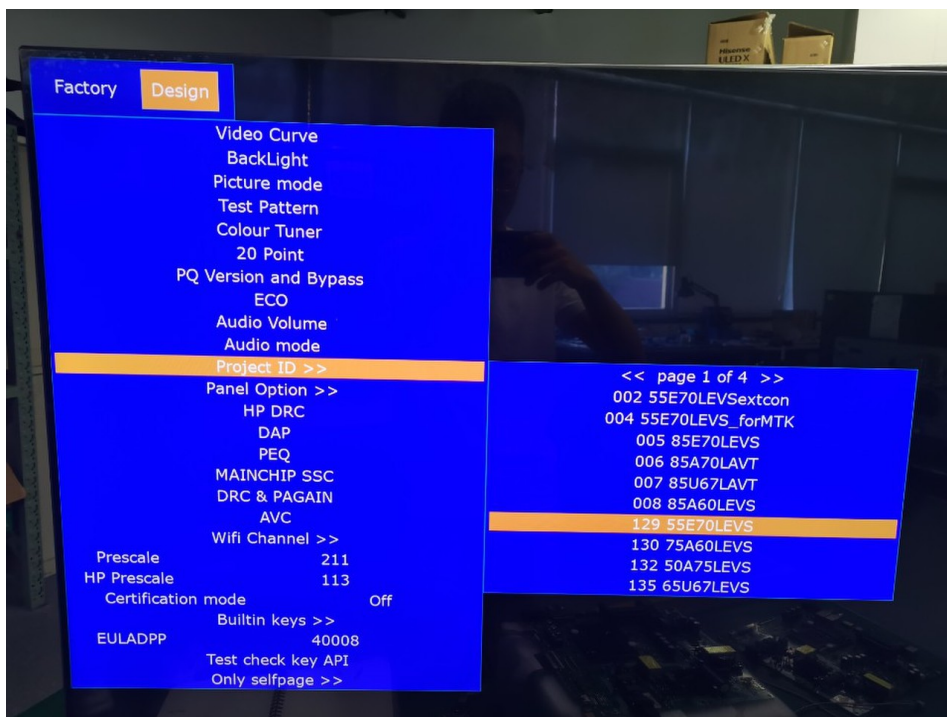
Firgure-1: Upgrading software
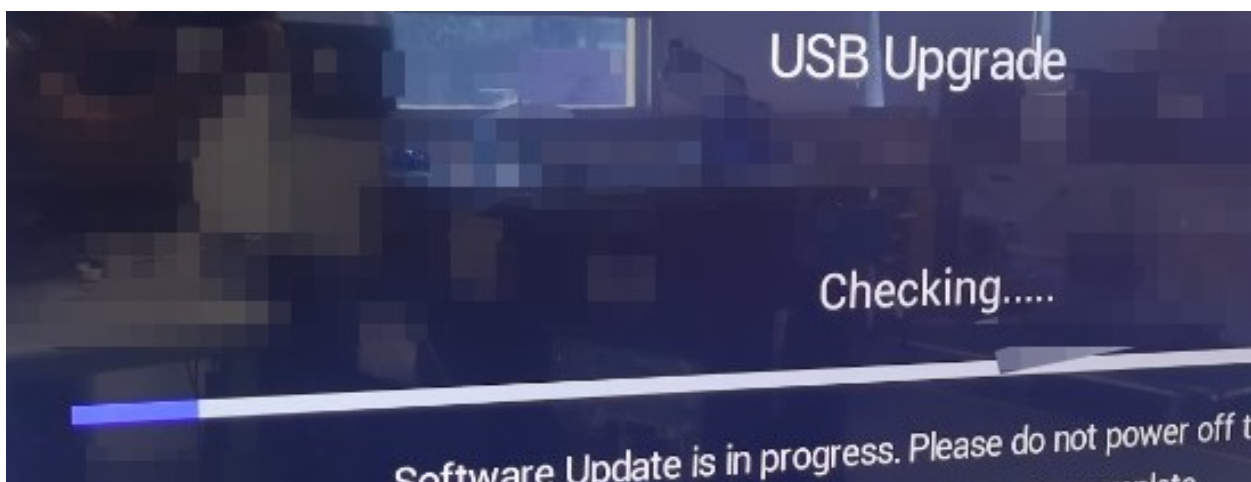
Firgure-1

