

CV72690_N42 Service Manual

CV72690_N42 is an integration board of power supply, LED driver and TV board. It can receive the analog television (NTSC-M/PAL-M/N) and digital television (DVB-T/T2/S2) signal, It is suitable for the market in Europe (include UK), Australia etc.

1. Safety Instructions:

1.1 Replace, soldering any components and dial/plug cable, the power supply must be cut off.

- a) BULK Capacitor need to discharge.
- b) After power on, the BULK Capacitor cannot be touched.

1.2 Anti-static Precautions (Whole production process must be anti-static!)

- a) Shall not be casually touched IC.
- b) Shall be used the anti-static soldering iron.
- c) Anti-static gloves must be wearer.

1.3 Replace the components with special safety requirements, should be refer to reference list, and shall not be arbitrarily changed the specifications and types.

1.4 Test and verify the board be sure to use supporting accessories (power panel, keypad, etc.), if use other accessories need to carefully identify the connection is correct.

1.5 The storage temperature and humidity are show as follow, please in strict accordance with the implementation:

The storage temperature/humidity: - 40 ~ + 85 °C. < = 95%

The usage temperature/humidity: - 10 ~ + 60 °C. < = 95%

Note: when maintenance of this mainboard, please in strict accordance with upon safety instructions.

2. Main function:

- 1. Supports SD/HD mode (480 p / 576 I / 720 p / 1080 I/p);
- 2. Standby power consumption (≤0.5W)
- 3. Port:

	ATV (Analog NTSC-M/PAL-M/N) , DTV(DVB-T/T2/S2)	2 path
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	RCA AV IN	1 path
	USB2.0	2 path
	HDMI In	3 path
	RJ45	1 path
(Output port)	EARPHONE (L, R)	1 path
	Optical/COAX	1 path

4. ARM CA53 Quad core@1.2GHz, Built-in 1GB DDR3;

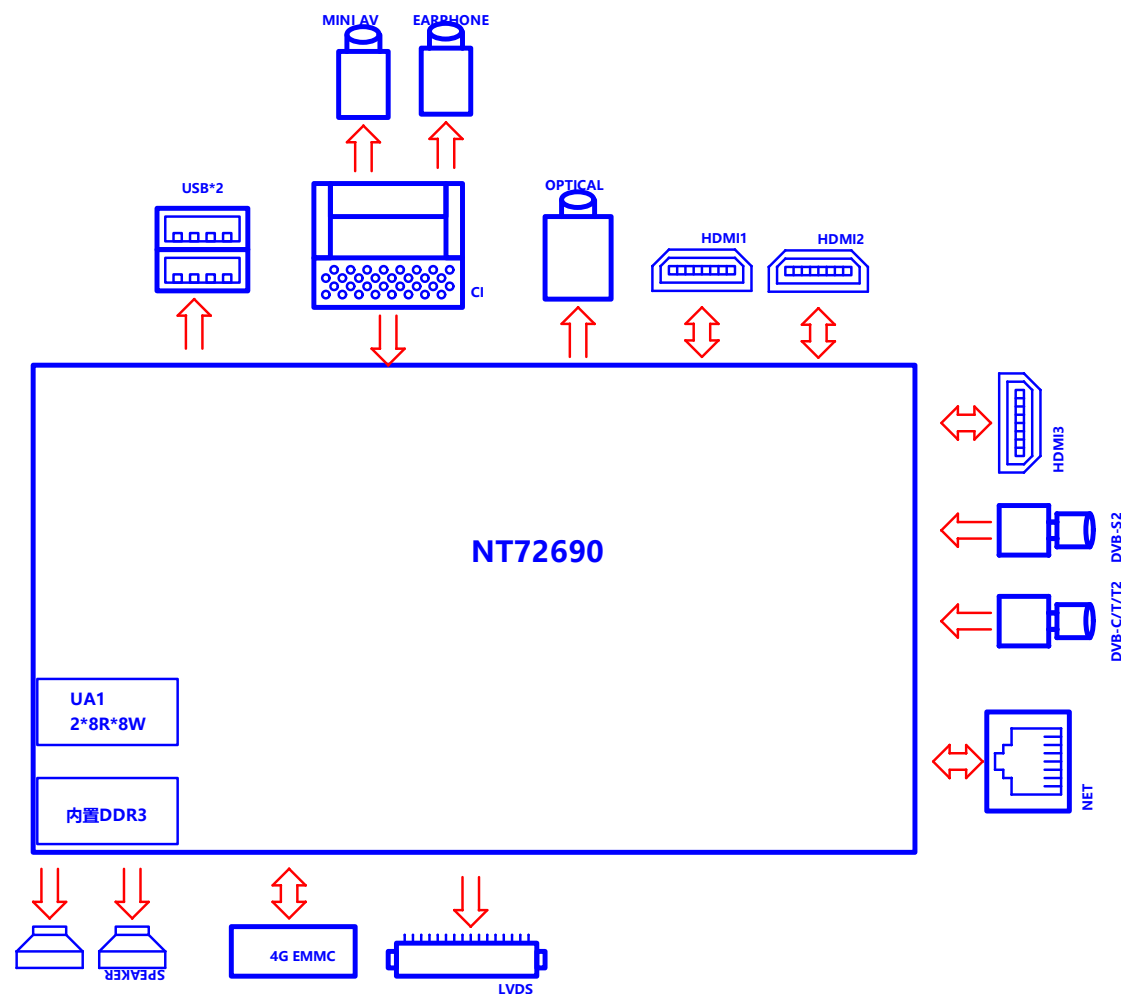
5. Supports USB software update;

3. The basic principle

(1) Analog signal process:

Antenna receive signal and send to TUNER(U7,SI2151), SOC(U1 MT9602)through I2C to control the TUNER, select frequency, set intermediate frequency bandwidth and set the intermediate frequency signal amplitude. Then TUNER output intermediate frequency into SOC to demodulate and decode. Finally, the signal was translated into video and audio signal.

