Service
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TPM17.2E
LA

Service Manual

Chassis name	Platform	Model name
TPM17.2E LA	MTK5800	32PHS5302/12
		32PHT5302/12
		43PFS5302/12
		43PFT5302/12
		49PFS5302/12

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1. Product information

1.1 Product Fiche

32PHx5301

• Energy Efficiency Class : A+
• Visible Screen Size : 80 cm / 32 inch
• On Mode Power Consumption (W) : 47 W
• Annual Energy Consumption (kWh) * : 68 kWh
• Standby Power Consumption (W) **: 0.30 W
• Display Resolution (Pixels) : 1366 x 768p

43PFx5301

• Energy Efficiency Class : A++
• Visible Screen Size : 108 cm / 43 inch
• On Mode Power Consumption (W) : 34 W
• Annual Energy Consumption (kWh) * : 50 kWh
• Standby Power Consumption (W) **: 0.30 W
• Display Resolution (Pixels) : 1920 x 1080p

49PFx5301

• Energy Efficiency Class : A++
• Visible Screen Size : 123 cm / 49 inch
• On Mode Power Consumption (W) : 37 W
•Annual Energy Consumption (kWh) * : 54 kWh
• Standby Power Consumption (W) **: 0.30 W
•Display Resolution (Pixels) : 1920 x 1080p

* Energy consumption kWh per year, based on the power consumption of the television operating 4 hours per day for 365 days. The actual energy consumption depends on how the television is used.

** When the TV is turned off with the remote control and no function is active.

1.2 Power

Product specifications are subject to change without notice. For more specification details of this product, see www.philips.com/support

• Mains power : AC 220-240V +/-10%
• Ambient temperature : 5°C to 35°C
• Power saving features : Eco mode, Picture mute (for radio), Auto switch-off timer, Eco settings menu.

For power consumption information, see chapter Product Fiche.

The power rating stated on the product typeplate is the power consumption for this product during normal household use (IEC 62087 Ed.2). The maximum power rating, stated between brackets, is used for electrical safety (IEC 60065Ed. 7.2

1.3 Reception

• Aerial input : 75 ohm coaxial (IEC75)
• Tuner bands : Hyperband, S-Channel, UHF, VHF
• DVB : DVB-T2, DVB-C (cable) QAM
• Analogue video playback : SECAM, PAL
• Digital video playback : MPEG2 SD/HD (ISO/IEC 13818-2), MPEG4 SD/HD (ISO/IEC 14496-10)
• Digital audio playback (ISO/IEC 13818-3)
• Satellite aerial input : 75 ohm F-type
• Input frequency range : 950 to 2150MHz
• Input level range : 25 to 65 dBm
• DVB-S/S2 QPSK, symbol rate 2 to 45M symbols,

SCPC and MCPC

•LNB : DiSEqC 1.0, 1 to 4 LNBs supported, Polarity selection 14/18V, Band selection 22kHz, Tone burstmode, LNB current 300mA max

1.4 Display type

Diagonal screen size

•32PHx5301 : 80 cm / 32 inch

• 43PFx5301 : 108 cm / 43 inch

• 49PFx5301 : 123 cm / 49 inch

Display resolution

• 1366 x 768p (for 32”)

• 1920 x 1080p（43”&49”）

1.5 Display input resolution

Video formats

Resolution — Refresh rate

•480i - 60 Hz

• 480p - 60 Hz

• 576i - 50 Hz

• 576p - 50 Hz

• 720p - 50 Hz, 60 Hz

• 1080i - 50 Hz, 60 Hz

• 1080p - 24 Hz, 25 Hz, 30 Hz

Computer formats

Resolutions (amongst others) for 32”

• 640 x 480p - 60 Hz

• 800 x 600p - 60 Hz

•1024 x 768p - 60 Hz

•1280 x 768p - 60 Hz

• 1360 x 765p - 60 Hz

• 1360 x 768p - 60 Hz

• 1280 x 1024p - 60 Hz

Resolutions (amongst others) for 43”&49”

• 640 x 480p - 60 Hz

• 800 x 600p - 60 Hz

• 1024 x 768p - 60 Hz

• 1280 x 768p - 60 Hz

• 1360 x 765p - 60 Hz

• 1360 x 768p - 60 Hz

• 1280 x 1024p - 60 Hz

• 1920 x 1080p - 60 Hz

1.6 Connectivity

TV Side

• HDMI 1 in - MHL

• USB 1

•USB 2

• 1x Common Interface slot: CI+/CAM

• Headphones - Stereo mini-jack 3.5mm

TV Rear

• CVBS/Y Pb Pr : CVBS/Y Pb Pr, Audio L/R

•• HDMI 2 in - ARC
• Audio out - Optical Toslink
• Network LAN - RJ45
• Antenna (75 ohm)
•Satellite tuner

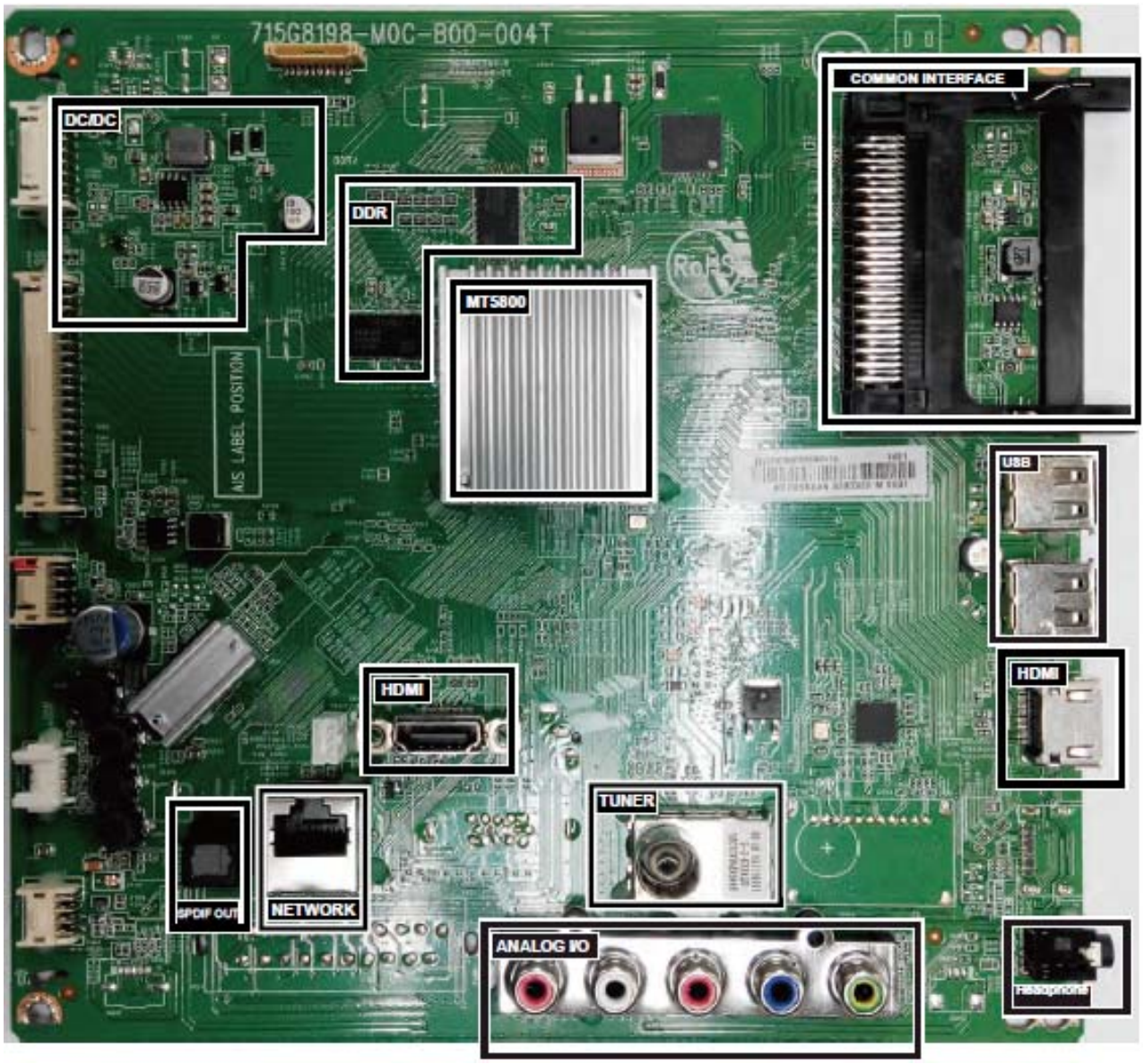
1.7 Sound

• HD Stereo
• Output power (RMS) : 16W
• Dolby® Digital Plus
• DTS 2.0+ Digital out ™

1.8 Multimedia

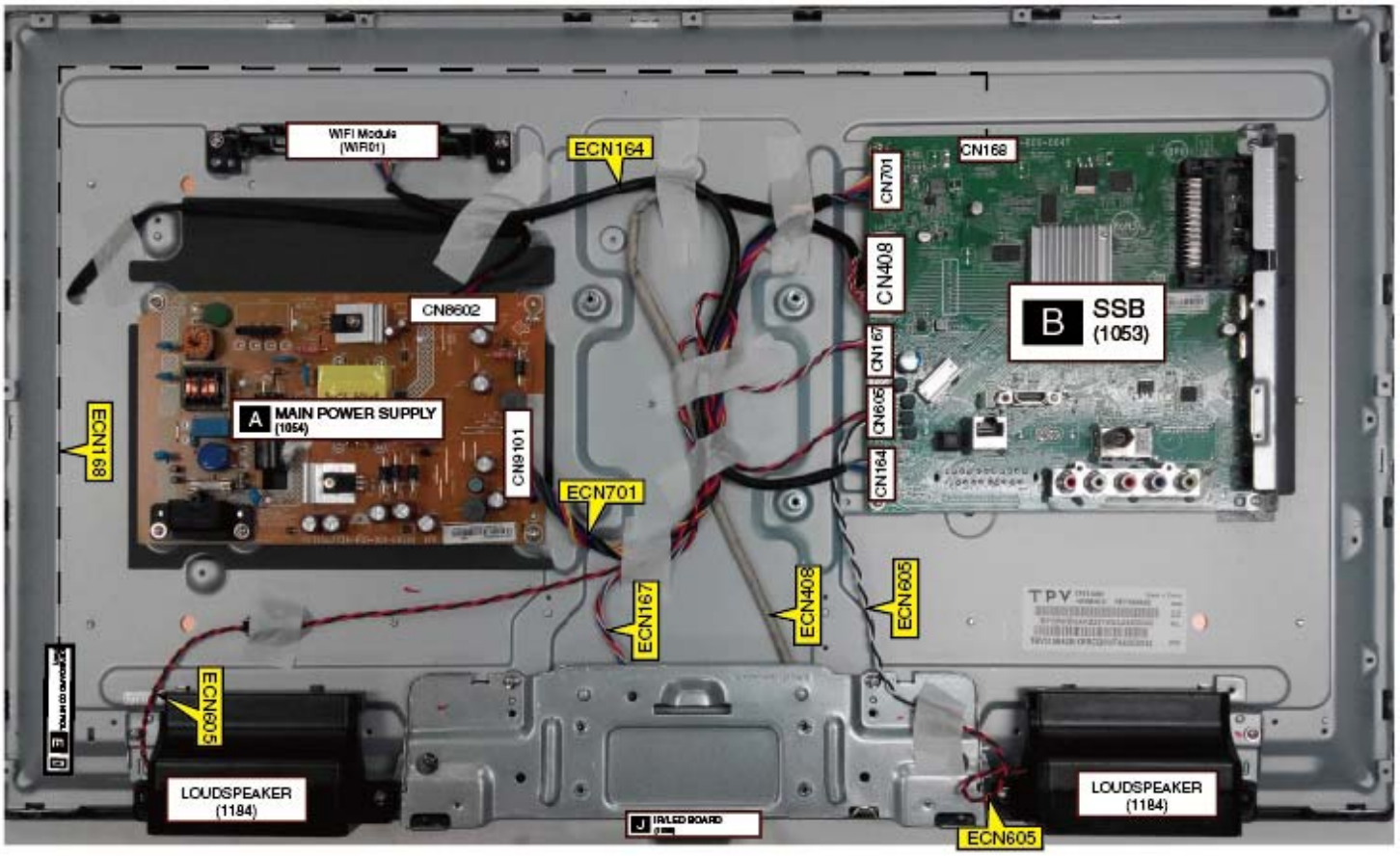
Connections
•USB 2.0
• Ethernet LAN RJ-45
• Wi-Fi 802.11a/b/g/n (built-in)
Supported USB file systems
• FAT 16, FAT 32, NTFS
Playback formats
• Containers : 3GP, AVCHD, AVI, MPEG-PS, MPEG-TS,MPEG-4, Matroska (MKV), Quicktime (MOV, M4V,M4A), Windows Media (ASF/WMV/WMA)
• Video Codecs : MPEG-1, MPEG-2, MPEG-4 Part 2, MPEG-4 Part 10 AVC (H.264), VC-1, WMV9, HEVC,VP9
• Audio Codecs : AAC, HE-AAC (v1/v2), AMR-NB,Dolby Digital, Dolby Digital Plus, DTS 2.0 + Digital Out™, MPEG-1/2/2.5 Layer I/II/III (includes MP3), WMA (v2 to v9.2), WMA Pro (v9/v10)
• Subtitles :
– Formats : SAMI, SubRip (SRT), SubViewer (SUB), MicroDVD (TXT), mplayer2 (TXT), TMPlayer (TXT)
– Character encodings : UTF-8, Central Europe and Eastern Europe (Windows-1250), Cyrillic (Windows-1251), Greek (Windows-1253), Turkish (Windows-1254), Western Europe (Windows-1252)
• Image Codecs : JPEG
• Limitations :
– Maximum supported total bit rate for a media file is 30Mbps.
– Maximum supported video bit rate for a media file is 20Mbps.
– MPEG-4 AVC (H.264) is supported up to High Profile @ L4.1.
– VC-1 is supported up to Advanced Profile @ L3. Wi-Fi Certified
This TV supports Miracast certified devices. Supported media server software (DMS)
•You can use any DLNA V1.5 certified media server software (DMS class).
• You can use the Philips TV Remote app (iOS and Android) on mobile devices. Performance may vary, depending on the capabilities of the mobile device and the software used.
ESD regulations
This apparatus meets performance criteria A for ESD. In case the apparatus does not recover in file sharing mode due to electrostatic discharge, user interference