4.2 Novatek Tool upgrading

If USB upgrades failure, TV crashed and SecureCRT no print message. Repairer must read IC device ID code 、 decipher& burn the Mboot program the EMMC flash first. then USB disk to upgrade the "usb_NOVATEK_DEV_EU.bin" file.

Hardware connecting

Connect the unit to your pc with Hisense USB-serial port cable. USB port connects to your PC and earphone port to TV's service debug. As following.

USB

4.2.1 Open the UART serial option

UAR serial choose "on "

Menu: Factory-->Options–>UART–>on
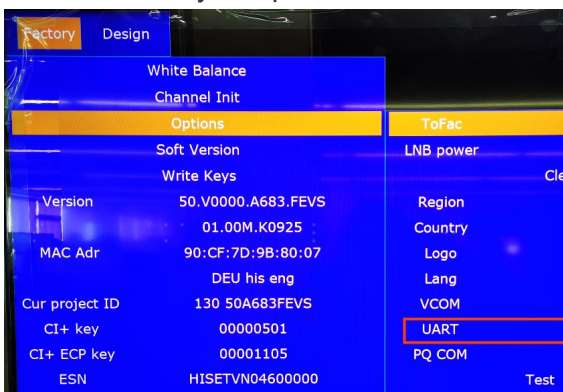
If finish the updating and data adjust UART serial, UART choose "off "

4.2.2 Novatek USB-serial driver
It's the same as Mstar bebug Tool.
If First use Mstar bebug Tool, you have to install drive software for bebug board.
If your PC is Windows XP system:
First install FTCUNIN.EXE of FTC100103(MSTAR) rar file in your PC.
This is a drive software of Mstar

Another:
If your PC is Win7 system, you will have to install CDM20802_Setup_WIN7 rar file，and then open the software of SecureCRT in your PC.

4.2.3 Stop board serial connect with SecureCRT
Run SecureCRT,printing information includes three status:Mboot\Supernova\no print information.
Current steps:
1) Run SecureCRT.exe
2) TV power on.
3) SecureCR tool print information can appear or not.

How to distribute the three status?

1) appearing "N62020_A32_SEC>" that meaning is in Mboot status;
2) Rolling many informmation automatically that meaning is in Supernova status;
3) No any print information that meaning the eMMC of board is no program.

Stop board serial with SecureCRT
1）In mboot status:
   N62020_A32_SEC>
      Input "shift" and "~" key to ensure, then close the SecureCRT window.
2）If no any print information with SecureCRT,then can directly close the SecureCRT window.