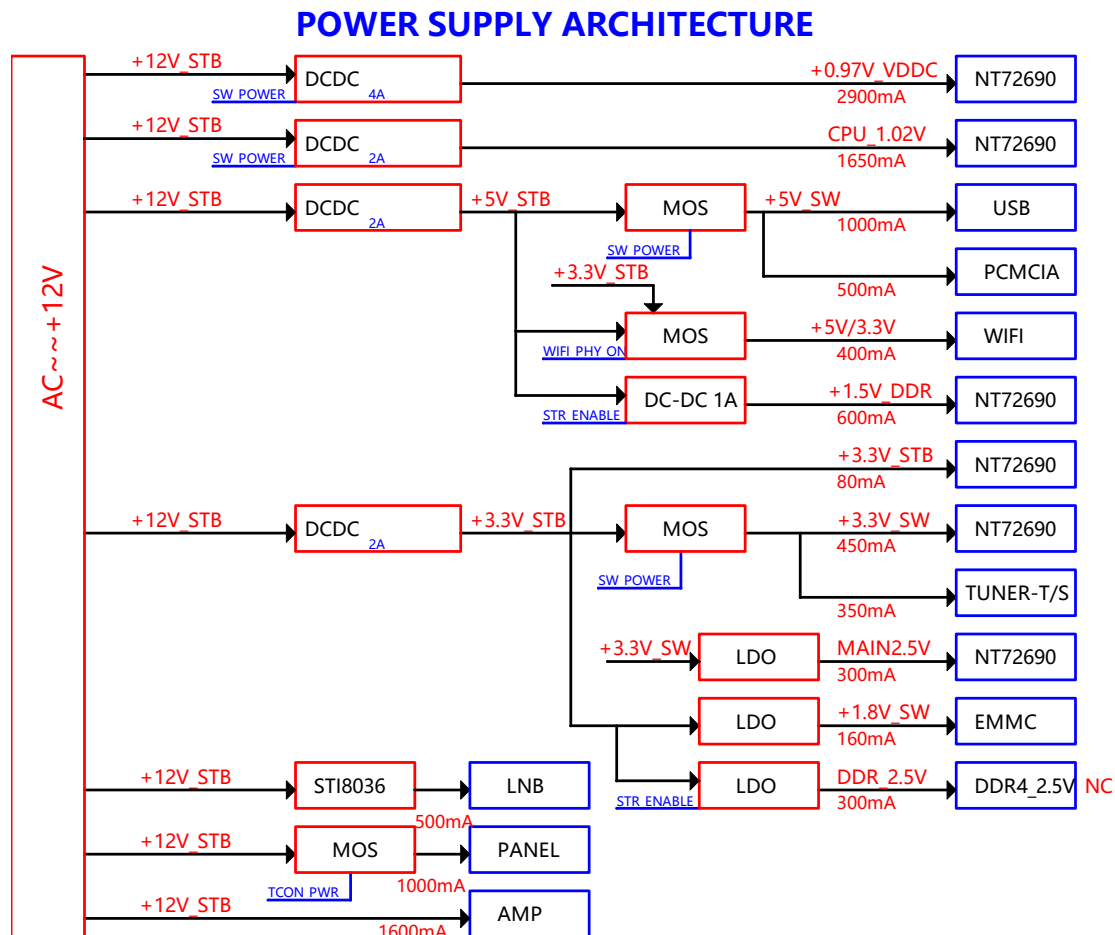
(2) The basic block diagram:



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CV72690_N42 principle block diagram

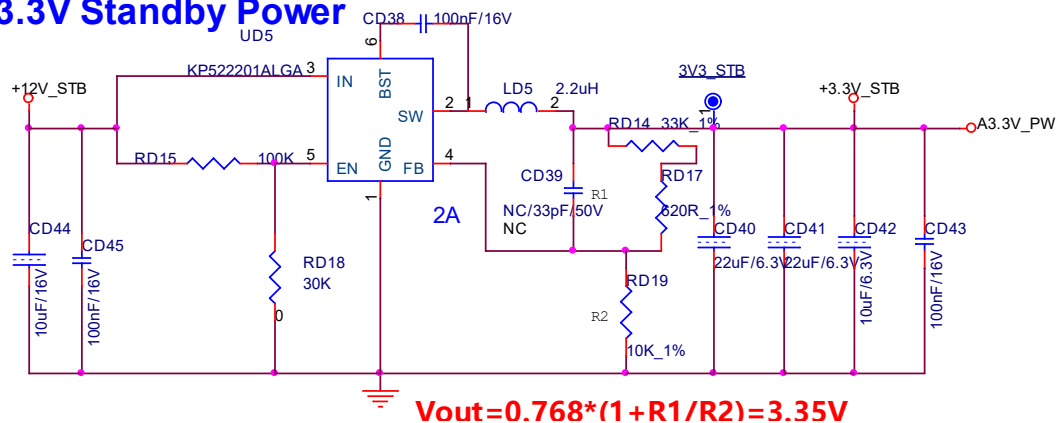
(3) The power supply block diagram:



CV72690-N42 power supply block diagram

(4) 12V to 3.3V_Standby circuit

3.3V Standby Power



$$V_{out} = 0.768 * (1 + R1/R2) = 3.35V$$

it is a low power DC-DC component of KIWI, SOT23-6 package, the main features of the IC are show as follow:

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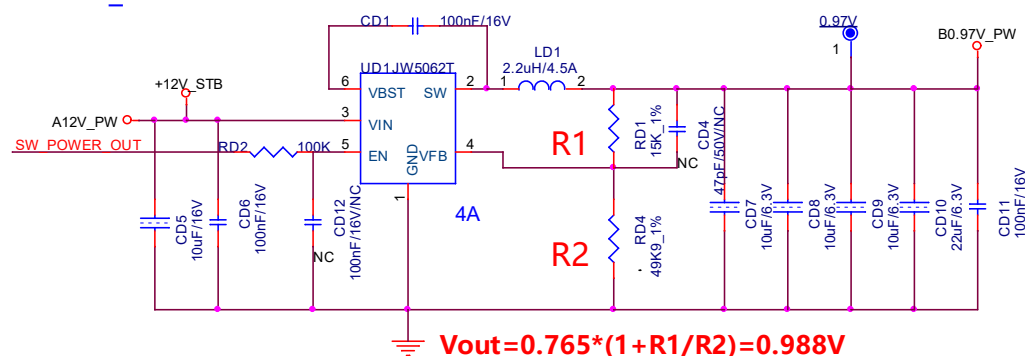
- Input voltage range: 4.5V—17V
- Up to 2A output current.
- High Efficiency.
- Over Current Protection with Hiccup-Mode, Input overvoltage protection(OVP), Thermal Shutdown, Inrush Current Limit and Soft Start

From the feature of IC, We need to pay attention on follows:

- Although there is PIN to PIN component of other brand, suggest according to the BOM material number to replace this component. If there is must to use a high specification to replace, it is recommended to replacement of adjacent specification, in order to avoid excessive ripple in light load mode.
- Under-voltage and overheat shutoff are unlatched, in other word, after get rid of these faults, the circuit can automatically return to normal state (not restart condition).

