TCL
SERVICE MANUAL

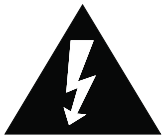
32S6500S/RT41PB-AG

1. Caution……
2. specification……
3. Alignment Procedure……
4. Block diagram……
5. Scheme Diagram ……
6. Troubleshooting……
7. Explode drawing.....

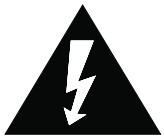
This m anual i s t he l atest at t he t ime of pr inting, and doe s not include the modification which may be made after the printing, by the constant improvement of product

1. CAUTION

CAUTION:
Use of controls, adjustments or procedures other than those specified herein may result in hazardous radiation exposure.



CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



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

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 appliance.

WARNING: TO REDUCE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

IMPORTANT SAFETY INSTRUCTIONS

CAUTION:

Read all of these instructions. Save these instructions for later use. Follow all Warnings and Instructions marked on the audio equipment.

1. Read Instructions- All the safety and operating instructions should be read before the product is operated.
2. Retain Instructions- The safety and operating instructions should be retained for future reference.
3. Heed Warnings- All warnings on the product and in the operating instructions should be adhered to.
4. Follow Instructions- All operating and use instructions should be followed.

FOR YOUR PERSONAL SAFETY

1. When the power cord or plug is damaged or frayed, unplug this television set from the wall outlet and refer servicing to qualified service personnel.
2. Do not overload wall outlets and extension cords as this can result in fire or electric shock.
3. Do not allow anything to rest on or roll over the power cord, and do not place the TV where power cord is subject to traffic or abuse. This may result in a shock or fire hazard.
4. Do not attempt to service this television set yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
5. Never push objects of any kind into this television set through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the television set.
6. If the television set has been dropped or the cabinet has been damaged, unplug this television set from the wall outlet and refer servicing to qualified service personnel.
7. If liquid has been spilled into the television set, unplug this television set from the wall outlet and refer servicing to qualified service personnel.
8. Do not subject your television set to impact of any kind. Be particularly careful not to damage the picture tube surface.
9. Unplug this television set from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

10.1. Do not place this television set on an unstable cart, stand, or table. The television set may fall, causing serious injury to a child or an adult, and serious damage to the appliance. Use only with a cart or stand recommended by the manufacturer, or sold with the television set. Wall or shelf mounting should follow the manufacturer's instructions, and should use a mounting kit approved by the manufacturer.

10.2. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

PROTECTION AND LOCATION OF YOUR SET

11. • Do not use this television set near water ... for example, near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, etc.
    • Never expose the set to rain or water. If the set has been exposed to rain or water, unplug the set from the wall outlet and refer servicing to qualified service personnel.

12. Choose a place where light (artificial or sunlight) does not shine directly on the screen.

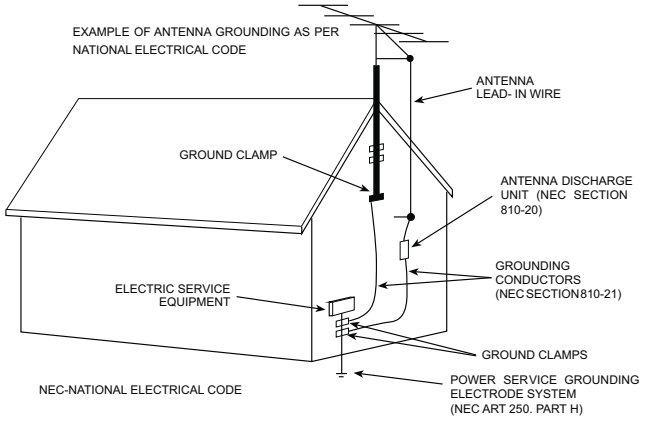
13. Avoid dusty places, since piling up of dust inside TV chassis may cause failure of the set when high humidity persists.

14. The set has slots, or openings in the cabinet for ventilation purposes, to provide reliable operation of the receiver, to protect it from overheating. These openings must not be blocked or covered.
    • Never cover the slots or openings with cloth or other material.
    • Never block the bottom ventilation slots of the set by placing it on a bed, sofa, rug, etc.
    • Never place the set near or over a radiator or heat register.
    • Never place the set in a "built-in" enclosure, unless proper ventilation is provided.

PROTECTION AND LOCATION OF YOUR SET

15.1. If an outside antenna is connected to the television set, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges, Section 810 of the National Electrical Code, NFPA No. 70-1975, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrode, and requirements for the grounding electrode.

EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE INSTRUCTIONS



15.2. Note to CATV system installer : (Only for the television set with CATV reception)

This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

16. An outside antenna system should not be located in the vicinity of overhead power lines or other electric lights or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.

17. For added protection for this television set during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna. This will prevent damage due to lightning and power-line surges.

OPERATION OF YOUR SET

18. This television set should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply at your home, consult your television dealer or local power company. For television sets designed to operate from battery power, refer to the operating instructions.
19. If the television set does not operate normally by following the operating instructions, unplug this television set from the wall outlet and refer servicing to qualified service personnel. Adjust only those controls that are covered in the operating instructions as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the television set to normal operation.
20. When going on a holiday : If your television set is to remain unused for a period of time, for instance, when you go on a holiday, turn the television set "off" and unplug the television set from the wall outlet.

IF THE SET DOES NOT OPERATE PROPERLY

21. If you are unable to restore normal operation by following the detailed procedure in your operating instructions, do not attempt any further adjustment. Unplug the set and call your dealer or service technician.
22. Whenever the television set is damaged or fails, or a distinct change in performance indicates a need for service, unplug the set and have it checked by a professional service technician.
23. It is normal for some TV sets to make occasional snapping or popping sounds, particularly when being turned on or off. If the snapping or popping is continuous or frequent, unplug the set and consult your dealer or service technician.

FOR SERVICE AND MODIFICATION

24. Do not use attachments not recommended by the television set manufacturer as they may cause hazards.
25. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
26. Upon completion of any service or repairs to the television set, ask the service technician to perform routine safety checks to determine that the television is in safe operating condition.

PRODUCT SPECIFICATION RELEASE

Model: 32S6500S/RT41PB-AG/CJ9W02

Version：1.1 Issued on: 2018-09-13

Basic Information

Product Type	Google Android TV---LED HD DTV
Chassis Platform	RT41PB-AG (SOC: RTD2841SAA)
CPU	CA53*4 64bit
GPU	Mali470x2
OS	Android O，Certified by Google Android TV
Storage	8G Byte eMMC Memory
UI Style	Google Android TV UI & TCL TV+ 3.x UI
Launcher Homepages Show	Featured Apps, Source, Apps, Settings, etc.
OSD Language	English, Spanish (Latin America), Portuguese (Latin America)
TV System	ATV: PAL-N, PAL-M, NTSC-M
	DTV: ISDB-T
AV System	PAL, NTSC
HDMI & HDCP Version	HDMI1.4b, HDCP1.4
HDR	2K HDR10 Decoding
Power Supply	AC 100V-240V 50/60Hz
Power Consumption (TV On)	50W
Power Consumption (Standby)	< 0.5W
ECO Energy Efficiency	Yes
Certification	CB, Dolby Audio, HDMI
	CTS (Google Official Certification), Netflix
Internet Link	2.4GHz Wi-Fi 802.11 b/g/n 2T2R
	Ethernet Network (RJ45)
Bluetooth	Bluetooth 4.0
LED Indicator Status	Below the middle of the frame, white in standby.
	Normal, Flashing, Off

Basic Function

Google Voice Input	Yes, need an extra special remote control.
Initial Setup	Yes, for user setting in TV first start-up.
Instant Power On	A special standby mode for start-up in shorter time.
Bluetooth	Yes, for external bluetooth speaker/soundbar.
Channels Edit	Yes, for TV channel renaming.
Input Setting	For input source device name choice and edit.
Input Method	T-IME, Gboard, Virtual Remote Keyboard
System Update	Yes
T-Link (CEC)	Yes
Teletext	No
Audio Language/MTS	Yes
PVR/Timeshift	No
EPG	Yes (for DTV programme only)
Closed Caption	Yes
E-Sticker	Yes
Parental Control	Yes

Picture

Picture Preset	Dynamic, Standard, Smart HDR, Sport, Movie
Backlight	0~100
Flicker-less	On, Off
Auto format	On, Off
Screen mode	16:9, 4:3, Cinerama, 14:9 zoom, 16:9 zoom, 16:9 zoom up
Overscan	On, Off
Dynamic Backlight	Off, ECO, Brightness+
Micro Dimming	On, Off
Motion Clarity	On, Off
Advanced Settings	Contrast, Sharpness, Color, Black level, Tint, Dynamic contrast, Black stretch, Gamma, Color temperature, White balance, Color space, RGB mode, MPEG NR, Noise reduction
Picture Reset	Yes

USB Device Media Format

Music	MP3, WMA, AC3
Picture	JPEG, PNG, BMP, GIF
Mutilmedia Video/Audio Decoder	H.265, H.264, MPEG1/2/4, WMV, VC1, VP8, VP9
Video Format up to	1920x1080@60Hz-10bit 4:4:4
USB Mouse/Key Board	Yes

Sound

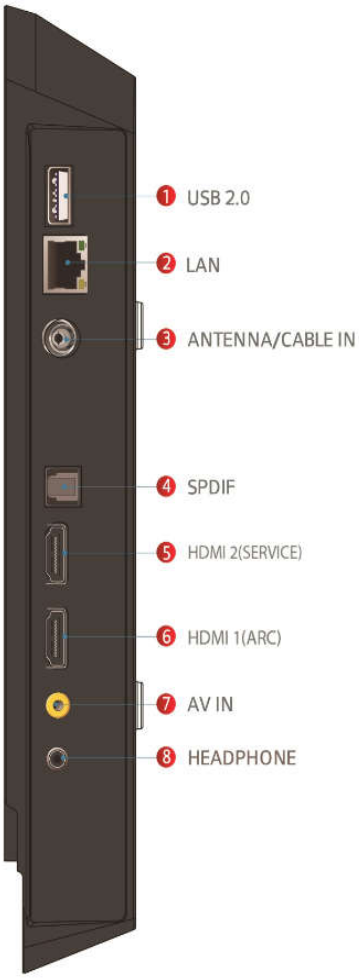
Speakers	Integrated speaker Box (Bottom Side)
Audio Power Output (THD=7%)	2×5W
Sound Mode	Standard, Movie, Music, Voice, Game, Stadium, Personal
Graphic EQ	5 Band Adjustable Frequency (100Hz, 500Hz, 1.5KHz, 5KHz, 10KHz)
Sound Preset Reset	Yes
TV Placement	Desk Top, Wall Mount
Dolby Audio	MS12D
Button Sound	On, Off
Bass Boost	On, Off
Audio Only	Yes
Advanced Settings	Balance, Auto Volume Control, SPDIF Type, SPDIF Delay

Panel Specification

Backlight Unit	DLED
Panel Supplier	CSOT
Aspect Ratio	16:9
Panel Active Size (inch)	31.5
Display Resolution	1366×768
Brightness (cd/m2)	220 (typ.)
Contrast Ratio	3000:1 (typ.)
Response Time (G to G)	6.5ms (typ.)
Viewing Angle (H/V)	178°/178° (typ.)
Life Time	30,000hrs (typ.)
Color	16.7 Million (8bit)
Refresh Rate	60Hz

Terminals

Right Side



Featured Application List

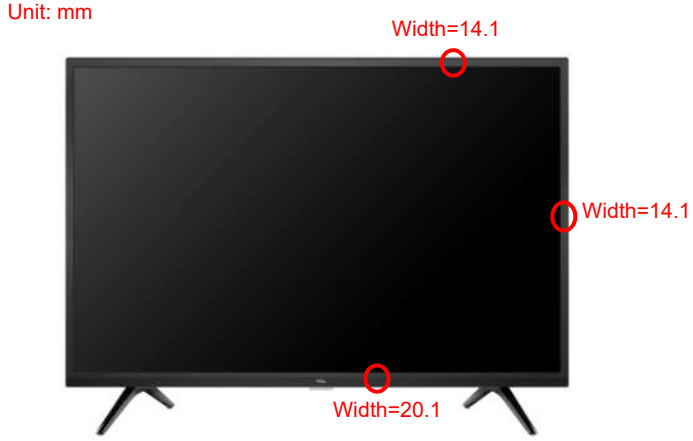
Google Play Store	Popular apps and games.
YouTube	Android TV version.
Google Play Games	Game platform of Google Play.
Google Play Movies & TV	Watch Google Play Movies & TV on Android TV.
Google Cast	To cast favorite entertainment and apps contents from your phone, tablet or laptop right to TV.
Netflix	Watch TV shows and movies online.
Media Center	Video/Music play for USB device.

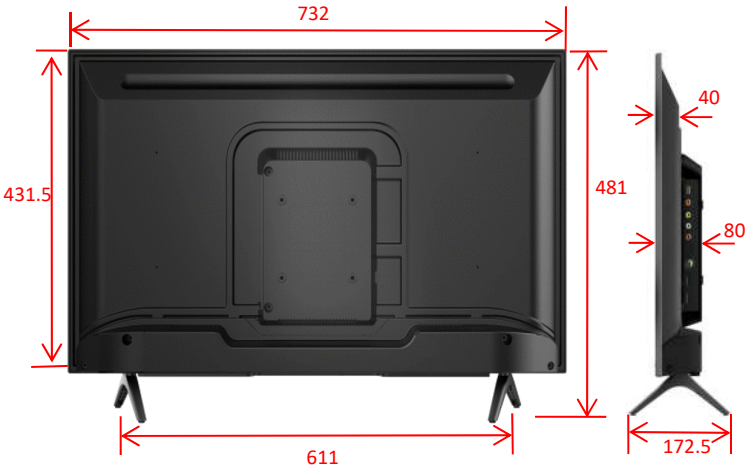
Essential Accessories (Default)

Operation Manual	English (Default)
Remote Control and Batteries	RC802V or RC802N (with 2 batteries)
Base Stand	Integrated Packaging
AC Power Cord	1 pcs (undetachable)

Mechanical ID Picture

Unit: mm





RC802V (Voice)

RC802

Mechanical Key Specification

Carton Dimensions LxWxH (mm)	800x128x520
Container Loading---20 feet (pcs)	520 (w/o pallet), 504 (with pallet)
Container Loading---40 feet (pcs)	1080 (w/o pallet), 1080 (with pallet)
Container Loading---40 feet High (pcs)	1350 (w/o pallet), 1080 (with pallet)
Net Weight with Stand (Kg)	3.9
Net Weight without Stand (Kg)	3.8
Gross Weight with Packaging (Kg)	5

Material Process

Finish on Front	Black High Gloss Molding
Lower front Frame	Texture Molding
Finish on Back	Texturing Injection
Finish on Stand	High Gloss Plastic

Base Stand Specifications

Screw Size	M4x20
Screw Length (mm)	20
Screw Pitch (mm)	1.79
Screw Quantity (pcs)	4

Wall-Mount VESA

VESA Mounting	WMB231
VESA Hole Pattern	100x100
Screw Size	M4x8
Screw Length (mm)	8
Screw Quantity (pcs)	4

Correct specifications and appearance depend on the actual model, all specifications are subject to change without prior notice.

Drafted by: 陈宇洪 Approved by:

TCL World-Wide R&D

FPD CENTER

Test & Alignment Specification (TAS) for RT2841 Series Version 0.01

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PREPARED BY : 李建伟 邹灵敏 DATE : 2018-05-15

CHECKED BY : _____ DATE : _____

APPROVED BY : _____ DATE : _____

Disclosure

The information contained in this document is proprietary to TCL SZ FPD lab and shall not be disclosed by the recipient to third persons without the written permission of the team leader or GM of R&D.

Revision History

Version	Issue Date	Description of changes
V0.01	2018-05-15	This is the initial version

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These chassis are designed for European LCD TV markets Ready for IPTV. The main chip is from realtak RT2841 series with embedded Linux &Android core and supports below features matrix:

Class	Item	RT41KT-AP				
Inputs & Outputs	**ATV** (PAL B/G D/K I, SECAM B/G D/K L/L')	√				
	DTV MPEG-2, MPEG-4, MHEG 1.06, MHP (1.3 broadband)	DVB-T/T2 DVB-C DVB-S/S2				
	HDMI (480i/p, 576i/p, 720p up to 2160p, compliant v2.0 with HDCP2.2)	2R(2xHDMI2.0a,4K@60Hz,YUV4:2:0)+ 2S(2xHDMI2.0a,4K@60Hz,YUV4:4:4, 1S-MHL、1S-ARC)				
	VGA	×				
	VGA/DVI audio	×				
	CMP (YPbPr can support from 480i up to 1080p, audio)	×				
	SCART1 (CVBS &RGB,audio,AV OUT)	×				
	SCART2 (CVBS &YC,audio)	N/A				
	Side AV or Back AV (CVBS,audio)	Share with CMP				
	Side AV OUT or Back AV out(CVBS,audio)	N/A				
	USB thumb drive	1*USB2.0, - Picture, Video, Audio Playback - Mouse, Keyboard - Hub	-	-	-	-
	SCART1 output (CVBS,audio)	×				
	SCART2 output (CVBS,audio)	N/A				
	Headphone output	√				
	SPDIF output	Coaxial				
Functions	**MEMC**	N/A				
	OAD, OND	√				
	CI+	√				
	WIFI Ready	Built in				
	DIVX	×				
	DLNA (DMP)	√				
	Internet	Netflix, YouTube, HbbTV, Google Cast				

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		(see FDS for details)				

Functions	**3D (auto, top & bottom, side by side, frame sequencing, …)** 1920x2205@24Hz (1920x1080p x2) 1280x1470@50Hz (1280x720p x2) 1280x1470@60Hz (1280x720p x2)	N/A				
	Audio Return Channel (ARC)	√				
Others	**Serial connector**	N/A				
	VGA connector	N/A				
	I2C connector of MEMC module	N/A				

IC Details & Position

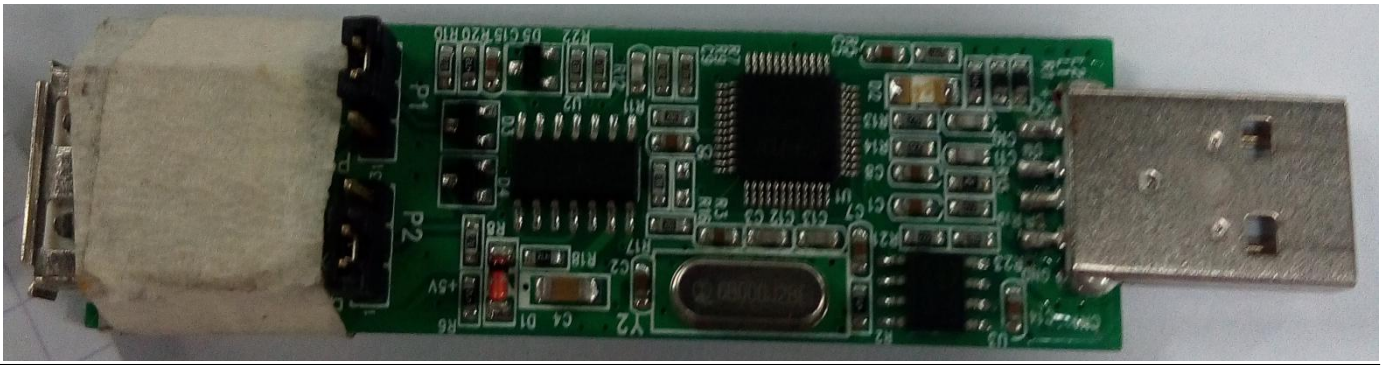
IC Details & Position	**Market**	**RT41KT-AP**		
	Main SW **EMMC(8GB/16GB)** **BIN image**	UF02 8GB V8-RT41KT01-LF1V001		
	HDMI SWITCH - EDID **BIN image**	HDMI EDID and HDCP Embedded in main chip Include in main SW		
	MEMC software **BIN image**	N/A		

- **Manufacturing Connectors Pin out**

ISP-UART / P15 Pin1:NC Pin2:RXD Pin3:TXD Pin4:GND

- **USB to UART Bridge Adapter (FT2232D chipset series)**

To communicate with TV product for debugging, adjustment and soon, It's required suitable 5V Serial Interface like following snapshot (further details are described on below sections):



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INFO:

- All tests and measurements mentioned hereafter have to be carried out at a normal mains voltage (**220 ~ 240 VAC**)
- All voltages have to be measured with respect to ground, unless otherwise stated
- All final tests have to be done on a complete set including LCD panel in a room with temperature of **25+/-7°C**
- The Picture Performance assessment such as Gamma Correction and White Balance (luminance and colortemperature) has to be performed into subdued lighted room after at least **45min** of warm-up in order to avoid any temperature drift influence (colorimetric vs. time)

1. PCB/SKD Assembly: Test & Alignment

1.1. *Pre-Conditions and DC/DC Check*

Before power-on, please check the board according to the relevant block diagram and circuit diagram, and make sure that no serious issue or mistake can destroy the board. For example, the output of DC/DC and LDO should not be shorted to ground.

Supply a suited voltage and power-on, then check the voltage according to the relevant block diagram, circuit diagram and voltage specification.

For example, check SoC voltage(AVDD3V3,DVDD3V3,VCCK_1V0,AVDD1V0_STB,095VM,3V3SB, etc.), DDR voltage (DDRV_1V5,1V5M) , audio amplifier voltage(24V AMP_VCC),etc...

Measurements should fulfill specification within ±5% tolerances.

Note①: *See enclosed circuit diagram for more details.*

40-RT41K1-TEB
2HG 05-07.pdf

1.2. *SW Image download*

Download the latest release SW from below FTP server:

- Link: \\10.120.99.200\
- Folder: \\10.120.99.200\Software_release\Official_Release_SW\NPI\SW_SQA_Pass\Reartek\RTK 外销机芯

1.2.1 LR or PR step. ---Only test

In case of starting from blanked flash / eMMC, it's necessary to use "rtice tool" to update the SW.

See Appendix ⑴"**How to upgrade Main SW using rtice tool**"
See Appendix ⑵**"How to upgrade Main SW using USB"**
See Appendix ⑶**"How to upgrade main SW using USB and RCU"**

1.2.2 MP Step

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In case of starting from blanked flash, it's necessary to write "**tcl.img"** file via factory copy in advance.