2. Connections Overview

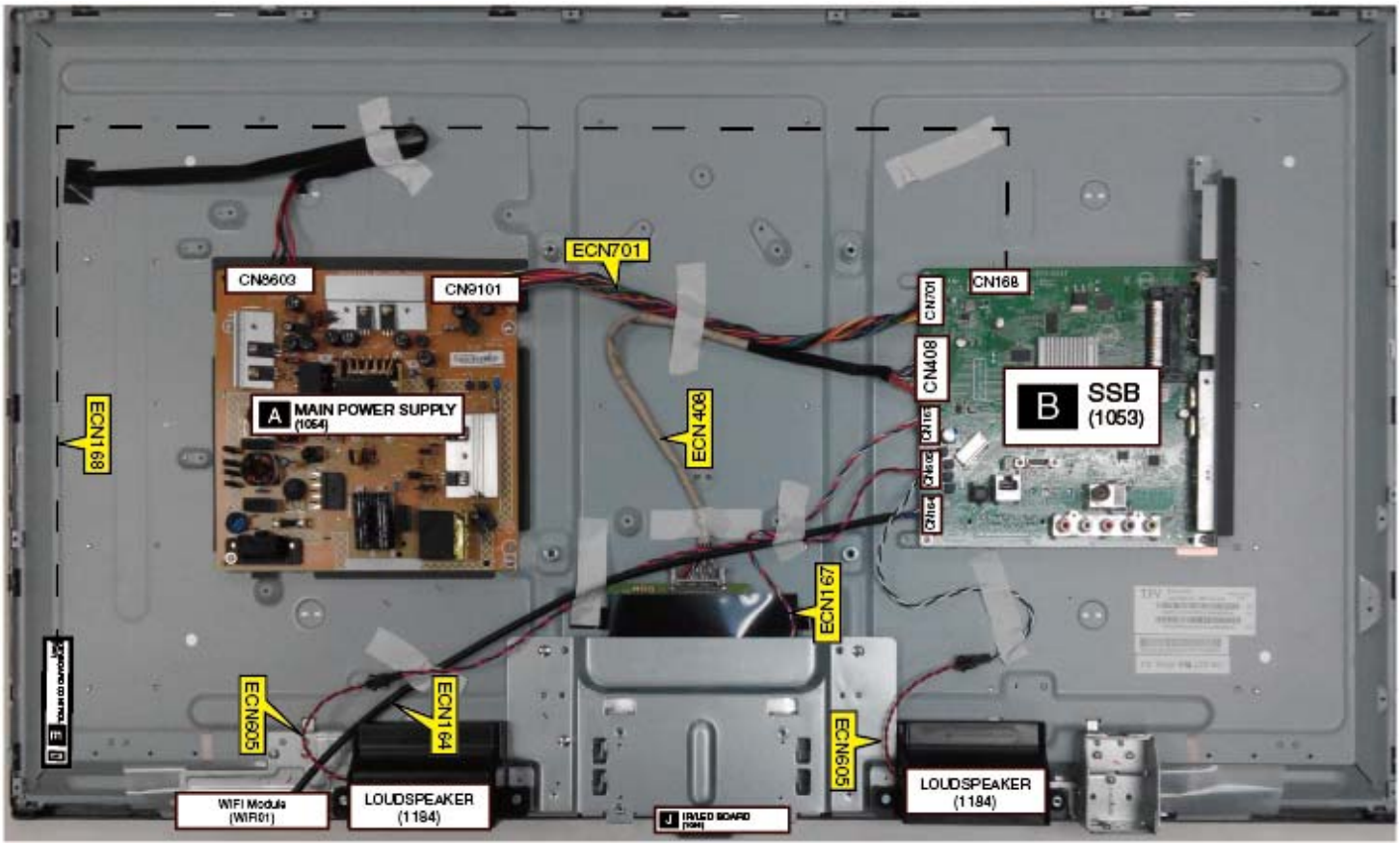


3. Mechanical Instructions

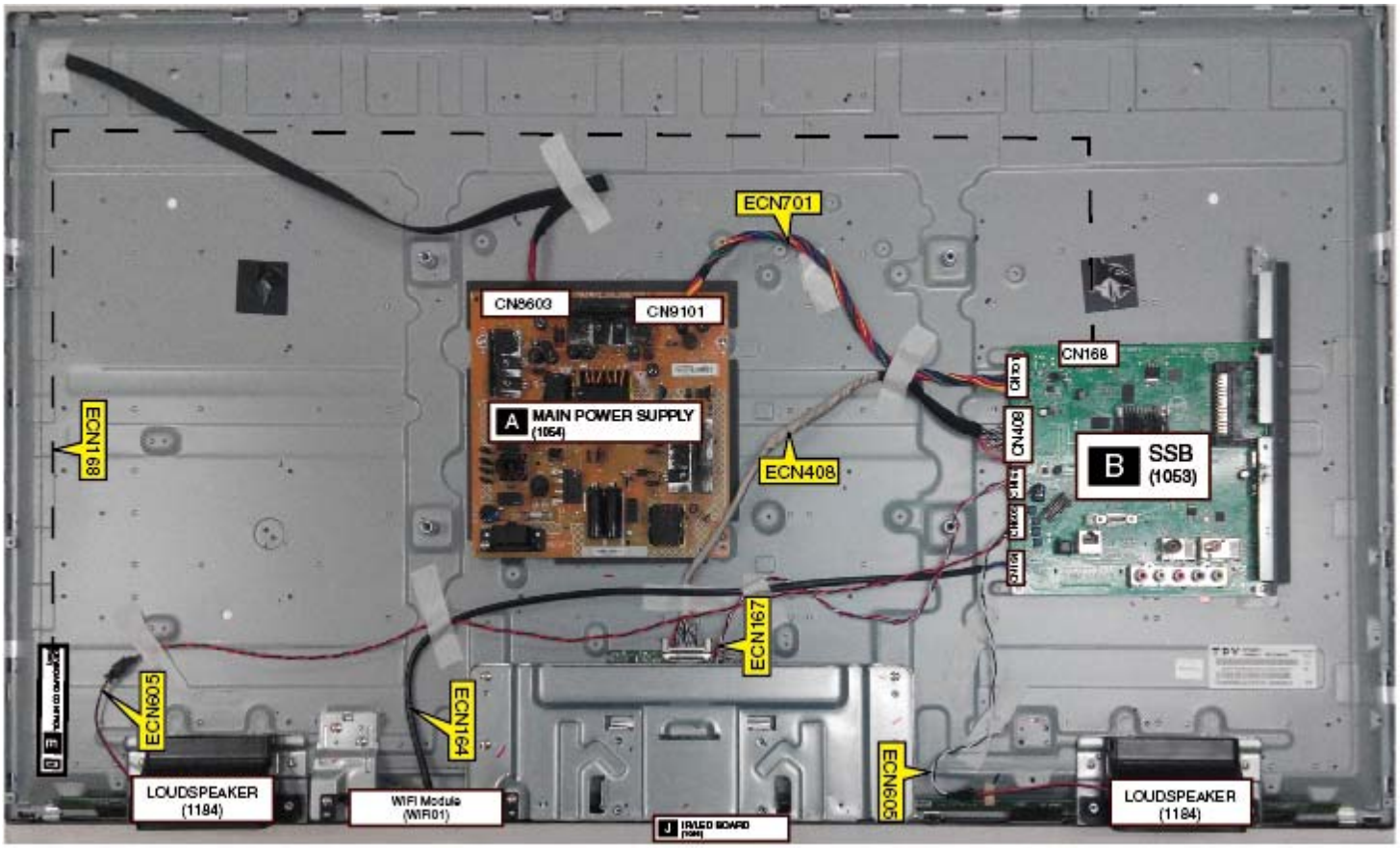
3.1 Cable Dressing



Cable dressing (32" 5302 series)



Cable dressing (43" 5302 series)



Cable dressing (49" 5302 series)

3.2 Assembly/Panel Removal

Instructions below apply to the 32PHS5302/12, but will be similar for other 32"/43"/49"Pxx5302 series models.

3.2.1 Stand removal

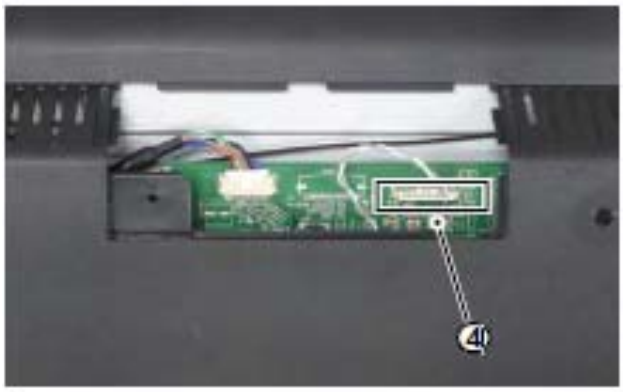
1. Remove the fixation screws [1] that secure the stand
2. Take the stand bracket out from the set.

3.2.2 Rear Cover

Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove fixation screws [2] and [3] that secure the Rear Cover
2. Unplug the connector [4] from SSB.
3. Gently lift the rear cover from the TV. Make sure that wires and cables are not damaged while lifting the rear cover from the set

Rear cover removal[1]



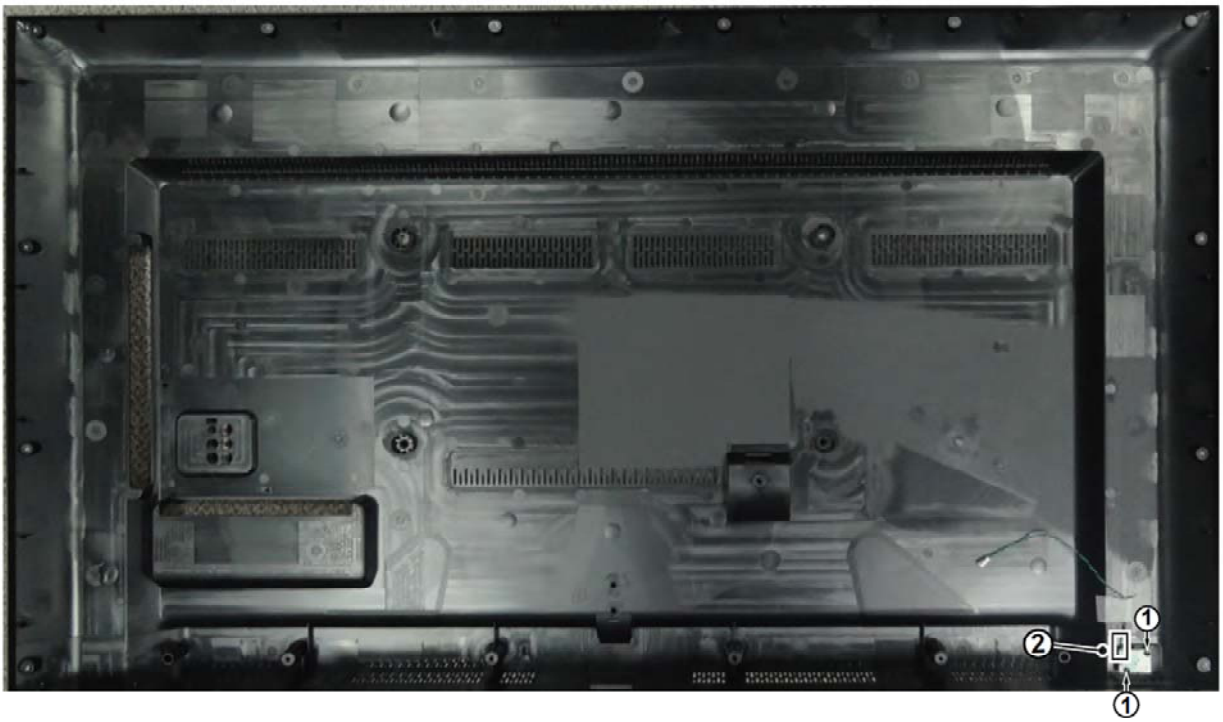
Rear cover removal[2]

3.2.3 Keyboard Control Unit

1. Release the connector [2] from the SSB Board.

   Caution: be careful, the Keyboard is catch on the Back cover, please be careful to avoid damage the fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover

   When defective, replace the whole unit.



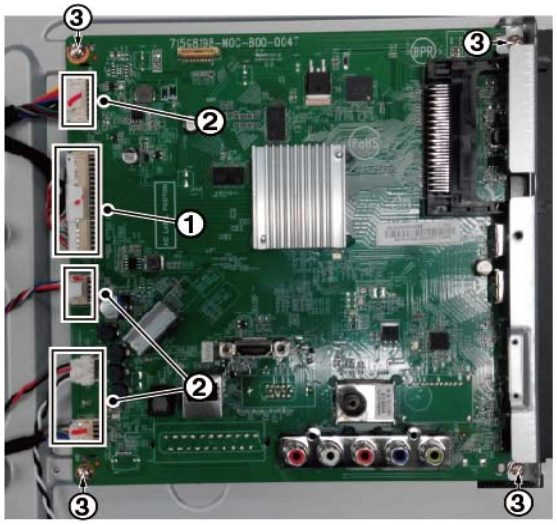
3.2.4 Small Signal Board (SSB)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from the LVDS connector that connect with the SSB[1].

   Caution: be careful, as these are very fragile connectors!

1. Unplug all other connectors [2] .
3. Remove all the fixation screws from the SSB [3].
4. The SSB can now be shifted from side connector cover, then lifted and taken out of the I/O bracket.



3.2.5 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Gently unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

3.2.6 IR board Control Unit

1. Unplug the connector from the SSB.

   Caution: be careful, as these are very fragile connectors!