(5) 12V_Standby to +0.97V_VDDC core voltage circuit:

+0.97V_VDDC



It is a low power DC-DC component of JW,SOT23-6 package, the main features of the IC are show as follow:

4.2V to 18V operating input range

4A output current

Up to 96% efficiency

600kHz switching frequency

Internal soft-start

Input under voltage lockout

Feedback short protection

Current run-away protection

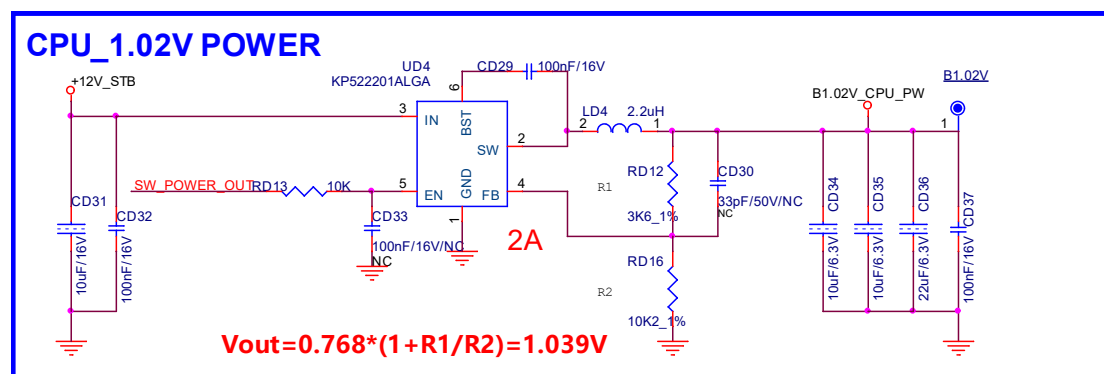
Output short protection

Thermal protection

Available in TSOT23-6 package

(6) 12V to +1.0V_VDDC_CPU voltage circuit:

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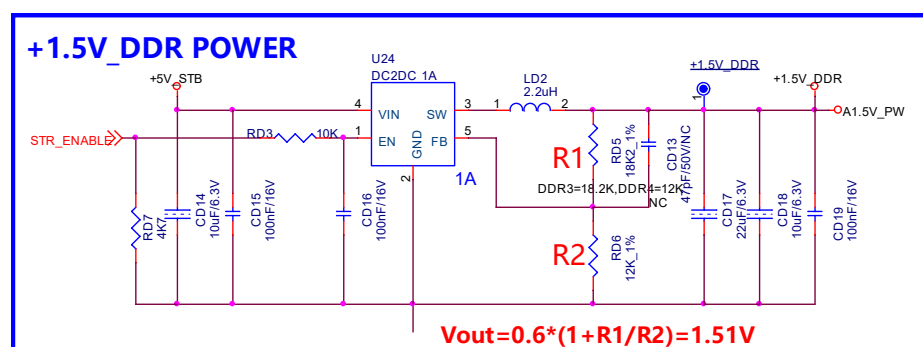
It is a low power DC-DC component of KIWI, SOT23-6 package, the main features of the IC are shown as follows:

- Input voltage range: 4.5V—17V
- Up to 3A output current.
- High Efficiency.
- Over Current Protection with Hiccup-Mode, Input overvoltage protection (OVP), Thermal Shutdown, Inrush Current Limit and Soft Start

From the features of the IC, we need to pay attention to the following:

- Although there is a PIN to PIN component of other brands, suggest according to the BOM material number to replace this component. If there is a must to use a high specification to replace, it is recommended to replace the adjacent specification, in order to avoid excessive ripple in light load mode.
- Under-voltage and overheat shutoff are unlatched, in other words, after getting rid of these faults, the circuit can automatically return to normal state (not restart condition).

(7) 3.3V to 1.5V DDR3 voltage circuit:



It is a low power DC-DC component of Joulwatt, SOT23-5 package, the main features of the IC are shown as follows:

- Input voltage range: 2.5V—5.5V
- Output voltage range: 0.6V—5.5V
- Up to 2A output current.
- Output short protection, thermal protection, Inrush Current Limit and Soft

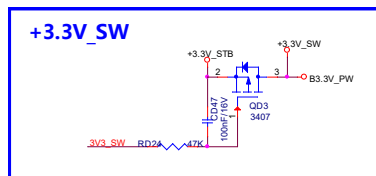
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Start, Input over voltage protection (OVP).

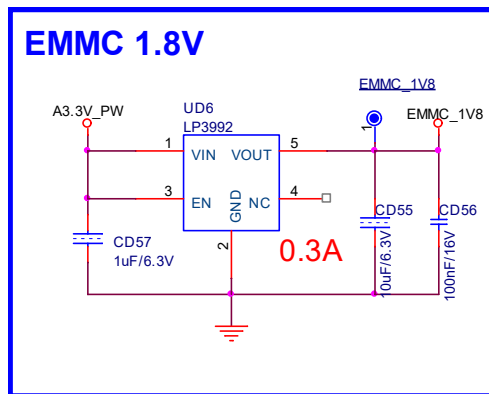
From the feature of TMI3108, We need to pay attention on follows:

- Although there is PIN to PIN component of other brand, suggest according to the BOM material number to replace this component. If there is must to use a high specification to replace, it is recommended to replacement of adjacent specification, in order to avoid excessive ripple in light load mode.

(8) 3.3V_Normal circuit



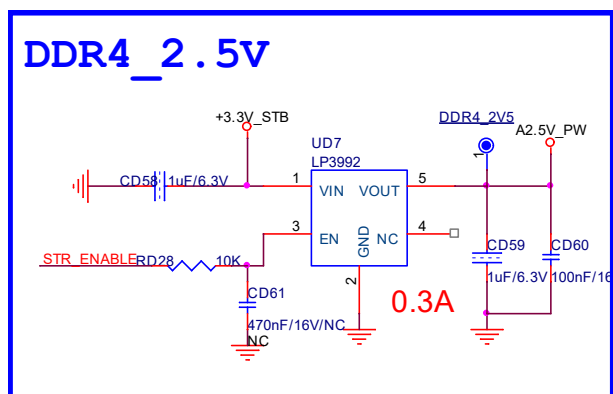
(10) 3.3V to 1.8V_normal circuit



It is a low power CMOS LDO component, SOT23-5 package, the main features of the IC are show as follow:

- Output current is 300mA
- input voltage: 3.3V
- Line regulation: 0.03%/V (typ.)