5. Trouble shooting

5.1 Troubleshooting for Remote Control

```
┌─────────────────────────────────┐
│   Remote control does not work  │
└─────────────────────────────────┘
                │
                ▼
            ◇ Try new batteries ◇ ──── YES ───▶ ┌──────────────────┐
                                                │  Replace battery │
                                                └──────────────────┘
                │ NO
                ▼
            ◇ Replace RC ◇ ──── YES ───▶ ┌────────────────────────┐
                                         │ Replace remote control │
                                         └────────────────────────┘
                │
                ▼
        ┌──────────────────┐
        │ Check IR receiver│
        └──────────────────┘
                │
                ▼
        ◇ Change Led & IR board ◇ ──── YES ───▶ ┌────────────────────┐
                                                │ Replace Led & IR BD│
                                                └────────────────────┘
                │ NO
                ▼
        ◇ Change Led & IR cable ◇ ──── YES ───▶ ┌──────────────────────┐
                                                │ Replace Led & IR cable│
                                                └──────────────────────┘
                │ NO
                ▼
        ┌────────────────────┐
        │ Replace main board │
        └────────────────────┘
```
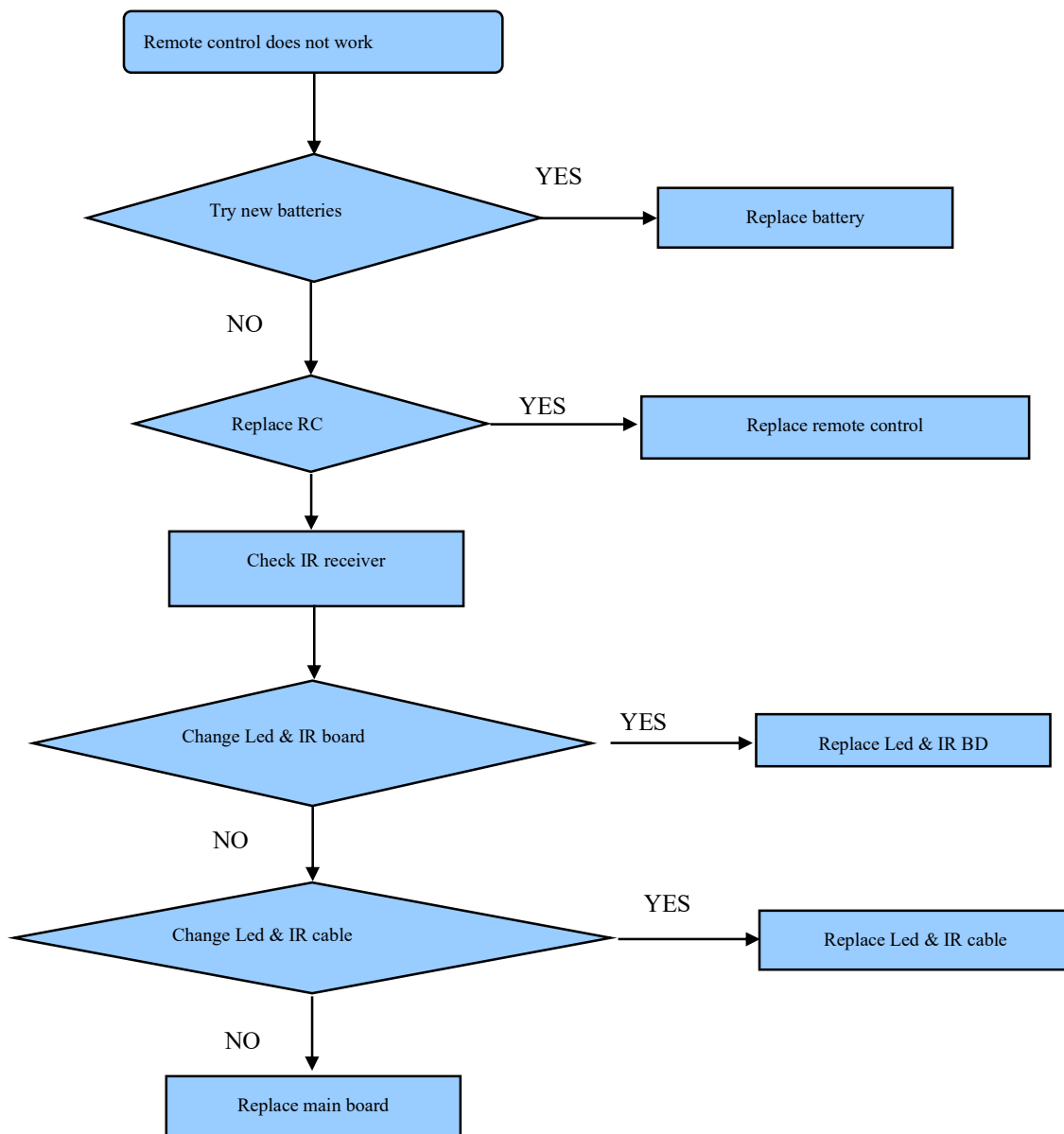
5.2 Troubleshooting for Function Key

```
┌──────────────────────────┐
│   Buttons does not work   │
└──────────────────────────┘
              │
              ▼
         ◇ Check switches ◇ ──YES──► ┌────────────────────────────────┐
              │                       │ Check solder connections and see if │
             NO                       └────────────────────────────────┘
              │
              ▼
         ◇ Check key board ◇ ──YES──► ┌──────────────────┐
              │                        │  Replace Key BD   │
             NO                        └──────────────────┘
              │
              ▼
┌──────────────────────────┐
│     Check Key BD cable    │
└──────────────────────────┘
              │
              ▼
                           YES
         ◇ Change   Key   BD ◇ ──────► ┌──────────────────┐
              │                         │        OK         │
             NO                         └──────────────────┘
              │
              ▼
┌──────────────────────────┐
│     Replace main board    │
└──────────────────────────┘
```