3. Remove all the fixation screws [1], [2] and connector [3] from the IR board control unit.
3. Remove the IR lens [4], IR board [5] from the DECO_REAR_COVER.

When defective, replace the whole unit.

3.2.7 Speakers

1. Gently release the tapes that secure the speaker cables.
2. Unplug the speaker connector from the SSB.
3. Take the speakers out.

When defective, replace the both units.

3.2.8 WIFI module

1. Unplug the connector from the SSB..
2. Remove fixation screw that secure the WIFI module,

When defective, replace the whole unit.

3.2.9 LCD Panel

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the keyboard control panel as described earlier.
4. Remove the stand bracket as described earlier.
5. Remove the IR/LED as described earlier.
6. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
7. Remove all other metal parts not belonging to the panel.
8. Lift the LCD Panel from the bezel.

When defective, replace the whole unit.

4. Service Modes

4.1 Service Modes

The Service Mode feature is split into following parts:

- Service Alignment Mode (SAM).
- Factory Mode.
- Customer Service Mode (CSM).SAM and the Factory mode offer features, which can be used by the Service engineer to repair/align a TV set.

SAM and the Factory mode offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:

- Make alignments (e.g. White Tone), reset the error buffer(SAM and Factory Mode).
- Display information (“SAM” indication in upper right corner of screen, error buffer, software version, operating hours,options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, “CSM”, is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:

- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers’ problem without home visit.

Note: For the new model range, a new remote control (RC) is used with some renamed buttons. This has an impact on the activation of the Service modes. For instance the old “MENU” button is now called “HOME” (or is indicated by a “house” icon).

4.2 Service Alignment Mode (SAM)

Purpose

- To modify the NVM.
- To display/clear the error code buffer.
- To perform alignments.

Specifications

- Operation hours counter (maximum five digits displayed).
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (White Tone).
- NVM Editor.
- Set screen mode to full screen (all content is visible).

How to Activate SAM

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: **“062596”**, directly followed by the **“INFO/OK”** button. Do not allow the display to time out between entries while keying the sequence.
- Or via ComPair.

After entering SAM, the following items are displayed,

with “SAM” in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the **UP/DOWN keys** to display the next/previous menu items.

- With the “LEFT/RIGHT” keys, it is possible to:
  - (De) activate the selected menu item.
  - (De) activate the selected sub menu.
  - Change the value of the selected menu item.
- When you press the MENU button once while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background).

How to Store SAM Settings

To store the settings changed in SAM mode (except the RGB Align settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set. The mentioned exceptions must be stored separately via the STORE button.

How to Exit SAM

Use one of the following methods:

- Switch the set to STANDBY by pressing the mains button on the remote control transmitter or the television set.
- Via a standard RC-transmitter, key in “00” sequence.

Note: When the TV is switched “off” by a power interrupt while in SAM, the TV will show up in “normal operation mode” as soon as the power is supplied again. The error buffer will not be cleared.

SAM mode overview

4.3 Factory mode:

Purpose

- To perform extended alignments.

Specifications

- Displaying and or changing Panel ID information.
- Displaying and or changing Tuner ID information.
- Error buffer clearing.
- Various software alignment settings.
- Testpattern displaying.
- Public Broadcasting Service password Reset.
- etc.

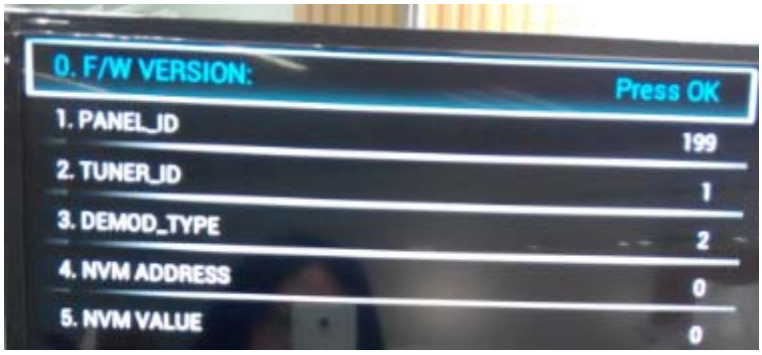
How to Activate the Factory mode

To activate the Factory mode, use the following method:

- Press the following key sequence on the remote control transmitter: from the **"menu/home"** press **"1999"**, directly followed by the **"Back/Return"** button. Do not allow the display to time out between entries while keying the sequence.

After entering the Factory mode, we can see many items displayed, use the **UP/DOWN** keys to display the next/previous menu items

Factory mode overview



How to Exit the Factory mode

Use one of the following methods:

- Select EXIT_FACTORY from the menu and press the "OK" button.

Note: When the TV is switched "off" by a power interrupt, or normal switch to "stand-by" while in the factory mode, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.

4.4 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the TVs operation settings.The call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set.This helps the call centre to diagnose problems and failures in the TV set before making a service call.

The CSM is a read-only mode; therefore, modifications are not possible in this mode.

Specifications

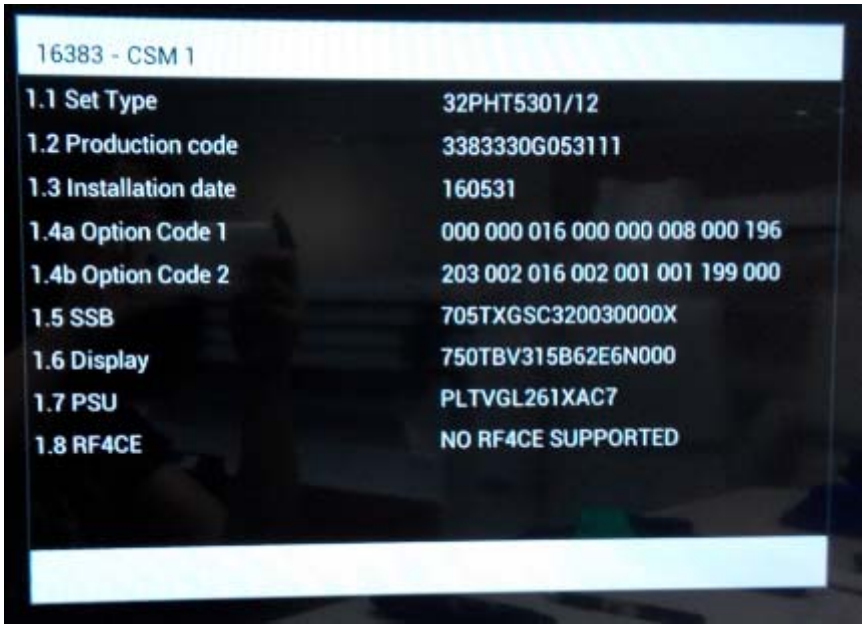
- Ignore "Service unfriendly modes".
- Line number for every
  line (to make CSM language independent).
- Set the screen mode to full
  screen (all contents on screen is visible).
- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use "CH+" or "CH-" for channel surfing, or enter the specific channel number on the RC.

How to Activate CSM

To activate CSM, press the following key sequence on a standard remote control transmitter: **"123654"** (do not allow the display to time out between entries while keying the sequence). After entering the Customer Service Mode, the following items are displayed. use the **Right/Left** keys to display the next/previous menu items

Note: Activation of the CSM is only possible if there is no (user) menu on the screen!

CSM Overview



How to Navigate

By means of the “CURSOR-DOWN/UP” knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

How to Exit CSM

To exit CSM, use one of the following methods.

- Press the MENU/HOME button on the remote control transmitter.
- Press the POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5. Software Upgrading, Error code and Panel Code

5.1 Software Upgrading

Step 1: Ready for F/W Upgrade

1. Rename the software as “autorun.upg”
2. Prepare a USB memory.
3. Copy the software to USB flash disk(root directory).

Note the version of this F/W before you change the software file name.

Step 2: F/W Upgrade

1. Plug the USB memory on the USB port on the side I/O port of TV (Please connect to USB 2.0 port, not recommend USB3.0 port)
2. AC on (Power plug)
3. TV will upgrade automatically as detect the software

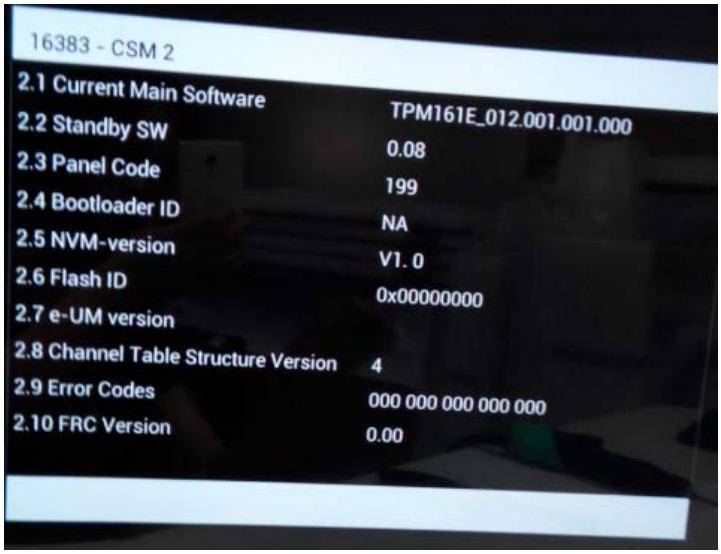
4. Press OK to start software upgrade

5. Upgrade in progress

Step 3: Check the SW version

1. After burning software, TV will restart
2. Press “Menu+1999+back”, enter Factory mode to check if the software version is correct

Caution: Please make sure that software upgrade is finished before unplug the USB and AC power!



5.2 Error Code

5.2.1 Introduction

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every:

• Activated (SW) protection.

• Failing I2C device.

• General I2C error.

The last five errors, stored in the NVM, are shown in the Service menu’s. This is called the error buffer.

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left.

An error with a designated error code never leads to a deadlock situation. It must always be diagnosable (e.g. error buffer via OSD or blinking LED).

In case a failure identified by an error code automatically results in other error codes (cause and effect), only the error code of the MAIN failure is displayed.

5.2.2 How to Read the Error Buffer

You can read the error buffer in three ways:

• On screen via the SAM/CSM (if you have a picture).

Example:

– **ERROR: 000 000 000 000 000**: No errors detected

– **ERROR: 013 000 000 000 000**: Error code 13 is the last and only detected error

– **ERROR: 034 013 000 000 000**: Error code 13 was detected first and error code 34 is the last detected (newest) error

• Via the blinking LED procedure (when you have no picture).

5.2.3 Error codes overview

In this chassis only “layer 2” error codes are available and point to problems on the SSB. They are triggered by LED blinking when CSM is activated. Only the following layer 2 errors are defined:

Description	LAYER 1 error	LAYER 2 error	Monitored	Error	I²C address	EB: in error buffer	Device	Defective board
				Prot.		BL: Blinking LED		
I²C BUSSES								
DSP bus (00)	2	11	SOC	E	00	BL/EB	SSB	Audio DSP
AMP bus (01)	2	12	SOC	E	01	BL/EB	SSB	Audio DSP
SSB bus (0F)	2	13	SOC	E	0F	BL/EB	SSB	SSB
BE bus (3F)	2	14	SOC	E	3F	BL/EB	SSB	SSB
FE bus (2F)	2	17	SOC	E	2F	BL/EB	SSB	SSB
DISP bus (30)	2	18	SOC	E	30	BL/EB	SSB	Display
AMBI bus (31)	2	19	SOC	E	31	BL/EB	SSB	Proj AL
SOC doesn't boot (HW cause)	2	15	St-by µP	P	D4	BL	MT5593	SSB
Supply related								
12V	3	16	St-by µP	P		BL		Supply
SSB								
I2C switch (SSB bus)	9	24	SOC	E	E0	EB	PCA9540	Audio DSP
I2C switch (BE bus)	2	25	SOC	E	E0	EB	PCA9540	SSB
Channel dec	2	27	SOC	E	C8-CE	EB	Silab Si216x	SSB
Boston (HDMI2.2)	2	29	SOC	E	40	EB	SIL 9777	SSB
Lnb controler	2	31	SOC	E	10	EB	LNBH 25	SSB
Tuner	2	34	SOC	E	C0	EB	Si2151/AV 2019	SSB
Tuner S2	2	36	SOC	E		EB		
Class - D 3 (DSP bus)	9	35	SOC	E	D8	EB	TAS 5760 LD	Audio DSP
Audio DSP	9	36	SOC	E	70	EB		Audio DSP
Class-D 1	2/9	37	SOC	E	D8	EB	TAS5760LD	SSB/Audio DSP
DSP EEPROM	9	38	SOC	E	A0	EB	Durango	Audio DSP
Class - D 2	2/9	39	SOC	E	DA	EB	TAS 5760 LD	SSB/Audio DSP
T° sensor SSB	2	42	SOC	E	98	EB	LM 75	T°sensor
Light sensor	6	43	SOC	E	52	EB	TSL2571	SET
B&O signal board	4	44	SOC	E		EB		
HDD XFS repair	8	45	SOC	E		EB		
DSP doesn't boot (SW cause)	9	52	SOC	E	70	EB	MT5593	Audio DSP
SOC doesn't boot (SW cause)	2	53	St-by µP	P	D4	BL	MT5593	SSB
FRC	2	61	SOC	E	34	EB	NT72324/72333	SSB
ASIC	2	62	SOC	E	84	EB	ASIC	SSB
Display	5	63	SOC	E	34	EB	Innolux	Display

5.2.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SAM menu
- By using the CLEAR command in the Factory mode:
- By using the following key sequence on the remote control transmitter: "**062599**" directly followed by the **OK** button.
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.3 Panel Code

Press the following key sequence on a standard RC transmitter: "062598" directly followed by MENU and "xxx", where "xxx" is a 3 digit decimal value of the panel type: see column "Display Code" in below tab. After resetting the Display Code, restart the set immediately.