(11) 3.3V to 2.5V_ Standby circuit

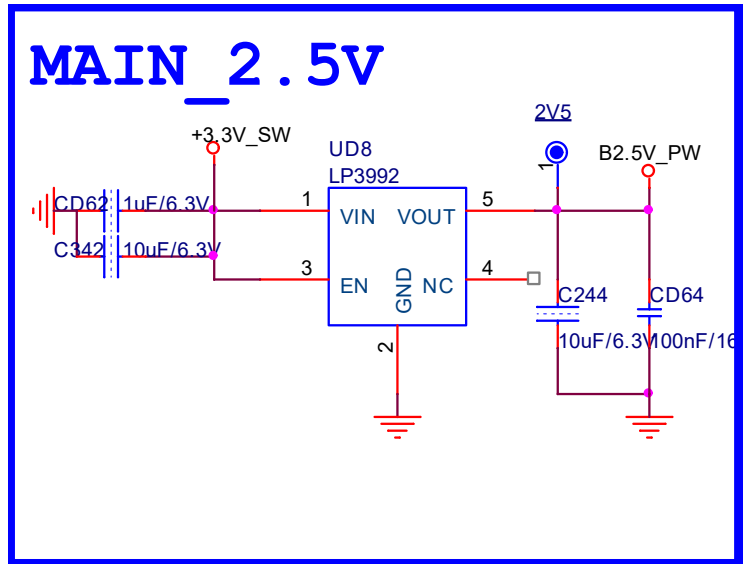


It is a low power CMOS LDO component, SOT23-5 package, the main features of the IC are show as follow:

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- Output current is 300mA
- input voltage: 3.3V
- Line regulation: 0.03%/V (typ.)

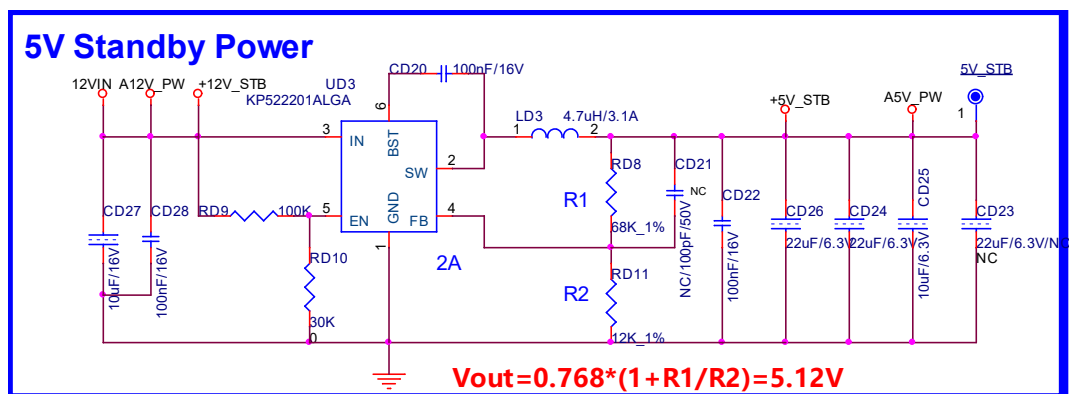
(12) 3.3V to 2.5V_normal circuit



It is a low power CMOS LDO component, SOT23-5 package, the main features of the IC are show as follow:

- Output current is 300mA
- input voltage: 3.3V
- Line regulation: 0.03%/V (typ.)

(13) 12V to 5V_NORMAL circuit:



it is a low power DC-DC component of KIWI,SOT23-6 package, the main features of the IC are show as follow:

- Input voltage range: 4.5V—17V
- Up to 2A output current.
- High Efficiency.
- Over Current Protection with Hiccup-Mode,Input overvoltage protection(OVP),Thermal Shutdown,Inrush Current Limit and Soft Start

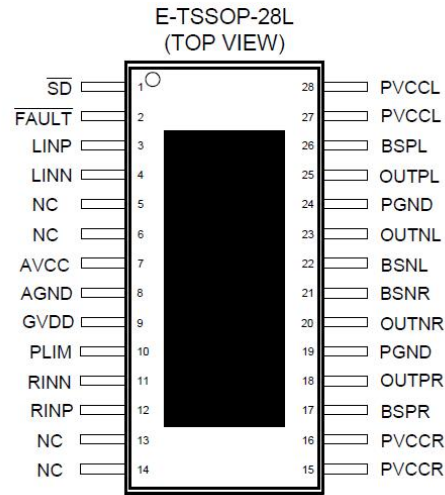
- (14) TUNER circu

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- Channel bandwidth: 6MHZ,7MHZ,8MHZ.

(15) AMP

HAA3603 is a digital amplifier IC, the definition of each PIN is show as follow:

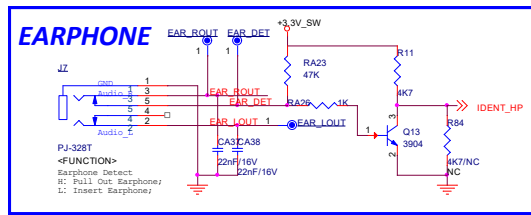


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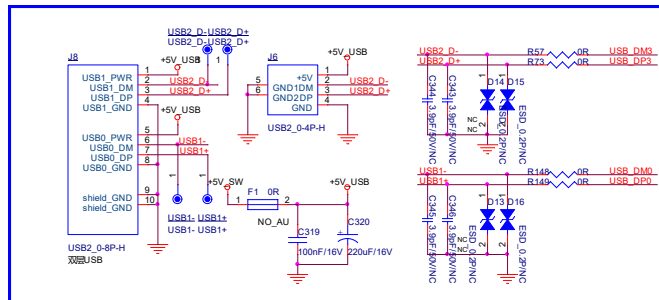
The function of each pin is show as follow:

NAME	E-TSSOP -28L	TYP	DESCRIPTION
$\overline{SD}$	1	I	Shutdown signal for IC (low = disabled, high = operational). Voltage compliance to AVCC.
$\overline{FAULT}$	2	O	Open drain output used to display short circuit or dc detect fault. Voltage compliant to AVCC. Short circuit faults can be set to auto-recovery by connecting FAULTB pin to $\overline{SD}$ pin. Otherwise, both short circuit faults and dc detect faults must be reset by cycling AVCC.
LINP	3	I	Positive audio input for left channel.
LINN	4	I	Negative audio input for left channel.
NC	5	NA	NC pin
NC	6	NA	NC pin
AVCC	7	P	Analog supply.
AGND	8	P	Analog signal ground. Connect to the thermal pad.
GVDD	9	O	5.5V regulated output, also used as supply for PLIMIT function.
PLIMIT	10	I	Power limit level adjustment. Connect a resistor divider from GVDD to GND to set power limit. Give V(PLIMIT) <2.4V to set power limit level. Connect to GVDD (>2.4V) or GND to disable power limit function.
RINN	11	I	Negative audio input for right channel.
RINP	12	I	Positive audio input for right channel.
NC	13	NA	NC pin