- **OAD Stream**(This function is not ready by SW)

To manage quicker mass reflashing on predefined DVB Channel, some licensed IBL tools ('xxx2lli.exe', 'lli2dsm.exe', dsmmerge.exe …) from Intel byte Inc. might be necessary to create appropriate DVB SSU image. Over some predefine settings such as repeated data block insertion, null packets size, … that are controllable in configuration file, here below are mandatory OUI entries structure to prepare DSM-CC carousel image format:

- export CUST_OAD_OUI **0x001C50**
- export CUST_OAD_HW_MODEL **0x5395**
- export CUST_OAD_HW_VERSION **0x0000**
- export CUST_OAD_SW_MODEL **0x0001**
- export CUST_OAD_SW_VERSION **0x00··**

OAD reflashing is managed within 4 steps operation: multiplex detection, DVB transfer, flashing and warm-start.

See Appendix ⑷**"How to upgrade FLASH SW by OAD"**

1.3. *UART & IR Parser*

To use both UART and/or IR parser, TV has to be set in Factory mode with its USB port well connected to suitable UART device or an IR emitter device correctly facing up TV (see below "section 2.0 - Product Assembly" how to activate "Factory key").

The UART parser engine is enabled by sending following command "**0xE2**" from host to TV within following presets **115200**/**8**/**n**/**1**.

Once initialized, "**PS**" caption is toggle displayed on bottom left screen ("S" like Serial).

To communicate with TV depending on SIACP revision layout implementation, you need to fulfill UART/IR commands protocol and format described on enclosed SIACP requirements document (rev. v8.31).

1.4. Project ID Modification

There are different IDs stored into the eMMC depending on different Panels settings and Models features, but there's only one key branching ProjectID that includes all. So it's not recommended to modify Panel ID with Hyper terminal as other ID features may not change!

To modify ProjectID, first of all you need to enable Factory Hotkey (See below "section 2.0-Product Assembly"). After that, go through1950 to "**Main menu →Service menu→ 8-Project ID**", then turn left or right with RCU "◄/►" key" keys to suitable ID (Project name is dynamically refreshed). Restart TV.

See Appendix ⑸"**How to change ProjectID with RCU**"

See below is the ProjectID table for reference:

MODEL-EU	ProjectID	PanelID	Panel Name		MODEL-EU	ProjectID	PanelID	Panel Name

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Note②: Because more and more projects will be added in the future.

1.5. Functional Test

Once the boards (chassis, KB, IR, PSU…) and the panel are well interconnected, plug all external generator devices to relevant below inputs/outputs using respective test patterns format to check picture and sound quality:

Source	Test Signal	Test Pattern
Analog /Digital Tuner (VHF/UHF & CATV)	RF cable generator	2D - Movie 1280x720 2D - Static Picture 1920x1080 1. Frequency Range: full band 2. Standard: PAL / SECAM 3. DVB-T/T2/C
Satellite Tuner - DiSEqC v1.0 (A, B, C, D) and Tone Burst (A, B) - Double LNB frequency (band change by 22KHz Tone)	Compliant DVB-S/S2 source from generator or dish antenna with switch	2D - Movie 720x576 1. Frequency Range: 950MHz..2150MHz 2. Symbol Rate Range: DVB-S 1..30MHz (for QPSK) DVB-S2 1..45MHz (for QPSK) 1..30MHz (for 8PSK) 3. LNB Voltage Range: Vertical 12.85V..14.2V Horizontal 17.6V..19.5V 4. 22KHz Tone Range Frequency 20.5KHz..23.5KHz Amplitude 400mV..900mV Current ≥400mA
SPDIF	Audio Amplifier	PCM or Dolby D+
PCMCIA	CI CAM card adaptor	Conax, Irdeto, Viaccess, …
CMP via mini jack adaptor (YPbPr& Audio)	Chroma/Quantum Data generator	1920x1080i@60Hz Half Color & Gray bars
AVIN share with Y,R,L (CVBS &Audio)	Chroma/ Quantum Data generator	1920x1080i@60Hz Half Color & Gray bars
HDMI (Video & Audio)	with beyond HDMI 1.3 and HDCP compliant DVD/BD player	2D - Movie 1280x720i@60Hz 3D - Movie 1920x1080p@24Hz HDMI1&2 support 4K*2K- Movie

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	With HDMI 2.0 and HDCP2.2 player	3820x2160@50&60Hz(4:4:4),HDCP2.2 HDMI3&4 support 4K*2K- Movie 3820x2160@50&60Hz(4:2:0),HDCP2.2
RJ45 (LAN)	DHCP Server	ICMP packets echo request
Headphone via mini jack adapter	RF signal	Suitable channel
Loud Speakers / Enclosures	RF signal	Suitable channel

Audio tones can be defined by the factory (ie: 1KHz & 3KHz, sweep, …).
Picture video formats can be changed by the factory according to their own standard.

1.6. AD Calibration Test

As the A/D self-calibration mechanism is built-in soc, there's no any ADC to perform.

1.7. DDC & EDID & T-Link Test

The E-EDID data structures are according to VESA Enhanced EDID 1.3 (and EIA/CEA-861B for HDMI). CEA Timing Extension structure has been extended to support all 3D capable timings.

All HDMI structures have their own BIN profile which are part of main SW and uploaded at power-on into soc chipset:

For EDID check, it's needed to check whether the correct EDID is downloaded by checking corresponding EDID NVM Checksum or read them out to check bit by bit if it is in line with the released EDID bin file.

1.8. HDCP Test

For HDCP compliancy, it's needed to check whether the HDCP key has been well set by connecting suitable generator.

1.9. CI+Key Upgrade, Activation and Test

See Appendix (6)"**How to upgrade CI Key using USB**"
See Appendix (7)"**How to upgrade Widewine Key using USB**"
See Appendix (8)"**How to upgrade PlayReady Key using USB**"(not support at this time)
See Appendix (9)**"How to upgrade HDCP key key using USB"**

1.10. LAN and WLAN Test(MAC address and Device/User ID codes)

Here are some representative codes examples:

Device ID	User ID	MAC Address
6fa0806936a0ada733262a3f8e8595d5586ce5cb	111382090	*00:1C:50:E2:B1:EC*

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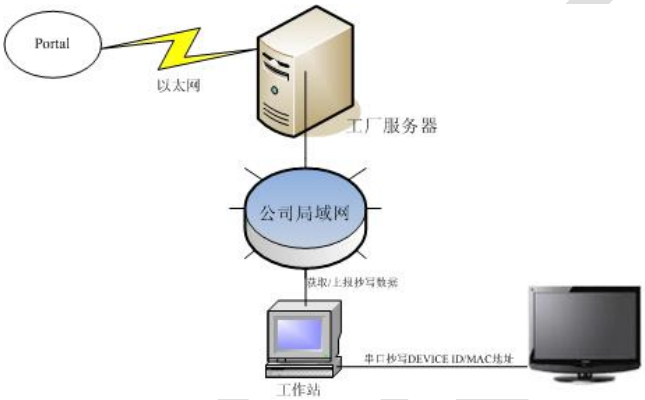
- **MAC Address Upgrade (IPv6)**

MAC can be set using UART commands described on enclosed SIACP requirements (rev. v8.31).
- Writing MAC command <**0xB3**>, Data length <**6**>, Data type <**HEXA**> (see below command example from above MAC code)
<**AA 0B B3** *00 1C 50 E2 B1 EC* **36 78**>

See Appendix ⑩"**How to upgrade MAC Address using USB**"

- **DeviceID (DID)**

Purpose is to allow Other Network Download (OND) and further specific Services via dedicated abroad portal (UK tbc).4 At final, when TV may ask for portal connection, there'll be Device ID matching control sent by host (TV client) to ensure total integrity.



For such, specific DID (40 bytes) needs to be paired and overwritten into memory for internal client encryption.
All DID and MAC codes have to be download from portal local service via suitable factory workstation LAN system.
Then during production lot, it's necessary to send/write all those codes to each TV.
DID codes can only be set using UART commands described above on enclosed SIACP requirements (rev. v8.31).
- Writing Device ID command <**0xB2**>, Data length <**32**>, Data type <**ASCII**> (see below command example from above DID code)
<**AA 25 B2***42 45 34 46 32 35 35 42 42 44 31 30 36 42 43 38 46 38 30 36 41 45 34 35 36 33 35 30 44 39 31 46***48 93**>

- **LAN Test**

A rough LAN test can be done by connecting DHCP server to TV's RJ45 and check that IP, subnet mask, DNS, … addresses are visible on "**User menu→ Network→Internet connection(On)→IP settings**".
More in-depth test can be performed faster using suitable UART/IR commands following SIACP requirements. SW will internally manage Network ID (NID) flag controlling all MAC/DID/UID integrity to facilitate PA screening further.

See Appendix ⑪"**Network Connection Setup**"
See Appendix ⑫"**How to upgrade Flash SW using Network**"

Note③: *It's not necessary to check video and audio from DLNA server.*

2. Product Assembly (PA): Test & Alignment

2.1. *Factory Menu* & Main Menu\

- **How to Enable Factory hotkey**

Follow the below steps to pop-up the Factory menu in case of "**Factory hotkey**" is disabled:

Enable Factory hotkey method:
Method one:
- Press RCU "**MENU**" key to display main menu
- Select "Settings→Picture→Advanced setting→ Contrast", Scroll down to "**Contrast**" item
- Press the subsequence RCU keys "**9**", "**7**", "**3**" and "**5**"
- Select "**9-Sita P mode**", Press RCU "◄/►" key change the values to ON
- Reboot TV
- 'Factory Hotkey' will be ON automatic.

Method two:
- Create a file named '**sita_P'** with no suffix, note the capitalization.
- Put the file 'sita_P' into the U disk, delete all PKG and BINC files.
- Put the U disk into the TV.
- Power on TV by AC, at the same time press "power on" key which on the boardfor 10s until the TCL logo show.
- 'Factory Hotkey' will be ON automatic.

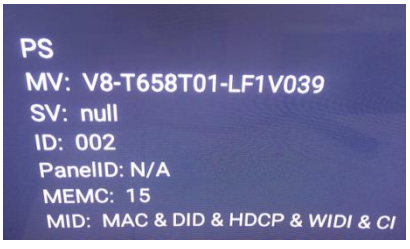
If "**Factory hotkey**" is enabled, just press RCU "**Return**" key（ ）to pop-up again the Factory menu.

The status of "**Factory hotkey**" can be changed in "**Factory menu->Factory hotkey**"
Press RCU "**OK/►**"key to enter the submenu.
Press RCU "**Menu**" key to go back to the root menu.
Press RCU "◄/►" key to change the values.
Press RCU "**OK**" key run the function.
Press RCU "**Exit**" key exit the Factory menu.

- **Factory Captions Description**

While "Factory hotkey" is enabled, there're some toggled display information (~2s) relative to SW, ProjectID, CI+, Network ID to facilitate 100% quick screening without accessing to whatever else menu:

MV (Main SW Version)
ID (Project ID)
Panel ID
MEMC (FRC SW Version)
MID(Internet info for factory)



P (Production/Factory mode flag) / S (Factory UART Parser mode flag) / W (Warm-Up mode flag)

See Appendix ⑬"Factory Menu Description"

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- **How to enter Main Menu**

- Press RCU "**MENU**" key to display main menu
- Select "Settings→Picture→Advanced setting→ Contrast", Scroll down to "**Contrast**" item
- Press the subsequence RCU keys "**1**", "**9**", "**5**" and "**0**"
- Then the Main Menu\ will be displayed on the screen.

See Appendix⑭ "Design mode Menu Description"

2.2. Warm-up Test

Following TCL standard and practices, it's required minimum **15min** of **Warm-Up** that can be considered as Burn-In. Additional Aging for White Balance alignment is no more necessary due to consistent Picture Performance with Cloning usage.

First you need to enable Factory Key. After that selecting" **Factory menu →WARM UP**", pressing RCU "**OK/►**" key and then leaving Factory menu by pressing "**Exit**" key. To release/disable Burn-in mode, it's just required to press "**Menu**" button from local keyboard. Other faster methods via UART/IR commands are available on enclosed SIACP requirements (rev. v8.31).

2.3. White Balance & Automatic Gamma correction

For the white balance & automatic gamma correction, we only need do one of them based on the value of Align_mode in PDM system or the method gave by AOE or R&D.

The detail instruction of Align_mode is as below table:

Prop Name	Description	Value
Align_mode	WB alignment or Auto Gamma correction	0 -- > WB alignment 1-- > Gamma correction

- **White Balance alignment (Golden sample)**

As some color coordinates discrepancies can be noticed from panel batches to others, it may necessary to perform slight touch-up.

For Color temperature adjustment, switch TV on leading **HDMI** input where should be connected suitable generator providing following format **1280x720p@60Hz** test pattern. A 32 steps grey scale is recommended to assess relevant colorimetry tracking and low/high light saturation points.

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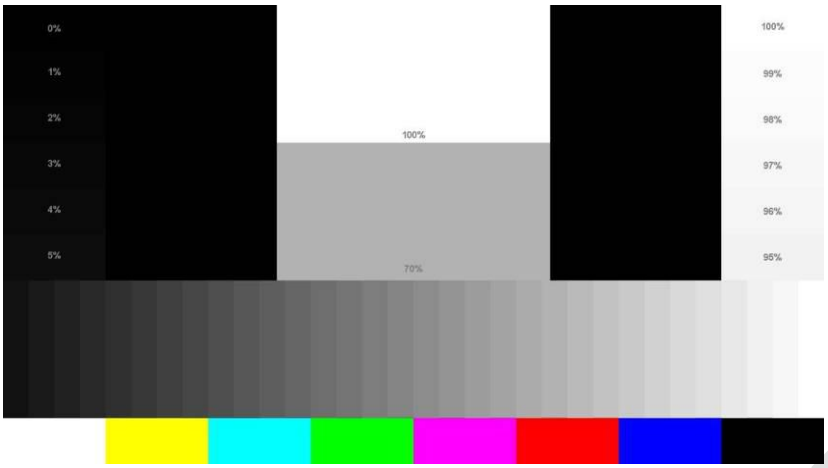

Ensure that TV's picture enhance is off.

Ensure that TV is in Factory mode to access to" **White Balance**" adjustment submenu.

WB Normal is the first mode which is adjusted in HDMI source，the next are HDMI warm and cool mode.

Warm and **Cool** Tone are relatives to **Normal** mode. WB adjust need to fix default G Gain .Offset registers needn't to be adjusted.

- "**Gain**" registers set need to be adjusted at 70IRE.

Note: The operation must enable factory "P" mode

- ***Automatic Gamma correction***

Gamma correction, or often simply gamma, is the name of a nonlinear operation used to encode and decode luminance or tristimulus values in video or still image systems.

You need adjust 4+3 gamma for different samples based on the color coordinates and target gamma offered by PQ engineer. So each sample can get almost the same effect as PQ golden sample. The 4+3 gamma include 4 gamma based on 4 different color temperature (cool, normal, warm1, warm2) and 3 gamma related to SDR to HDR (cool, normal, warm).

For the automatic gamma correction, we can do as below, but please refer to **"Gamma correction specification (v1.00)"**for detail.

▪Initialize the picture, turn off dynamic backlight, dynamic contrast, and set picture mode as computer desktop mode;

▪ Get the color coordinates (x, y, Y) and target gamma in the PDM of the target model;

▪ Open the factory menu of TV, Open the tools **SIACP** and **main.vi** on the PC, connect the equipment correctly (CA310, serial port, PC, TV);

▪ Fill the color coordinates (x, y, Y) target gamma, error range and time-delay in the main.vi tool that made by AOE, and save it;

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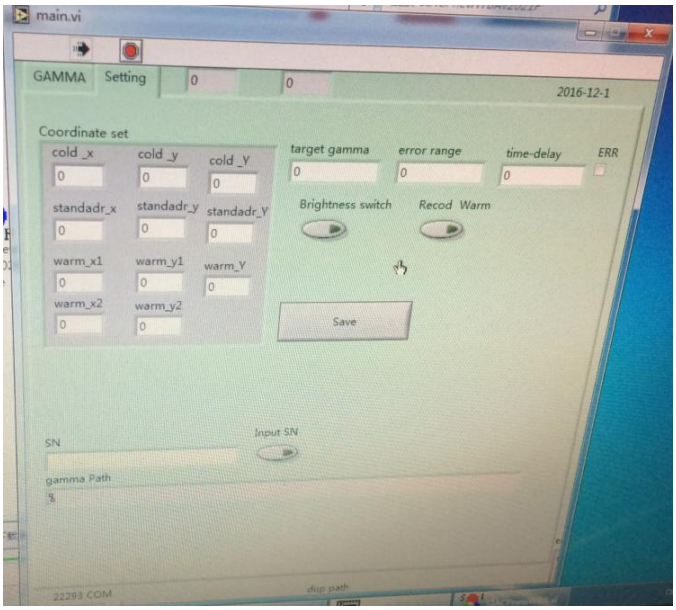

▪ Put the probe on the middle of the panel, then run **main.vi.** The 4+3 gamma will be created and calibrated automatically and saved in the TV.

As 4+3 gamma is a new and good way for PQ especially for HDR, we need adjust it in the factory now. And if we do the 4+3 gamma, there is no need to adjust the white balance. But we need do the initial setup of white balance.

See Appendix⑮*"How to do initial setup of white balance"*

Note: The operation must enable factory "P" mode

- **Targets and Tolerances for all inputs**

(According to company uniform LED color temperature standard of panel)

The measured and adjustable parameters should be mainly "**x**", "**y**" coordinates.

The White Balance alignment and Automatic Gamma correction should be performed using a well calibrated and contact less analyzer (ex: Minolta CA210 or CA310). The analyzer may not touch the screen surface, and measurement must be performed in a dark environment keeping the probe(s) at 90+/-2° from the panel center.

The results should fulfill specification for each TV set offered by R&D and below tolerances:

MT5658	Panel name	Energy	FW Min (Nits)	Preset Targets (x, y)&CA310				Gamma	
Model		Efficient	FW>Min	Cool	Normal	Warm	Warm2	Target	Error range
U65S9906	LVU650SD6L SD9W01	B	300	267 276	279 287	313 329	314 351	2.2	±0.05

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For the 4+3 gamma the target value is 2.2 and error range is ±0.05.

Note④: *We will add more project ID later.*

Note*:* If we can do both of White Balance & Automatic Gamma correction. For some special models, please notice the information provided by Huizhou factory or PJM to choose which way to make it.

- **Cloning**

Once a TV is well aligned and prepared (channels maps, volume, picture presets, …) , user can prepare golden clone image that can be copied on demand to all further TV production lot of same TV. To access cloning function, you can select "**Factory menu →USB Clone →All / Chanel List/ EEPROM/ Users Setting**" , Scroll down to "**TV to USB**" or "**USB to TV**" and press RCU "**OK/►**" key to process. 4 BIN images can created, overwritten or read on USB stick (pen drive) depending on chosen template like following: "**database\applications\database***.db**" . These files need to be used strictly with MT58SoC platform as depending on SW structure.

Other faster access methods via UART/IR command share available on enclosed SIACP requirements (rev. v8.31).

Note*: This function is only useful on factory sita P mode. And in hotel mode, we can use it too, but only copy the information related to the hotel.*

2.4. High Pot. and Insulating Resistance Tests

At the end of the process, a "High Voltage" and an "Insulating Resistance" tests are required to fulfill Safety Electrical requirements (CEI 65065).

- **High Voltage Withstanding requirements**

- "Voltage" ⇨**3500VAC**
- "Max Leakage Current" ⇨**10 mA**
- "Test Time" ⇨**3 sec**

- **Insulating Resistance requirements**

- "Voltage" ⇨**500VDC**
- "Threshold Min" ⇨**4M Ω**
- "Test Time" ⇨**2 sec**

2.5. SHOP-END Test

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At final process stage, it's necessary to perform "**Reset shop**" before any packing to leave Factory mode and restore User default presets.

First you need to enable Factory Key. After that selecting "**Factory menu → Reset Shop**", then pressing RCU "**OK/►**" key. Other faster methods via UART/IR commands are available on enclosed SIACP requirements (rev. v8.31).

Note⑤:*A password might be required in case of Parental Control function is locked, use default "**1234**" password or "**0423**" super password to clean-up existing ones if forgotten.*

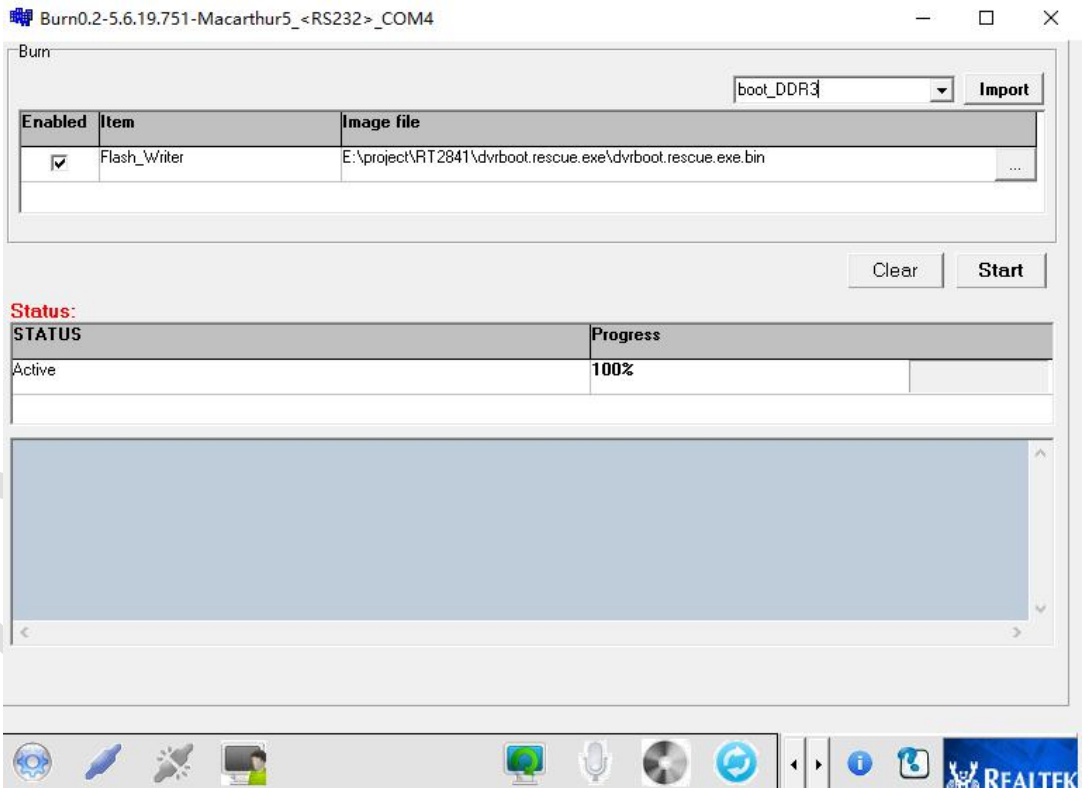
END

- Appendix(1) **"How to upgrade main SW using tool"**
  - **Upgrade RT2841 main SW by using RTK tool**

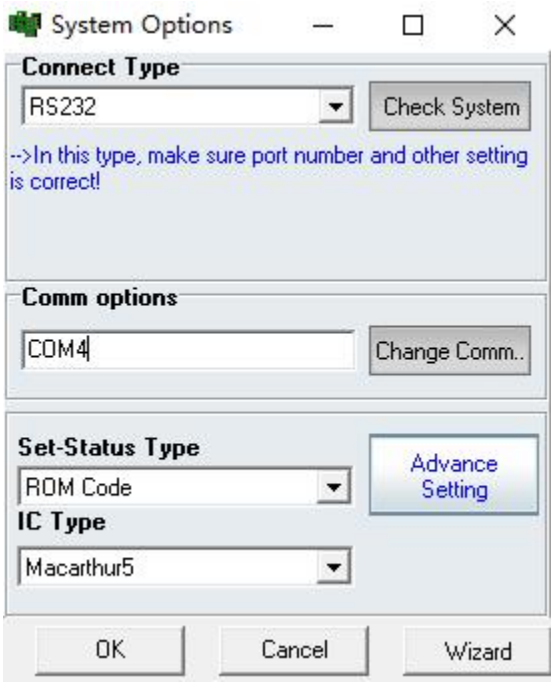
➢ Download boot bin "dvrboot.rescue.exe.bin.bin" &main software "Update.img" from the software route.