5.3 TV won't Power On

TV won't power on

Is LED light?

NO → Check Power Output

YES → Make Sure Power source is live

NO → Check Power Cord

YES → Replace Power Cord

NO →

Try Power on by RC and Button

Only one works → Check/replace IR BD or Keypad PCA

Neither works → Replace Main BD

Both Work →

Power on

YES → OK

NO → Replace Power BD

YES

No light

RED

Panel Bright

YES → Check signal Source

NO → Replace Main BD

YES → OK

NO → Replace Panel (to contact Hisense tech support.)

NO → OK

Notice:

MSD6586 Europe market：

TV work normally indication led is no light.

TV standby indication led is red.

5.4 Troubleshooting for Audio

```
                    ┌─────────────────────┐
                    │      No sound       │
                    └─────────────────────┘
                               │
                               ▼
                    ◇─────────────────◇      YES      ┌──────────────────┐
                    │  Check connecter │ ──────────▶  │    Reconnect     │
                    ◇─────────────────◇              └──────────────────┘
                               │ NO
                               ▼
                    ◇─────────────────◇      YES      ┌──────────────────────┐
                    │ Check speaker wire│ ─────────▶  │ Replace speaker wire │
                    ◇─────────────────◇              └──────────────────────┘
                               │ NO
                               ▼
                    ◇─────────────────◇      YES      ┌──────────────────────┐
                    │ Check speaker set │ ─────────▶  │  Replace speaker set │
                    ◇─────────────────◇              └──────────────────────┘
                               │ NO
                               ▼
                    ┌─────────────────────┐  YES      ┌──────────────────┐
                    │ Replace main board  │ ────────▶ │        OK        │
                    └─────────────────────┘          └──────────────────┘
                               │
                               ▼
                    ┌─────────────────────┐
                    │ Power Supply Board  │
                    └─────────────────────┘
```
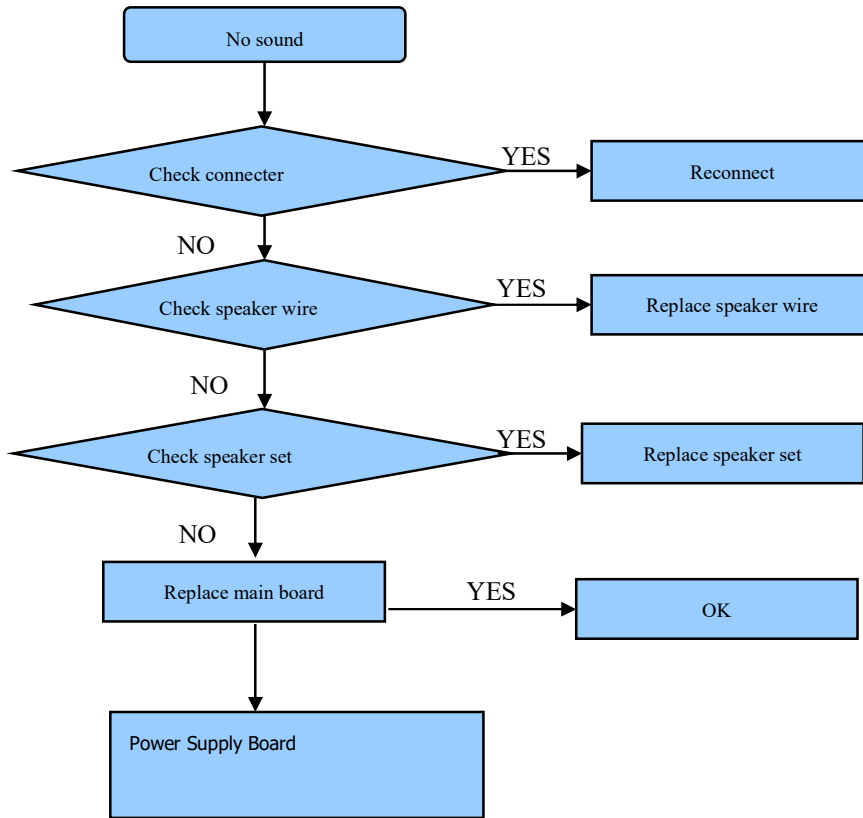
5.5 Troubleshooting for TV/VGA/HDMI input

```
┌─────────────────────────┐
│  No picture on the screen │
└─────────────────────────┘
              │
              ▼
         ◇ Check Signal Source ◇ ──NO──► ┌──────────────────────┐
                                         │ Make  sure  signal   │
                                         │ source is available  │
                                         └──────────────────────┘
              │
              ▼
         ◇ Check connect ◇ ──YES──► ┌────────────┐
                                    │  Reconnect  │