CTN_ALT BOM#	Panel Type	Display Code
32PHS5302/12	TPT315B5-DXYSGA.G S6A	205
32PHS5302/12	TPT315B5-DXYSHA.G S3A	206
32PHT5302/12	TPT315B5-DXYSGA.G S6A	205
32PHT5302/12	TPT315B5-DXYSHA.G S3A	206
43PFS5302/12	TPT430H3-DUYSHA.G S1BP	238
43PFT5302/12	TPT430H3-DUYSHA.G S1BP	238
49PFS5302/12	TPT490F2-FHBN0.K S8940J	204
49PFS5302/12	TPT490F2-FHBN0.K S8940J	204

6.Circuit Descriptions

6.1 Introduction

The TPM17.2E LA is a new chassis launched in Europe in 2017. The whole range is covered by MT5800 platform. The major deltas versus its predecessor support DVB-T/C; DVB T2; DVB S2,WIFI/ multi-media, Video out function.

The TPM17.2E LA chassis comes with the following stylings:

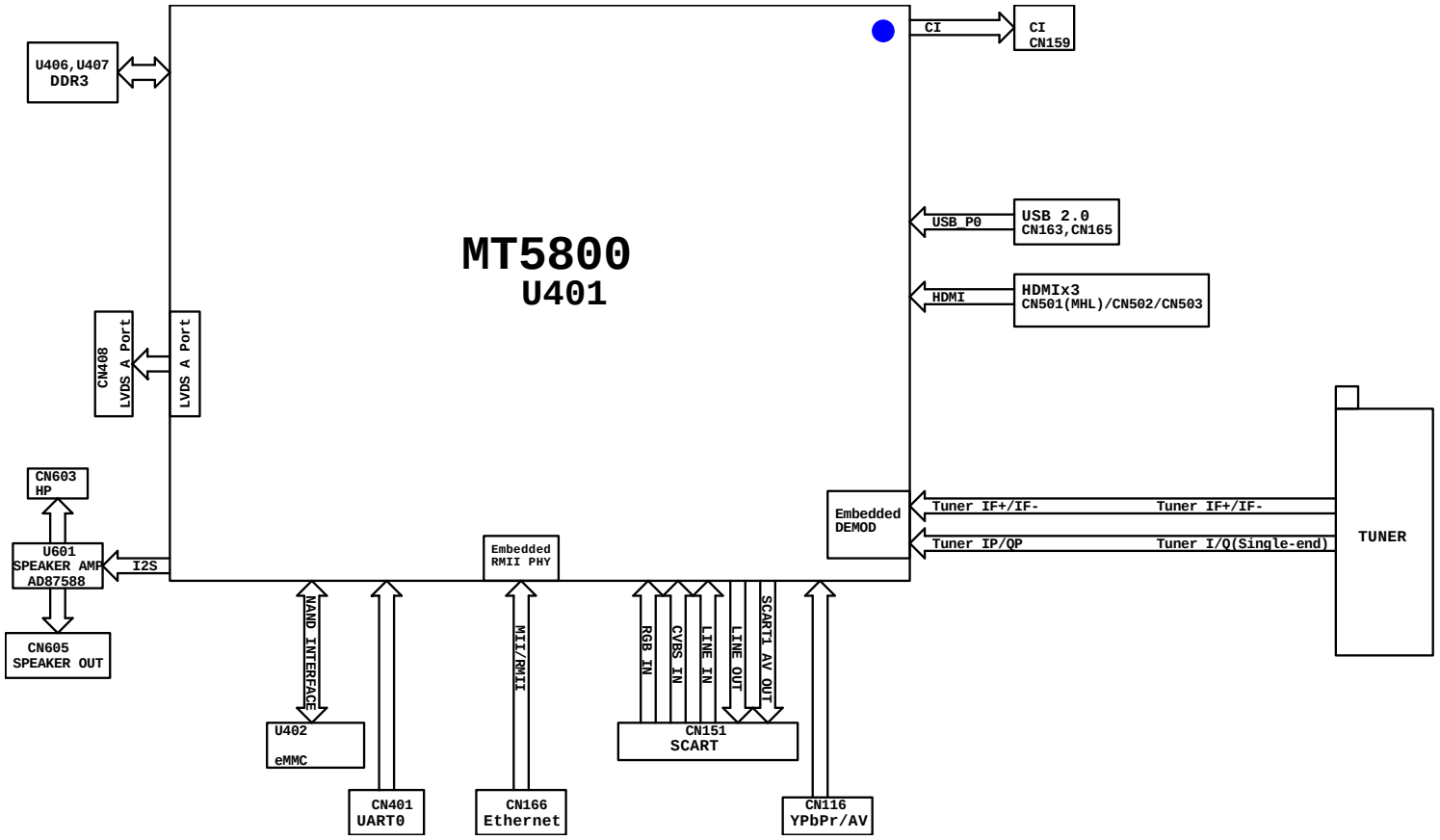
- series xxPxx5302/xx

6.1.1 Implementation

Key components of this chassis are:

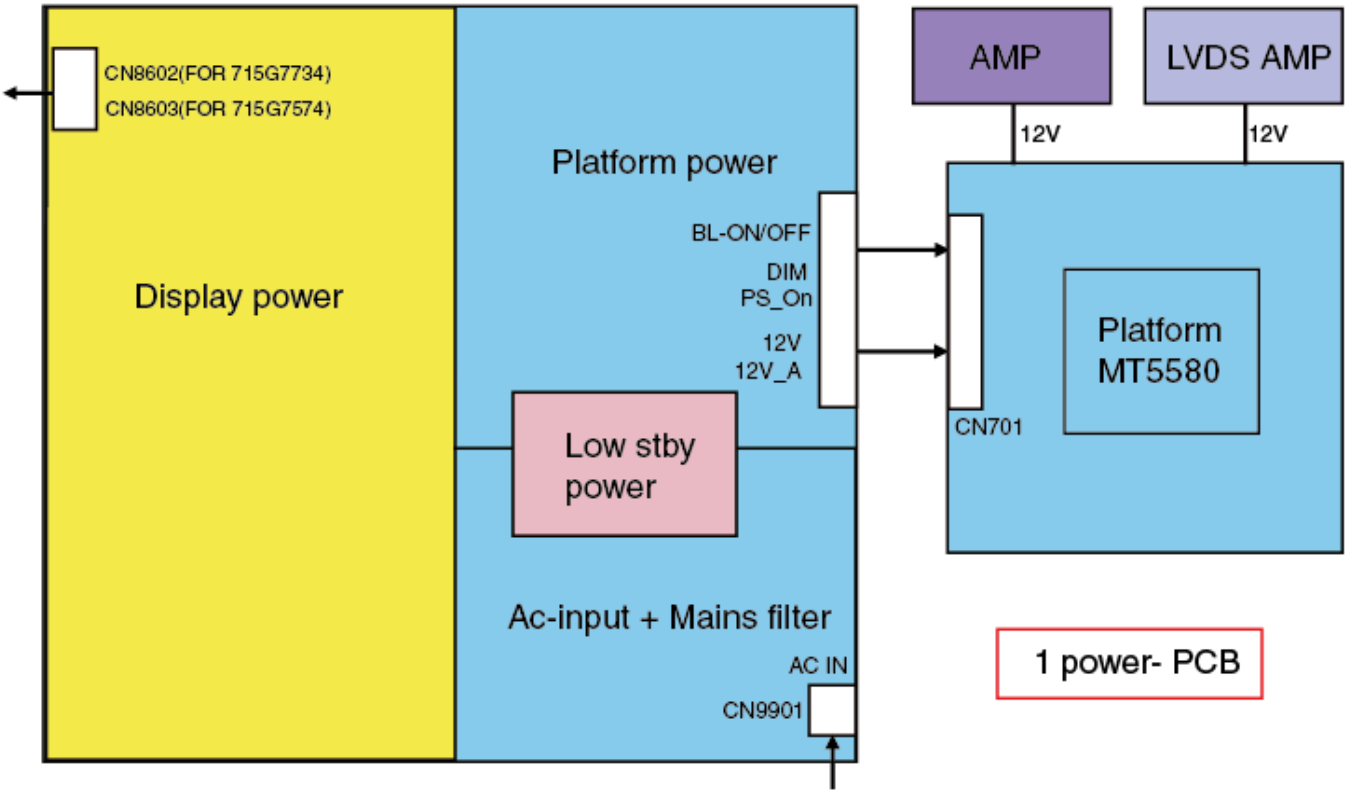
- SCALER MT5800WUEJ BGA-597
- DEMODULATOR SI2169-C50-GMR QFN-48
- EMMC THGBMDG5D1LBAIT 4GB FBGA153
- NAND FLASH KLM4G1FEPD-B031 4GB FBGA-153
- AUDIO Amplifier. AD87588-LG48NAY
- TUNER EUROPE ST42CS-2-E

6.1.2 Block diagram



6.2 Power Supply

Power architecture of this platform.



6.2.1 Power Supply Unit

All power supplies are a black box for Service. When defective, a new board must be ordered and the defective one must be returned, unless the main fuse of the board is broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market.

Consult the Philips Service web portal for the order codes of the boards.

Important delta's with the platform are:

• New power architecture for LED backlight

• "Boost"-signal is now a PWM-signal + continuous variable

The control signals are:

• Stand-by

• Lamp "on/off"

• DIM (PWM) (not for PSDL)

In this manual, no detailed information is available because of design protection issues.

• +5.2V output (standby mode) for 715G7734P

• +12V output (standby mode) for 715G7574P

• +12 output (on-mode)

• +12V_audio (audio AMP power)

• Output to the display; in case of

- IPB: High voltage to the LCD panel

- PSL and PSLS (LED-driver outputs)

- PSDL (high frequent) AC-current.

6.2.2 Diversity

The diversity in power supply units is mainly determined by the diversity in displays.

The following displays can be distinguished:

• CCFL/EEFL backlight: power panel is conventional IPB

• LED backlight:

- side-view LED without scanning: PSL power panel

- side-view LED with scanning: PSLS power panel

- direct-view LED without 2D-dimming: PSL power panel

- direct-view LED with 2D-dimming: PSDL power panel.

PSL stands for **P**ower **S**upply with integrated **L**ED-drivers.

PSLS stands for a **P**ower **S**upply with integrated **L**ED-drivers with added **S**canning functionality (added microcontroller).

PSDL stands for a **P**ower **S**upply for **D**irect-view **L**ED backlight with 2D-dimming.

6.3 DC/DC Converters

The on-board DC/DC converters deliver the following voltages(depending on set execution):

• STB_PWR, permanent voltage for the Stand-by Power system and WIFI

• ++3V3SB,voltage for scaler,IR/LED reciver,Key board

• +12V, input from the power supply for the panel common(active mode)

• LBN power, input from the power supply for LNB supply

• LDO_PWR,DVDD3V3, voltage for EMMC when TV on

• VCCK, voltage for DDR when TV on

• AVD3V3,AVDD1V0, supply voltage for scaler MT5593

• +5V_SW, input intermediate supply voltage for USB Power/SPDIF/CI

• +3V3_TUNER, supply voltage for tuner

• DVDD3V3, voltage for IC MT5800/EMMC when TV on

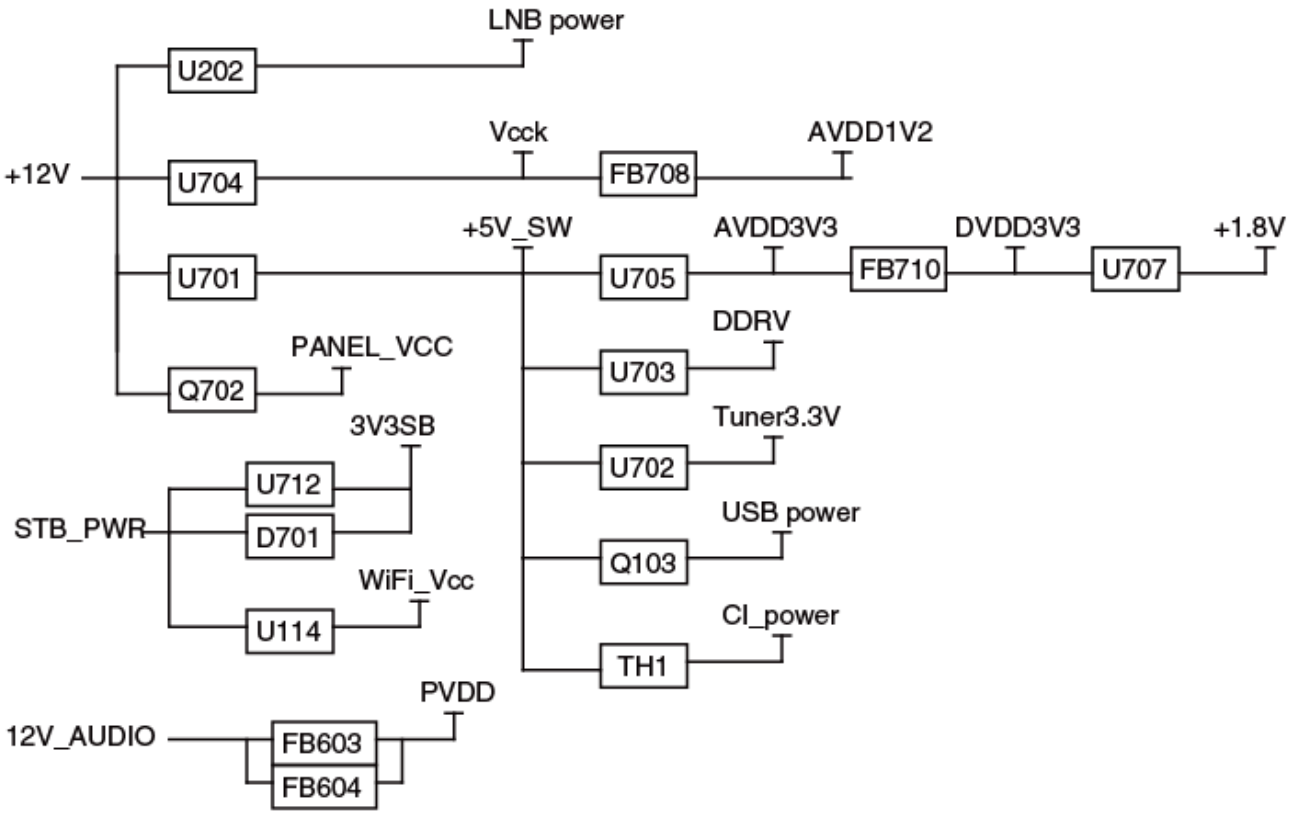
•PVDD from the power +12V_AU for the AUDIO AMP