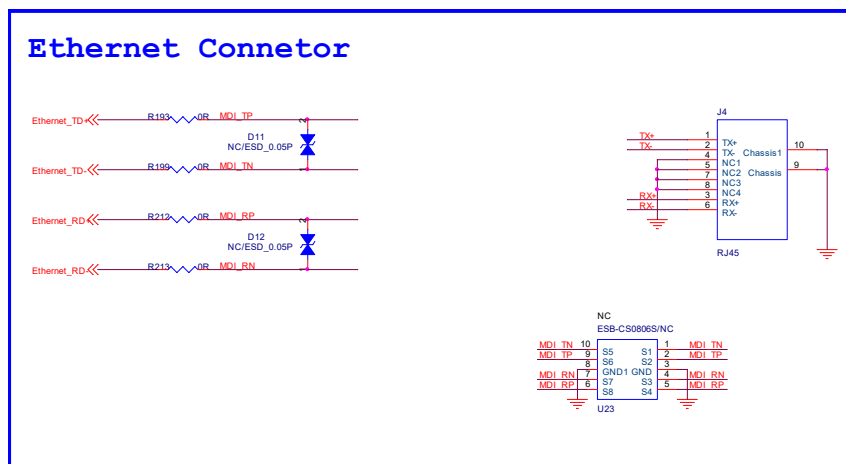
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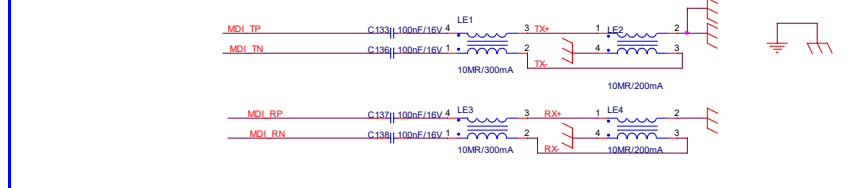
(17) USB



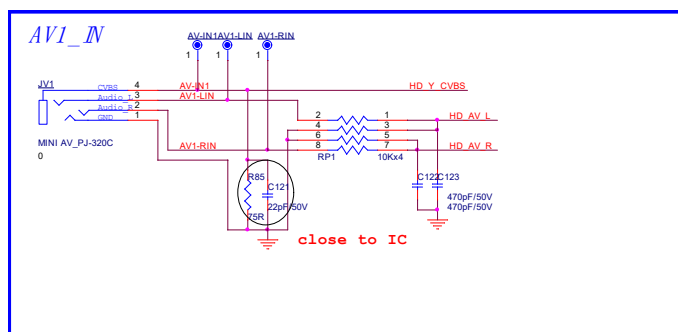
(18) Ethernet



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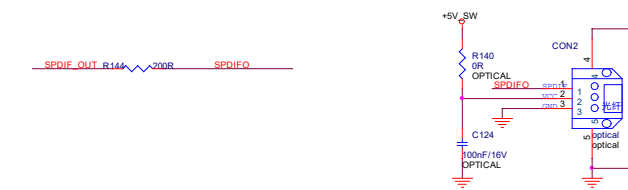
(19) AV IN



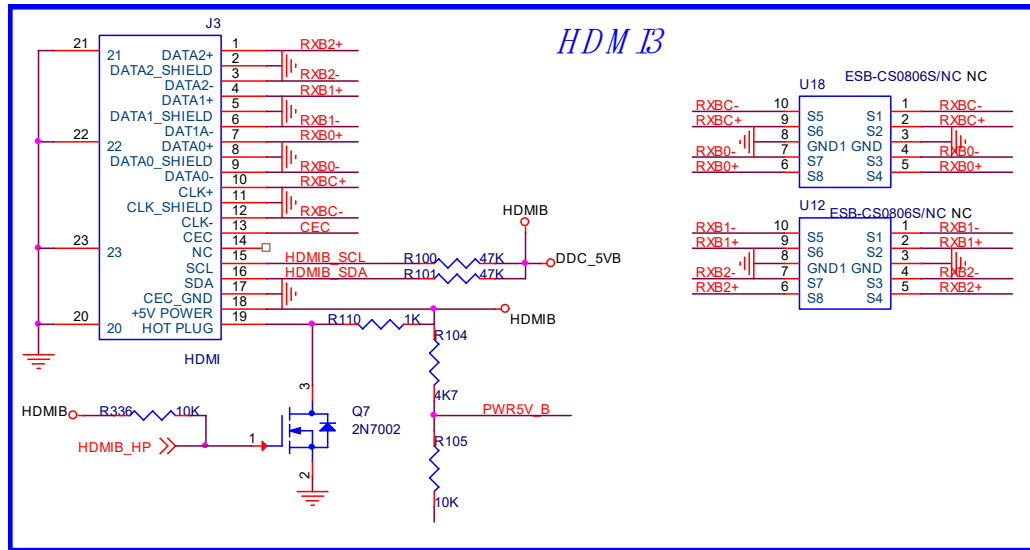
(20) SPDIF OUT

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SPDIF OUT



(21) HDMI SIGNAL



The schematic diagram illustrates the internal circuitry of the HDM12 module. It features a J9 connector (20 pins) connected to an HDM12 IC (20 pins). The HDM12 IC is connected to an HDM12 module (20 pins). The diagram shows the internal connections and external components like resistors and capacitors.

J9 Connector Pinout:

Pin	Signal
1	RXC2+
2	RXD
3	RXC2-
4	RXC1+
5	RXC1-
6	RXC0+
7	RXC0-
8	RXC0+
9	RXC0-
10	RXC0+
11	RXC0-
12	RXC0-
13	CEC
14	TxD
15	HDMIC_SCL
16	HDMIC_SDA
17	CEC_GND
18	+5V POWER
19	HOT PLUG

HDM12 IC Pinout:

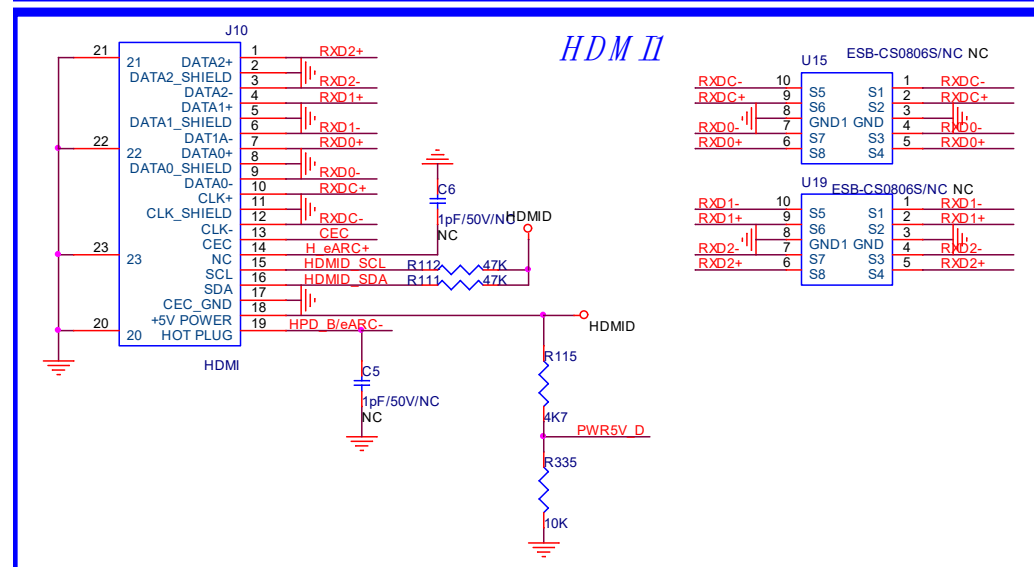
Pin	Signal
1	RXC2+
2	RXD
3	RXC2-
4	RXC1+
5	RXC1-
6	RXC0+
7	RXC0-
8	RXC0+
9	RXC0-
10	RXC0+
11	RXC0-
12	RXC0-
13	CEC
14	TxD
15	HDMIC_SCL
16	HDMIC_SDA
17	CEC_GND
18	+5V POWER
19	HOT PLUG

HDM12 Module Pinout:

Pin	Signal
1	RXC2+
2	RXC2-
3	RXC1+
4	RXC1-
5	RXC0+
6	RXC0-
7	RXC0+
8	RXC0-
9	RXC0+
10	RXC0-
11	RXC0+
12	RXC0-
13	CEC
14	TxD
15	HDMIC_SCL
16	HDMIC_SDA
17	CEC_GND
18	+5V POWER
19	HOT PLUG

External Components:

- Resistors:** R106 (47K), R107 (47K), R25 (1K), R27 (10K), R113 (4K7), R118 (10K).
- Capacitors:** C1 (100nF), C2 (100nF), C3 (100nF), C4 (100nF), C5 (100nF), C6 (100nF), C7 (100nF), C8 (100nF), C9 (100nF), C10 (100nF), C11 (100nF), C12 (100nF), C13 (100nF), C14 (100nF), C15 (100nF), C16 (100nF), C17 (100nF), C18 (100nF), C19 (100nF), C20 (100nF), C21 (100nF), C22 (100nF), C23 (100nF), C24 (100nF), C25 (100nF), C26 (100nF), C27 (100nF), C28 (100nF), C29 (100nF), C30 (100nF), C31 (100nF), C32 (100nF), C33 (100nF), C34 (100nF), C35 (100nF), C36 (100nF), C37 (100nF), C38 (100nF), C39 (100nF), C40 (100nF), C41 (100nF), C42 (100nF), C43 (100nF), C44 (100nF), C45 (100nF), C46 (100nF), C47 (100nF), C48 (100nF), C49 (100nF), C50 (100nF), C51 (100nF), C52 (100nF), C53 (100nF), C54 (100nF), C55 (100nF), C56 (100nF), C57 (100nF), C58 (100nF), C59 (100nF), C60 (100nF), C61 (100nF), C62 (100nF), C63 (100nF), C64 (100nF), C65 (100nF), C66 (100nF), C67 (100nF), C68 (100nF), C69 (100nF), C70 (100nF), C71 (100nF), C72 (100nF), C73 (100nF), C74 (100nF), C75 (100nF), C76 (100nF), C77 (100nF), C78 (100nF), C79 (100nF), C80 (100nF), C81 (100nF), C82 (100nF), C83 (100nF), C84 (100nF), C85 (100nF), C86 (100nF), C87 (100nF), C88 (100nF), C89 (100nF), C90 (100nF), C91 (100nF), C92 (100nF), C93 (100nF), C94 (100nF), C95 (100nF), C96 (100nF), C97 (100nF), C98 (100nF), C99 (100nF), C100 (100nF).



SIGNAL OFFPAGE

The diagram shows the signal offpage connections for the WIF1 module. Key components and connections include:

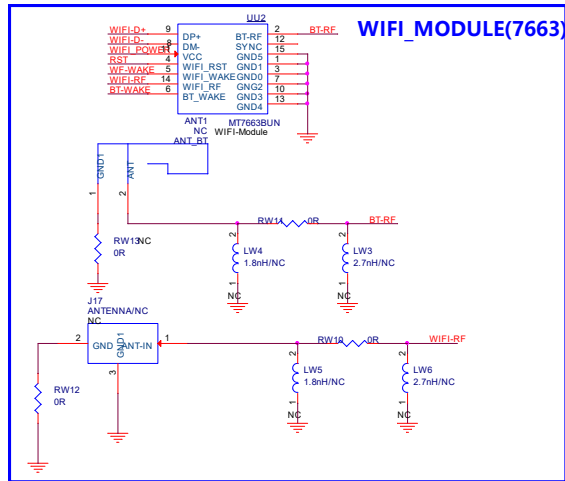
- WIF1_POWER:** Connected to a 100R resistor (R3) and a 150R resistor (R150) to WIF1_WOL.
- WIF1_WAKE:** Connected to a 10K resistor (R4) and a 100R resistor (R100) to WIF1_WOL.
- WIF1_WOL:** Connected to a 100R resistor (R100) and a 150R resistor (R150) to WIF1_POWER.
- BT_WAKE:** Connected to a 100R resistor (R100) and a 150R resistor (R150) to WIF1_WOL.
- USB_WIF1+ and USB_WIF1-:** Connected to a 100R resistor (R100) and a 150R resistor (R150) to WIF1_WOL.
- WIF1_PHY_ON:** Connected to a 10K resistor (RD32) and a 10K resistor (RD21) to WIF1_POWER.
- WIF1_MODULE:** Connected to a 100R resistor (R100) and a 150R resistor (R150) to WIF1_WOL.