➢ Connect UART interface to suitable manufacturing TV input connector, upgrade boot bin first to blank IC.

1) Turn off your TV, and then connect the Serial Interface to USB debug port.
2) open the rtice software, select the Burn page, click the icon, enter the boot burn page as shown below.



3) Click the settings icon, open the settings page, and configure it as shown below.



Connect Type select RS232;

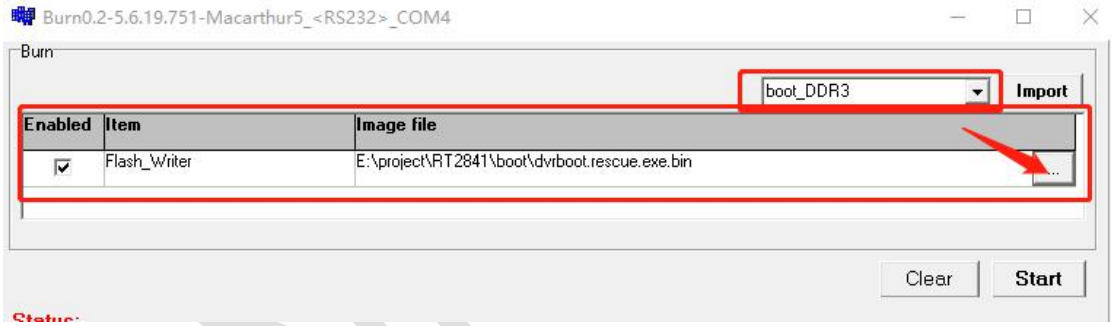
Comm port selects the corresponding serial port;

Set-Status type option ROM Code;

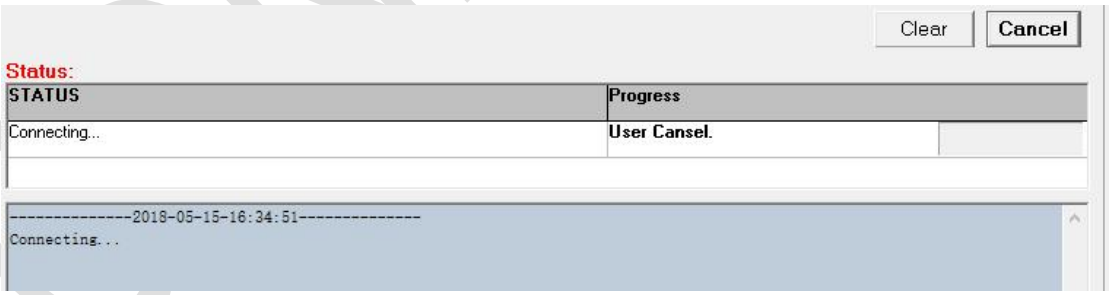
IC Type Selection Macarthur5;

Then click ok.

4) Configure Burn parameters and select bootcode load path, as shown below.



5) Click the Start button to enter the boot state and the state will change to the connect state as shown below.



6) Then power on the TV. After the connection is successful, the TV enters the upgrade state and waits for the upgrade to complete. After the upgrade is complete, the following figure shows the bootcode successfully burned.

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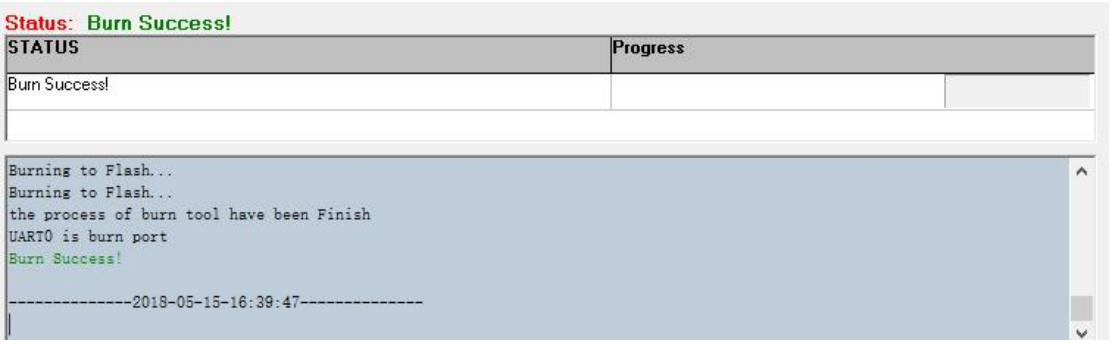

- Then Upgrade Main SW , Copy Main SW “Update.img” into USB stick (pen drive) root path，
- Insert USB to TV USB port, long press the “MENU/STB” button of local keyboard , and then Power on TV by AC, The light of IR will flicker, it means TV is updating SW.
- After finish update SW, TV will reboot automatically and please remove the USB.

Appendix（2）“How to upgrade SW using USB”

- **Upgrade RT2841 main SW**

- Copy the “**Update.img**” into USB stick (pen drive) root path.
- Please delete other xxx.img files from USB stick.
- Plug USB stick to the TV.
- Power on TV by AC, at the same time press “power on” key for 10s, TV will update SW automatically.
- When reflashing is successful, TV should restart automatically (about 4min).

Note⑥:*If “upgrade” was performed, a “Welcome Setup” menu should be displayed, otherwise new SW version should be displayed into relevant Factory mode caption info or on bottom of “**Factory menu**“*

*If the P mode is reflashing after upgrade and can not be closed, go to “**Factory menu**” and select ‘Sita P mode’ to ON, restart TV. Then go to “**Factory menu**” again and select ‘Factory hotkey’ to OFF.*

Appendix (3)“How to upgrade SW using USB and RCU”

Appendix (4) “How to upgrade FLASH SW by OAD”（not support now）

Appendix（5）“How to change Project ID with RCU”

- Enable Factory Key (See “section 2.0-Product Assembly”)
- Process following subsequence IR codes to change project ID: **062598+ +xxx** (xxx: Project ID, ex: 001)
- If it works, the TV will restart automatically.

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Appendix（6）“How to upgrade CI Key using USB”

- Enable Factory Key
- Create the folder named “CIKEY”, change the CI key to “CIKEY_xxx.bin” (xxx is the number), put CI key into the folder.
- Plus the USB into the TV.
- Go to “**Main menu→ Service menu→ USB Update →CI Key Upgrade** “, click the right button.
- If the toast show CI Update OK, it means burn the key success.
- After burning, the CI key will movie to the folder CIKEY_BACKUP.

  Note: The operation must enable factory “P” mode

Note⑧: *If unfortunately the process failed, you may need to download new CI key and repeat operation again.*

Appendix（7）“How to upgrade Widevine Key using USB”

- Enable Factory Key
- Create the folder named “WIDEVINEKEY”, change the Widevine key to “WIDEVINE_xxx.bin”(xxx is the number), put Widevine key into the folder.
- Plus the USB into the TV.
- Go to “**Main menu→ Service menu→ USB Update →**Widevine **Key Upgrade** “, click the right button.
- If the toast show Widevine Update OK, it means burn the key success.
- After burning, the Widevine key will movie to the folder WIDEVINEKEY_BACKUP.

  Note: The operation must enable factory “P” mode

Appendix（8）“How to upgrade PlayReady Key using USB”(not support now)

Appendix（9）“How to upgrade HDCP key using USB”

HDCP

- Create the folder named “HDCP”, change the HDCP key to “HDCP_xxx.bin”(xxx is the number), put HDCP key into the folder.
- Enable Factory Key
- Plus the USB into the TV.
- Go to “**Main menu→ Service menu→ USB Update →[HDCP] Upgrade**“, click the right button.
- If the toast shows HDCP Update OK, it means burn the key success.

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- After burning, the HDCP key will movie to the folder HDCP_BACKUP.

Appendix ⑩ "How to upgrade MAC Address using USB"

- Create the folder named "MAC", change the MAC key to "MAC_xxx.bin"(xxx is the number), put MAC key into the folder.
- Enable Factory Key
- Plus the USB into the TV.
- Go to "**Main menu→ Service menu→ USB Update → MAC Upgrade**", click the right button.
- If the toast show MAC Update OK, it means burn the key success.
- After burning, the MAC key will movie to the folder MAC_BACKUP.

Note⑨: There is no this function which is only displaying.

Appendix ⑪ "Network Connection Setup"

Note⑩:You can set up your TV so that it can access the Internet through your local area network (LAN) using a wired or wireless connection.

Wired Network Connection

You can connect your TV to your LAN using cable in three ways:

1) Plug your TV to your LAN by connecting the LAN port on your TV to an external modem using a Cat5 cable.
2) Plug your TV to your LAN by connecting the LAN port on your TV to an IP Sharer which is connected to an external modem. Use Cat5 cable for the connection
3) Depending on how your network is configured, you may be able to plug your TV to your LAN by connecting the LAN port on your TV directly to a network wall outlet using a Cat5 cable (Note that the wall outlet is attached to a modem or router elsewhere in your house)
4) Select "**Menu →Network Settings→Ethernet**" to check if the network has connected. If not then select "**IP settings**" to connect to network.

- **Wireless Network Connection**

To connect your TV to your wireless network, you need a wireless router or modem and a Wireless LAN Adapter.

- Select "**Menu →Network Settings→Wi-Fi→On**", then it will appear the valid wireless networks near your area.
- Select available access point and press "**OK/►**" to connect the TV to it.

Note（11）:

*- If you select a protected access point, you will have to enter the corresponding password. Press "***OK***" on the remote control to display virtual keyboard to enable you to enter the password.*

- **Network Setup**

- Connect your TV and the available network with the network cable first.
- Press "**Menu** "on the remote control and select "**Network Settings→Ethernet**" to check if the network has

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connected.

- If connected, the Internet connection will display Connected. If not, If not it will display “Not Connected” and you can try to enter your IP address manually to connect the network follow below steps
  - Select “**Advanced options**”→ “**IP Settings**”→“**Static**” by pressing “**OK/►**” key
  - Enter the “**IP address**”, “**Gateway**”, “**Network prefix length**”, “**DNS1**”and “**DNS2**”values. Use remote control digital keys to enter number sand “◄/►” key to move from one to other field location
  - After setting all required inputs and save successful, to check the Internet connectivity again
- Select “**Menu →Network Settings→Ethernet**”, then press “**OK/►**” key to display current connection details, such as Internet connection status, IP address, MAC address etc..

Appendix ⑿ “How to upgrade Flash SW using Network”(not support now)

Appendix ⒀ “Factory Menu Description”

1-Factory Hotkey submenu

Item	Sub-item	Value	Note
Hotkey		OFF/ON	Enable Hotkey flag by pressing “◄►” key to have possibility to access Factory menu with “RETURN” key（ ） (default is disabled)

Note: Sita P mode submenu change to ON and reboot TV for the first time to enable the Factory Hotkey submenu.

2-Warm-Up Mode submenu

Item	Sub-item	Value	Note
Burning Mode		OFF/ON	Enable Burning mode by pressing “◄►” key, then press “**EXIT**” key to activate it Press “**Menu**” key on local keyboard to exit the Burning mode

Note: Factory Hotkey submenu must be ON.

3-Reset Shop submenu

Item	Sub-item	Value	Note
Reset Shop		>	Press “**OK►**” key to remove Factory presets (channel Maps, bargraph context…) and restore User settings. All adjustments are not impacted!

Note: Factory Hotkey submenu must be ON.

4-NVM Reset submenu

Item	Sub-item	Value	Note
Reset ALL		>	Press “**OK►**” key to default NVM

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			according to selected Project ID (all adjustments are defaulted, channel Maps are cleared, Hotkey is enabled, …)

Note: Factory Hotkey submenu must be ON.

5-Power on Mode submenu

Item	Sub-item	Value	Note
Power on Mode		ON STB LAST	Select starting sequence by pressing "◄►" key - ON: Force TV to start -STB: Force TV to standby - Last: Force TV to standby or to start depending on latest operation

Note: Factory Hotkey submenu must be ON.

6-USB Clone submenu

Item	Sub-item	Value	Note
USB Clone	All Clone: USB TO TV	ALL Channel list EEPROM Users Settings	Enable factory Hotkey; Press "**OK**" to copy USB template content to TV depending on Cloning mode
	All Clone: TV TO USB	ALL Channel list EEPROM Users Settings	Press "**OK**" to copy TV template context to USB depending on Cloning mode

7-Preset Factory Channel submenu

Item	Sub-item	Value	Note
Preset Factory Channel	Factory Area	HZ PL	Choose the factory area
	Channel Preset		Preset TV Channel

8-DeviceID Test submenu

Item	Sub-item	Value	Note
DeviceID Test		DO	Test device ID

9-Sita P mode submenu

Item	Sub-item	Value	Note
Sita P mode		OFF/ON	

Note（12）: A quick access to suitable submenu item can be achieved by pressing it prefixed RCU key number (ex: pressing "6" to directly highlight "USB Clone" item).

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Appendix ⑭ "Design mode Menu Description"

- Other submenu

Item	Sub-item	Value	Note
TestPattern		>	Enable TestPattern by pressing "◄►" key, Hold "**Menu**" key on local keyboard , select "TV" source to exit TestPattern.
UartEnable		OFF/ON	Enable console by pressing "◄►" key. - ON: Enable print by console -OFF: Unable print by console
ScreenPixel			Not used
DeviceID			Not used
MAC		MAC Address	
SN		SN	
Register Code		Register Code	
HuanID			Not used
ClientType		Client Type	
ReadEeprom To USB			Not used
WatchDog		OFF/ON	Enable Watch Dog by pressing "◄►" key - ON: Open Watch Dog -OFF: Close Watch Dog
ADB		OFF/ON	Enable ADB by pressing "◄►" key - ON: Open ADB -OFF: Close ADB

- Service menu submenu

Item	Sub-item	Value	Note
0-Project SN		Project SN	
1-EPolisy Number		EPolisy Number	
2-Hardwarel		Hardwarel	
3-Software		Software Version	
4-ProjectName		Project Name	
5-frcVersion		Frc Version	
6-stbc version		stbc version	
7-Bootloader		Bootloader	
8-Project ID		Project ID	Factory Hotkey submenu must

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			be ON.
9-Panel ID		Panel ID	
10-USB Update	Main Upgrade	>	Upgrade Main Software
	[HDCP] Upgrade		Upgrade HDCP key
	[HDCP2_0] Upgrade		Upgrade HDCP2.0/2.2 key
	[FRC_IMAGE] Upgrade		Upgrade FRC
	DONGLE Upgrade[RC65]		Not used
	DONGLE Upgrade[RC71]		Not used
	MAC Upgrade		Upgrade MAC Address
	LocalDimming Upgrade		Upgrade Local Dimming
	LocalDimming Version		Show Local Dimming Version
	CI Key Upgrade		Upgrade CI Key
11-Nonstandard			Not used
12-Non-standard_DTV			Not used
13-HotelMenu		OFF/ON	Enable Hotel Menu by pressing "◄►" key - ON: Enable Hotel Menu -OFF: Unable Hotel Menu
14-Suspend To Ram		OFF/ON	Enable STR by pressing "◄►" key - ON: Open STR -OFF: Close STR

Note: Factory Hotkey submenu must be ON for item 8, item 10 and item 14

-Param setting submenu

Item	Sub-item	Value	Note
0-Sound Setting	Sound mode	["Music","Movies","News","Standard","User"]	Switch sound mode by pressing "◄►" key.
	Balance	[0~100]	Adjust sound balance by pressing "◄►" key.
	Auto audio	OFF/ON	Enable Auto audio by pressing "◄►" key - ON: Enable Auto audio -OFF: Unable Auto audio
	Sound Scene	VOL_WALL / VOL_DESKTOP	Switch sound scene by pressing "◄►" key.
	Sys_audio	["BG","DK","I","M","L"]	Switch audio format by pressing "◄►" key.
1-Picture Curve	Source	SOURCE_ATV, SOURCE_DTV, SOURCE_AV, SOURCE_YPBPR, SOURCE_HDMI,	

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		SOURCE_VGA, SOURCE_DV, SOURCE_STORAGE	
	Curve Setting	"Brightness", "Contrast", "Saturation", "Hue", "Sharpness", "Backlight"	
	Curve_0		Adjust value of Curve by pressing "◄►" key.
	Curve_25		
	Curve_50		
	Curve_75		
	Curve_100		
2-Picture Setting	Picture mode	"Standard", "Vivid", "Dynamic", "Mild", "User"	Switch picture mode by pressing "◄►" key.
	Brightness	0~100	Adjust Brightness by pressing "◄►" key.
	Contrast	0~100	Adjust Contrast by pressing"◄►" key.
	Backlight	0~100	Adjust Backlight by pressing"◄►" key.
3-SSC(Spread Spectrum clocking) Adjust			Not used
4-DBC(Dynamic Backlight Control)	DBC_Mode	0~2	Switch nature light mode by pressing "◄►" key.
	APL1	0~255	Adjust value ofAPL1by pressing"◄►" key.
	APL1_BL	0~255	Adjust value of APL1_BLby pressing"◄►" key.
	APL2	0~255	Adjust value of APL2by pressing"◄►" key.
	BP	0~255	Adjust value of BP by pressing"◄►" key.
	K	0~100	Adjust value of K by pressing"◄►" key.
	Print_Enable	OFF/ON	Switch DBC Print mode by pressing "◄►" key. - ON: Enable DBC Print -OFF: Unable DBC Print
	Energy saving	"OFF", "LOW",	Switch Energy saving mode by pressing "◄►" key.

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		"HIGH"	
5-Overscan	Source	SOURCE_ATV, SOURCE_AV, SOURCE_YPBPR, SOURCE_HDMI, SOURCE_VGA, SOURCE_STORAGE	
	H Position		Adjust value by pressing"◄►" key.
	H.size		
	V Position		
	V.size		
6-WIFI CHEAK			Press "**OK**" on remote control to check if WIFI works.
7-MEMC LEVEL			Not used

-Hotel menu submenu

Item	Sub-item	Value	Note
CH LOCK		OFF/ON	Enable CH LOCK by pressing "◄►" key. -ON:EnableChannel scan -OFF:Unable Channel scan
MAX VOL		0~100	Adjust max sound volbypressing "◄►" key.
AUTO SET		OFF/ON	Enable AUTO SET by pressing "◄►" key. -ON:Enable set **"PIC MODE","SOUND MODE"** etc. -OFF:Unable set **"PIC MODE","SOUND MODE"** etc.
PIC MODE		"Standard" "Vivid" "Mild" "Studio" "User" "Dynamic" "Stadium" "Digital cinema"	Switch preset picture mode bypressing "◄►" key. Option menu depend on model.ini with opposite Project ID. **Format in model.ini :** [Factory] PictureModePreset = STANDARD:VIVID:MILD:STUDIO:USER:DYNAMIC:STADIUM:CINEMA
SOUND MODE		"Music" "Movie" "News" "Standard" "User" "Subwoofer" "Stadium" "Game"	Switch preset sound mode bypressing "◄►" key. Option menu depend on model.ini with opposite Project ID. **Format in model.ini:** [Factory] SoundModePreset = MUSIC:MOVIE:NEWS:STANDAR

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		"Sport"	D:USER:SUBWOOFER:STADIUM :GAME:SPORT
PRESET VOL		**0~100**	Adjust preset sound volbypressing "◄►" key.
Input preset		ATV DTV AV1 AV2 YPBPR VGA HDMI1 HDMI2 HDMI3 HDMI4	Switch preset sound mode bypressing "◄►" key. Option menu depend on model.ini with opposite Project ID. **Format in model.ini:** [Factory] InputSourceList= MUSIC:MOVIE:NEWS:STANDAR D:USER:SUBWOOFER:STADIUM :GAME:SPORT
Channel preset			If source is ATV, start from 9001; If source is DTV,start from 1; Channel preset is unable while source is on other situation.
KEY LOCK		OFF/ON	Enable KEY LOCK by pressing "◄►" key. -ON:Enablelocal keyboard -OFF:Unablelocal keyboard
TV to USB		**>**	Press "◄►" key to copy data from TV to USB
USB to TV		**>**	Press "◄►" key to copy data from USB to TV

-Reset ALL submenu

Item	Sub-item	Value	Note
Reset ALL		**>**	Press**">"** to Reset all factory data.

Note: Bofore do this operation, the Factory Hotkey submenu must be ON.

Appendix ⑮ "How to do initial setup of white balance"

Firstly, you need to enable Factory Key:

- Press RCU "MENU" key to display main menu
- Select "Settings →Picture → Advanced setting → Contrast", Scroll down to "Contrast" item
- Press the subsequence RCU keys "9", "7", "3" and "5"
- Select "9-Sita P mode", Press RCU "◄/►" key change the values to ON
- Reboot TV
- 'Factory Hotkey' will be ON automatic.