•+1.2V_T2, +3.3VA_T2 voltage for Demodulator IC channel decoder.Wi-Fi_VCC,voltage for WIFI

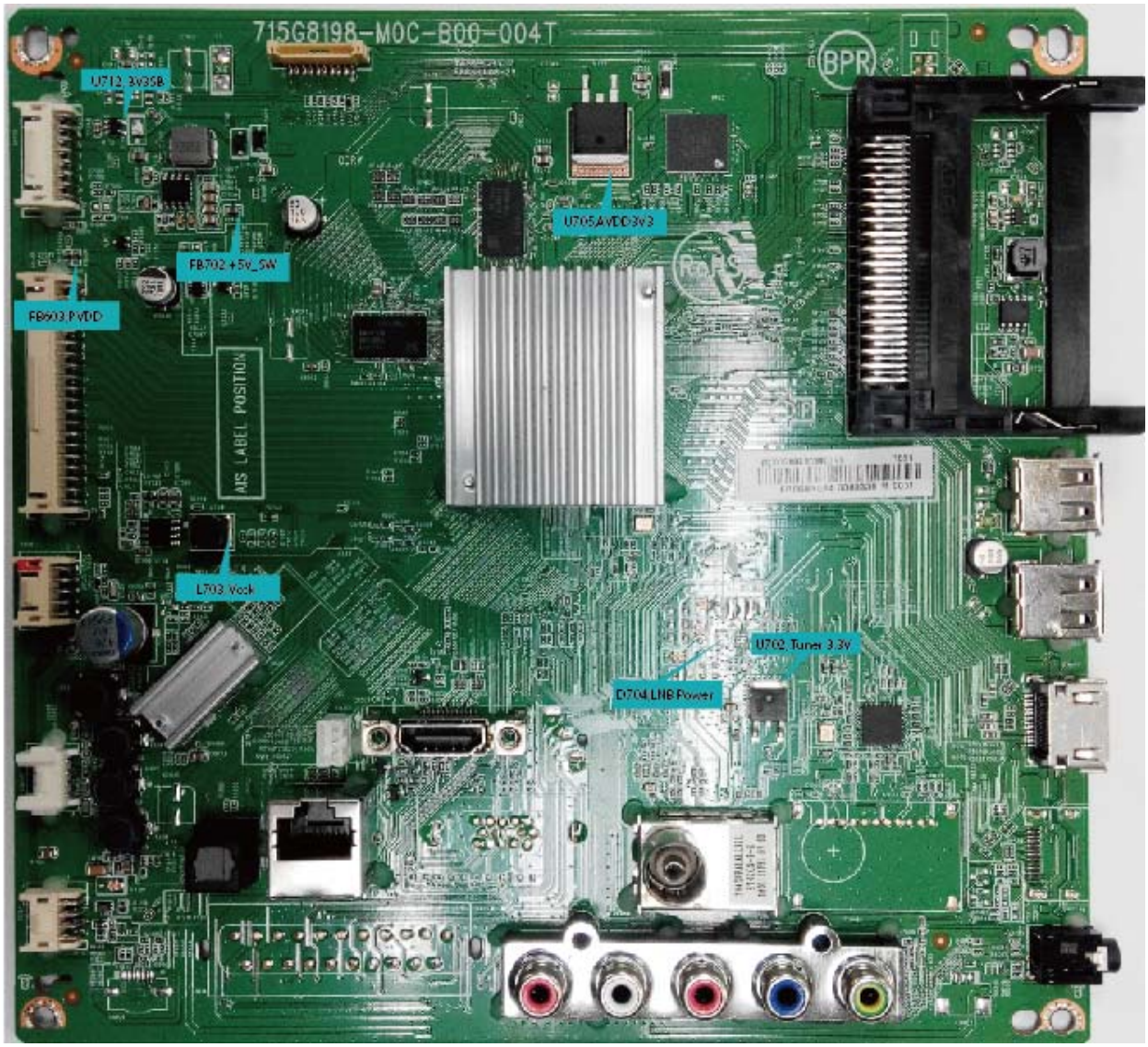
•+1.8V, voltage for EMMC when TV on

•Wi-Fi_VCC, voltage for WIFI

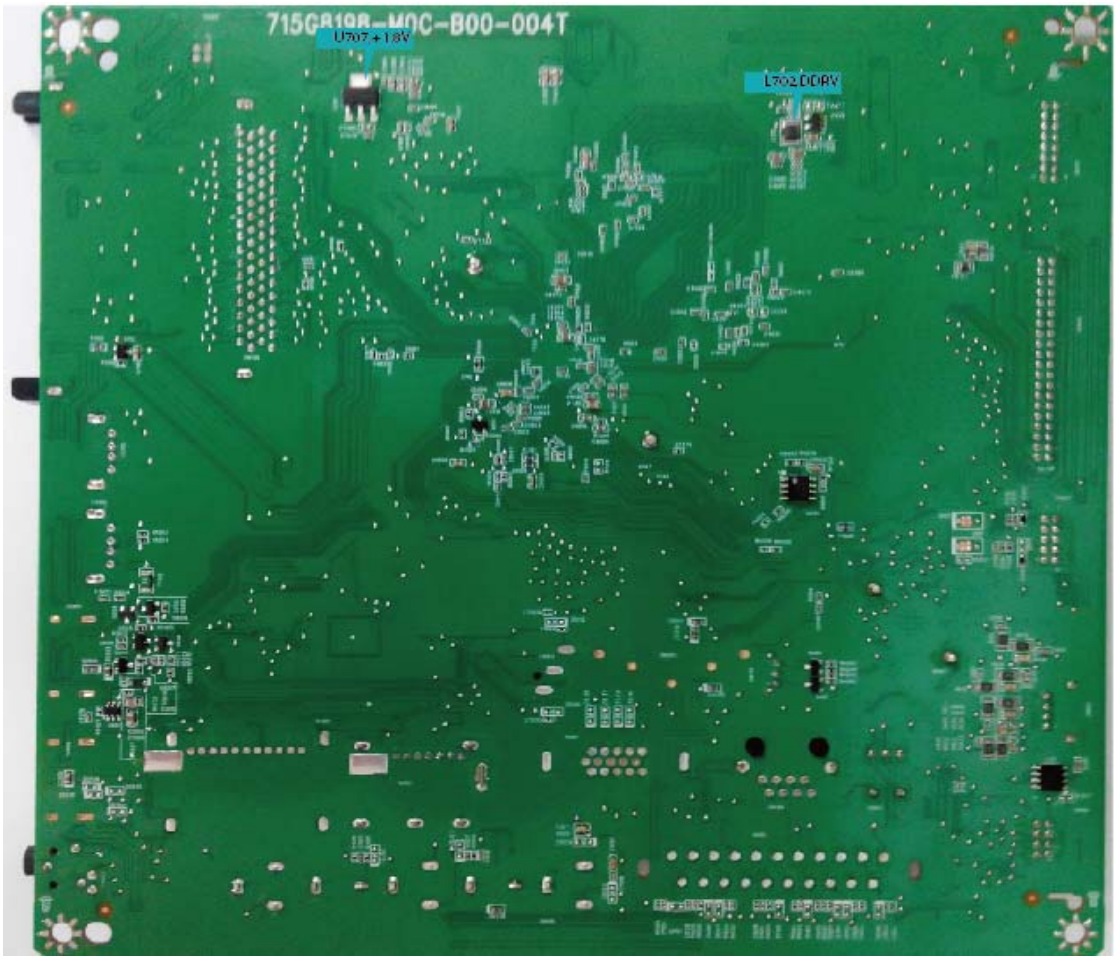
6.3.1 Power tree



6.3.2 Power layout SSB



Power SSB Top View



Power SSB Bottom View

6.4 Front-End Analogue and DVB-T, DVB-C;ISDB-T reception

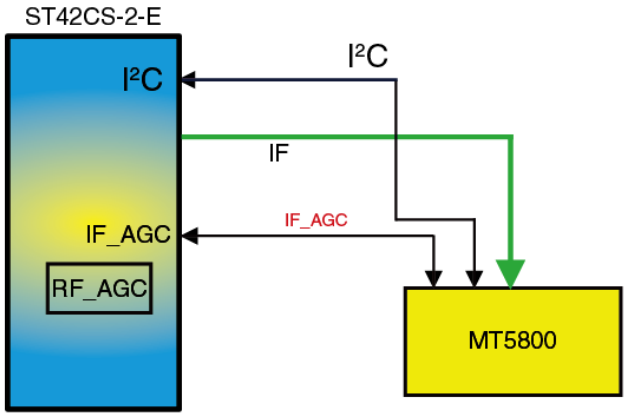
6.4.1 DVB-C part

The Front-End for analogue tuner consist of the following key components:

• TUNER EUROPE ST42CS-2-E

• SCALER MT5800WUEJ BGA-597 Processor

Below find a block diagram of the front-end application for DVB-C part.



6.4.2 DTB-T2 part

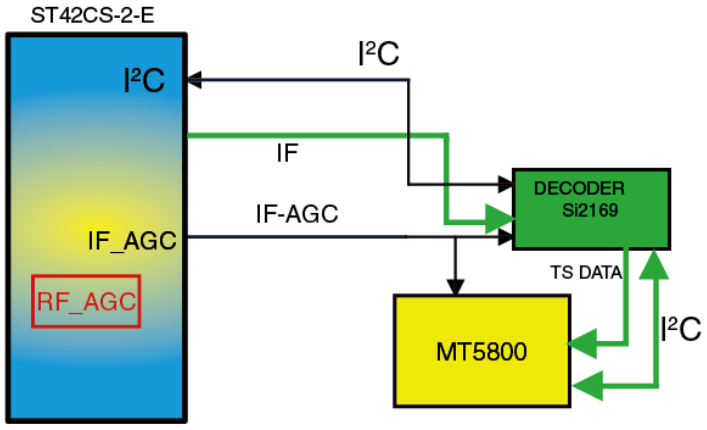
The Front-End for DVT part consist of the following key components:

• TUNER EUROPE ST42CS-2-E

• SCALER MT5800WUEJ BGA-597 Processor

• DEMODULATOR SI2169-C50-GM

Below find a block diagram of the front-end application for DTV part.



6.4.3 Front-End DTV-S2 reception

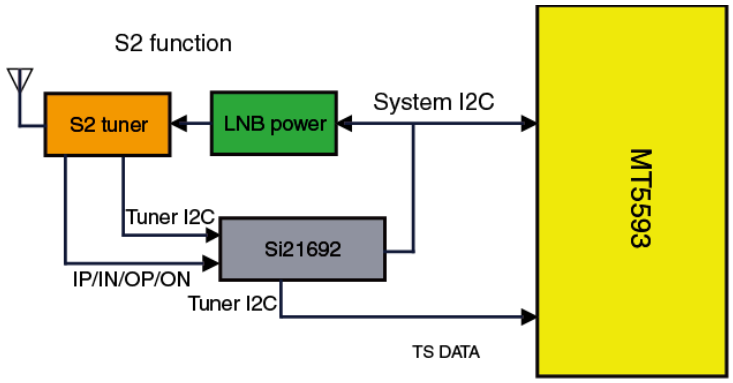
The Front-End for ISTB part consist of the following key components:

• TUNER EUROPE ST42CS-2-E

• SCALER MT5800WUEJ BGA-597 Processor

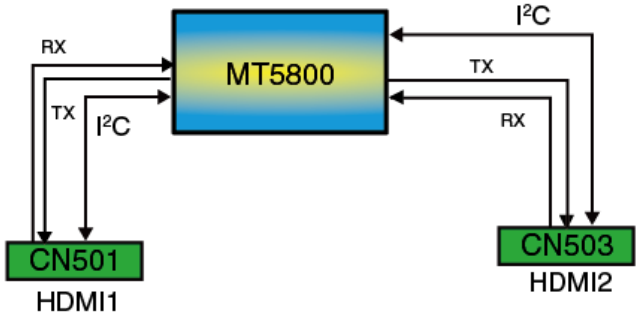
• DEMODULATOR Si2166-C50-GMR QFN48

Below find a block diagram of the front-end application for DTV part.



6.5 HDMI

Refer to below for the application.



