

CV72690_MH Service Manual

CV72690_MH is an integration board of 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 and UHD mode (480 p / 576 I / 720 p / 1080 I/p/3840*2160 up to 60HZ);
- 2. Standby power consumption (≤0.5W)
- 3. Port:

	ATV (Analog NTSC-M/PAL-M/N) , DTV(DVB-T/T2/S2)	2 path
	MINI AV IN	1 path

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(Input port)	USB2.0	2 path
	HDMI In	3 path
	RJ45	1 path
(Output port)	EARPHONE (L, R)	1 path
	Optical/COAX	1 path

4. ARM CA55 Quad core@1.2GHz, Built-in 1.5GB DDR;

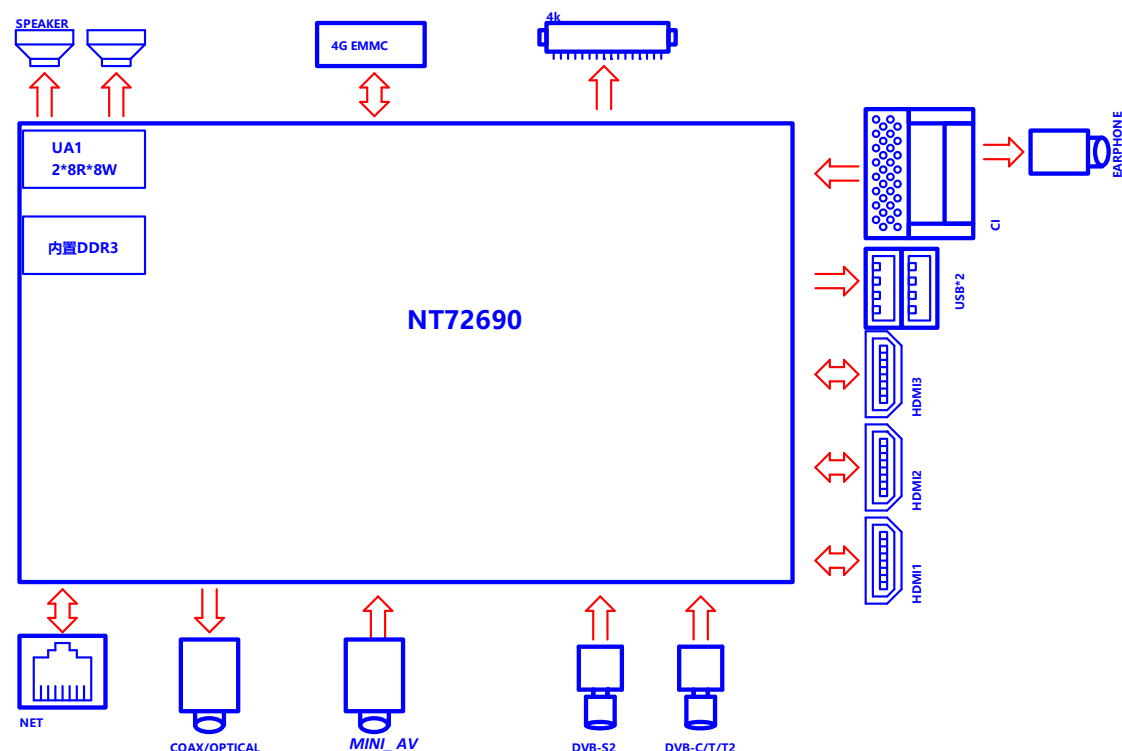
5. Supports USB software update;

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.

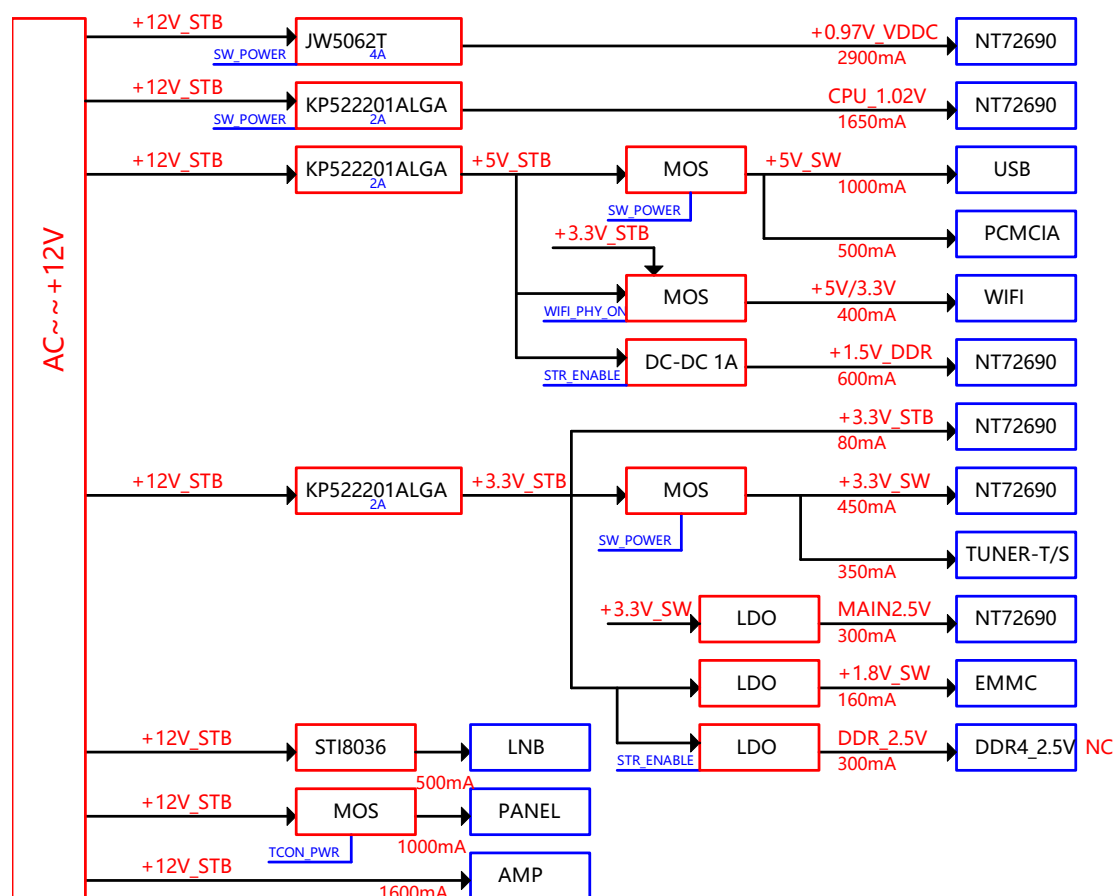
(2) The basic block diagram:



CV72690_MH principle block diagram

(3) The power supply block diagram:

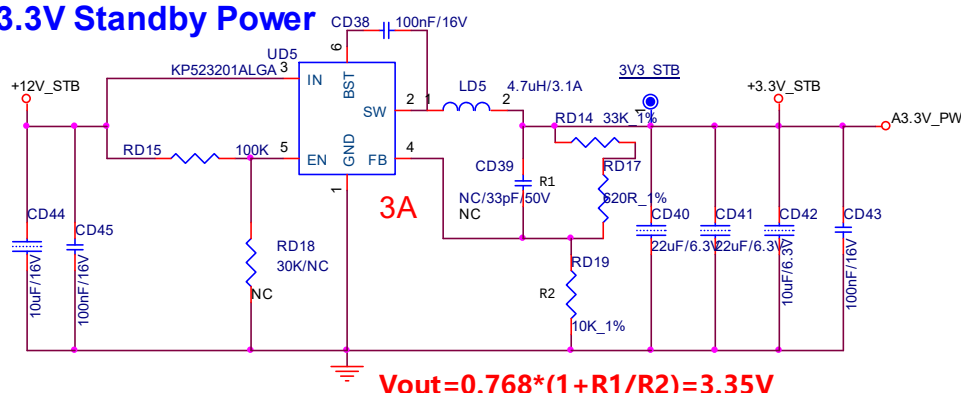
POWER SUPPLY ARCHITECTURE



CV72690-MH power supply block diagram

(4) 12V to 3.3V_Standby circuit

3.3V Standby Power



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

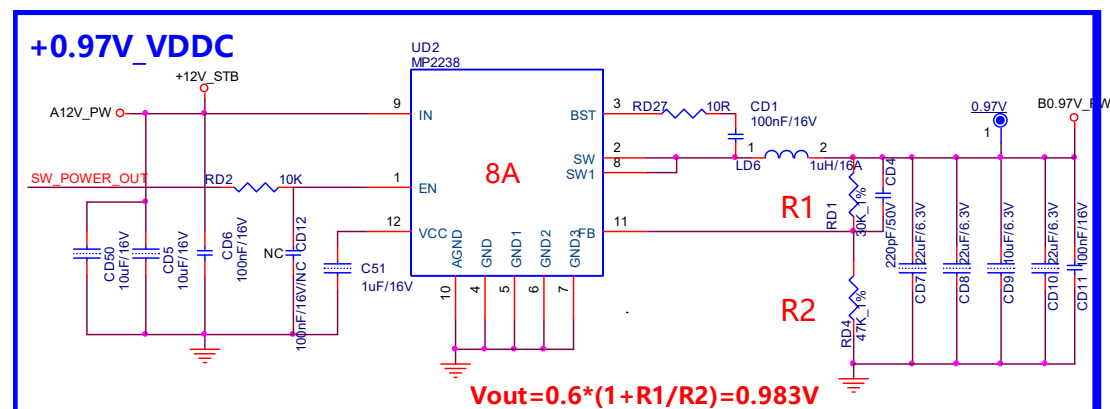
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protection(OVP),Thermal Shutdown,Inrush Current Limit and Soft Start

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:



It is a low power DC-DC component of MPS, QFN-12-2X3 package, the main features of the IC are show as follow:

4.2V to 18V operating input range

8A output current

Up to 95% efficiency

High efficiency (>85%) at light load

600kHz switching frequency

Internal soft-start

Input under voltage lockout

Feedback short protection

Current run-away protection

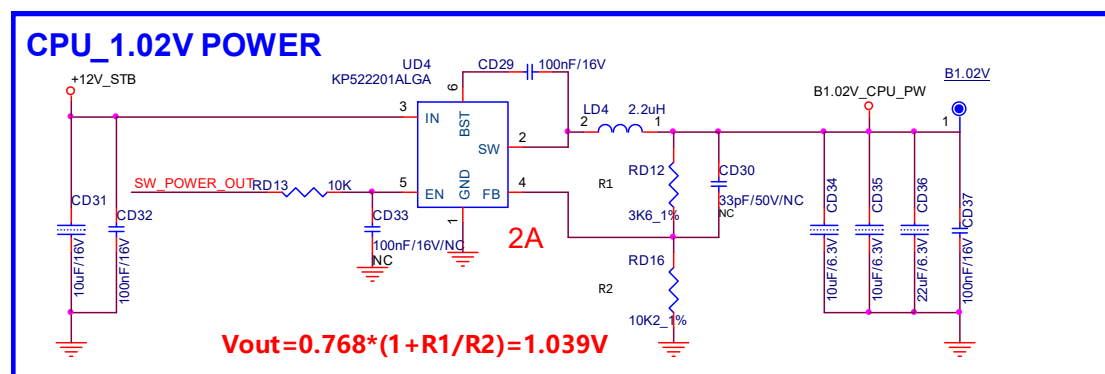
Output short protection

Thermal protection

Available in TSOT23-6 package

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

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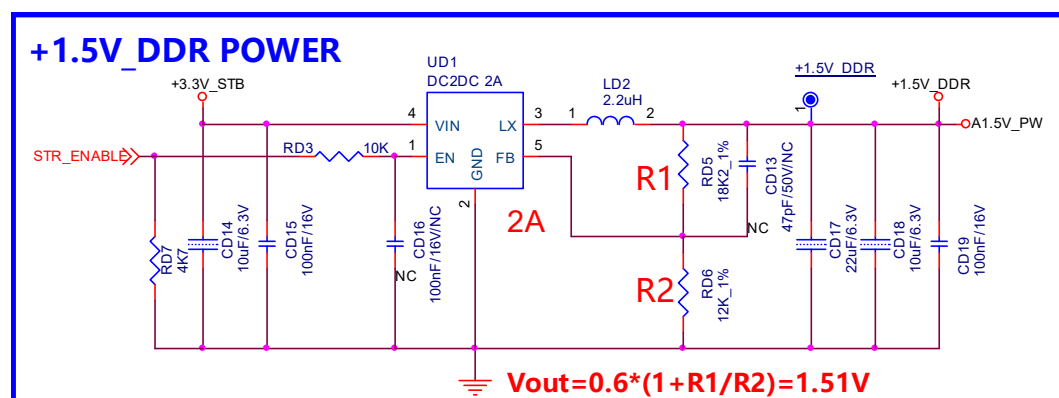
It is a low power DC-DC component of KIWI,SOT23-6 package, the main features of the IC are show as follow:

- 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 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).

(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 show as follow:

- Input voltage range: 2.5V—5.5V
- Output voltage range: 0.6V—5.5V
- Up to 2A output current.