Secondly, press RCU Option, Select Picture → Advanced setting → Contrast → Press RCU "1950" enter design main menu → Reset all

Done

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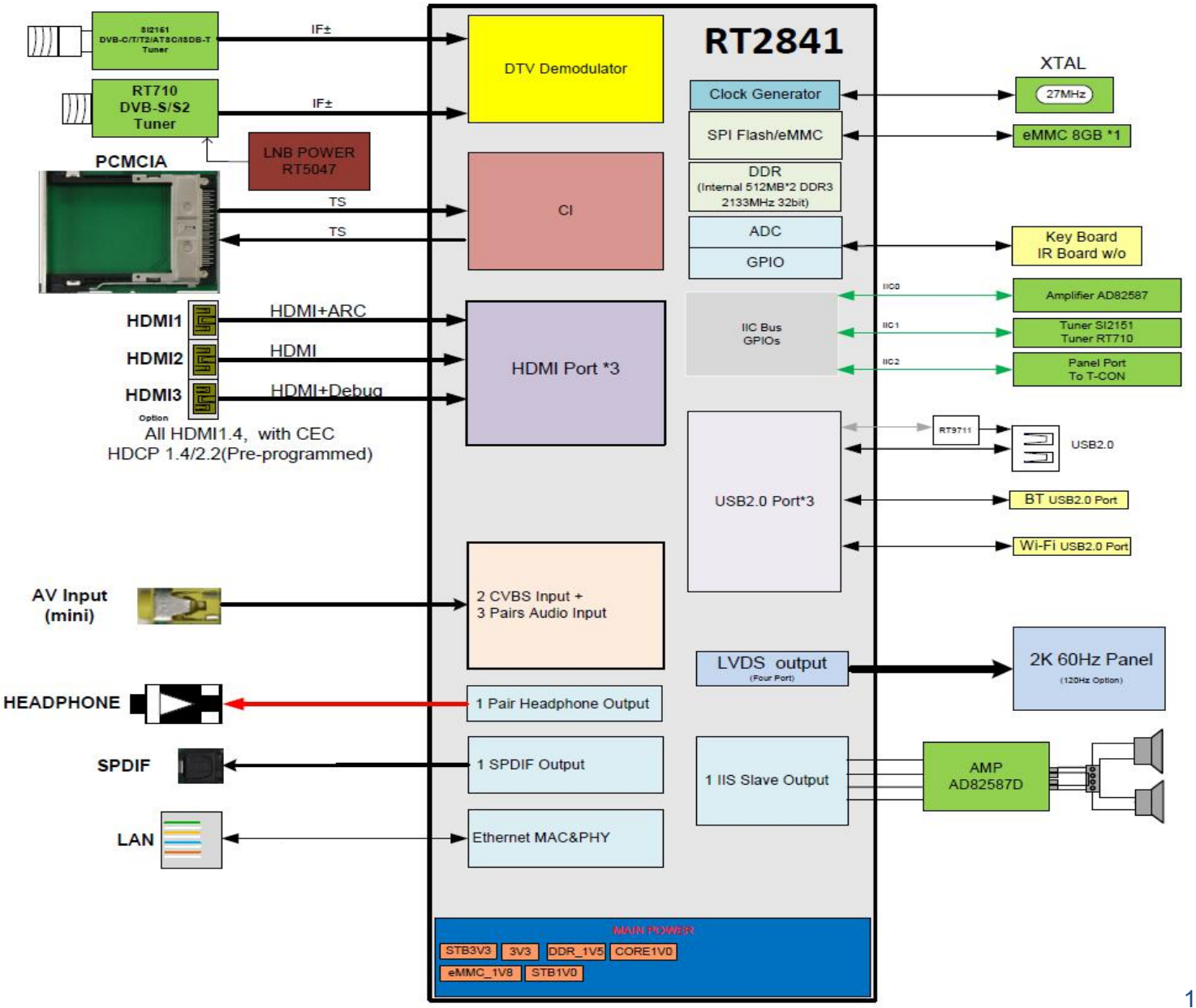
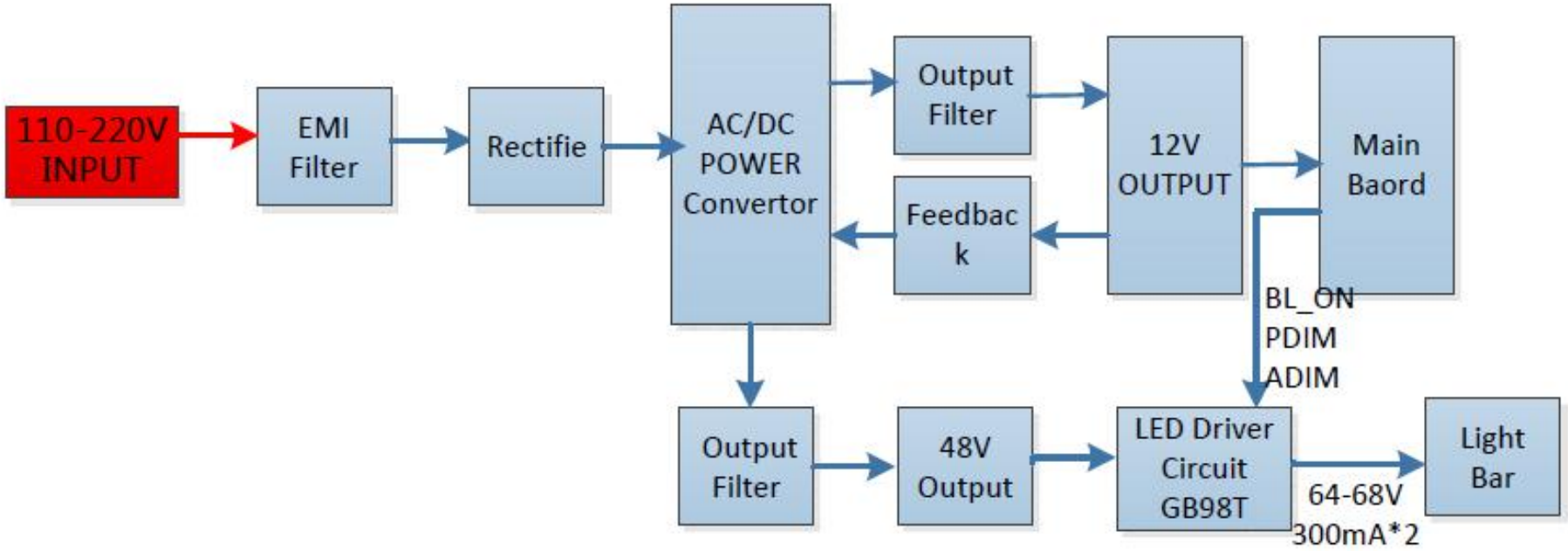
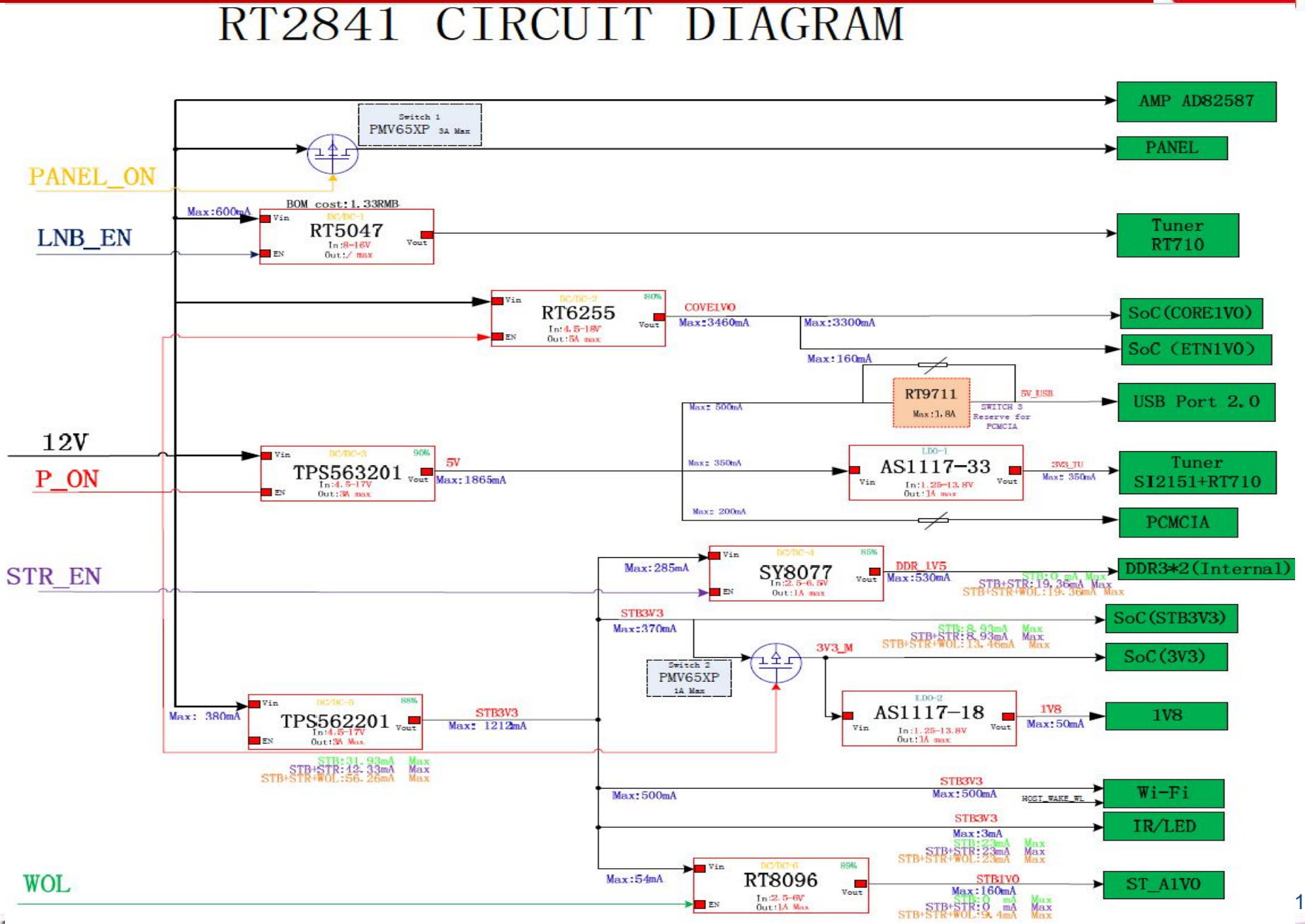
RT41—Chassis Block Diagram



POWER Circuit Diagram



RT41—Power supply Block Diagram



RT2841 FOR 2K TV SCHEMATICS INDEX

PAGE1 INDEX
PAGE2 POWER SUPPLY SYSTEM & IR/KEY
PAGE3 TUNER
PAGE4 HDMI/HEADPHONE/ETHERNET/SPDIF/MINI-AV
PAGE5 SOC CONFIGURATION
PAGE6 EMMC
PAGE7 AMP
PAGE8 USB & Wi-Fi & BLUETOOTH & LVDS

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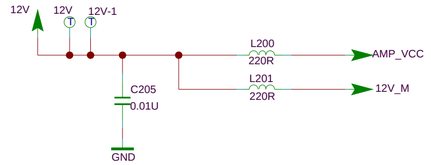
TEL:+86 755 33312403

NOTE:	.....	PAGE:	OF

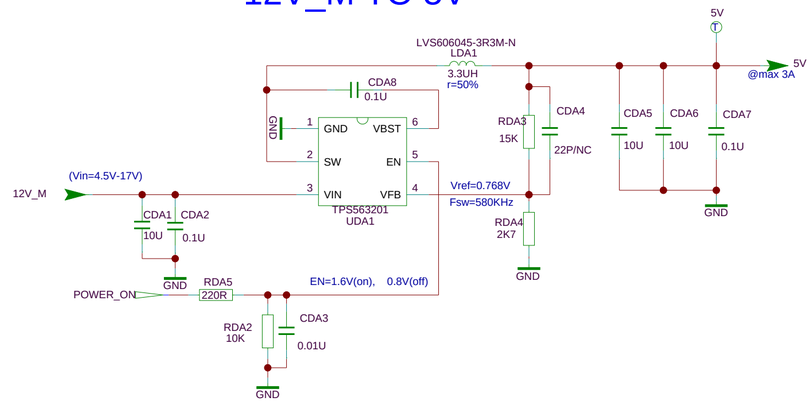
FORMAT DIN A3

FUNCTION	NET NAME
Main 12V	12V
3D_EN	BOOSTER
A_DIM	A_DIM
POWER_ON	POWER_ON
BACKLIGHT	BL_ON
P_DIM	DIM_PWM

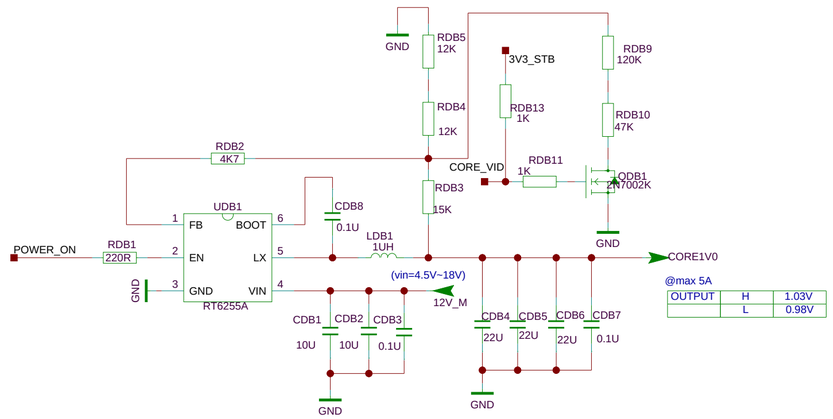


R200-R209
C200-C206
L200-L201

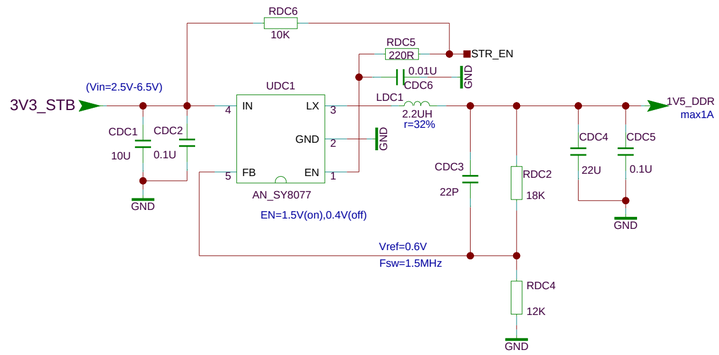
12V_M TO 5V



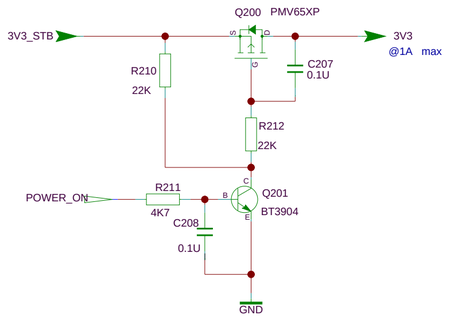
12V TO CORE1V0



3V3_STB TO 1V5_DDR

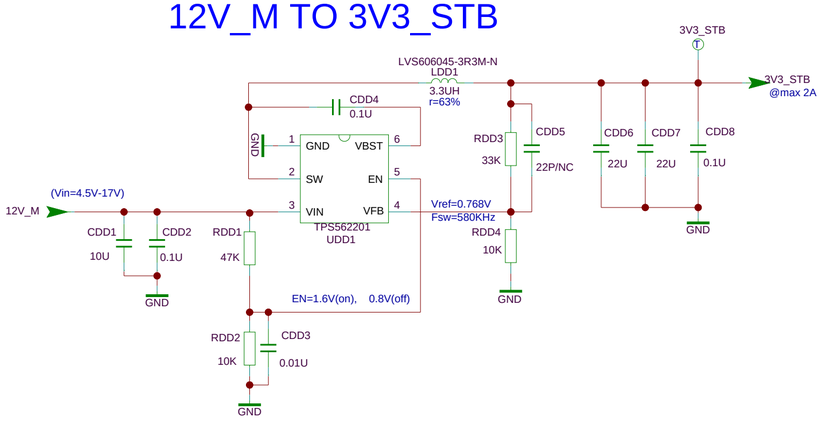


3V3_STB TO 3V3

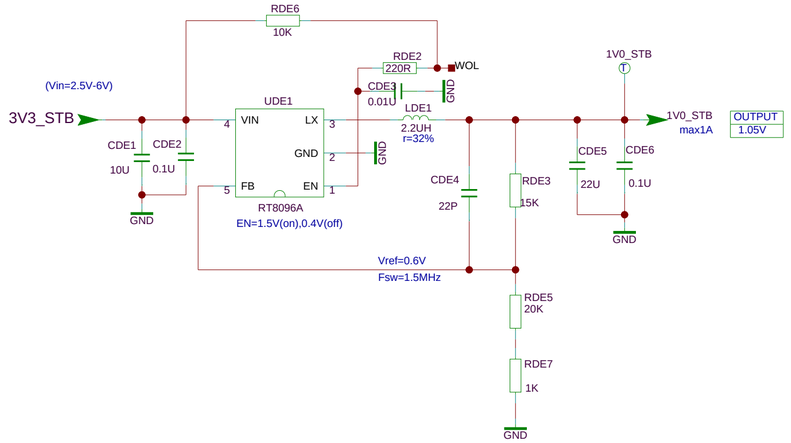


R210-R212
C207-C208

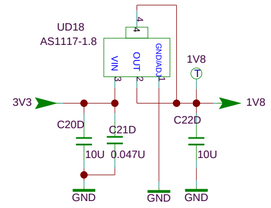
12V_M TO 3V3_STB



3V3_STB TO 1V0_STB



3V3 TO 1V8



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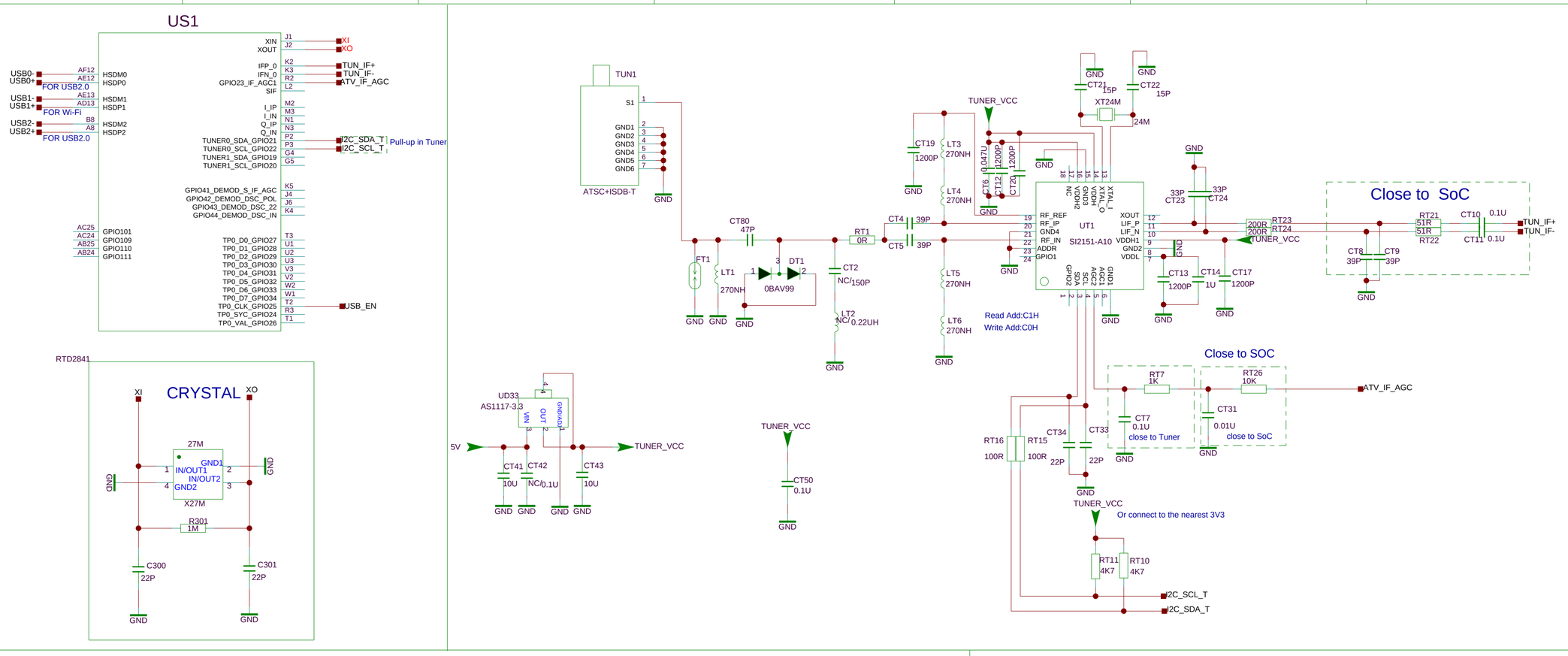

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...	DD-MM	...	...	...
...	DD-MM	...	...	...
...	DD-MM	...	...	...