The following HDMI connector can be used:

• HDMI 1: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC

• HDMI 2: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC

• +5V detection mechanism

• Stable clock detection mechanism

• HPD control

• Sync detection

• Audio return channel(ARC)

• TMDS output control

• MHL control

• CEC control

6.6 Video and Audio Processing – MT5800WUEJBGA

The MT5800WUEJ BGA-597 is the main audio and videoprocessor (or System-on-Chip)for this platform. It has the following features:

• Worldwide multi-standard analog TV demodulator

• DVB-T/DVB-C demodulators

• Powerful quad core CPU

• 3D graphic support OpenGL ES 2.0

• A muti-standard video decoder

• A transport de-multiplexer

• Rich format audio codec

• H.264 encoder

• 2D/3D converter

• HDMI 1.4a receiver with 3D support

• Local dimming (LED backlight)

• Ethernet MAC+PHY

• MHL 2.0 & Standby Charging

• Panel overdrive control

• Two-link LVDS, mini-LVDS, V-by-one, EPI

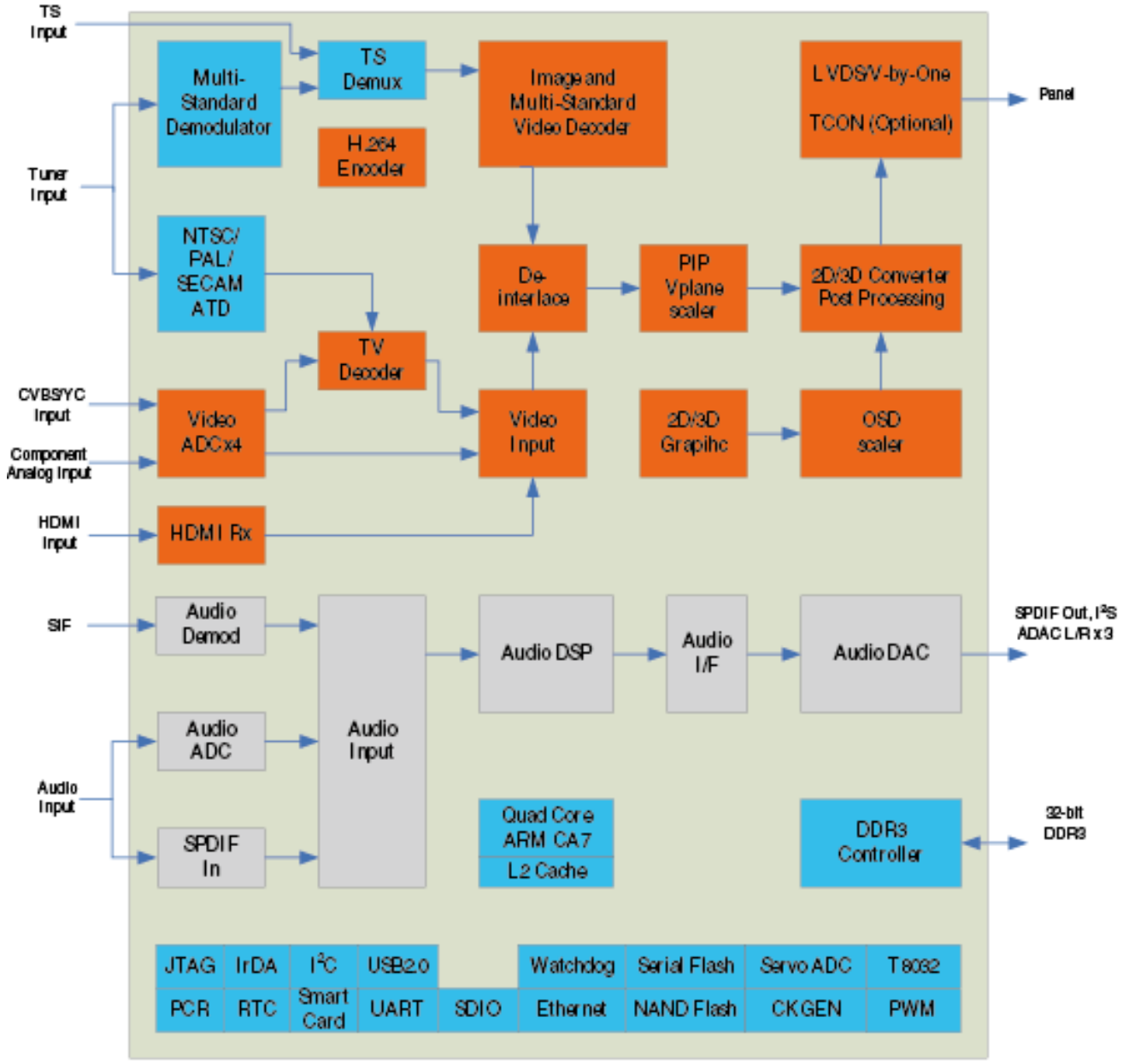
The MediaTek MT5800WUEJ family consists of a DTV front-end demodulator, a backend decoder and a TV controller and offers high integration for advanced applications. It integrates a transport de-multiplexer, a high definition video decoder, an audio decoder, a two-link LVDS transmitter, a mini-LVDS transmitter, a V-by-One transmitter, an EPI transmitter, and an NTSC/PAL/SECAM TV decoder with a 3D combfilter (NTSC/PAL). The MT5800WUEJ enables consumer electronics manufacturers to build high quality, low cost and feature-rich DTV.World-Leading Audio/Video Technology.

The MT5800WUEJ supports Full-HDMPEG1/2/4/H.264/HEVC(H.265)/MVC/DiviX/Xvid/VC1/RM/AVS/AVS+/VP8/VP9 video decoder standards, and JPEG. The MT5800WUEJ also supports MediaTek MDDiTM de-interlace solution which can reach very smooth picture quality for motions.A 3D comb filter added to the TV decoder recovers great details for still pictures. The special color processing technology provides a natural, deep colors and true studio quality video. Moreover, the MT5800WUEJ family has built-in high resolution and high-quality audio codec.Rich Features for High Value Products.

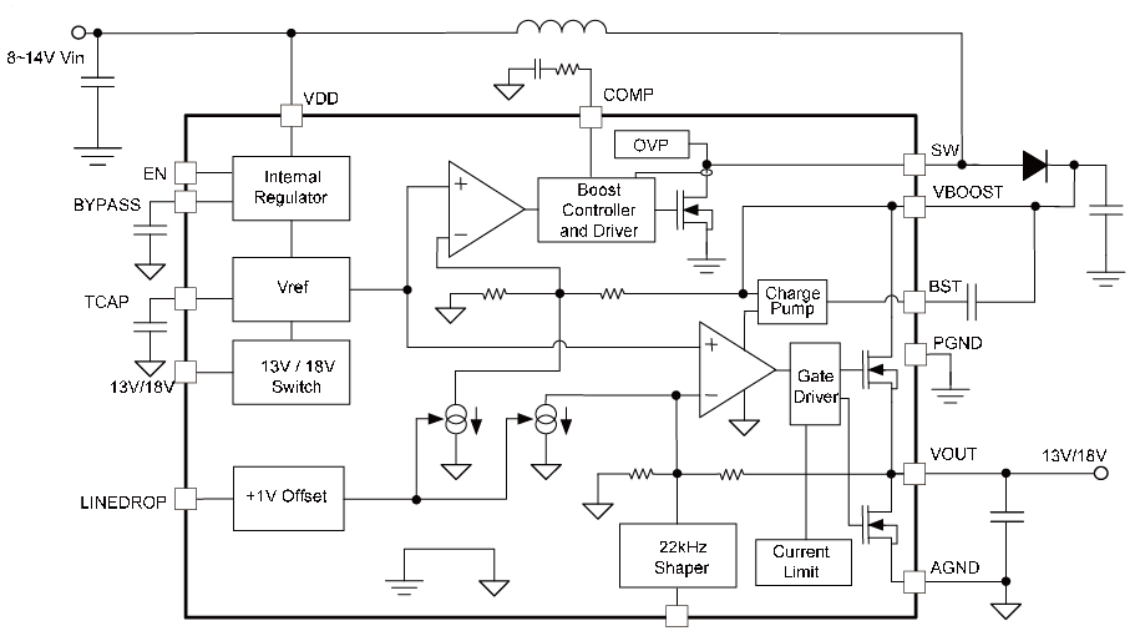
The MT5800WUEJ family enables true singlechip experience. It integrates high-quality HDMI1.4a,high speed VGA ADC, two-link LVDS, mini-LVDS , V-by-One, EPI, USB2.0 receiver, Ethernet MAC+PHY, quad core CPU and 512K bytes L2 cache, TCON, panel overdrive, OpenGL ES 1.1/2.0, OpenVG 1.1 compliant 3D graphic engine, and /DVB-T/DVB-C demodulators.WW Common Platform Capability: The MT5800WUEJ family supports DVB-T, DVB-C demodulation functions. It reserves transport stream inputs for external demodulators for other countries or areas. TV maker can easily port the same UI to worldwide TV models. First-class adjacent and co-channel rejection capability grants excellent reception. Professional error concealment provides stable, smooth and mosaic-free video quality.

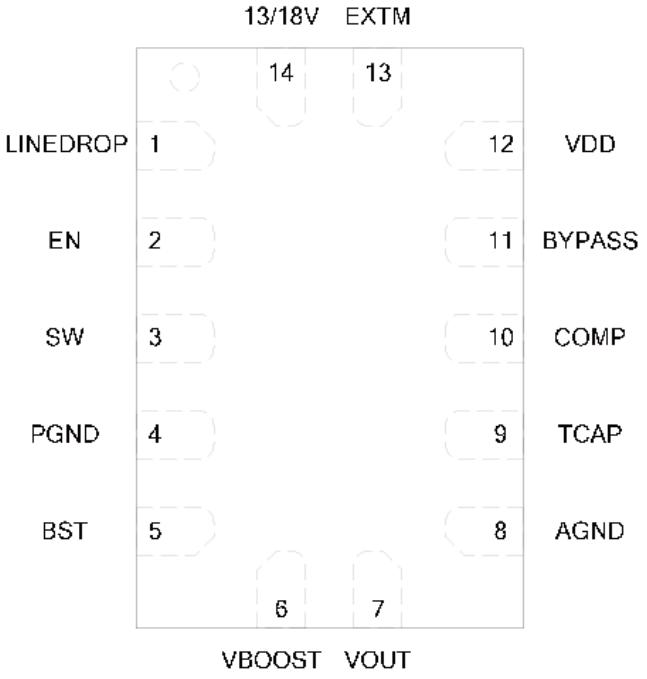
7. IC Data Sheets

7.1 MT5800WUEJ (IC U401)

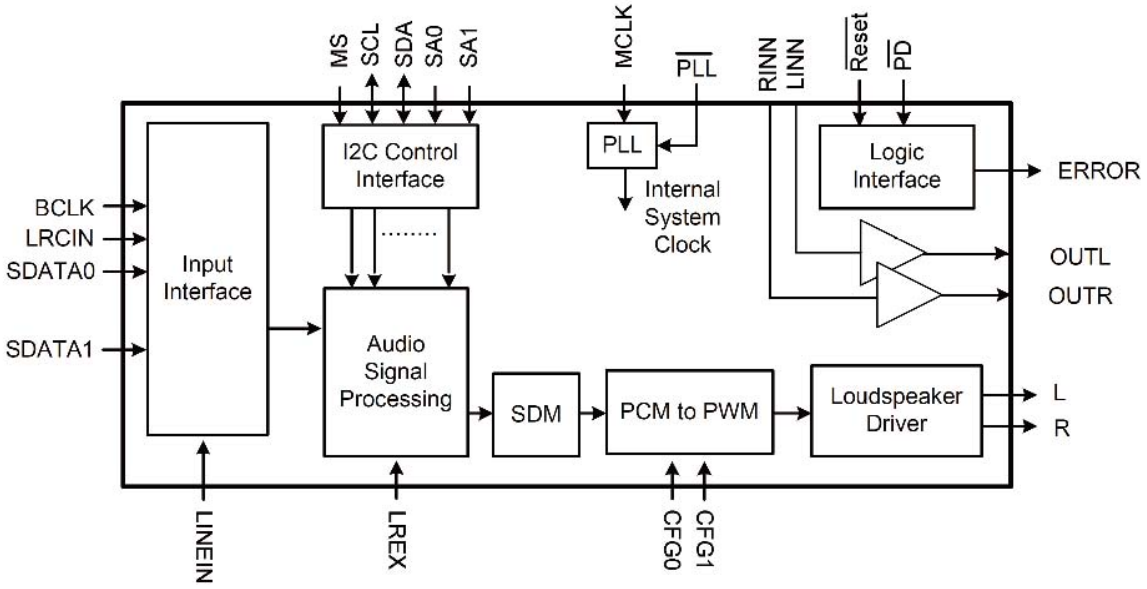


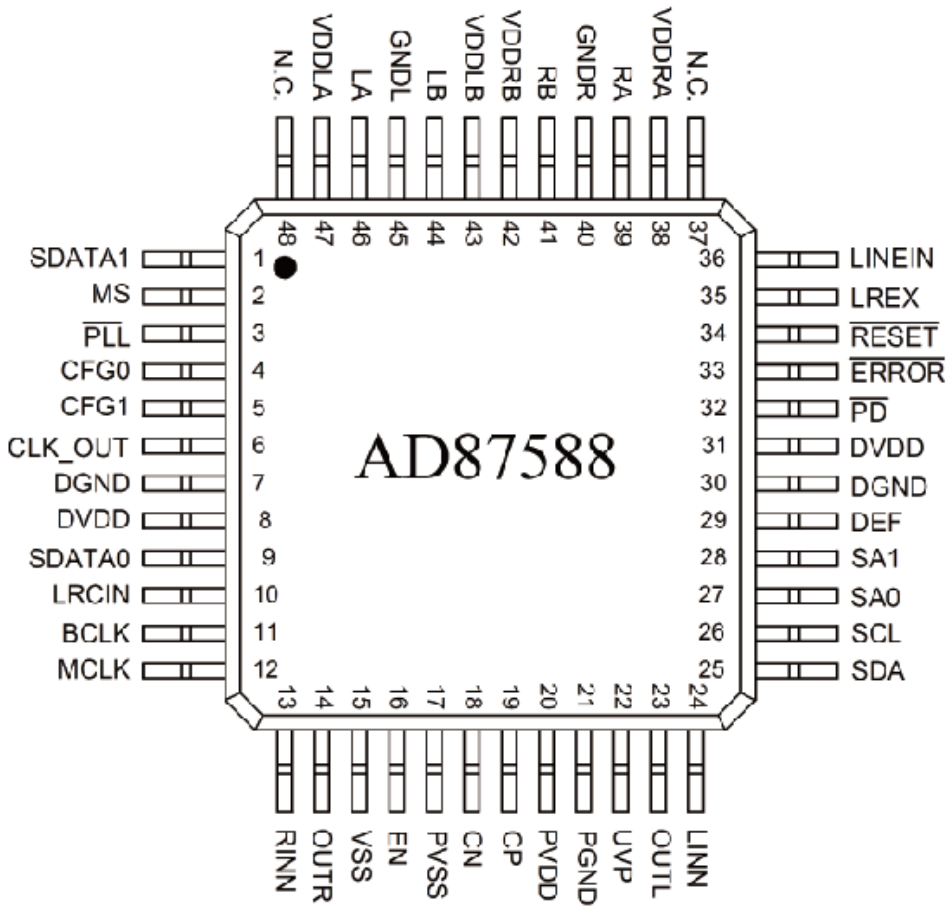
7.2 MP8124GD (IC U202)