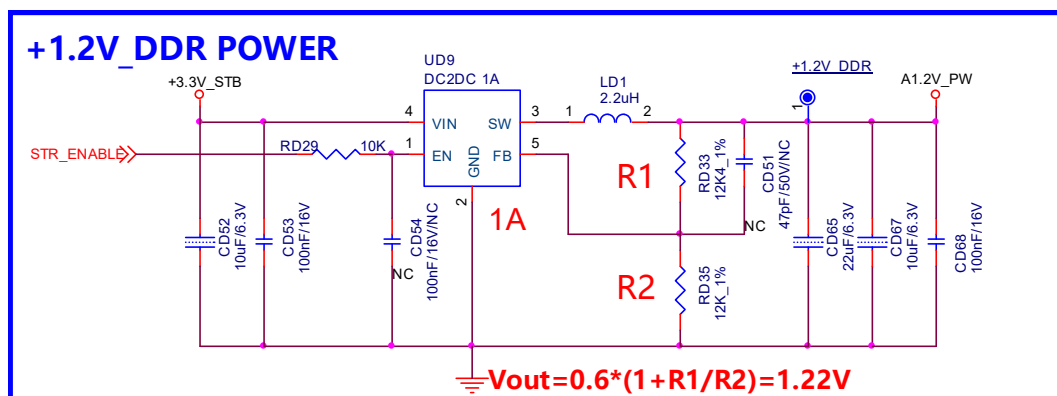
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- Output short protection, thermal protection, Inrush Current Limit and Soft Start, Input over voltage protection (OVP).

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 to 1.2V DDR4 voltage circuit:



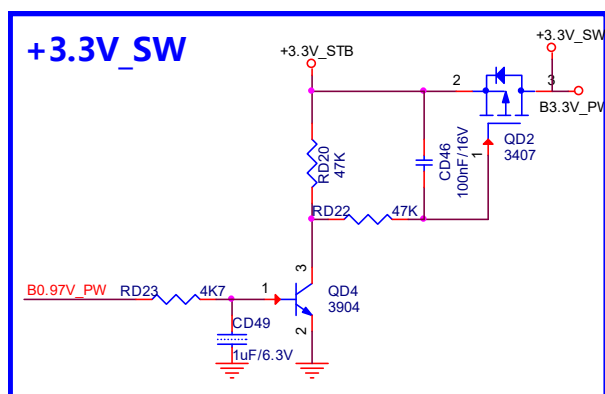
It is a low power DC-DC component of Joulwatt, SOT23-5 package, the main features of the IC are show as follow:

- Input voltage range: 2.5V—5.5V
- Output voltage range: 0.6V—5.5V
- Up to 1A output current.
- Output short protection, thermal protection, Inrush Current Limit and Soft Start, Input over voltage protection (OVP).

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

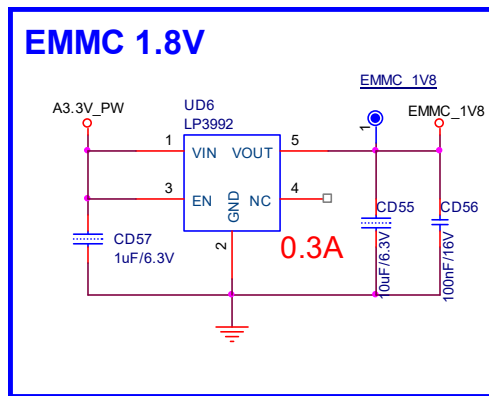
- Although there is PIN to PIN component of other brand, suggest according to the BOM material number to replace this component. If there is must to use a high specification to replace, it is recommended to replacement of adjacent specification, in order to avoid excessive ripple in light load mode.

(9) 3.3V_Normal circuit



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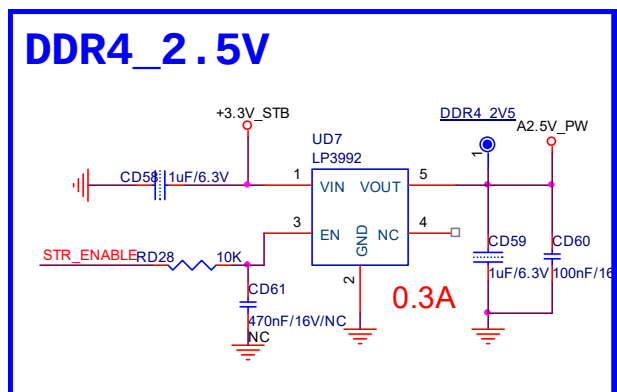
(10) 3.3V to 1.8V_normal circuit



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

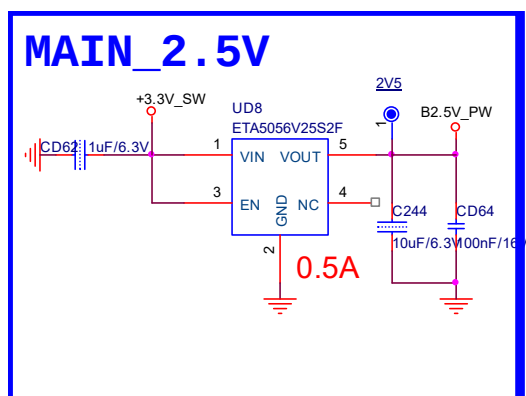


It is a low power CMOS LDO component, SOT23-5 package, the main features of the IC are show as follow:

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

(12) 3.3V to 2.5V_normal circuit

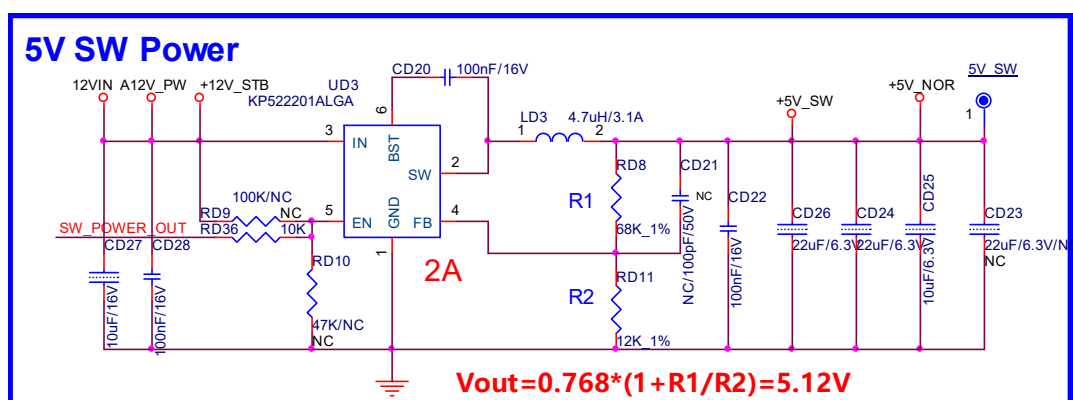
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It is a low power CMOS LDO component, SOT23-5 package, the main features of the IC are show as follow:

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

(13) 12V to 5V_NORMAL circuit:



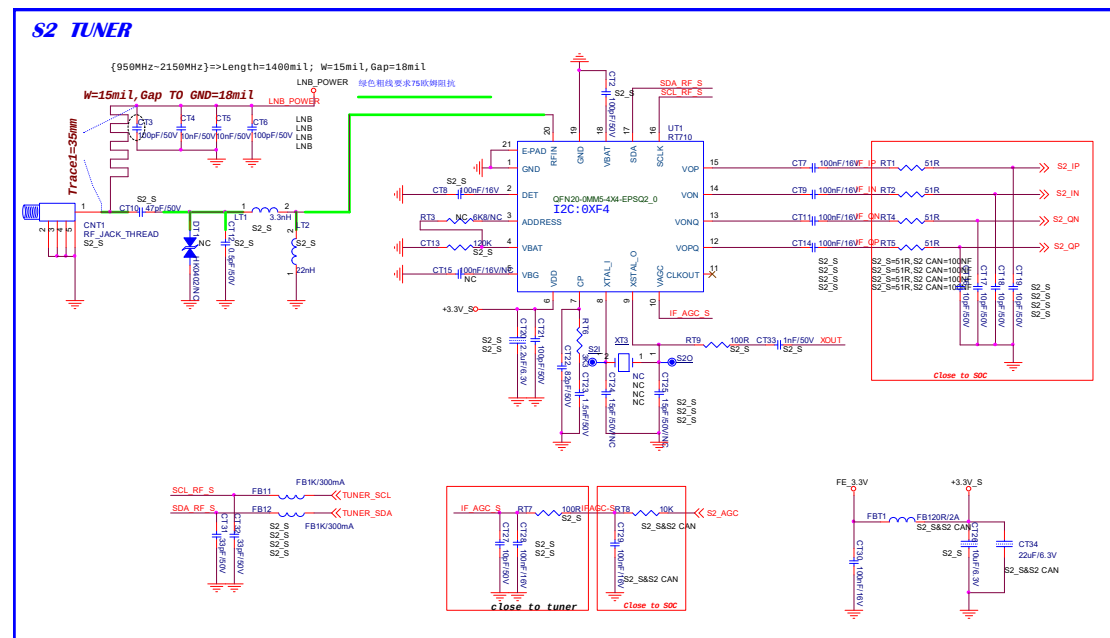
it is a low power DC-DC component of KIWI,SOT23-6 package, the main features of the IC are show as follow:

- 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

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

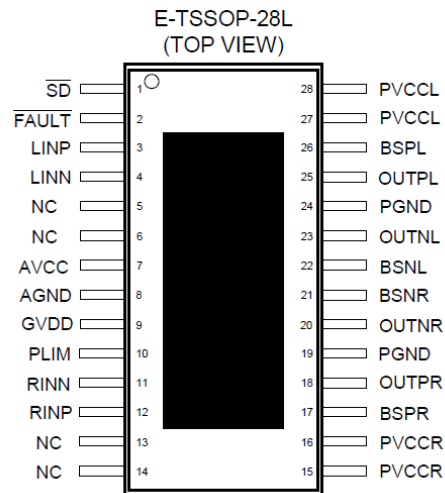
condition).



- RF frequency range: 42MHZ-1002MHZ.
- Worldwide hybrid TV tuner
- Analog: PAL, NTSC,and SECAM.
- Digital: DVB-T/T2/C/S2
- Channel bandwidth: 6MHZ,7MHZ,8MHZ.

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

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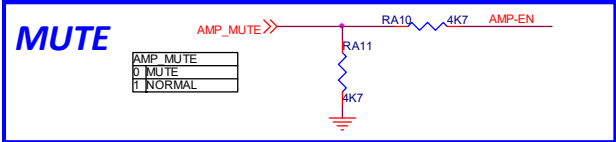
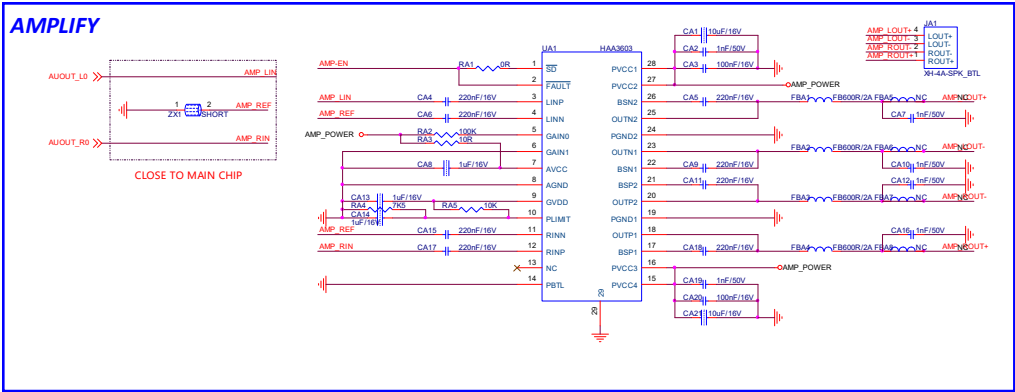
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The function of each pin is show as follow:

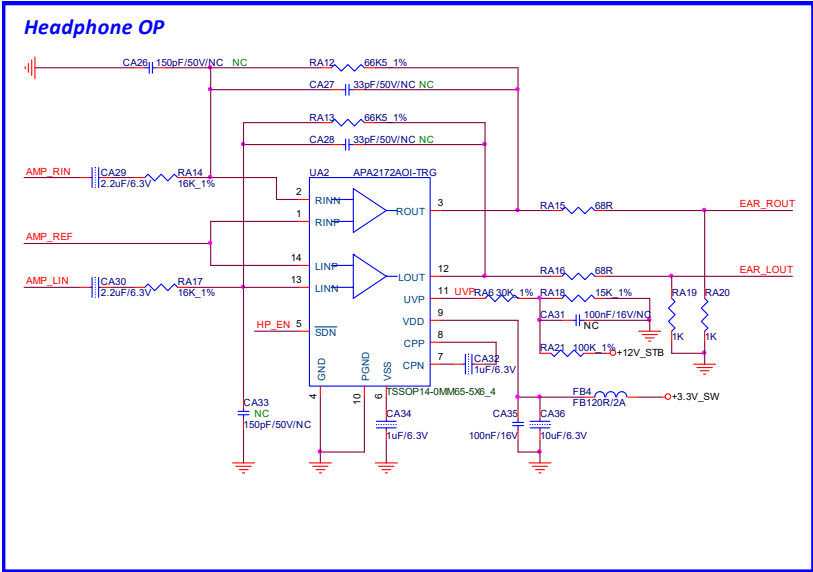
NAME	E-TSSOP-28L	TYP	DESCRIPTION
$\overline{SD}$	1	I	Shutdown signal for IC (low = disabled, high = operational). Voltage compliance to AVCC.
$\overline{FAULT}$	2	O	Open drain output used to display short circuit or dc detect fault. Voltage compliant to AVCC. Short circuit faults can be set to auto-recovery 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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NC	14	NA	NC pin
PVCCR	15,16	P	High-voltage power supply for right-channel. Right channel and left channel power supply inputs are connect internal.
BSPR	17	I	Bootstrap I/O for right channel, positive high side FET.
OUTPR	18	O	Class-D H-bridge positive output for right channel.
PGND	19	P	Power ground for the H-bridges.
OUTNR	20	O	Class-D H-bridge negative output for right channel.
BSNR	21	I	Bootstrap I/O for right channel, negative high side FET.
BSNL	22	I	Bootstrap I/O for left channel, negative high side FET.
OUTNL	23	O	Class-D H-bridge negative output for left channel.
PGND	24	P	Power ground for the H-bridges.
OUTPL	25	O	Class-D H-bridge positive output for left channel.
BSPL	26	I	Bootstrap I/O for left channel, positive high side FET.
PVCCL	27,28	P	High-voltage power supply for right-channel. Right channel and left channel power supply inputs are connect internal.
Thermal Pad		P	Must be soldered to PCB's ground plane.