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TCLNO: 40-RT72NA-TEA2HG

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B Building, TCL Tower, Nanhai Road
Nanshan District, Shenzhen, Guangdong
Tel +86-755-3331xxxx Fax +86-755-3331xxxx

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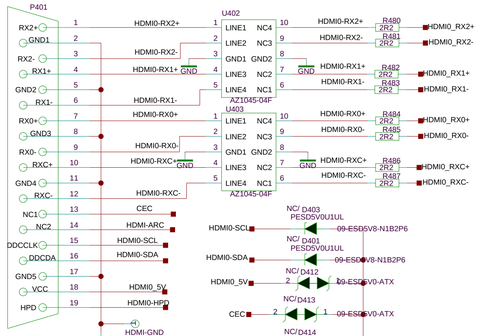
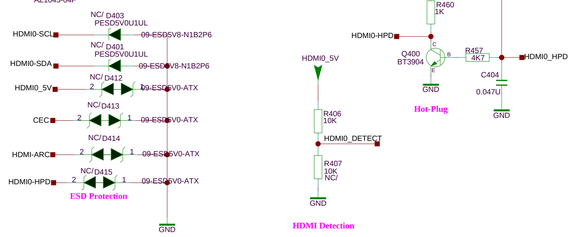
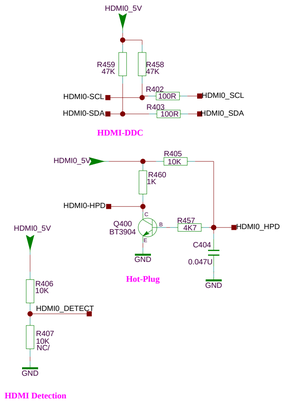
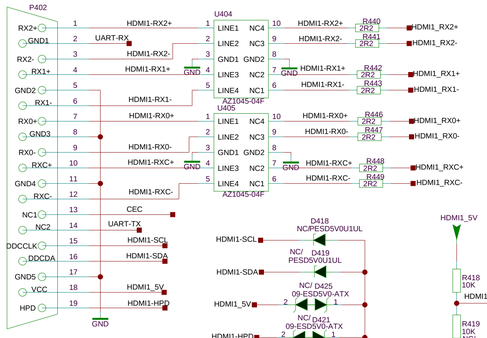
HDMI1(CEC & ARC)

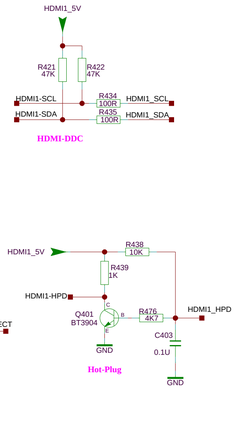


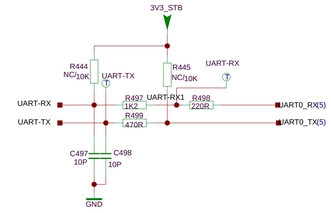




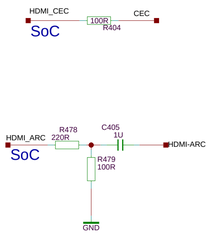
HDMI2(CEC+DEBUG)





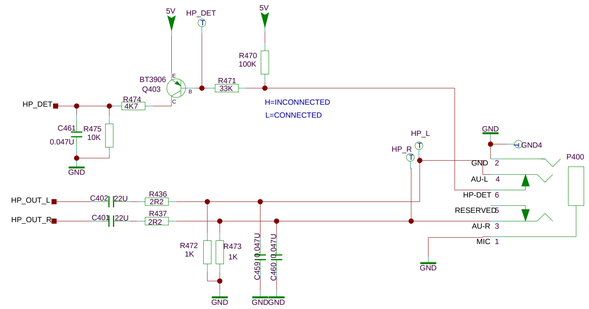


CEC & ARC



SPIDIF

HEADPHONE OUT



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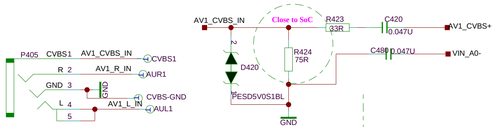
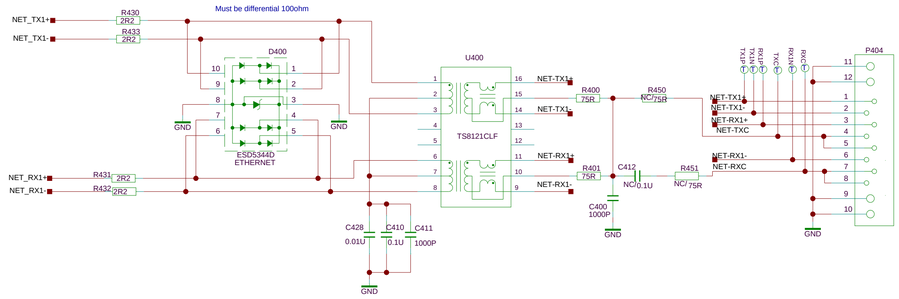


ETHERNET



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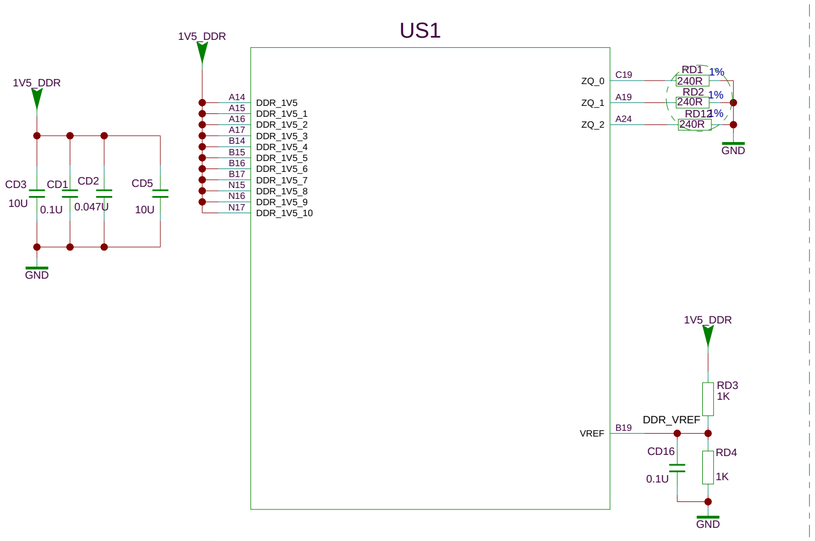
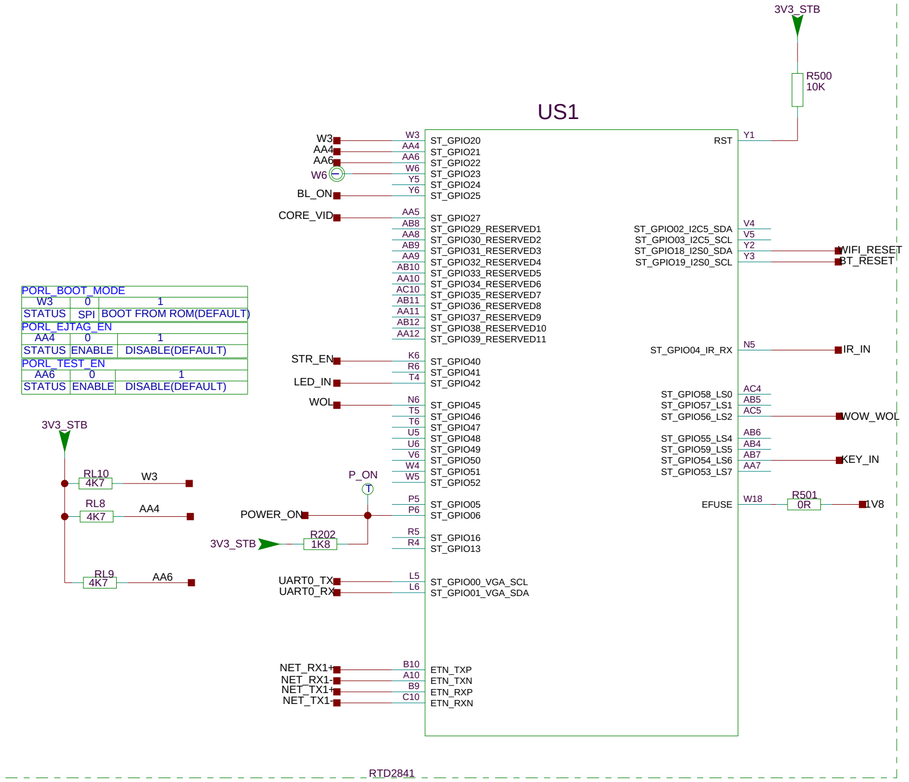
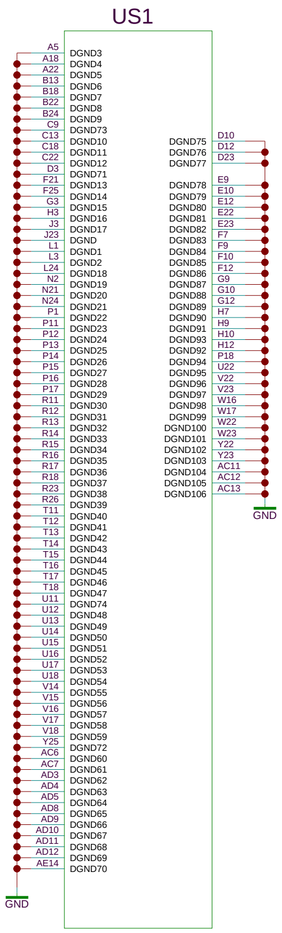
INTERNAL DDR POWER SUPPLY AND CONFIGURATION

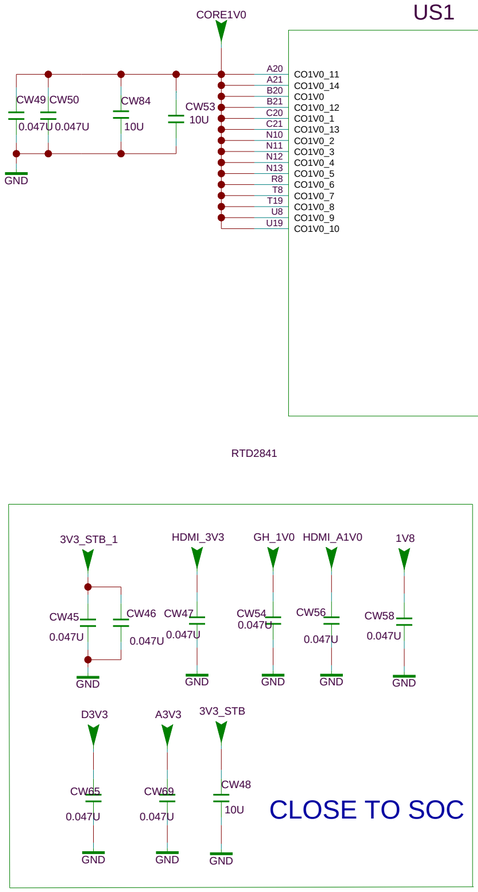


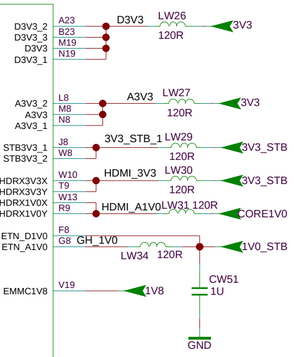
SOC BOOT AND DEBUG CONFIGUREATION



SOC POWER SUPPLY AND GROUND

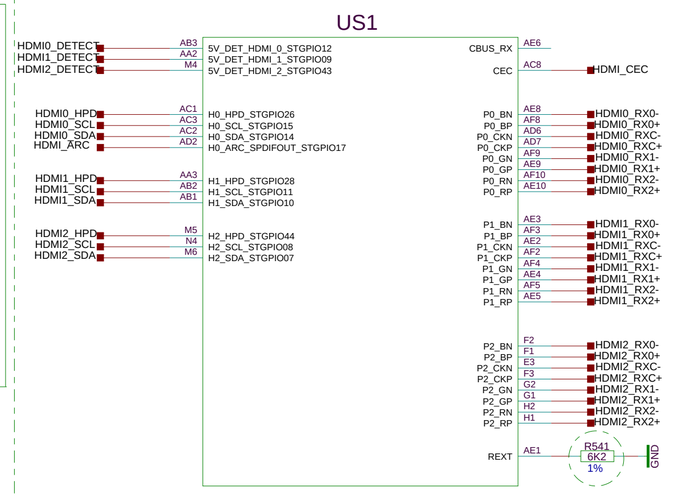




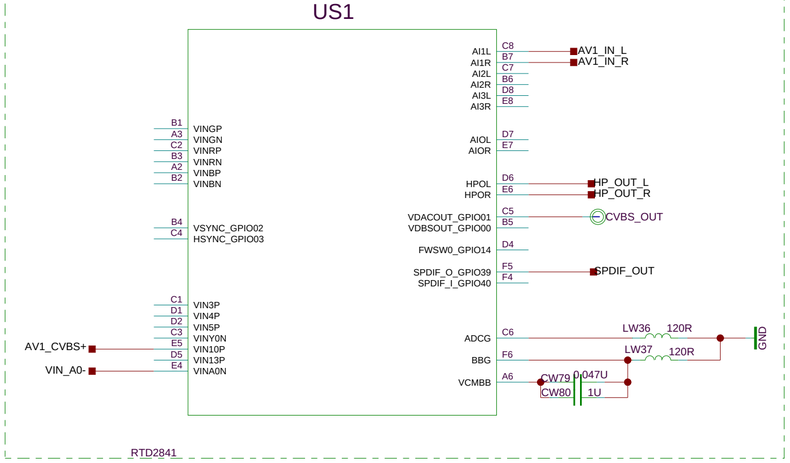


CLOSE TO SOC

HDMI CONFIGURATION



VIDEO AND AUDIO CONFIGURATION



PORL_BOOT_MODE		
W3	0	1
STATUS	SPI	BOOT FROM ROM(DEFAULT)
PORL_EJTAG_EN		
AA4	0	1
STATUS	ENABLE	DISABLE(DEFAULT)
PORL_TEST_EN		
AA6	0	1
STATUS	ENABLE	DISABLE(DEFAULT)

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US1

AF14	PC_CD1_N_GPIO46	
AA16	PC_CE1_1_N_GPIO57	
AF17	PC_OE_N_GPIO59	
AD17	PC_IORD_N_GPIO60	
AC17	PC_IOWR_N_GPIO62	
AF23	PC_REG_N_GPIO89	
AB21	PC_RST_GPIO83	
AD19	PC_WE_N_GPIO71	
AB22	PC_INPACK_N_GPIO87_PC_CD2_N_	
AD22	PC_WAIT_N_GPIO85	
AA19	CAM_IRE_N_5V_GPIO45	
AE24	PC_A0_GPIO94	
AB23	PC_A1_GPIO92	
AD23	PC_A2_GPI90	
AE23	PC_A3_GPIO88	
AC22	PC_A4_GPIO86	
AE22	PC_A5_GPIO84	
AC21	PC_A6_GPIO82	
AE21	PC_A7_GPIO80	
AE18	PC_A8_GPIO65	
AA17	PC_A9_GPIO63	
AE17	PC_A10_GPIO58	
AB17	PC_A11_GPIO61	
AA20	PC_A12_GPIO78	
AC18	PC_A13_GPIO67	
AA18	PC_A14_GPIO69	
AE25	PC_D0_GPIO96	
AD25	PC_D1_GPIO98	
AD24	PC_D2_GPIO100	
AD14	PC_D3_GPIO47	
AE15	PC_D4_GPIO49	
AC15	PC_D5_GPIO51	
AA15	PC_D6_GPIO53	
AD16	PC_D7_GPIO55	
AF25	TP1_D0_GPIO95	
AE26	TP1_D1_GPIO97	
AD26	TP1_D2_GPIO99	
AF15	TP1_D3_GPIO48	
AD15	TP1_D4_GPIO50	
AB15	TP1_D5_GPIO52	
AE16	TP1_D6_GPIO54	
AB16	TP1_D7_GPIO56	
AD21	TP1_CLK_GPIO81	
AC23	TP1_VAL_GPIO91	
AF24	TP1_SYC_GPIO93	
AD18	TPO_D0_GPIO66	
AB18	TPO_D1_GPIO68	
AE19	TPO_D2_GPIO70	
AB19	TPO_D3_GPIO72	
AF20	TPO_D4_GPIO73	
AD20	TPO_D5_GPIO75	
AC20	TPO_D6_GPIO77	
AF21	TPO_D7_GPIO79	
AB20	TPO_CLK_GPIO76	
AE20	TPO_VAL_GPIO74	
AF18	TPO_SYC_GPIO64	

GPIO35_TP2_SYNC	G6	
GPIO36_TP2_CLK	H5	HP_DET
GPIO37_TP2_VAL	H6	
GPIO38_TP2_D0	J5	
GPIO108_I2C1_SCL	AA25	AMP_SCL
GPIO107_I2C1_SDA	AA26	AMP_SDA
		Pull-up in AMP
EMMC_D0	U26	EMMC_D0
EMMC_D1	U25	EMMC_D1
EMMC_D2	U24	EMMC_D2
EMMC_D3	V26	EMMC_D3
EMMC_D4	V24	EMMC_D4
EMMC_D5	V25	EMMC_D5
EMMC_D6	T24	EMMC_D6
EMMC_D7	T25	EMMC_D7
EMMC_DS	W24	EMMC_DS
EMMC_CLK	Y24	EMMC_CLK
EMMC_CMD	W25	EMMC_CMD
EMMC_RST_N	Y26	EMMC_RSTN
GPIO113	AC26	
GPIO119	AA24	
GPIO120	AA22	
GPIO114	AA23	
GPIO169_SC_DATA	J22	
GPIO170_SC_RSTN	J21	
GPIO171_SC_CLK	H22	
GPIO172_SC_CD	H21	
GPIO173_LD_SCK	G22	
GPIO174_LD_SD0	G23	PANEL_ON/OFF
GPIO175_LD_VSYNC	G21	
GPIO176_LD_SDI	F23	A_DIM
GPIO177	F22	DIM_PWM
GPIO178_WCLK	C12	I2S_LRCK
GPIO179_MCLK	B12	I2S_MCLK
GPIO180_SCLK	C11	I2S_BCLK
GPIO181_I2S_D0	B11	I2S_DATA
GPIO182_I2S_D1	A11	AMP_RESET

RTD2841

UF02

EMMC_CLK → M6 CLK
EMMC_CMD → M5 CMD
EMMC_D0 → A3 D0
EMMC_D1 → A4 D1
EMMC_D2 → A5 D2
EMMC_D3 → B2 D3

1V8 → C600 2U2, C601 0.047U, C602 0.047U → GND

C6 VCCQ1, M4 VCCQ2, N4 VCCQ3, P3 VCCQ4, P5 VCCQ5 → C604 0.1U → GND
C4 VSSQ1, N2 VSSQ2, N5 VSSQ3, P4 VSSQ4, P6 VSSQ5 → GND

iNAND

THGBMDG5D1LBAIL

B3 D4 → EMMC_D4
B4 D5 → EMMC_D5
B5 D6 → EMMC_D6
B6 D7 → EMMC_D7
H5 DS → EMMC_DS
K5 RESET → R602 10K → EMMC_RSTN → GND

E6 VDD3, F5 VDD2, J10 VDD1, K9 VDD, J5 VSS → 3V3
E7 VSS1, G5 VSS2, H10 VSS3, K8 VSS4, A6 VSS5, C2 CREG/VDDI → GND

3V3 → C605 0.047U, C606 0.047U, C607 2U2 → GND
3V3 → C603 2U2 → GND

1V8 → R604 10K, R605 10K, R606 10K, R607 10K, R608 10K, R609 10K, R610 10K, R611 10K, R612 NC/10K, R613 10K, R614 10K

EMMC_D0	R604
EMMC_D1	R605
EMMC_D2	R606
EMMC_D3	R607
EMMC_D4	R608
EMMC_D5	R609
EMMC_D6	R610
EMMC_D7	R611
EMMC_CLK	R612
EMMC_CMD	R613
EMMC_RSTN	R614

R613 NC — WHEN TOSHIBA eMMC
R613MOUNTED — WHEN SAMSUNG eMMC

TCL

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5TH FLOOR.TCL BUILDING.SOUTH NANHAI ROAD
NANSHAN DISTRICT.SHENZHEN.GUANGDONG 518067 CHINA
TEL:+86 755 33312403

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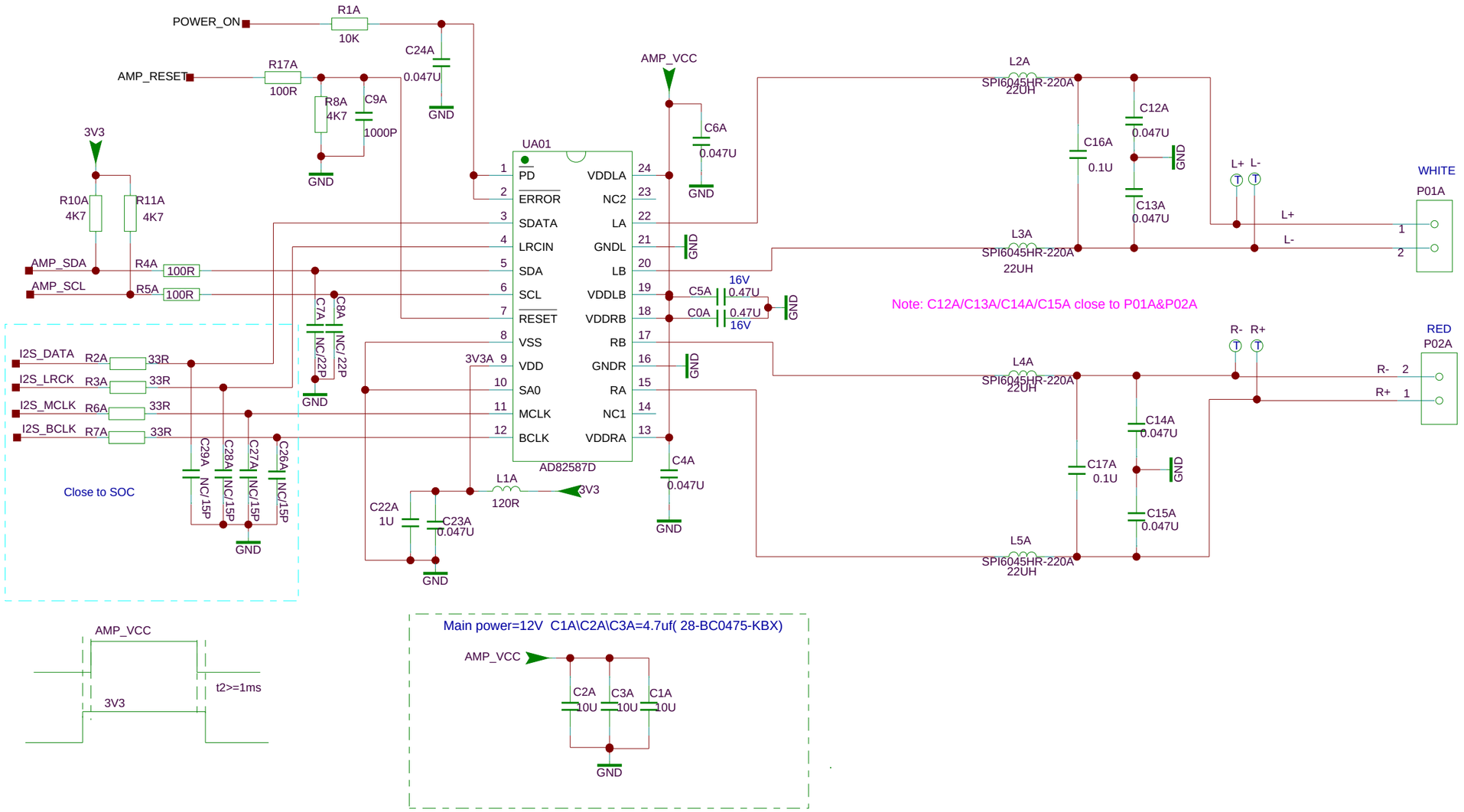
FORMAT DIN A3