POWER SWITCH

The diagram shows the power switch connections for the WIF1 module. Key components and connections include:

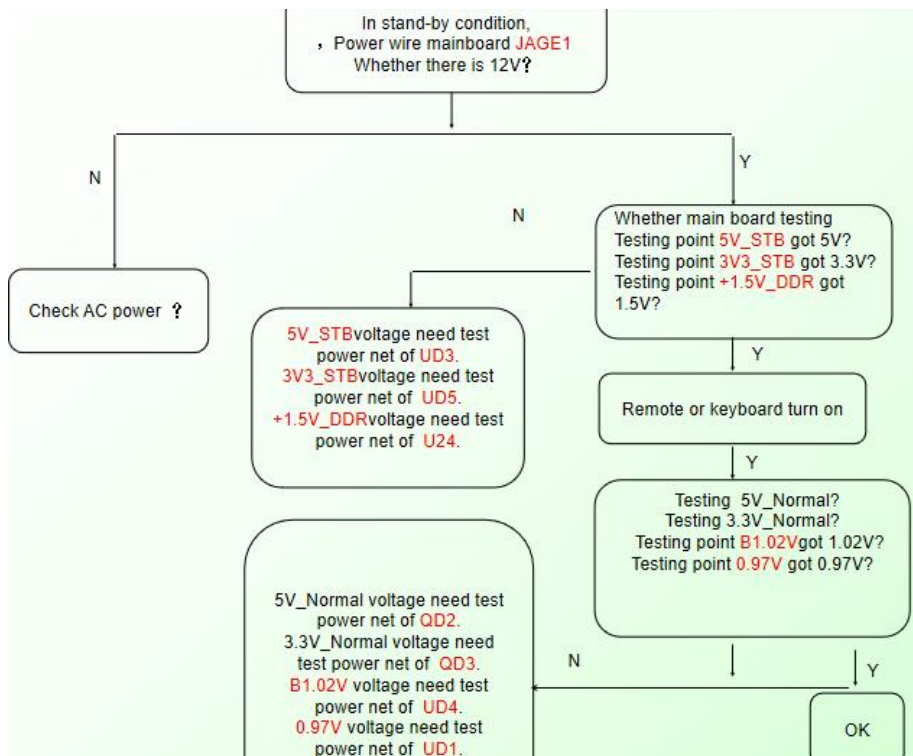
- +5V_STB:** Connected to a 100R resistor (RD32) and a 10K resistor (RD21) to WIF1_POWER.
- +3.3V_STB:** Connected to a 100R resistor (RD32) and a 10K resistor (RD21) to WIF1_POWER.
- WIF1_POWER:** Connected to a 100R resistor (RD32) and a 10K resistor (RD21) to WIF1_MODULE.
- WIF1_MODULE:** Connected to a 100R resistor (RD32) and a 10K resistor (RD21) to WIF1_POWER.

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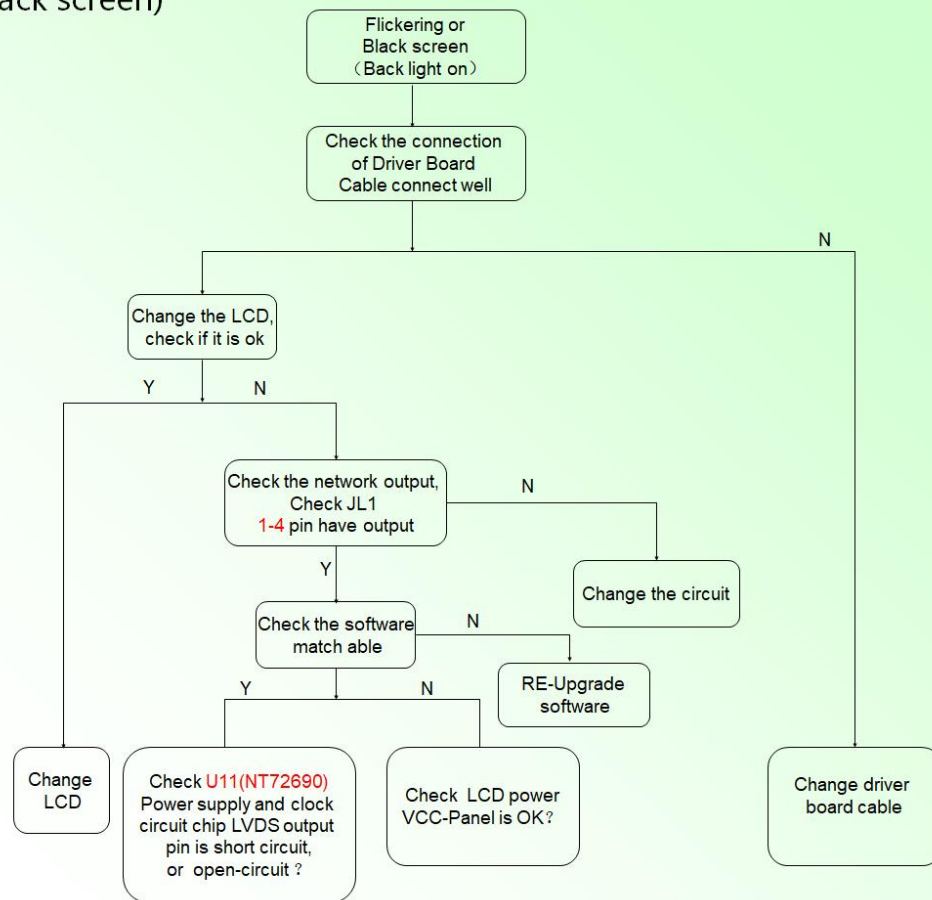
4. Common problem solving:

(1) Power Units Problem Solving:



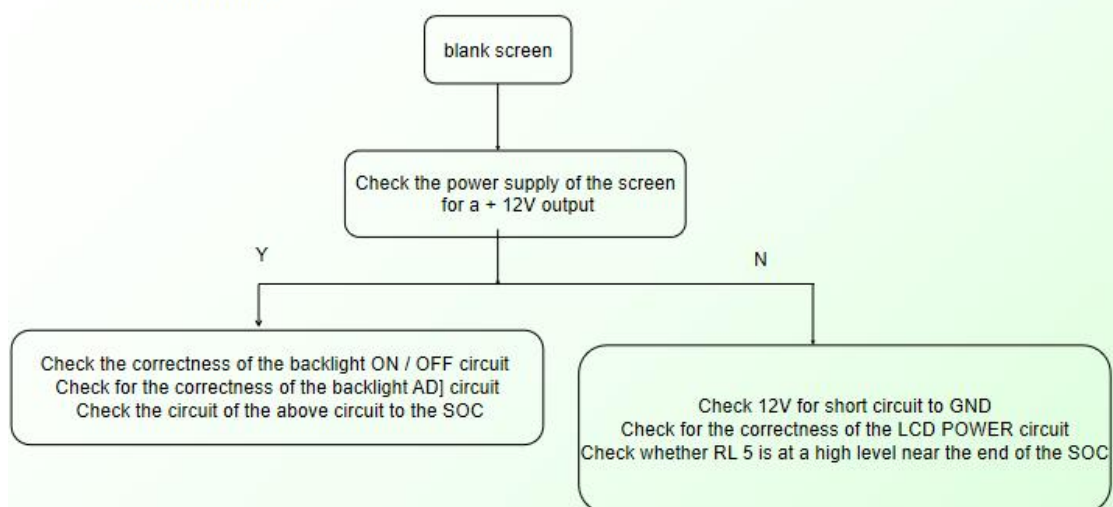
(2) Flickering or Black screen (Back light on) :