                                    └────────────┘
              │ NO
              ▼
         ◇ Check cable ◇ ──YES──► ┌────────────────┐
                                  │  Replace cable  │
                                  └────────────────┘
              │ NO
              ▼
      ┌───────────────────────┐
      │  Replace main board   │
      └───────────────────────┘
```
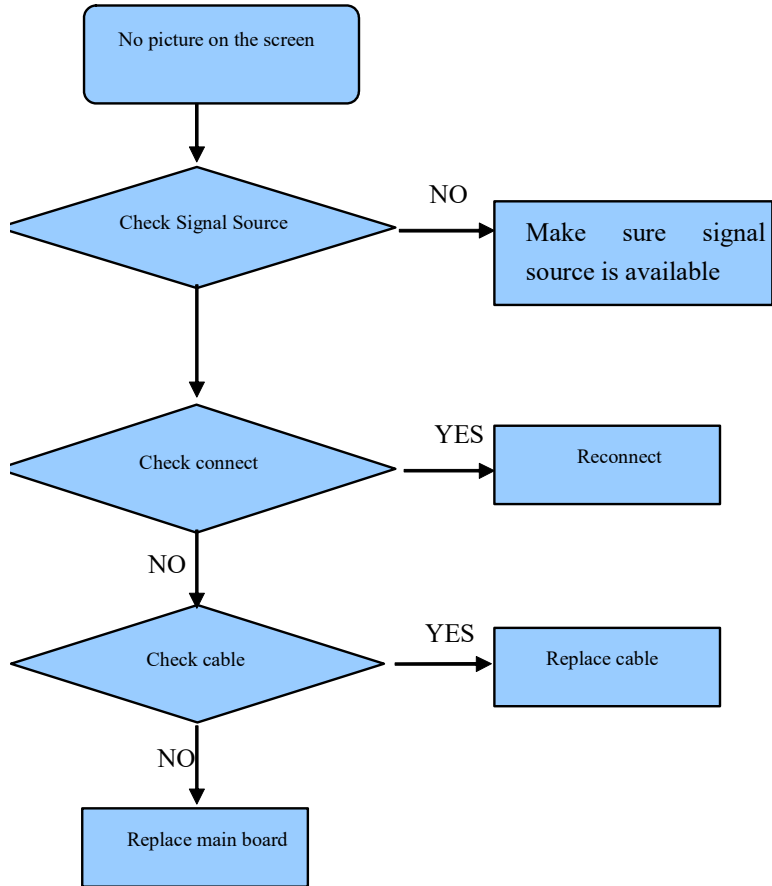
5.6 Troubleshooting for Video input

```
          ┌─────────────────────────┐
          │  No picture on the screen │
          └─────────────────────────┘
                       │
                       ▼
              ◇ Check Source work or not ◇ ──── NO ────▶ [ Check Signal Source ]
                       │
                      YES
                       │
                       ▼
                  ◇ Check connect ◇ ──── YES ────▶ [ Reconnect ]
                       │
                      NO
                       │
                       ▼
                ◇ Check Cable/ Wires ◇ ──── YES ────▶ [ Replace Cable/Wires ]
                       │
                      NO
                       │
                       ▼
              ┌─────────────────────┐
              │  Replace main board │
              └─────────────────────┘
```
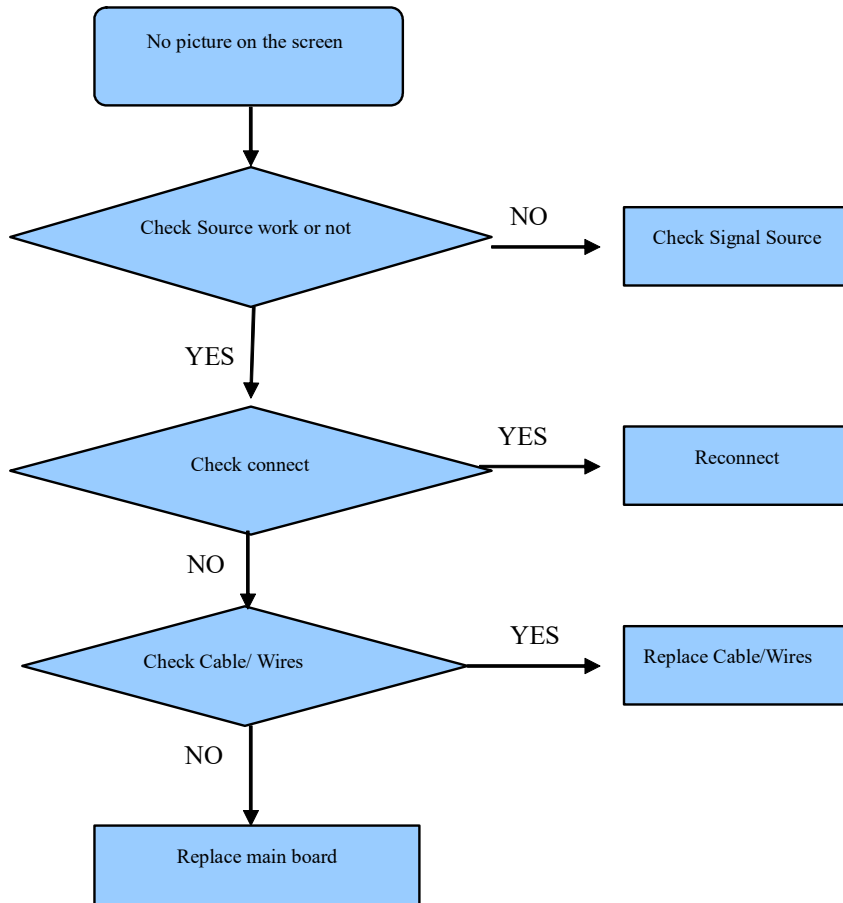
6. Signals Block Diagram & power assign & schematic diagram