AD82587D



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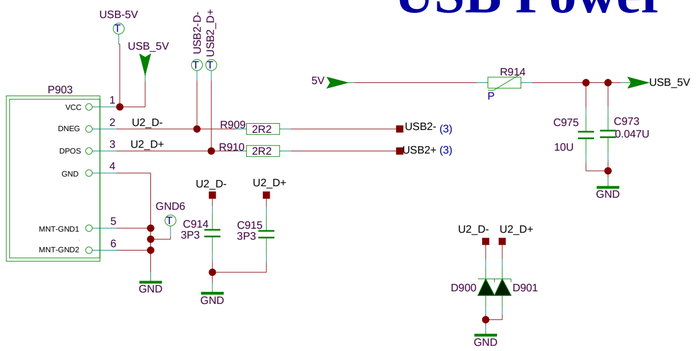
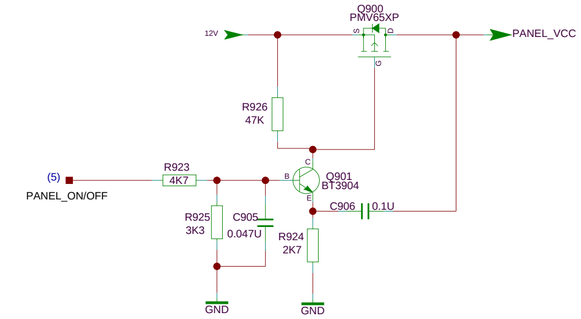
FORMAT DIN A3

USB2.0

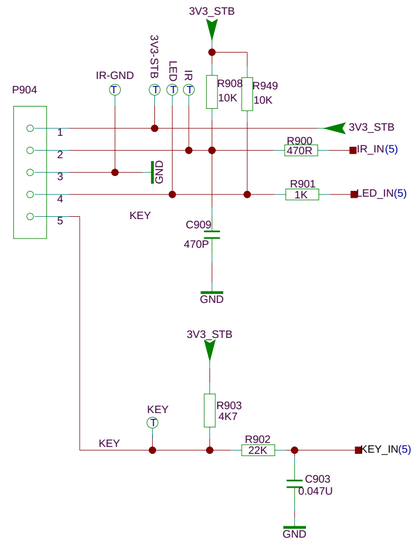
USB Power



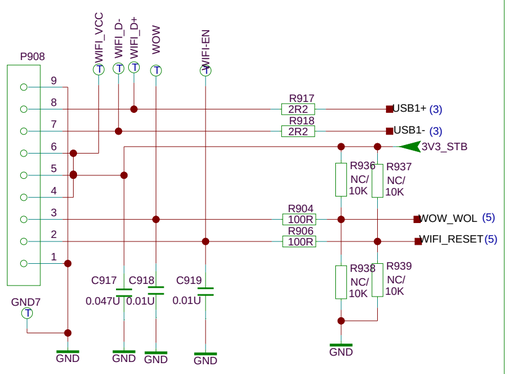
Panel Power



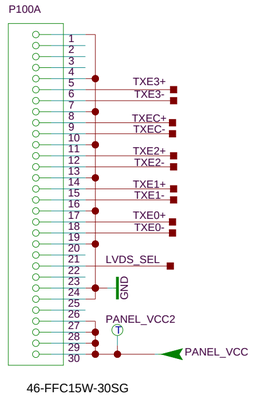
KEY&IR



FOR WiFi

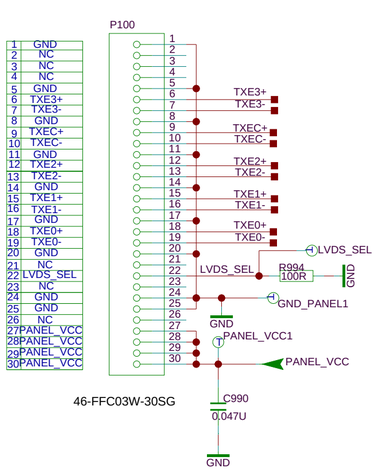


LVDS Panel Interface



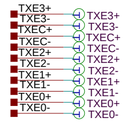
46-FFC15W-30SG

HD 30pin 0.5mm FFC



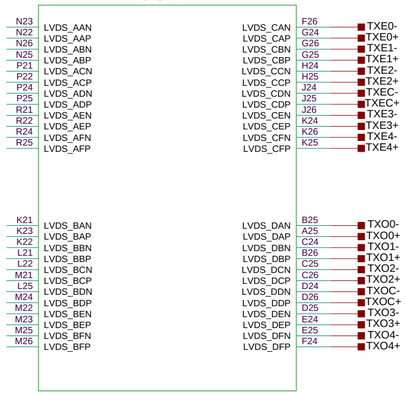
46-FFC03W-30SG

HD 30pin 1.0mm FFC



LVDS Test Point

US1



RTD2841

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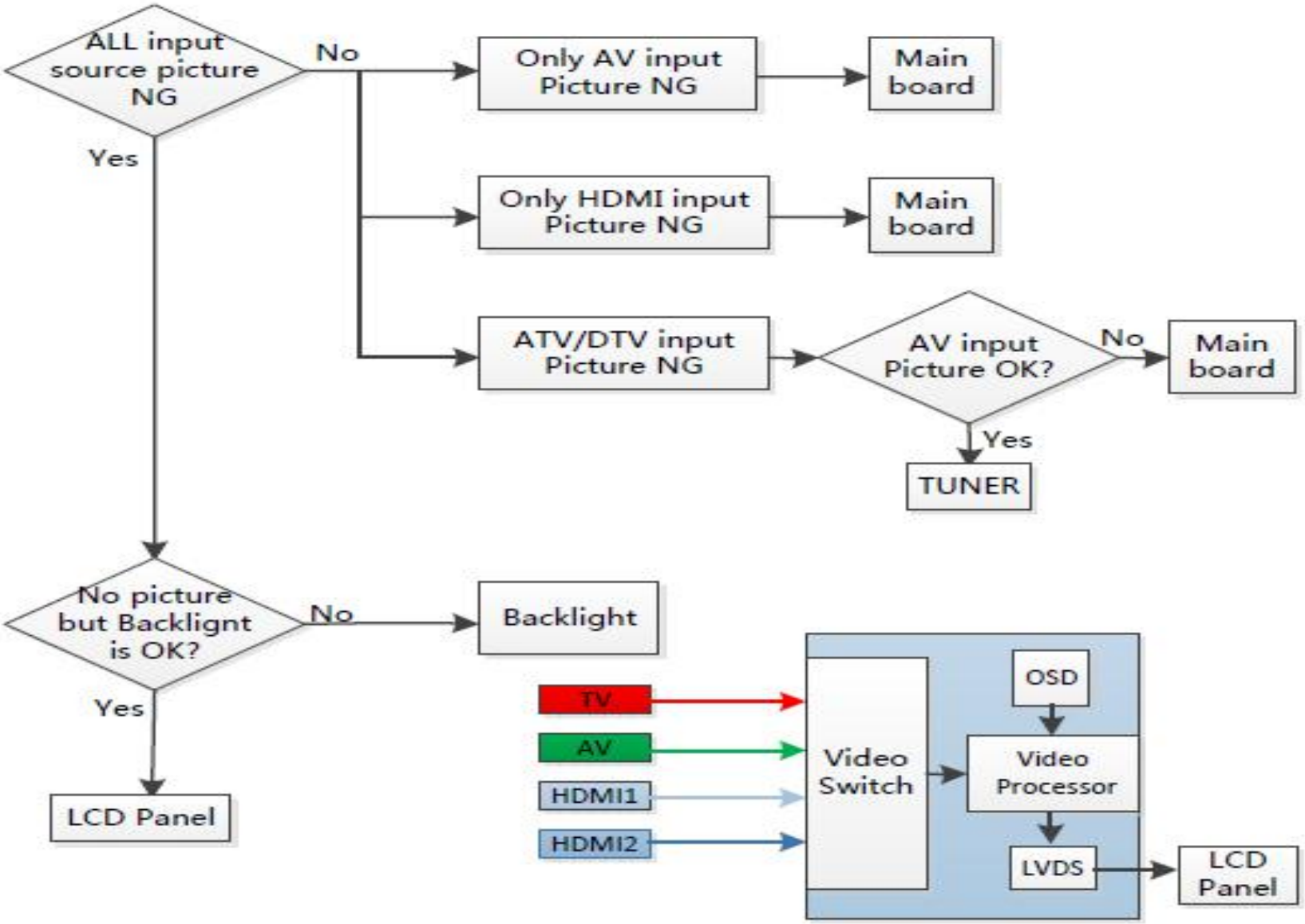
FORMAT DIN A2