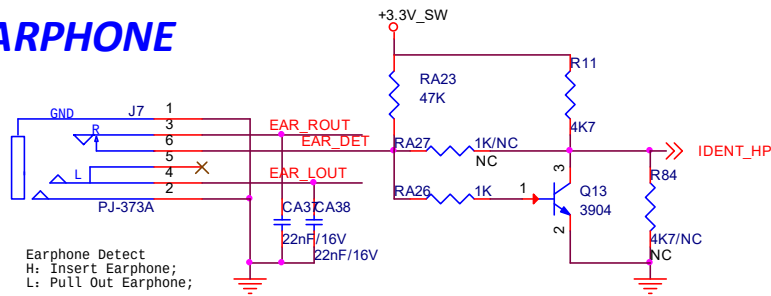


(16) EARPHONE

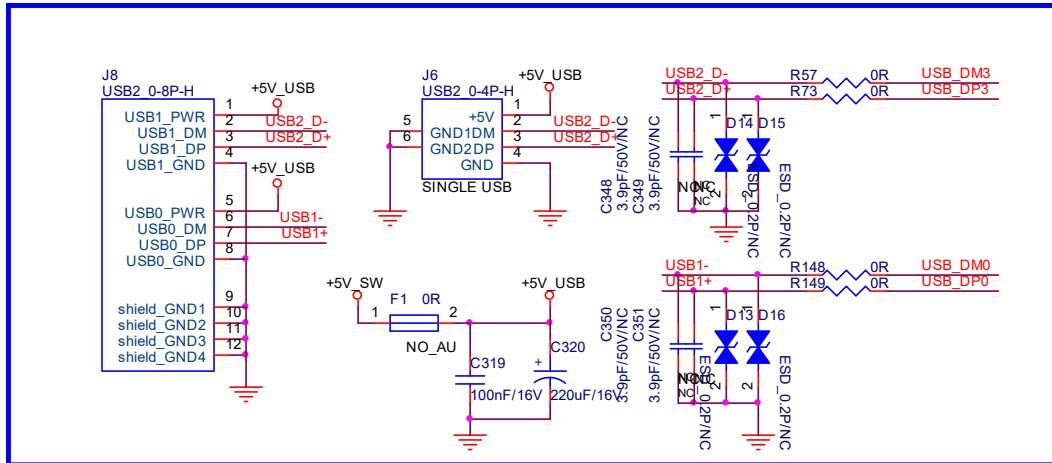


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EARPHONE

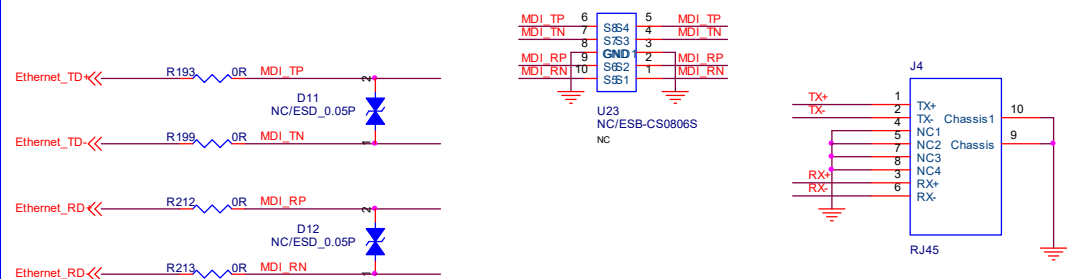


(17) USB

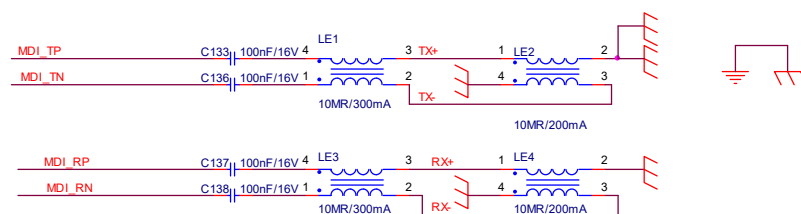


(18) Ethernet

Ethernet Connetor



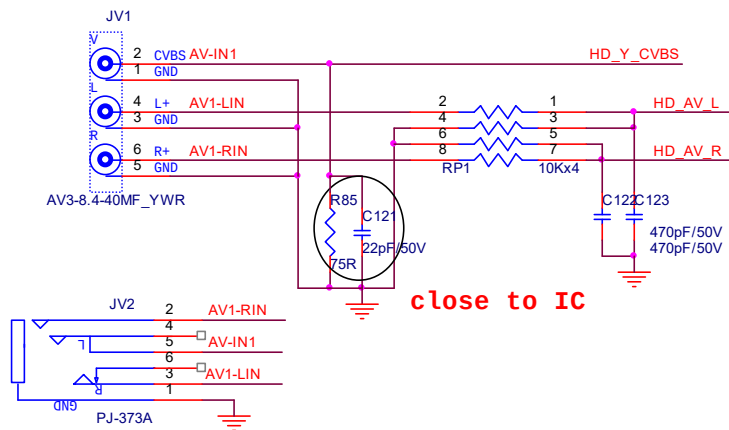
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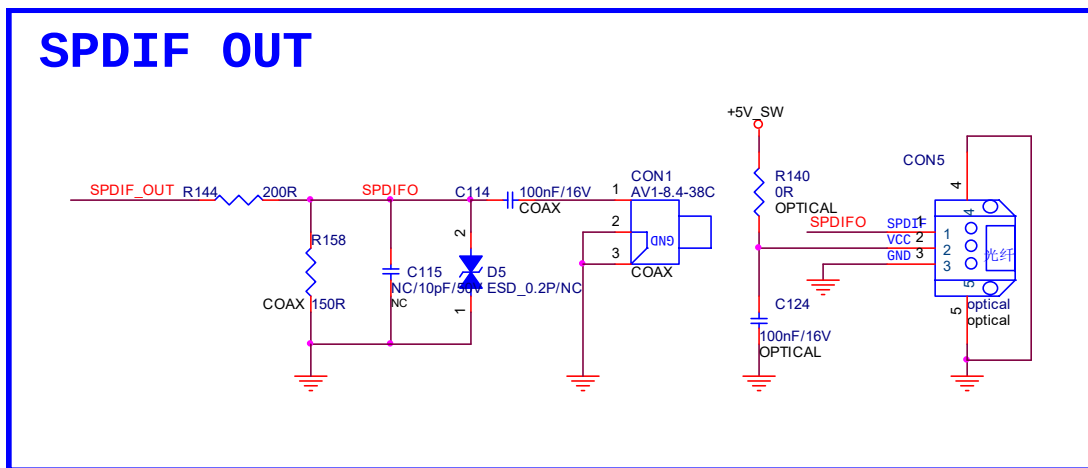
(19) AV IN