7.3 AD87588 (IC U601)

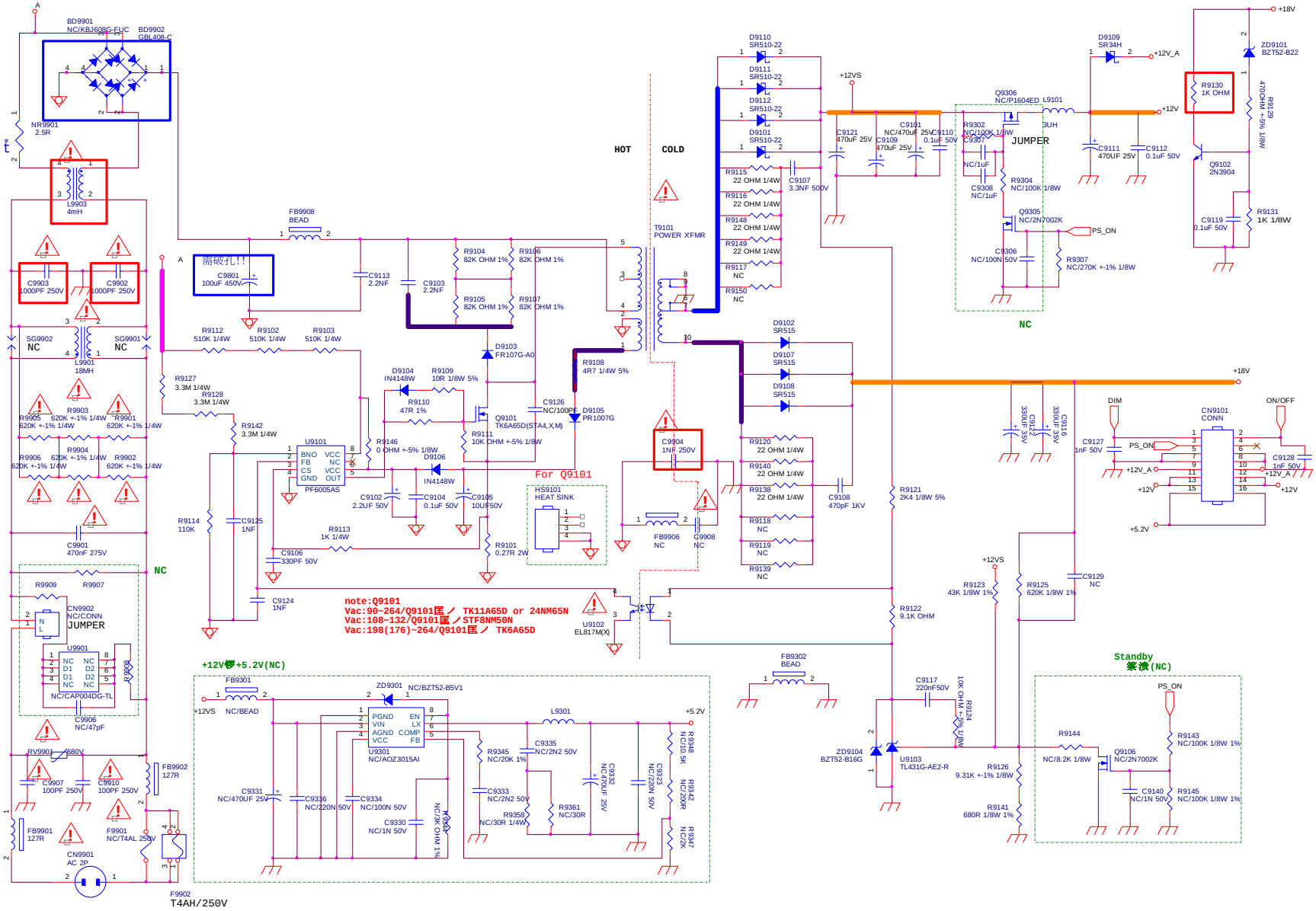




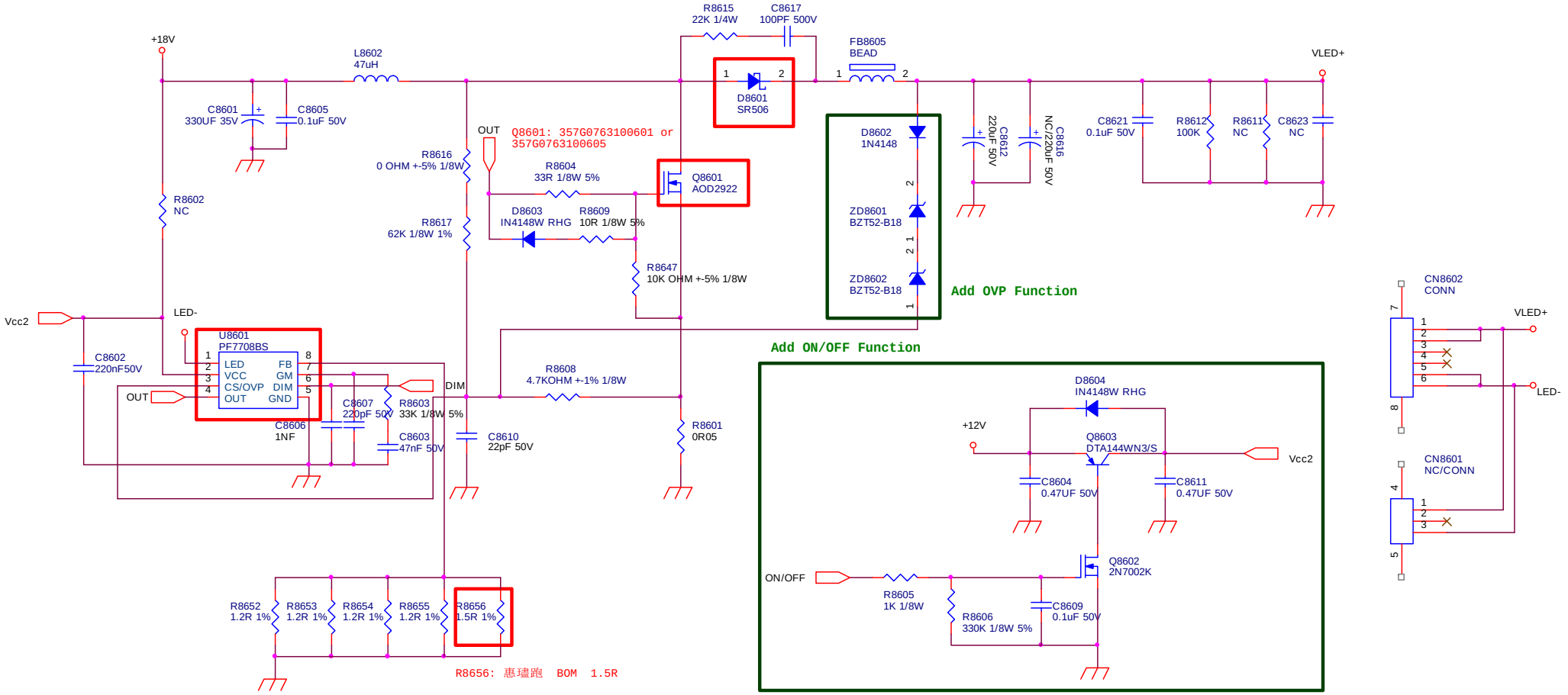
8.Circuit Diagrams

8.1 A 715G7734 PSU(For 32” 5302 Series)

8-1-1 AC Input

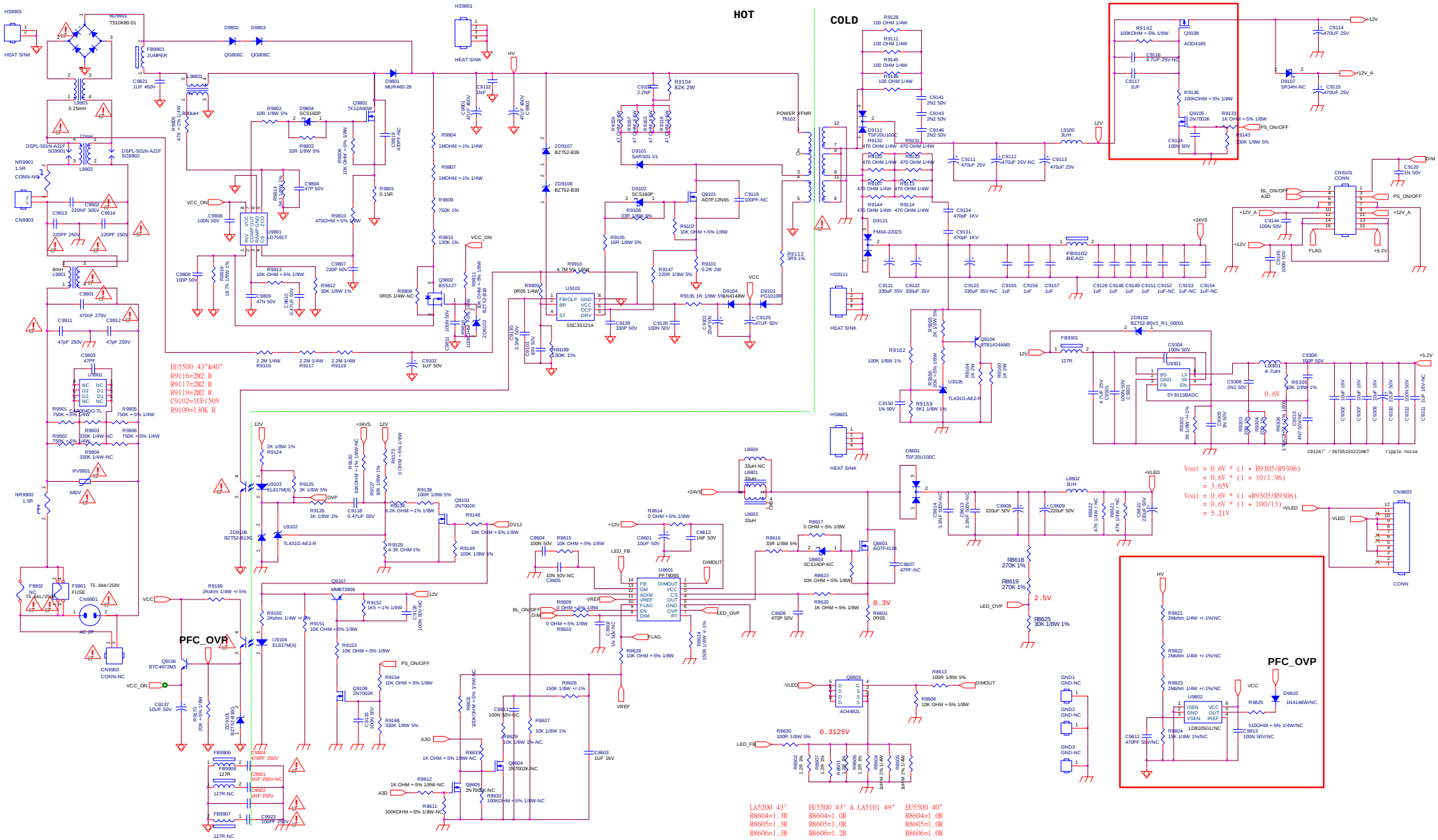


8-1-2 LED DRIVER



8.2 A 715G7574 PSU(For (For 43”/49” 5302 Series)

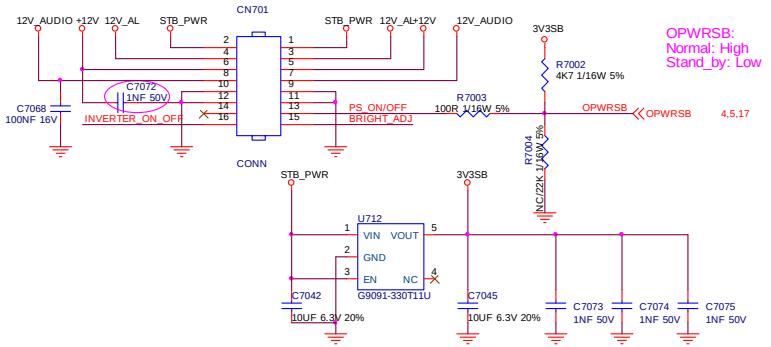
8-2-1 AC Input



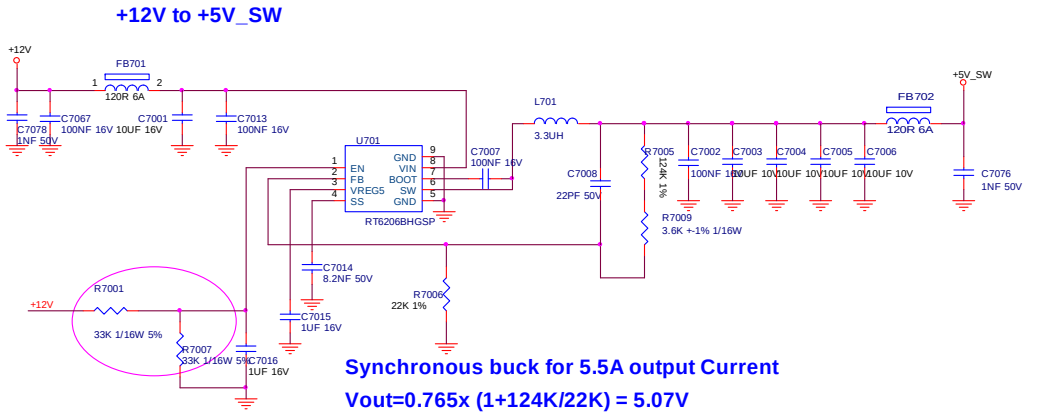
8.3 B 715G8198 SSB

8-3-1 System Power 1

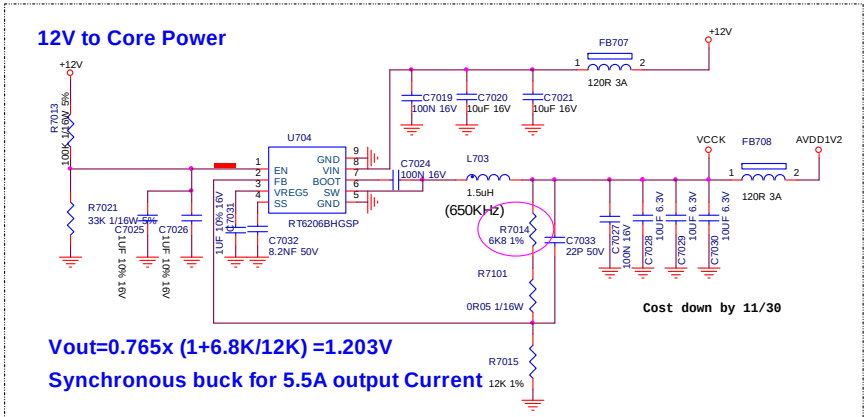
DC POWER INPUT



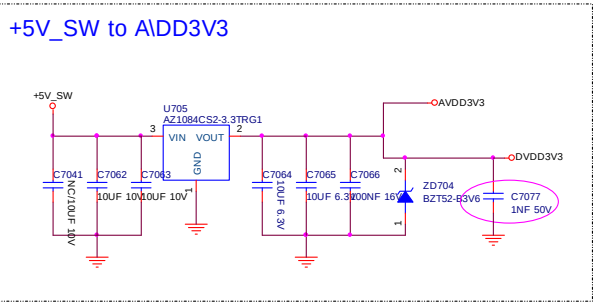
+12V to +5V_SW



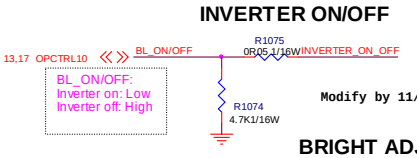
12V to Core Power



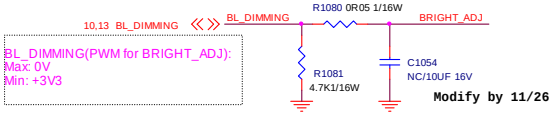
+5V_SW to A\DD3V3



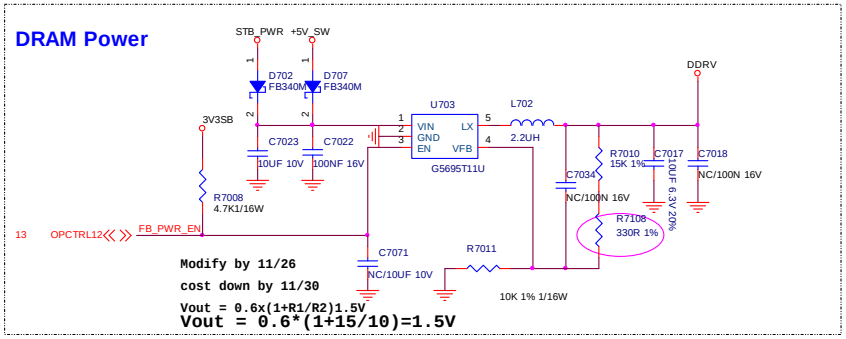