Trouble Shooting

创意感动生活 The Creative Life

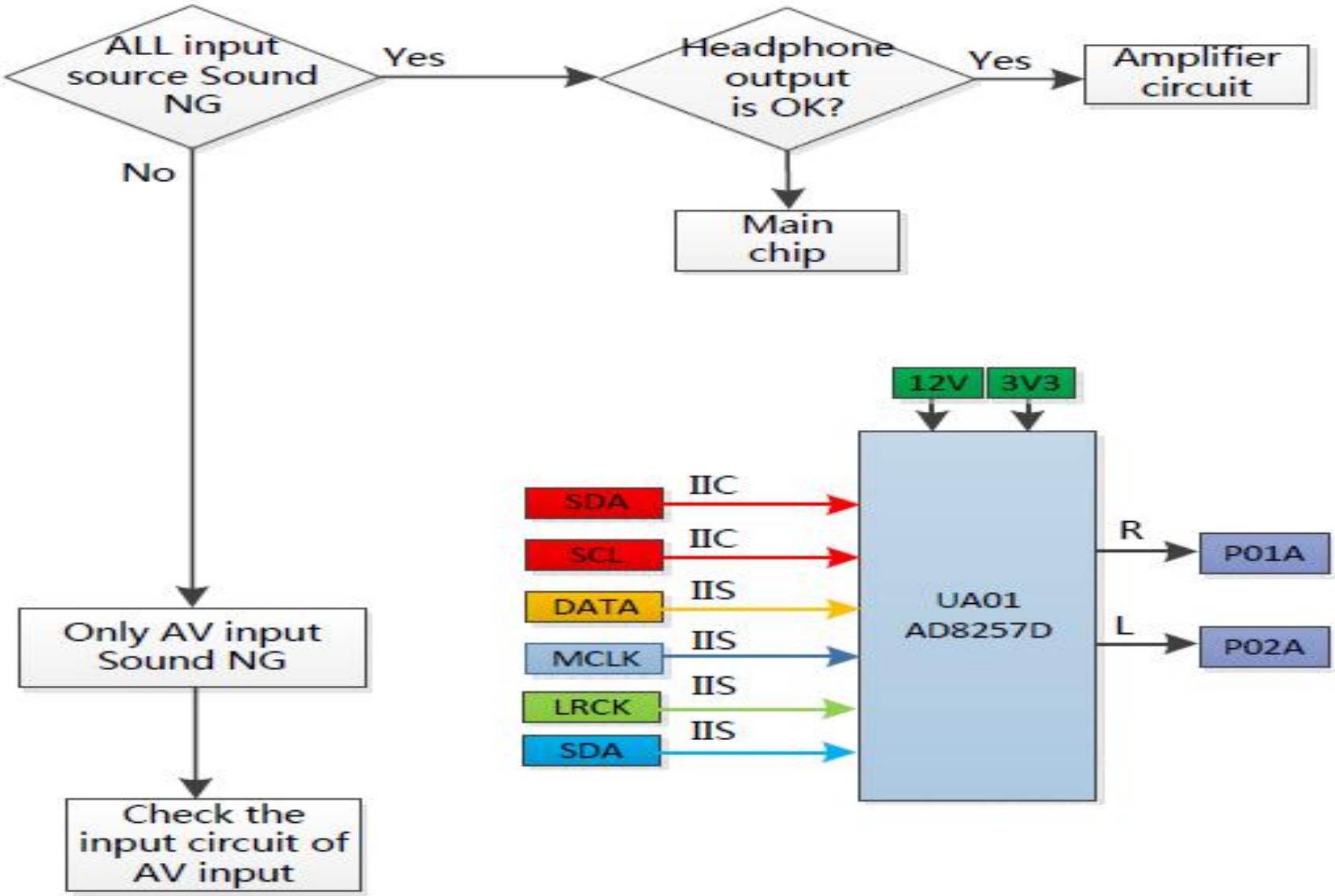
TCL

Picture NG and Sound OK



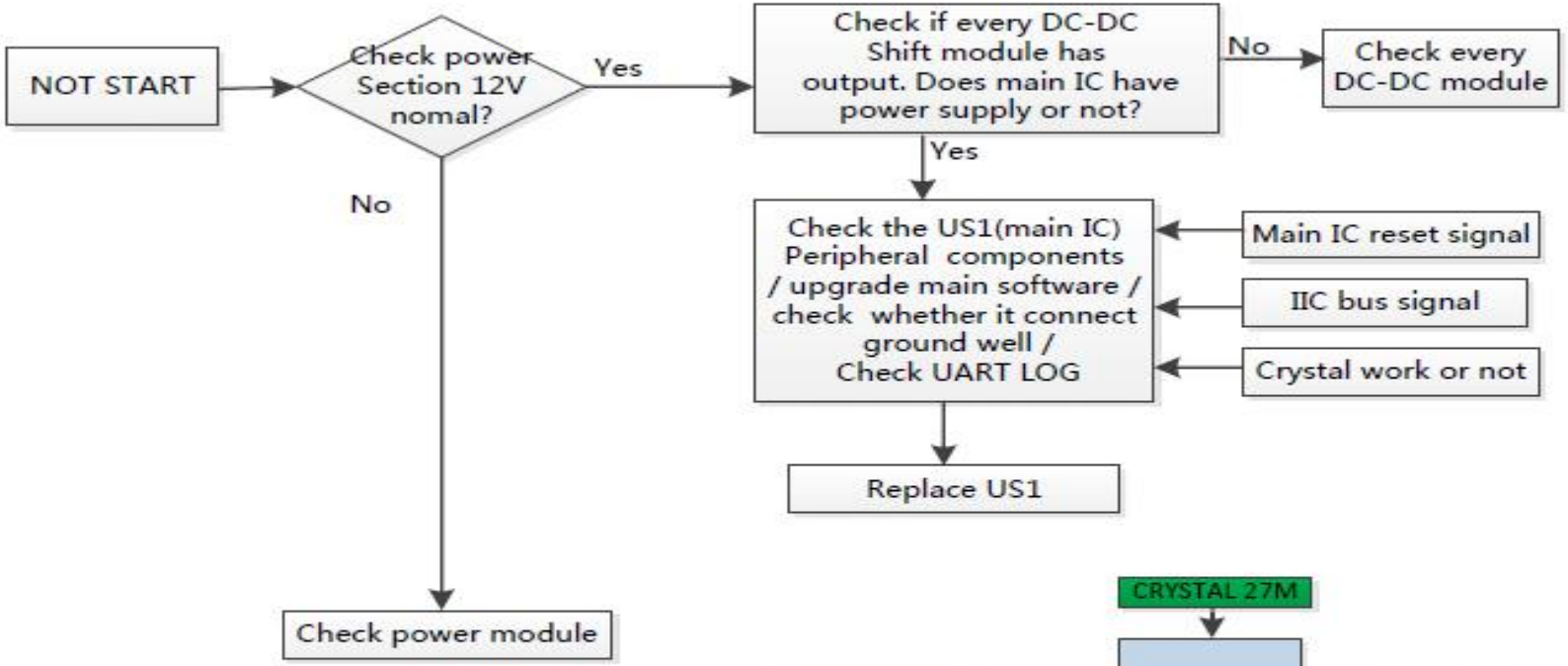
Trouble Shooting

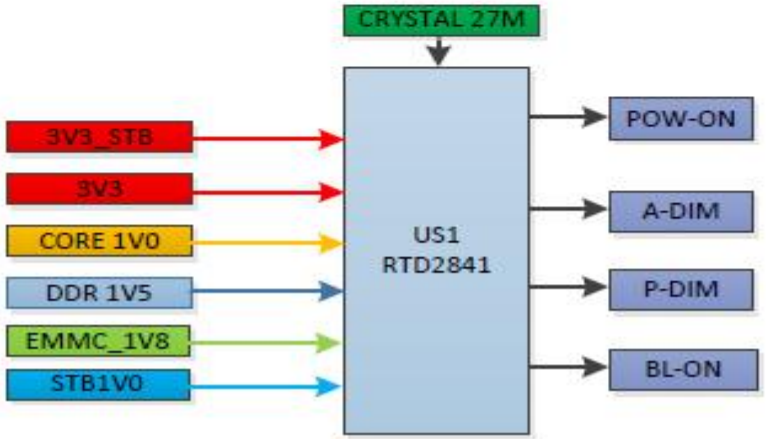
Picture OK and Sound NG



Trouble Shooting

Not Start



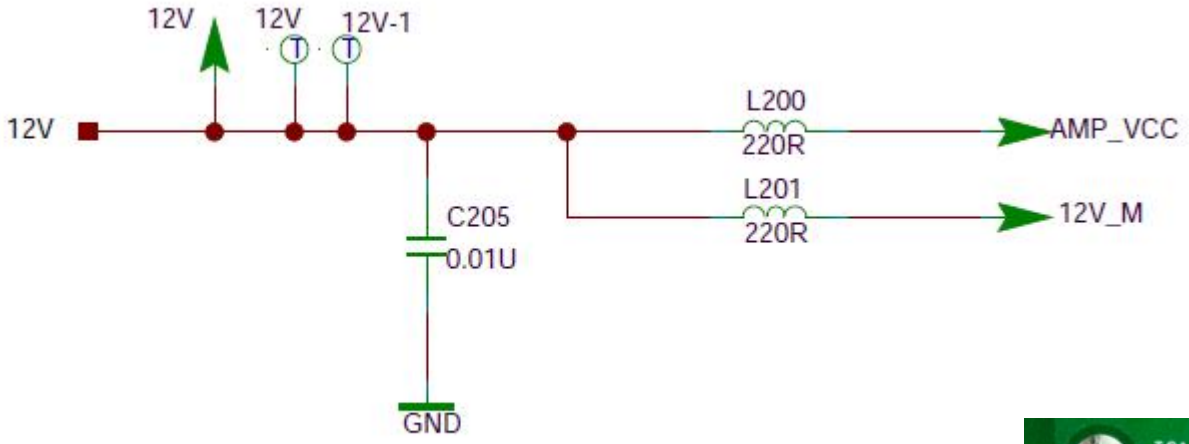


Key Test Point

创意感动生活 The Creative Life

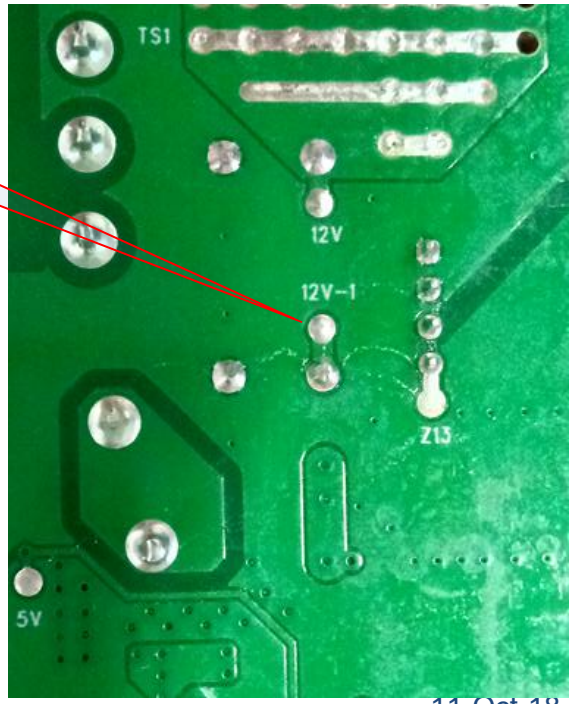
TCL

----Main Power Supply



12V

12V Test point



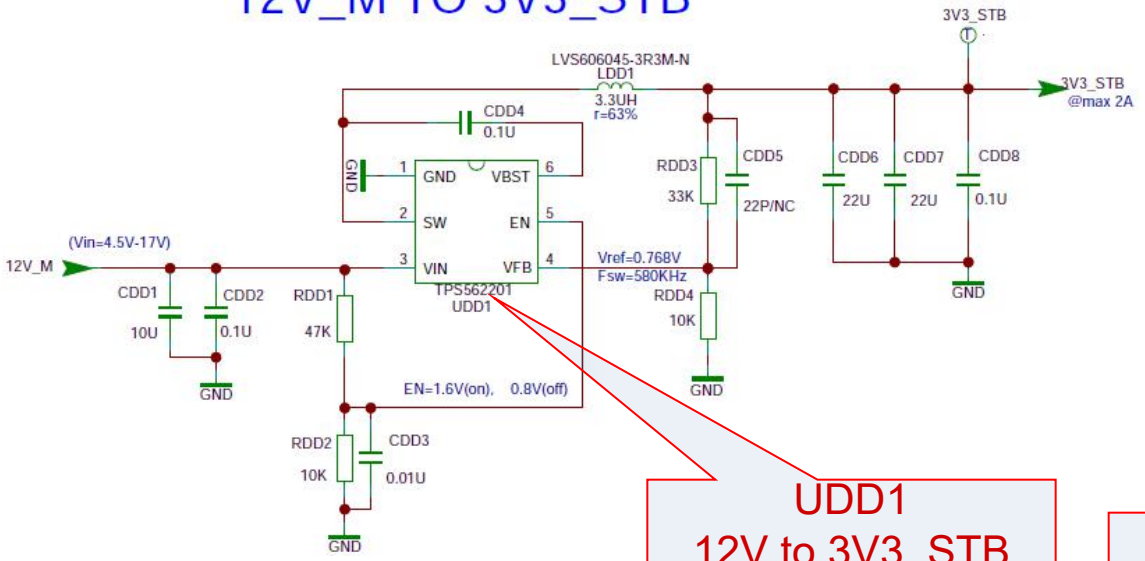
■Key Test Point

创意感动生活 The Creative Life

TCL

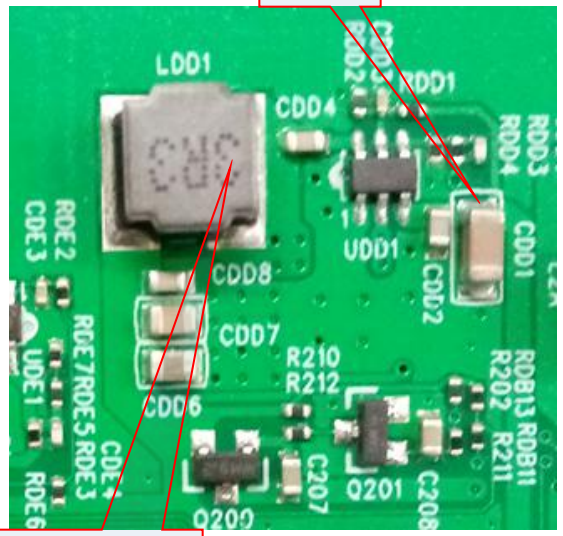
----DC to DC

12V_M TO 3V3_STB



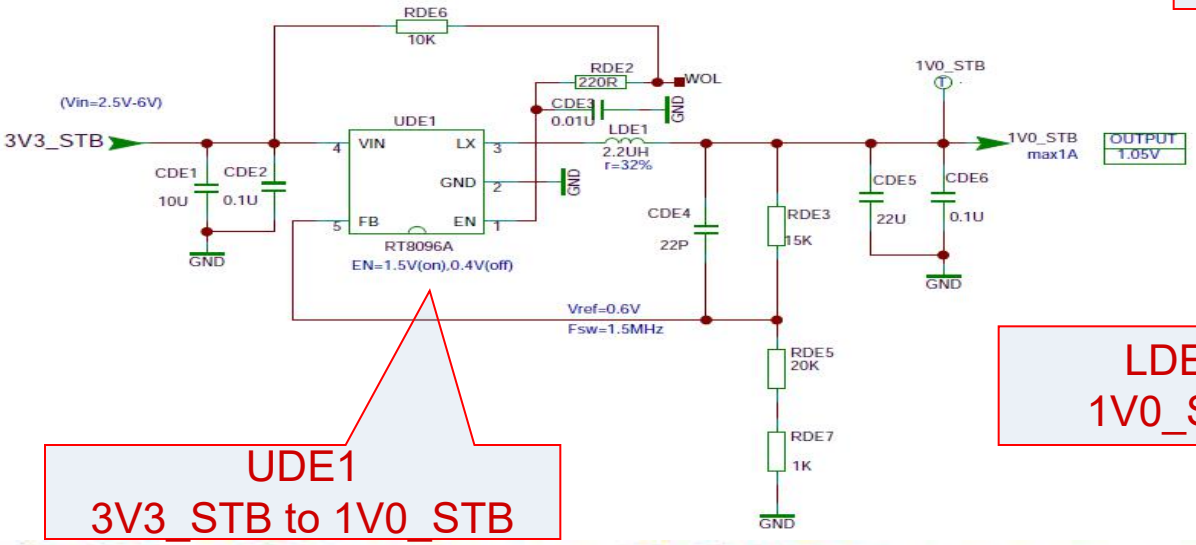
UDD1
12V to 3V3_STB

12V



LDD1
3V3_STB

3V3_STB TO 1V0_STB

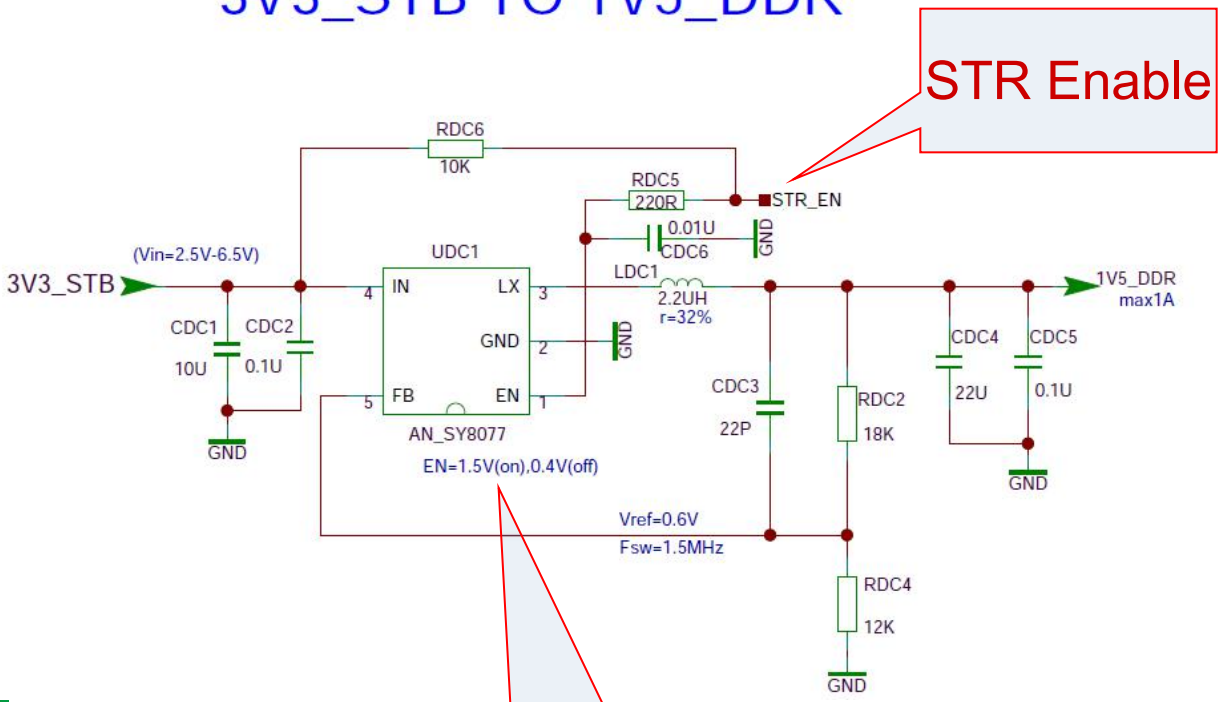


UDE1
3V3_STB to 1V0_STB

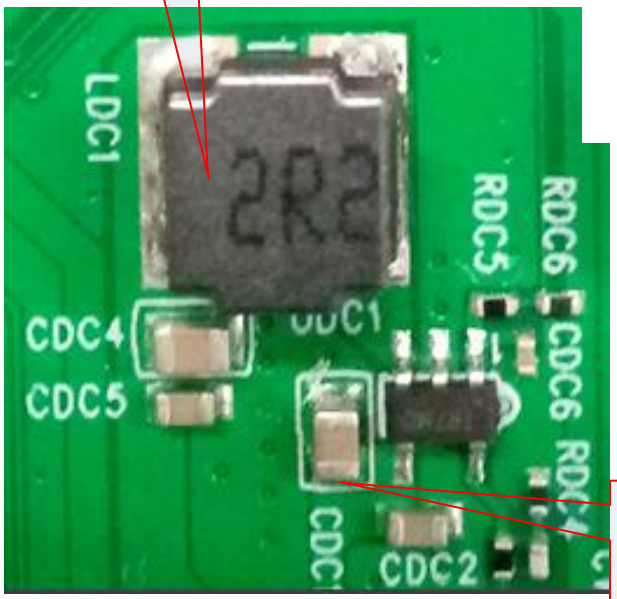
LDE1
1V0_STB

■Key Test Point

3V3_STB TO 1V5_DDR



LDC1
1V5_DDR



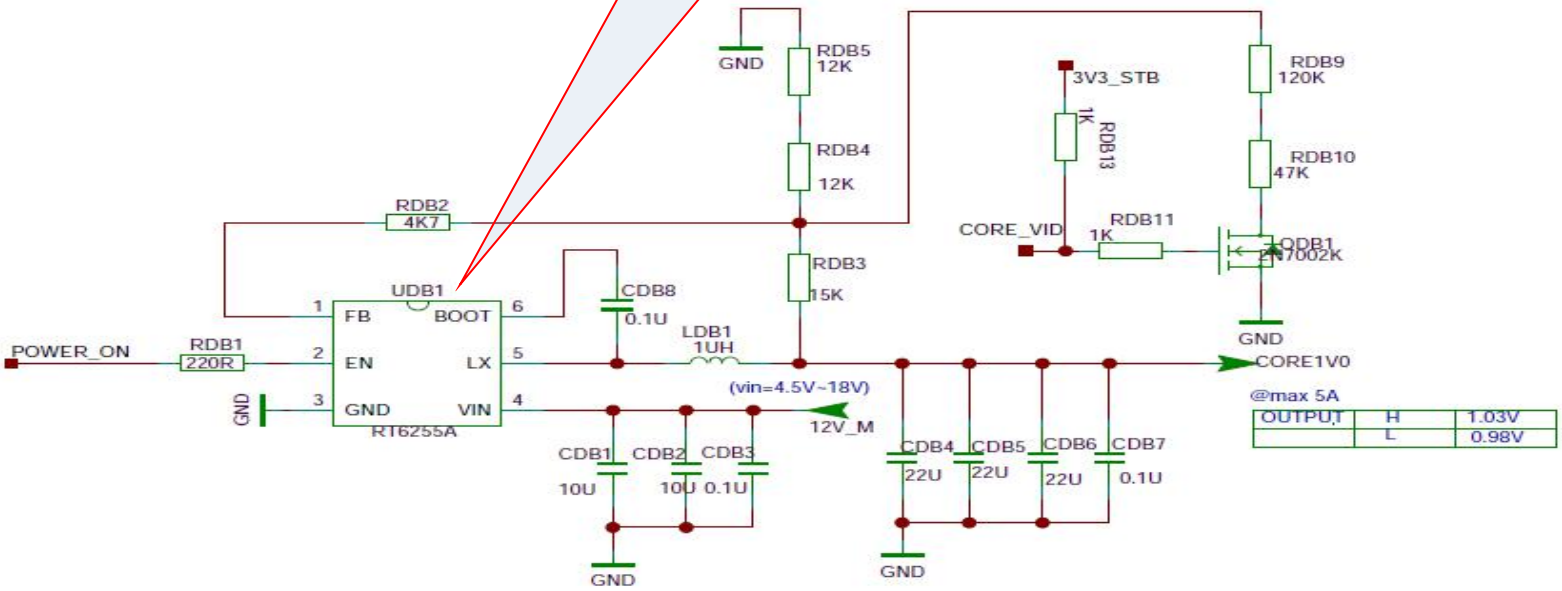
3V3_STB

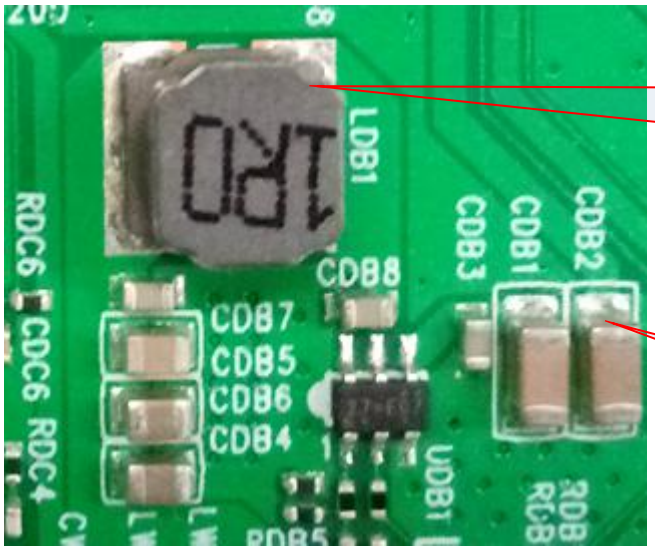
UDC1
3V3_STB to 1V5_DDR

Key Test Point

12V TO CORE1V0

UDDB
12V TO 1V0



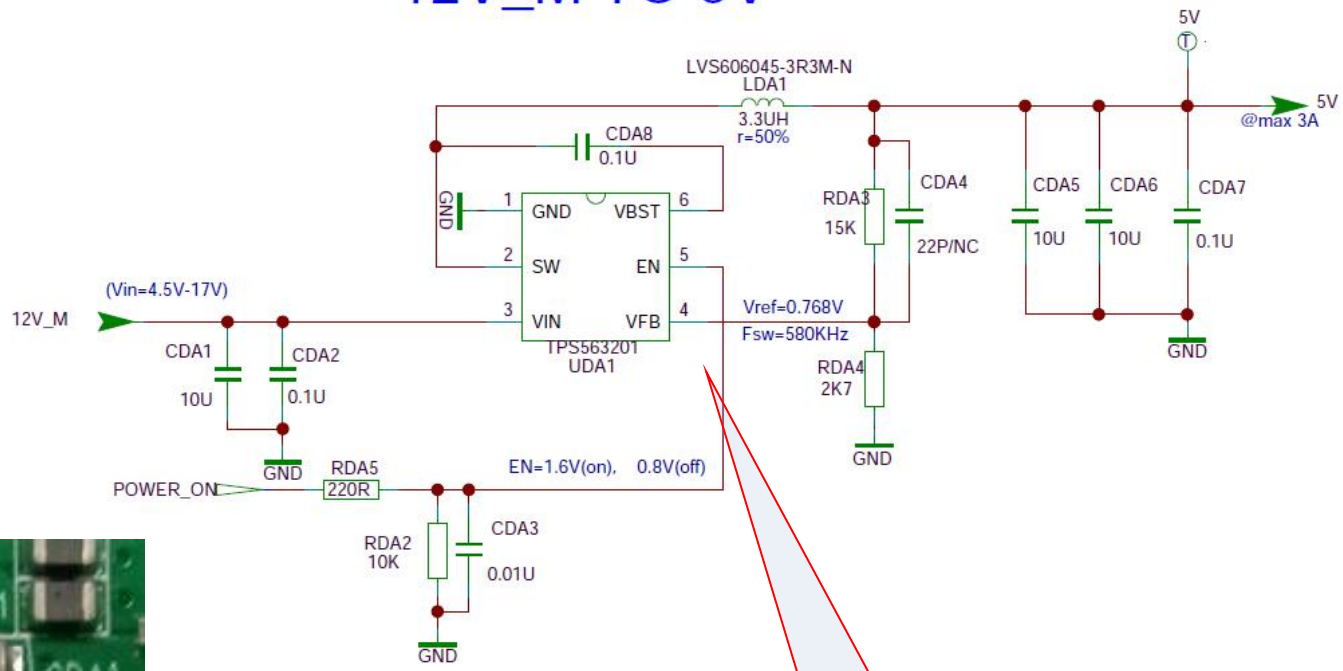


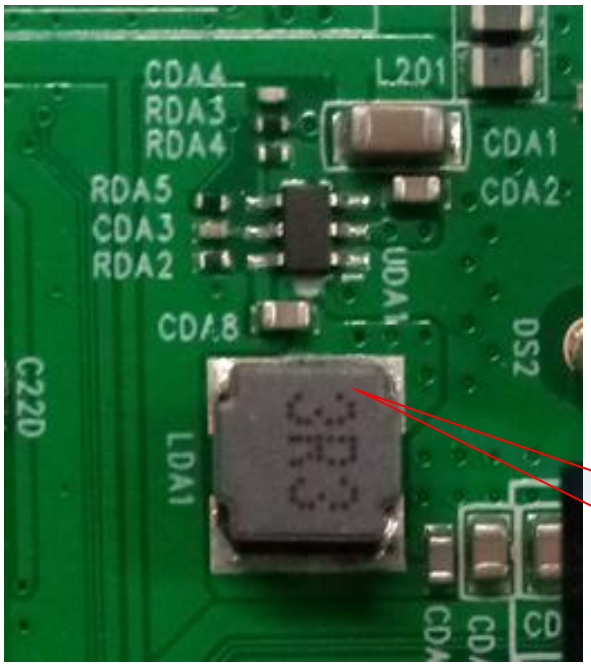
LDB1
CORE 1V0

12V

Key Test Point

12V_M TO 5V



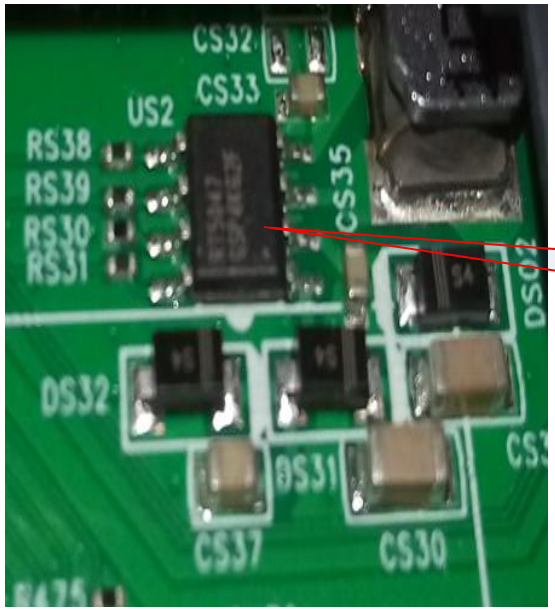


LDA1
5V

UDA1
12V TO 5V

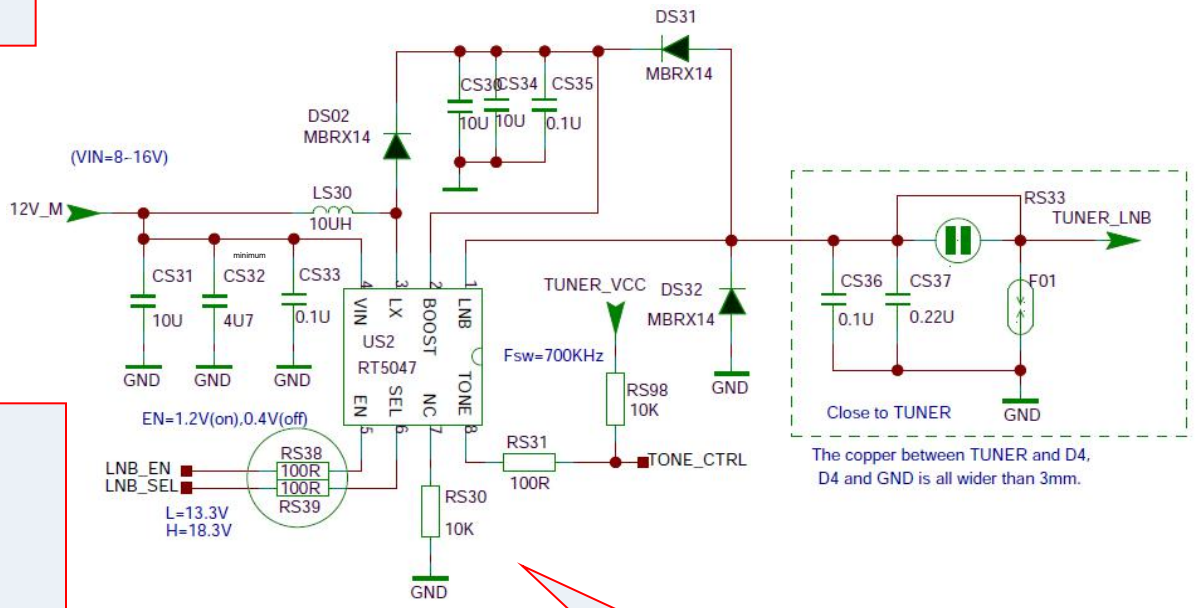
■Key Test Point

----LNB power supply(Only for DVB-S)



US2

There are two different LNB voltage output:
13.5V(min13.3V,max14.2V):For vertical polarization(V)
18.5V (min17.7V,max19.2V):For horizontal polarization(H)