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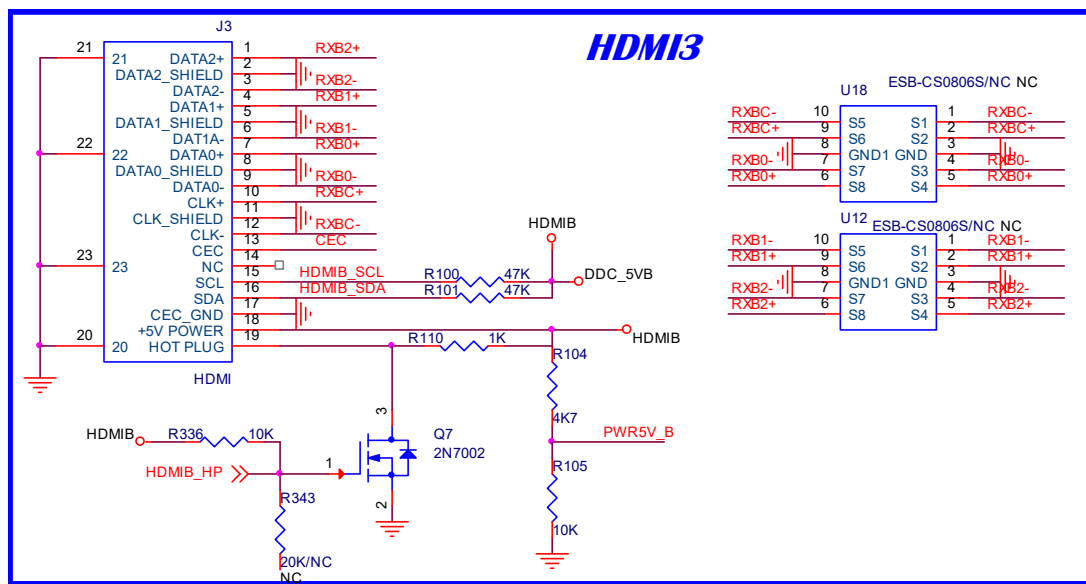
AV1_IN

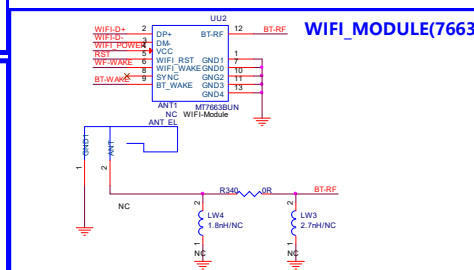
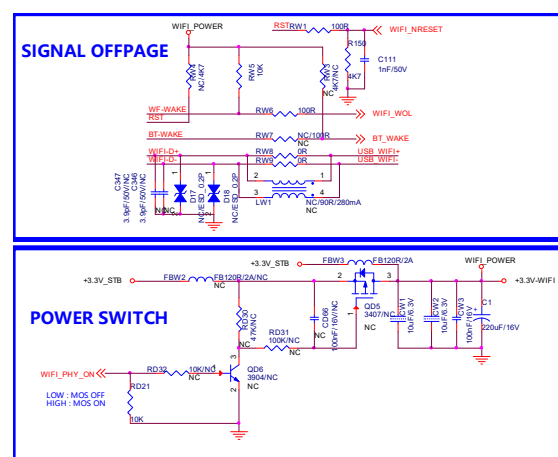
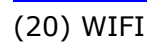


(20) SPDIF OUT



(21) HDMI SIGNAL

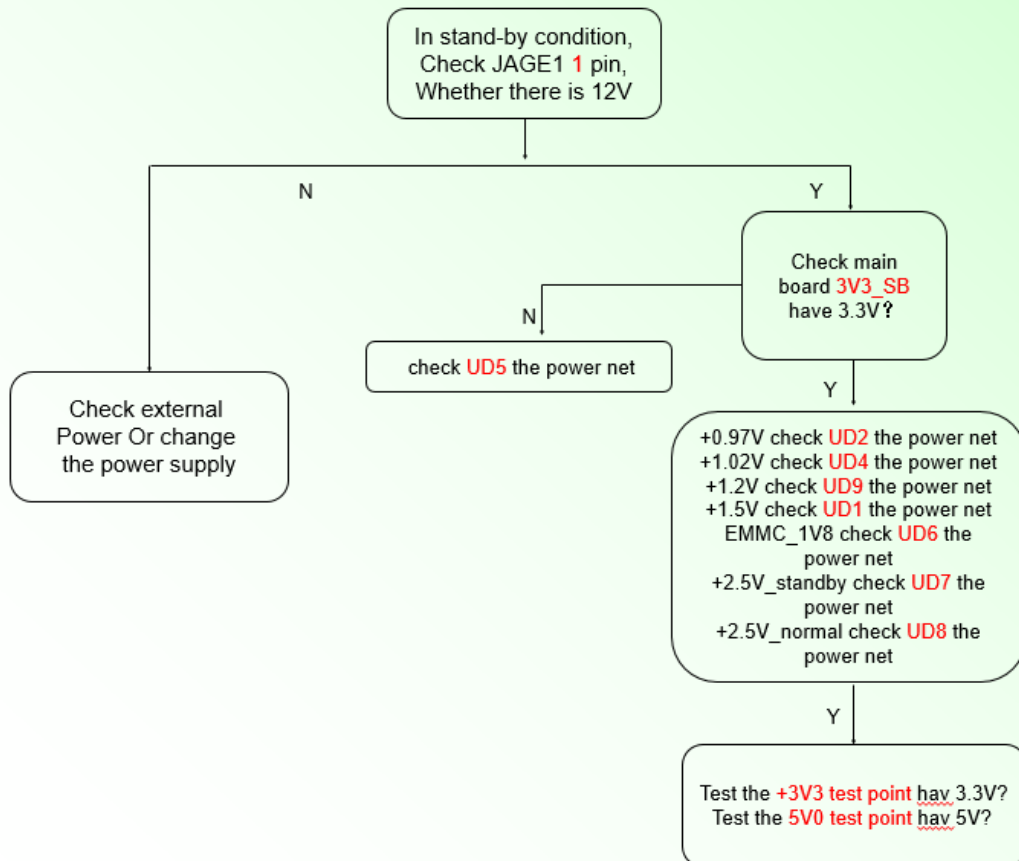


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4. Common problem solving:

(1) Power Units Problem Solving:

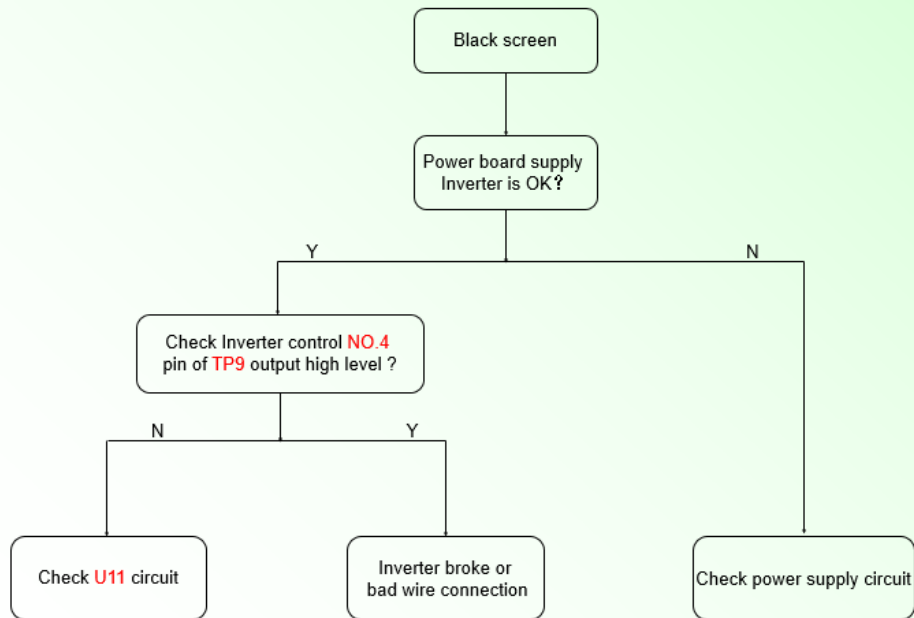
PICTURE 1
Power Units
Problem Solving



(2) Display Unit (black screen):

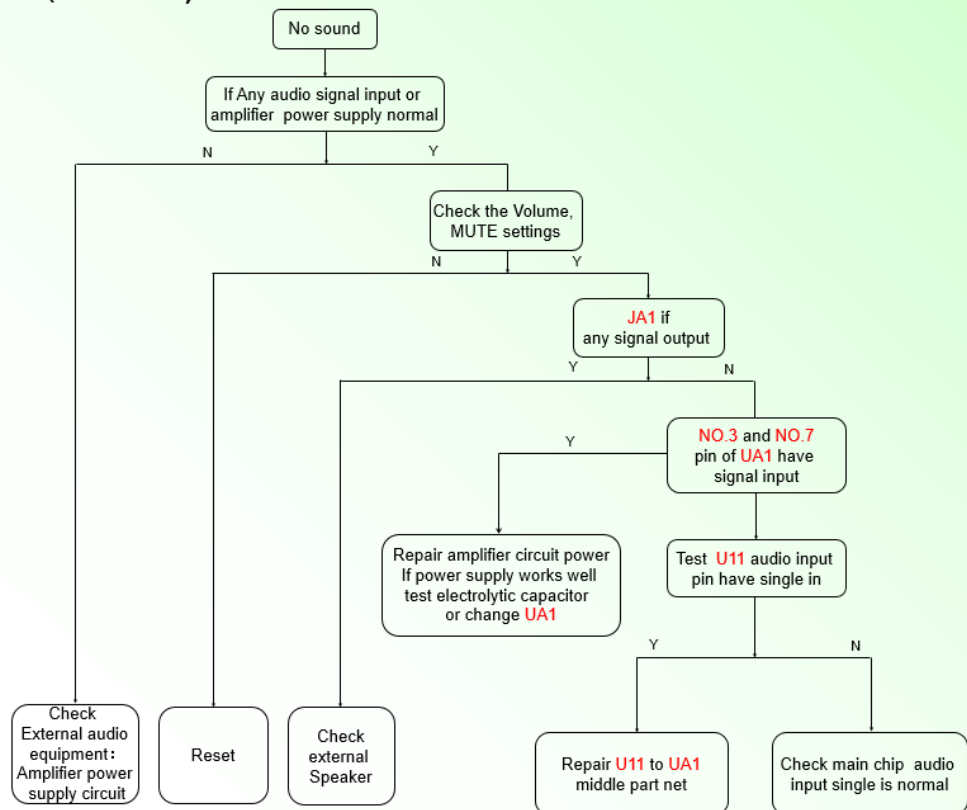
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PICTURE 3
Display Unit
(black screen)



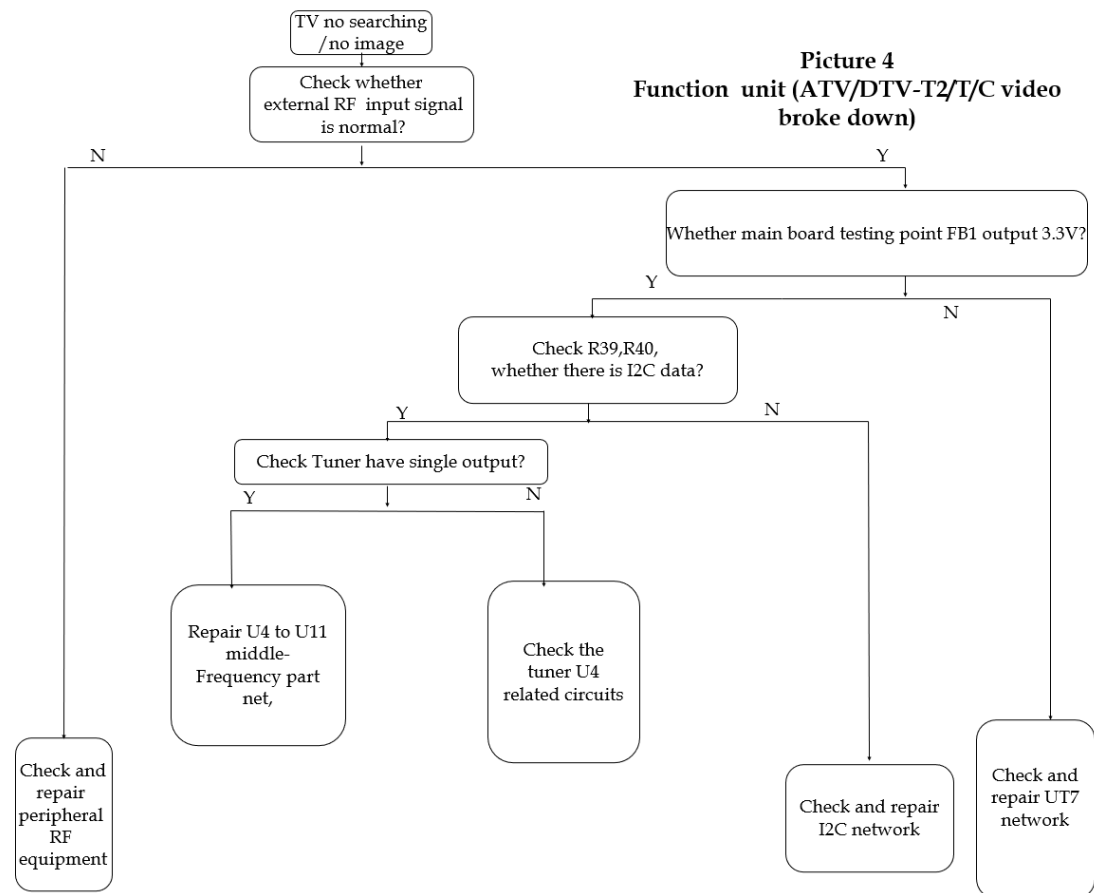
(3) Audio Unit (no sound)