PICTURE 2
Display Unit
(black screen)

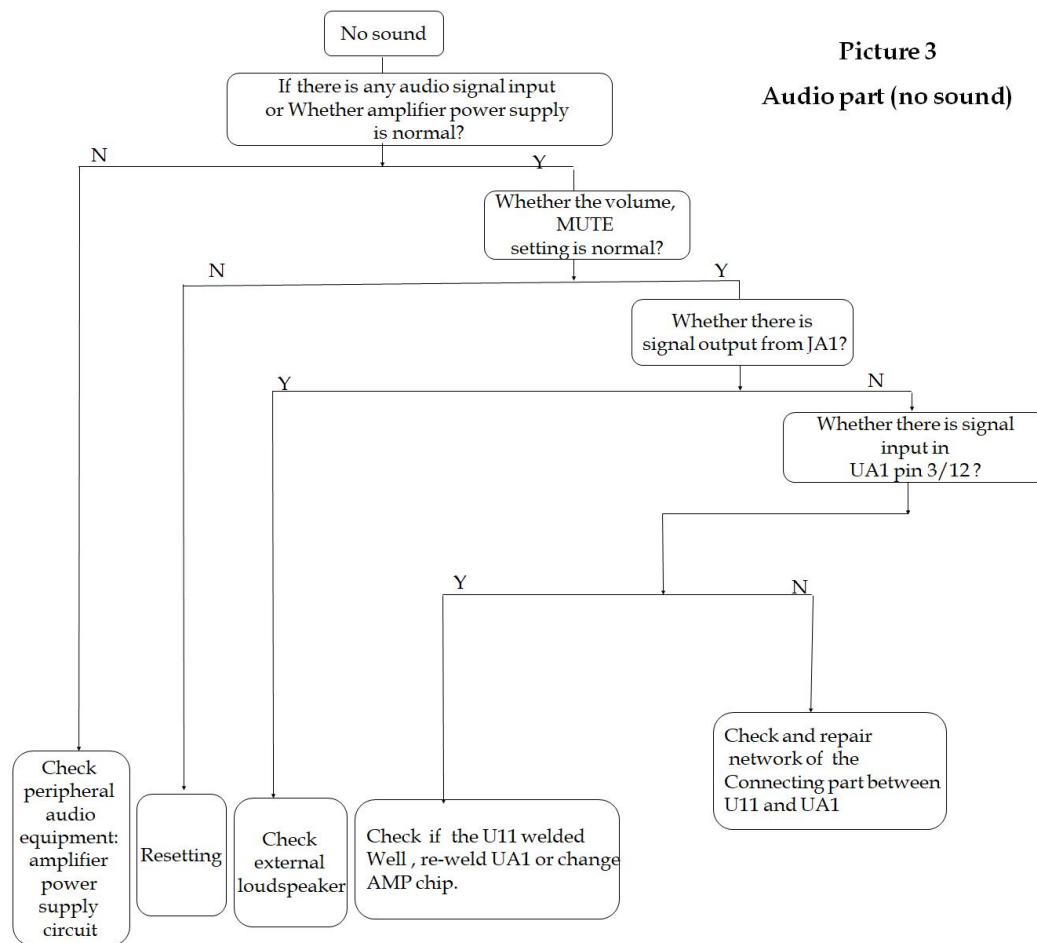


(3) The screen is black but the motherboard works properly:

Picture 3 Display Unit
(black screen)

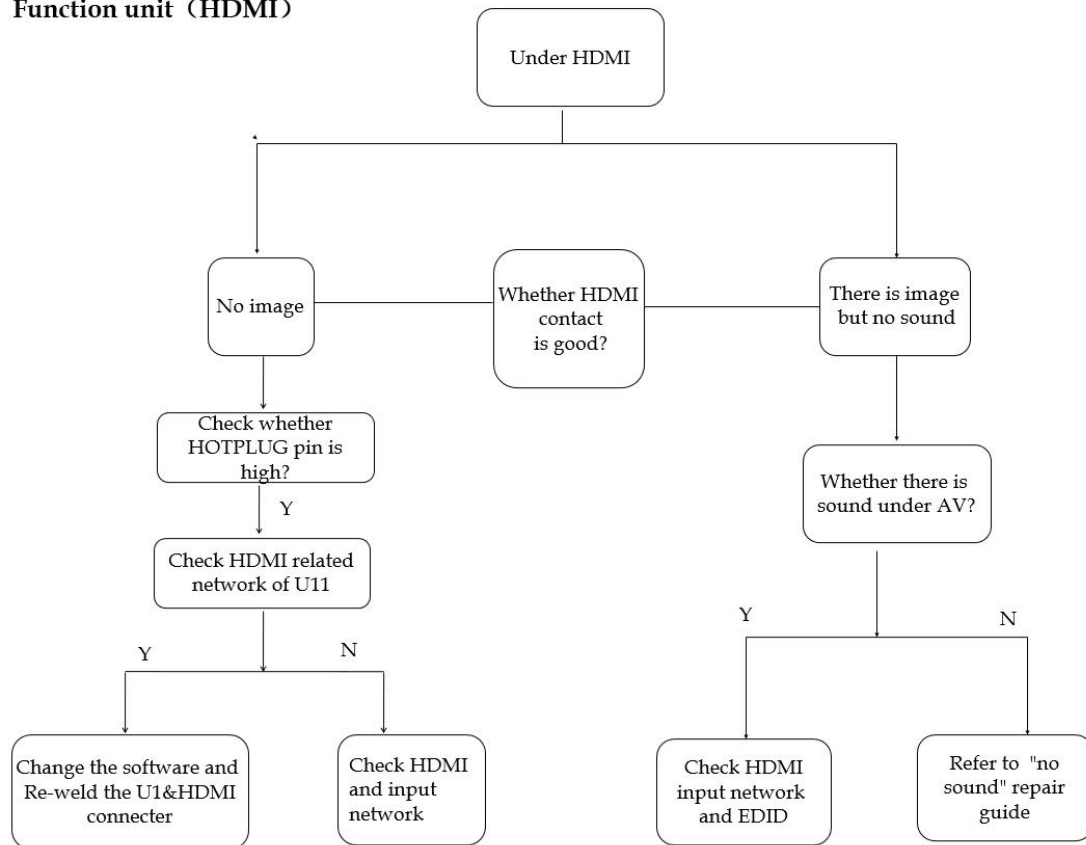


(4) There are images without sound



(5) Function Unit (HDMI)

Function unit (HDMI)



5. The Television updates process

USB update:

- (1) Copy the BIN file to USB dish's root directory.
- (2) Connect the USB to the USB port on TV; it will be automatically upgrade by power on.