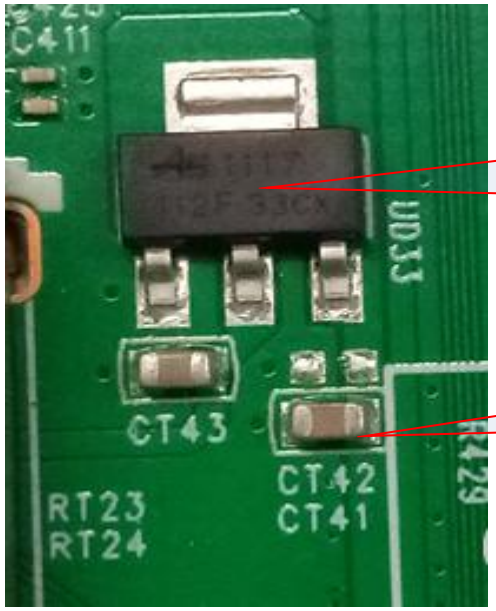


DS33
Lightning protection diode for LNB VCC

RS33 LNB VCC

US2
12V to 13.5V or 18.5V
LNB VCC

Key Test Point

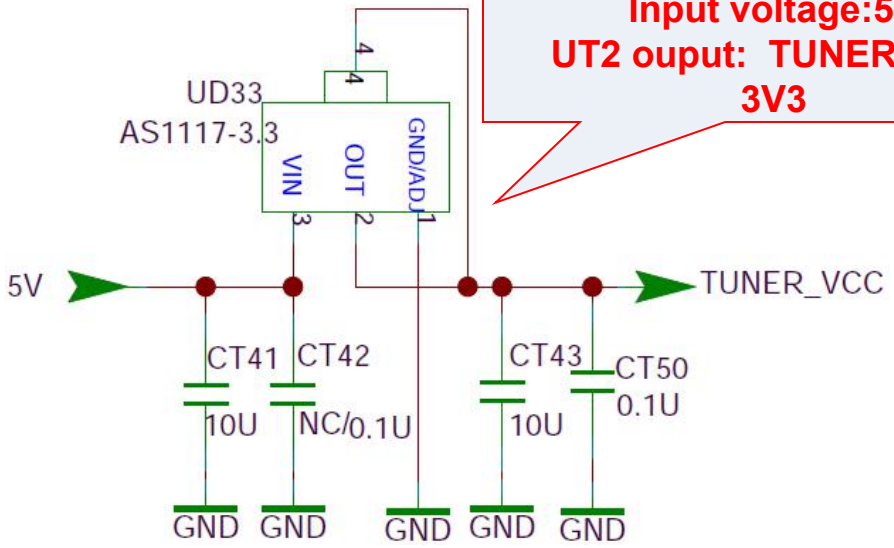


UT33
TUNER-VCC
3V3

5V

----LDO

Reference voltage:GND
Input voltage:5V
UT2 ouput: TUNER_VCC
3V3

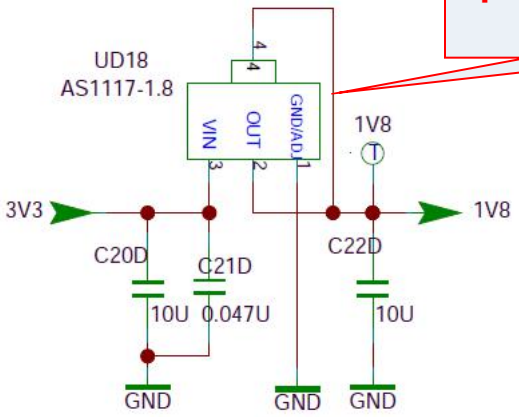


3V3_normal

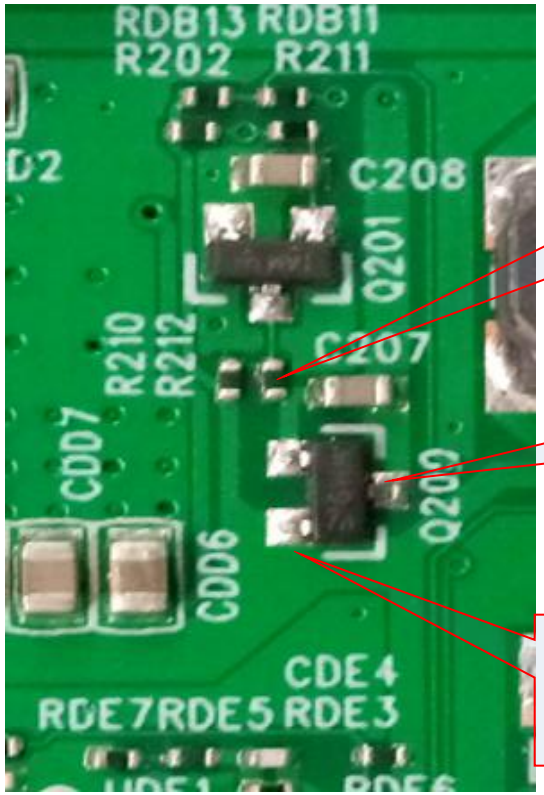
UD18
1V8

3V3 TO 1V8

Reference voltage:GND
Input voltage:3V3_NORMAL
U202 ouput: 1V8



■Key Test Point

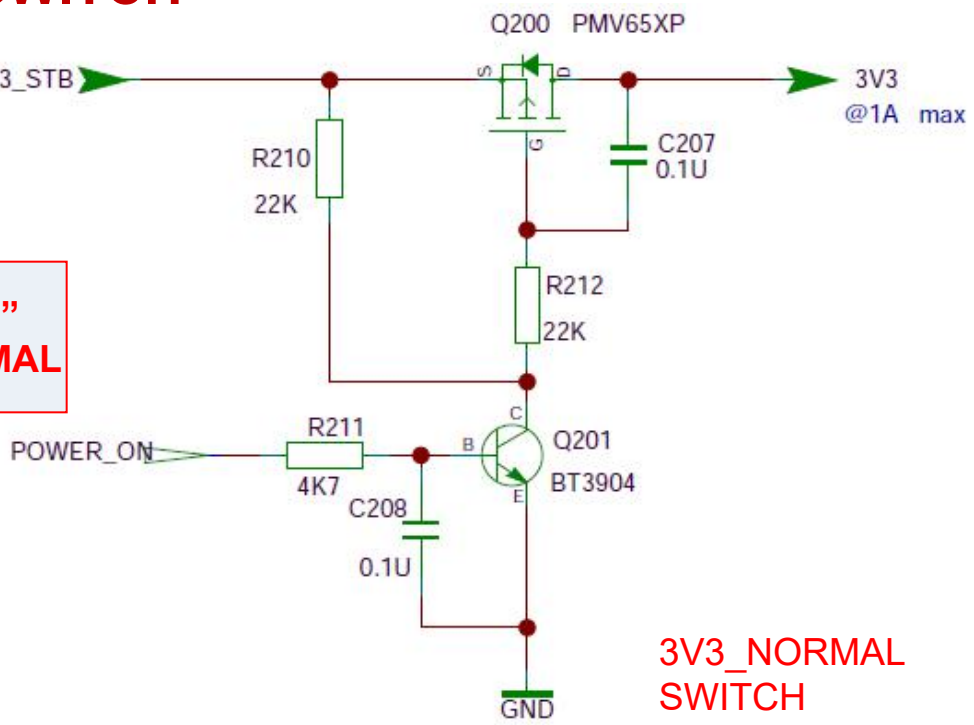


----POWER SWITCH

Q200 "G"
POWER_ON

Q200 "D"
3V3_NORMAL

Q200 "S"
3V3_STB



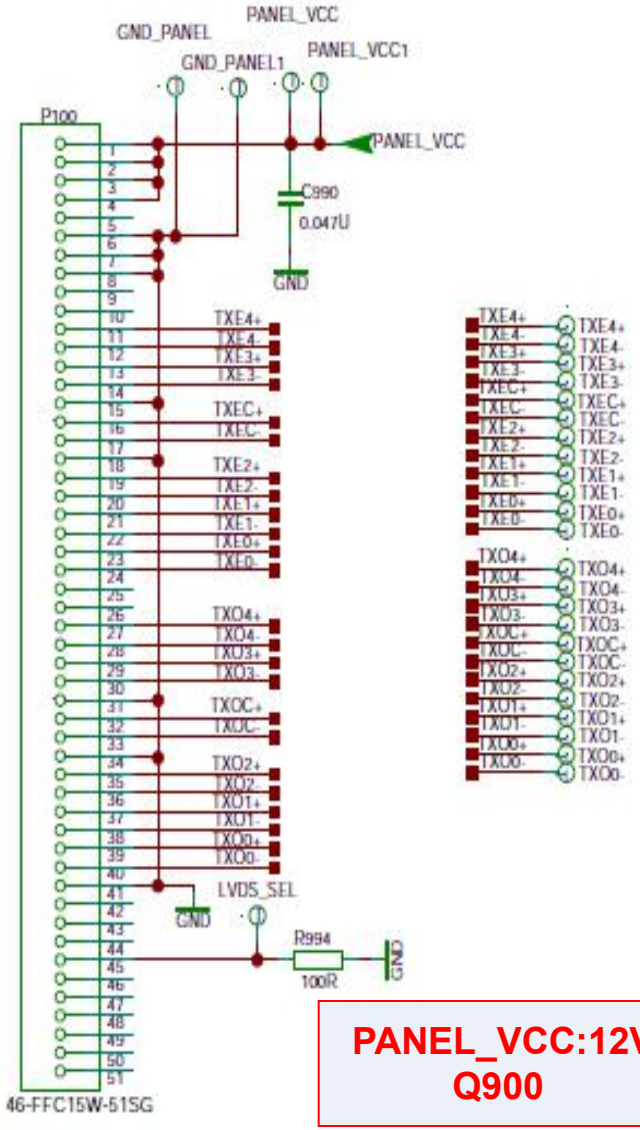
3V3_NORMAL SWITCH

Key Test Point

创意感动生活 The Creative Life TCL

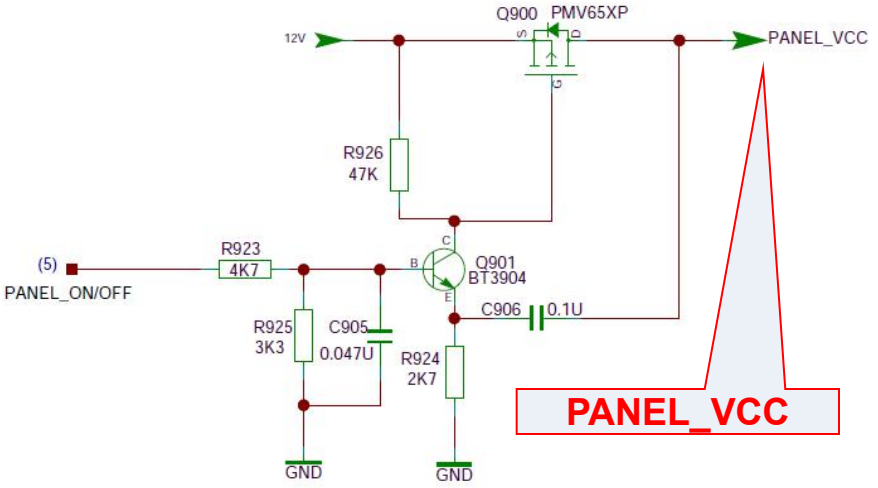
LVDS Panel Interface

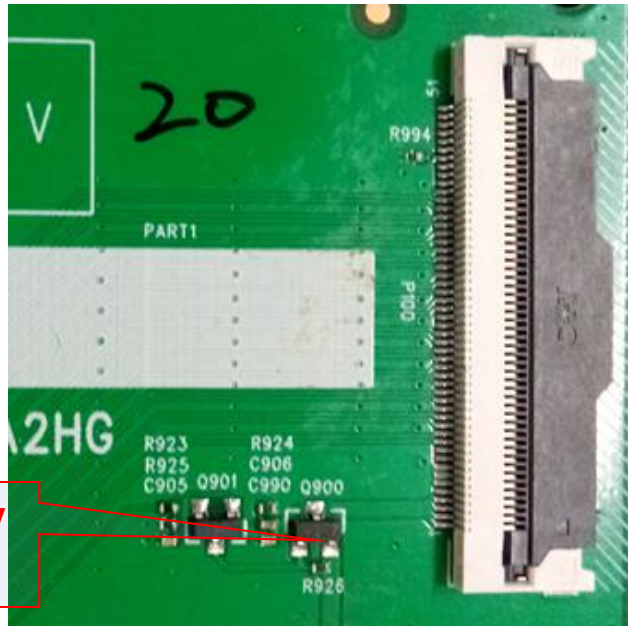
No.	FFC PIN NAME	MCU
1	PANEL_VCC	
2	PANEL_VCC	
3	PANEL_VCC	
4	PANEL_VCC	
5	NC	
6	GND	
7	GND	
8	GND	
9	NC	
10	LD_EN	OUT
11	TXE4+	
12	TXE4-	
13	TXE3+	
14	TXE3-	
15	GND	
16	TXEC+	
17	TXEC-	
18	GND	
19	TXE2+	
20	TXE2-	
21	TXE1+	
22	TXE1-	
23	TXE0+	
24	TXE0-	
25	3D_LR_OUT	PWM
26	3D_EN	OUT
27	TXO4+	
28	TXO4-	
29	TXO3+	
30	TXO3-	
31	GND	
32	TXOC+	
33	TXOC-	
34	GND	
35	TXO2+	
36	TXO2-	
37	TXO1+	
38	TXO1-	
39	TXO0+	
40	TXO0-	
41	GND	
42	NC	
43	NC	
44	LD_DIM	PWM
45	LVDS_SEL	
46	3D_FORMAT	OUT
47	3D_VSYNC_IN	IN
48	3D_FORMAT/SDA/WP	OUT
49	SDA/SCL/WP	OUT
50	SCL	OUT
51	NC	

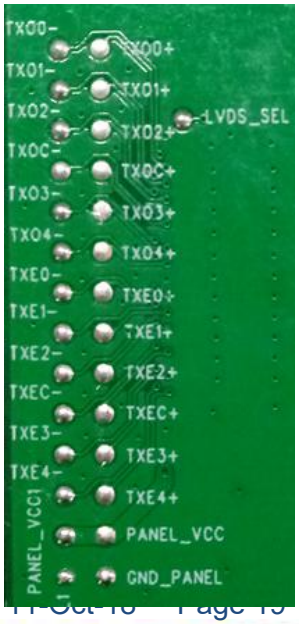


PANEL_VCC:12V
Q900

Panel Power





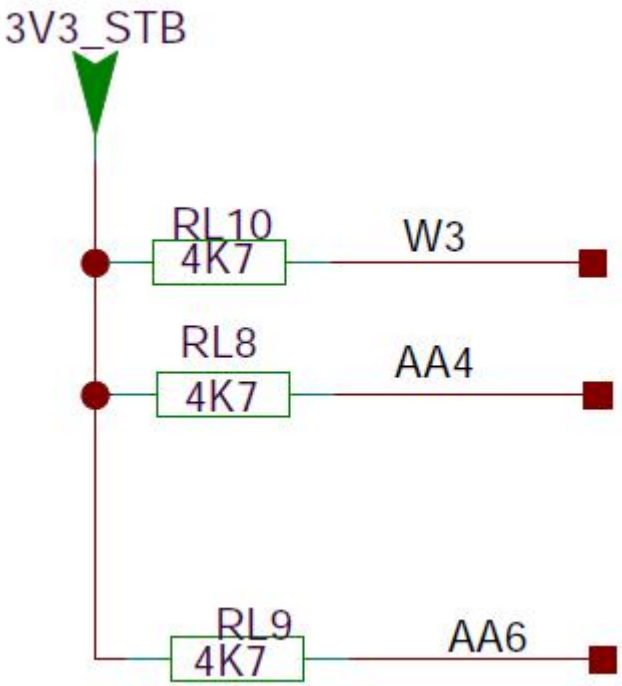


Key Test Point

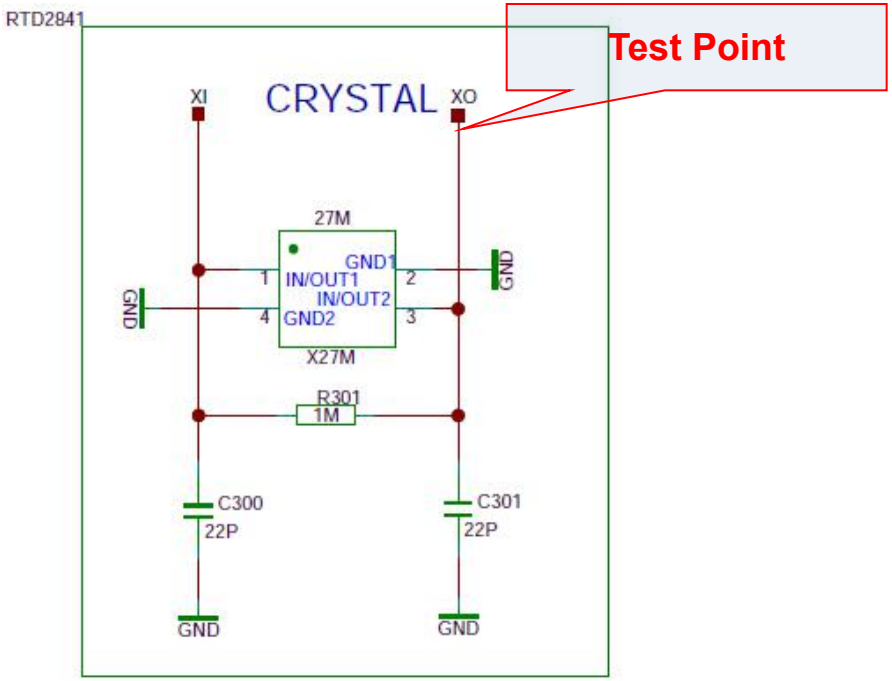
创意感动生活 The Creative Life TCL

----Main Chip

1: SOC Config

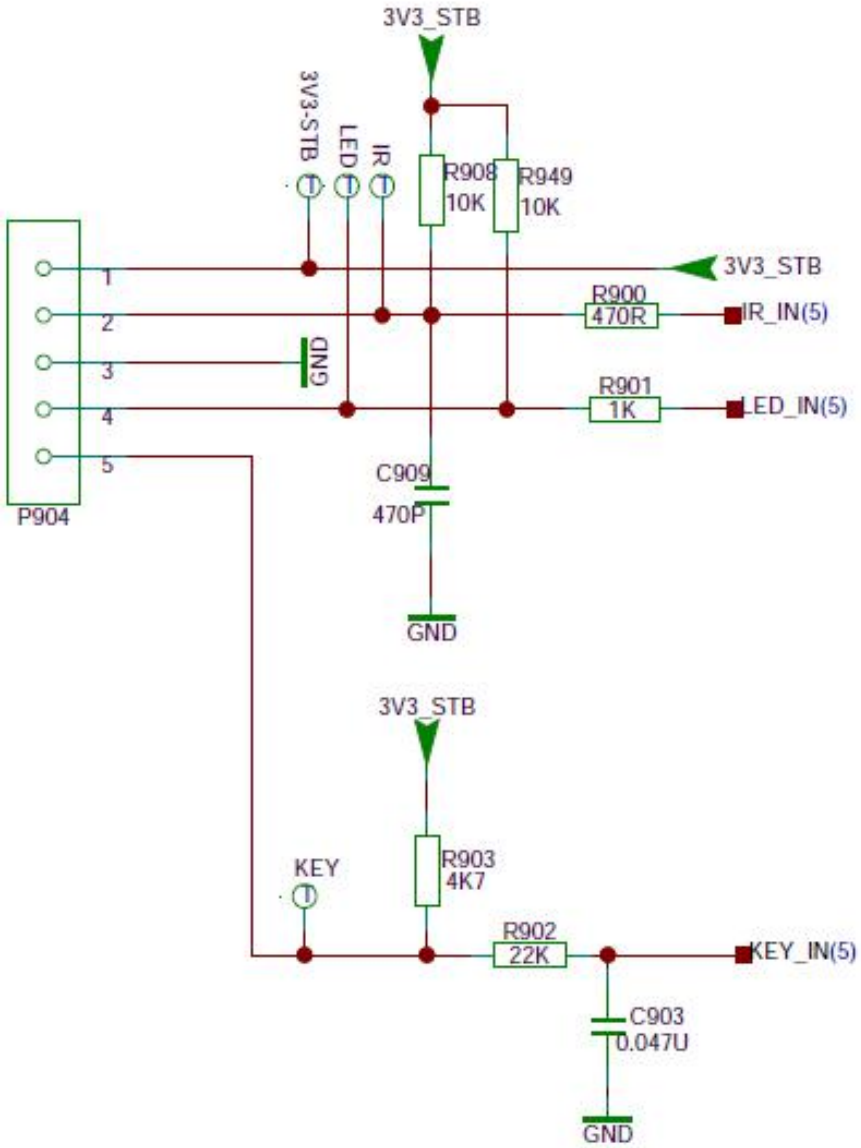


2: 24MHz CRYSTAL



■Key Voltage

KEY&IR

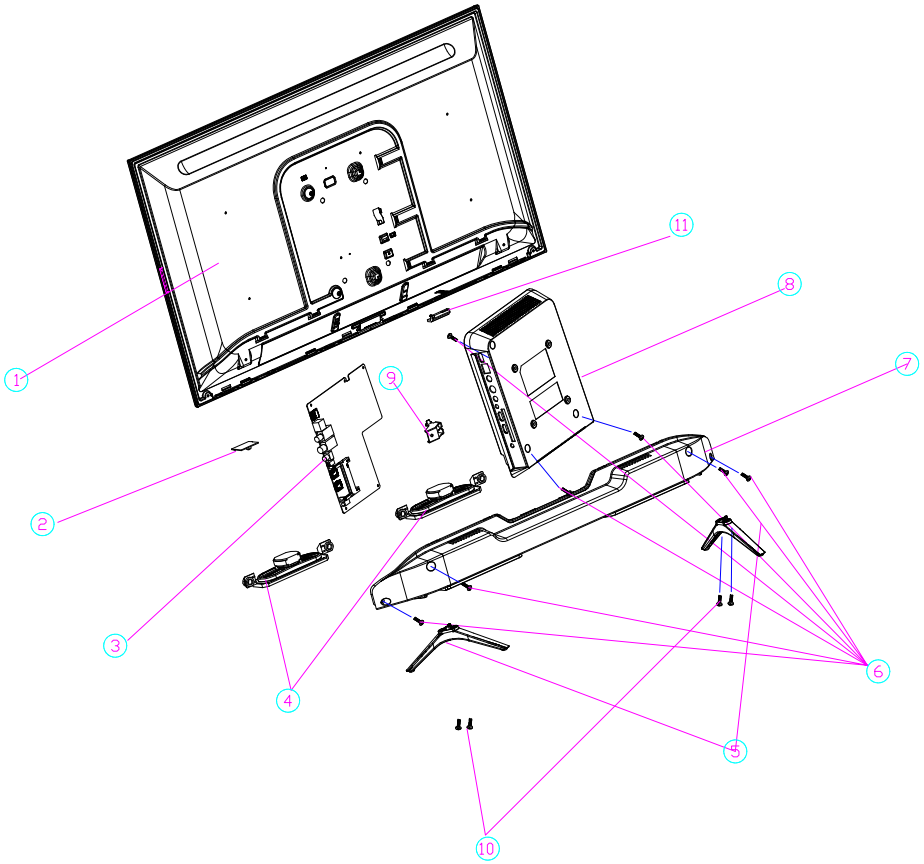


Key Voltage for RTD2841

	TCL New Standard
	RTD2841
POWER	0V

Test Point

Exploded Drawing



No.	Description	Code No.	Material	Qty's	Remark
11	Decor Lens			1	
10	Self-tapping Screw			4	锁底座和后壳下
9	VESA Support			1	
8	Small Back Cover Up			1	锁后壳上、下采背板
7	Small Back Cover Down			1	锁底座与后壳下
6	Mechine Screw			7	
5	Stand			2	
4	Speaker			2	
3	Chasiss			1	
2	Key			1	
1	Module			1	

TCL

PART NUMBER	APPROVED	DATE
PART DESCRIPTION	CHECKED	DATE
MODEL NAME	DESIGNED	DATE

UNIT	SCALE	PROJECT	SIZE	SHEET NUMBER	REVISION
MM	XX		A4	1 OF 1	V1.0