PICTURE 4
Audio Unit
(no sound)

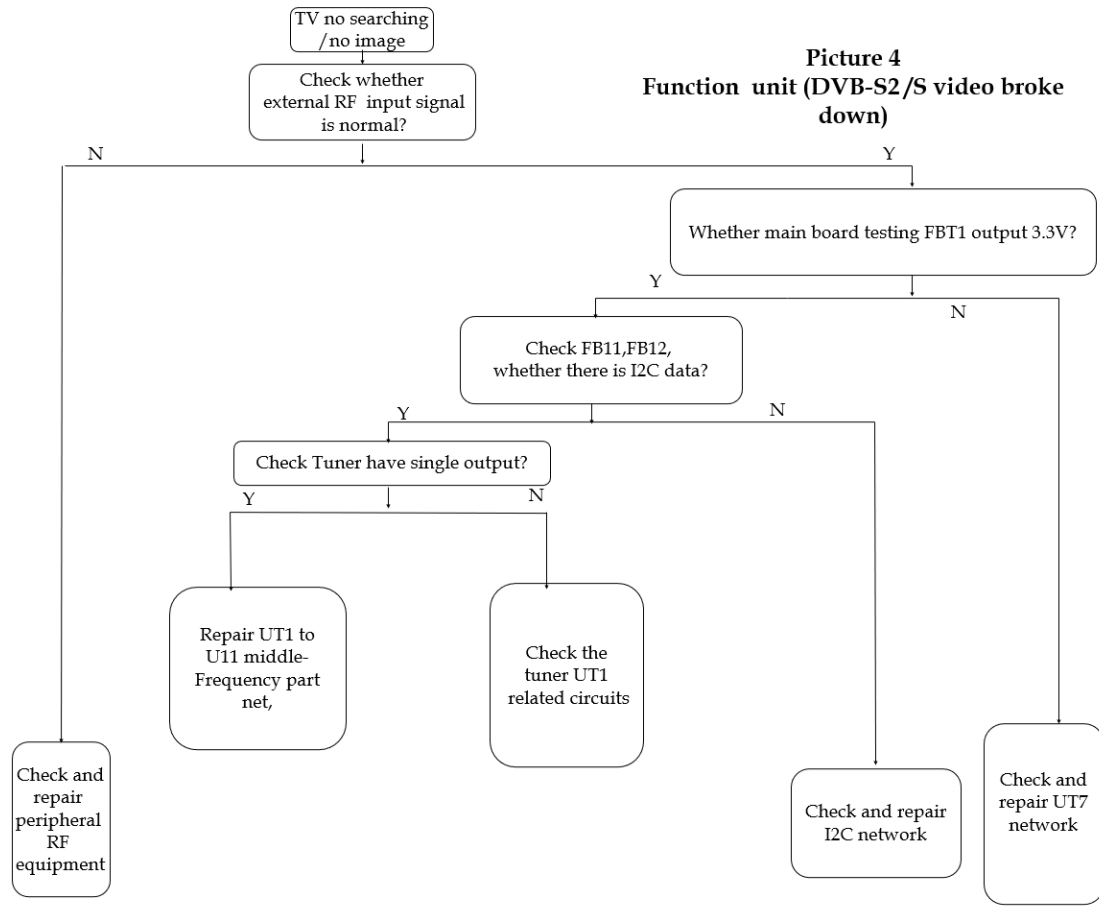


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(4) Function Unit(ATV/DTV broke down)

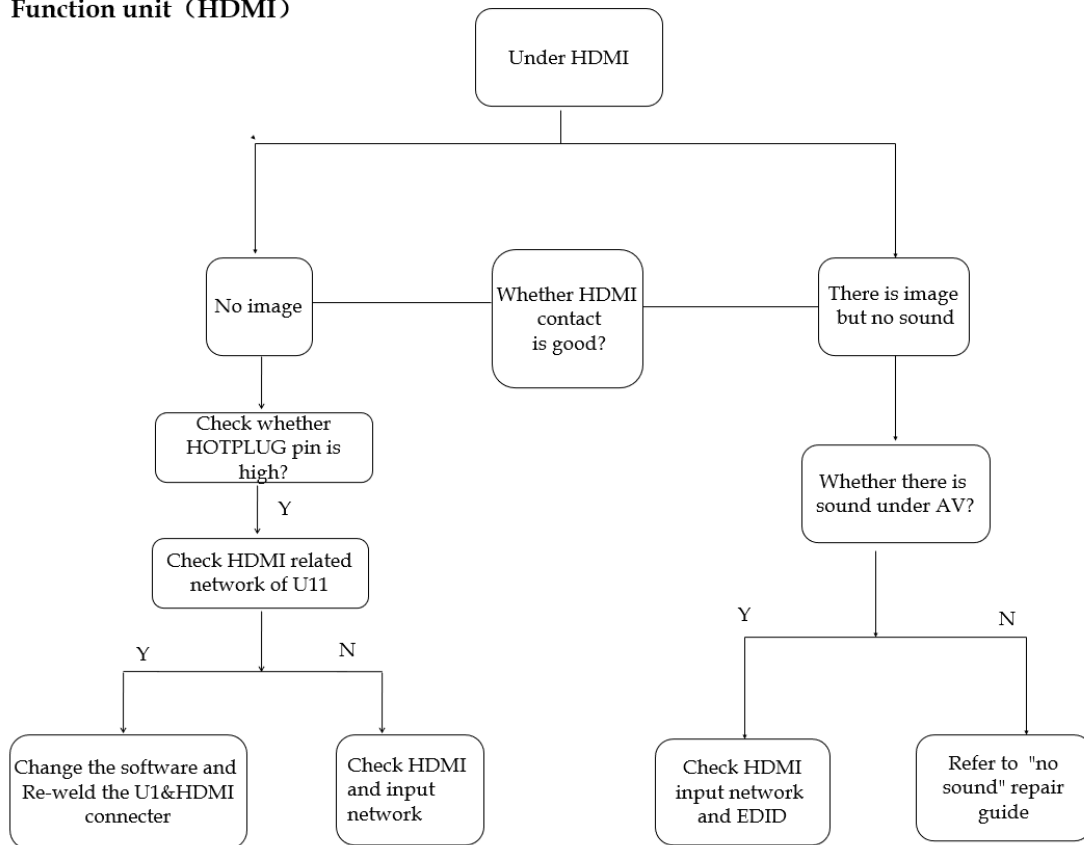


Picture 4
Function unit (DVB-S2/S video broke down)



(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.