INVERTER ON/OFF



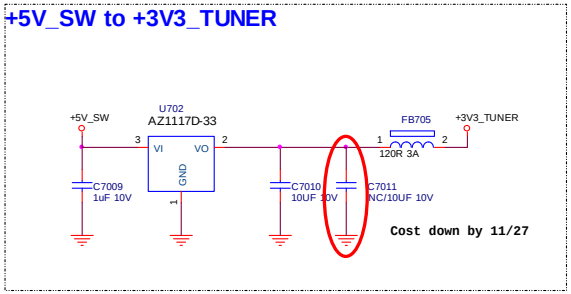
BRIGHT ADJUST



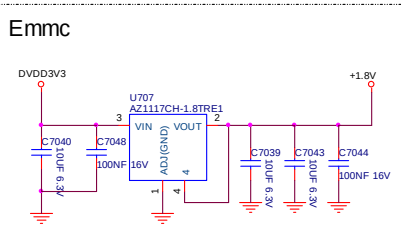
DRAM Power



+5V_SW to +3V3_TUNER



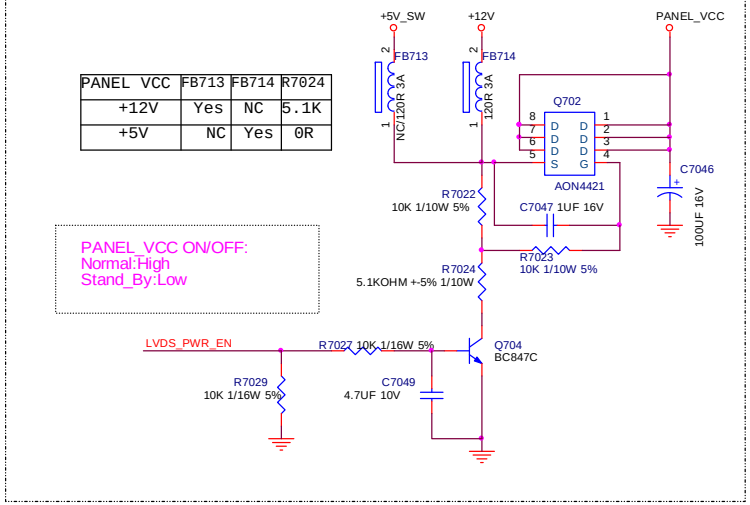
Emmc



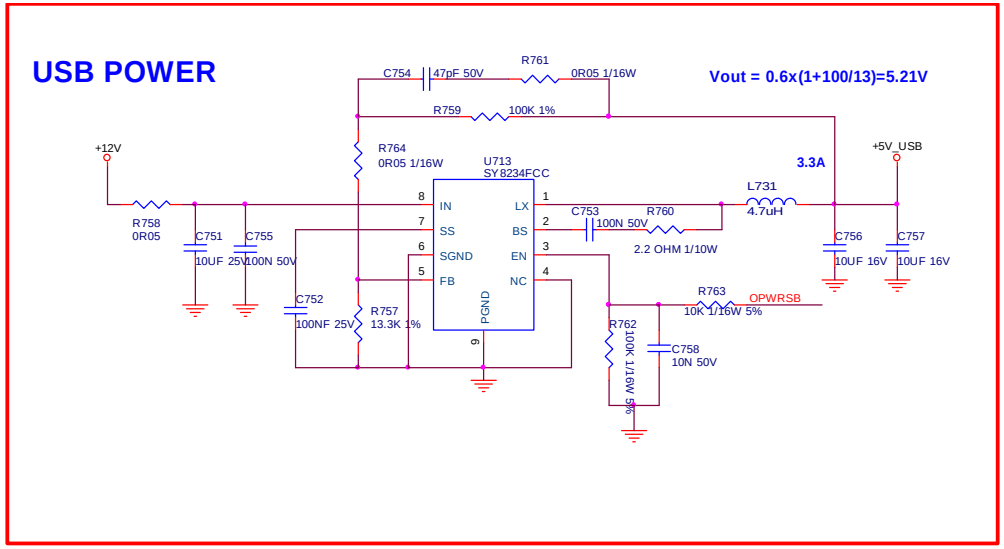
8-3-2 System Power 2

Panel VCC=12V or 5V

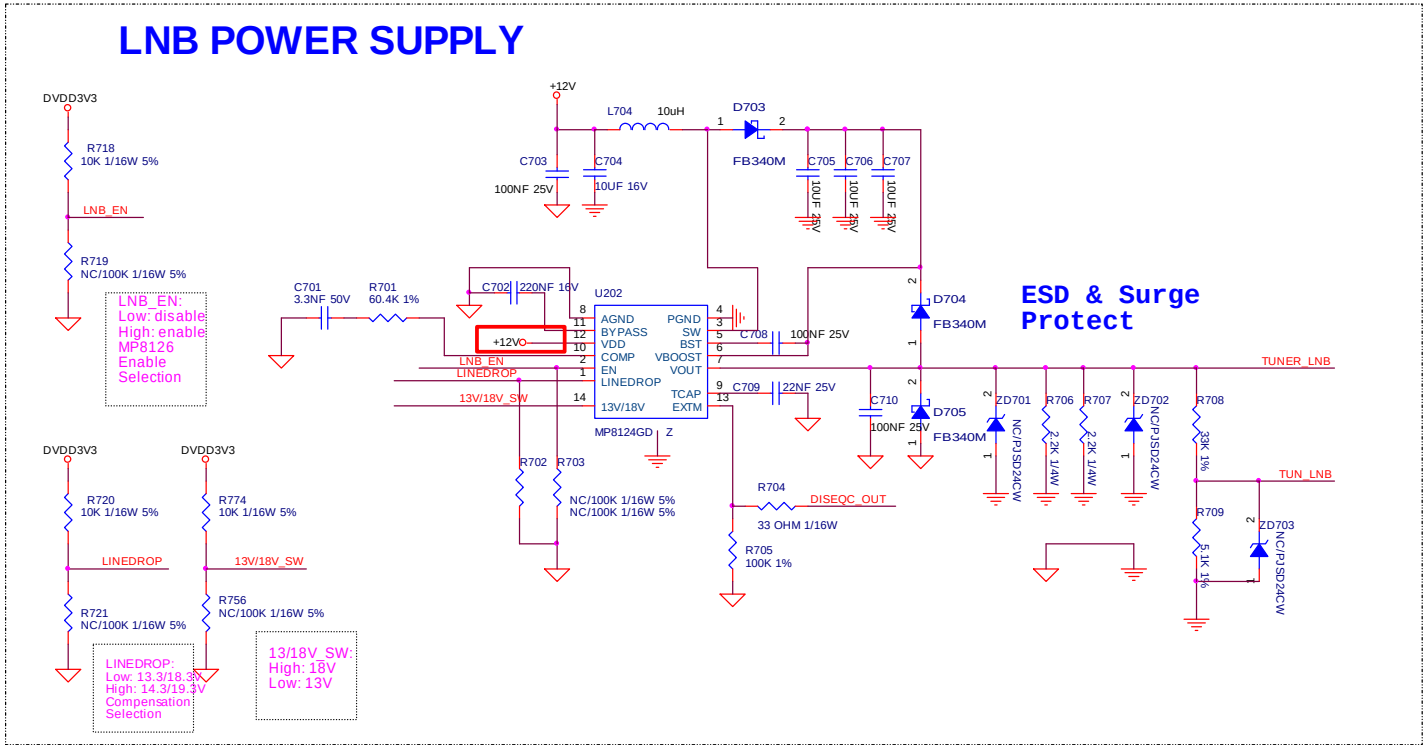
PANEL_VCC	FB713	FB714	R7024
+12V	Yes	NC	5.1K
+5V	NC	Yes	0R



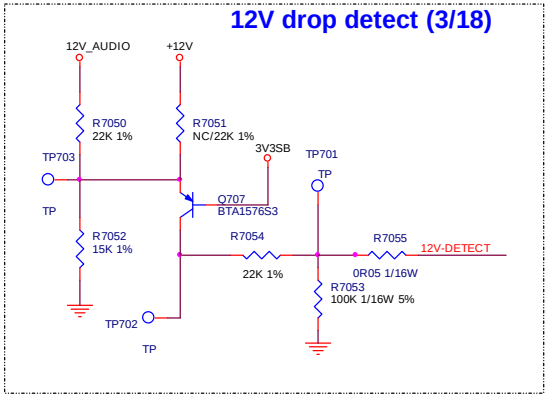
USB POWER

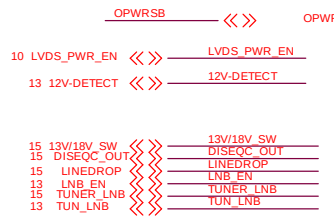


LNB POWER SUPPLY

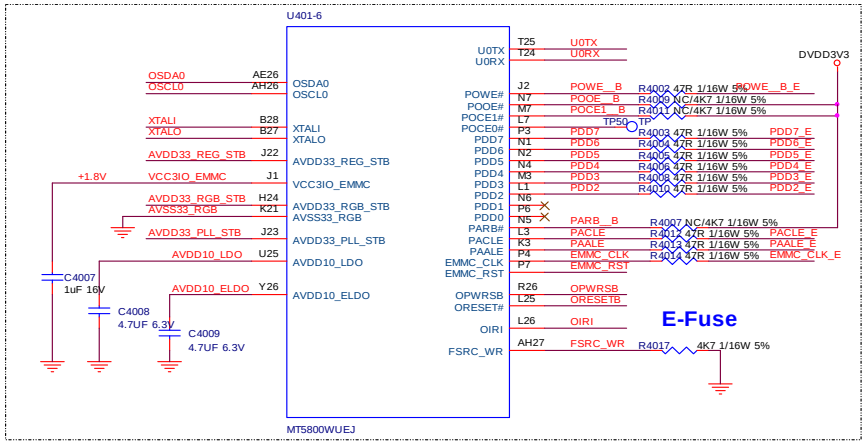


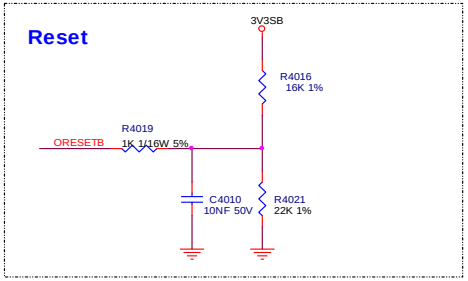
12V drop detect (3/18)

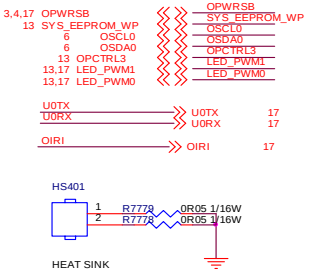


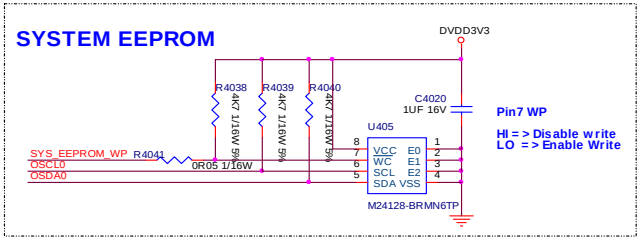


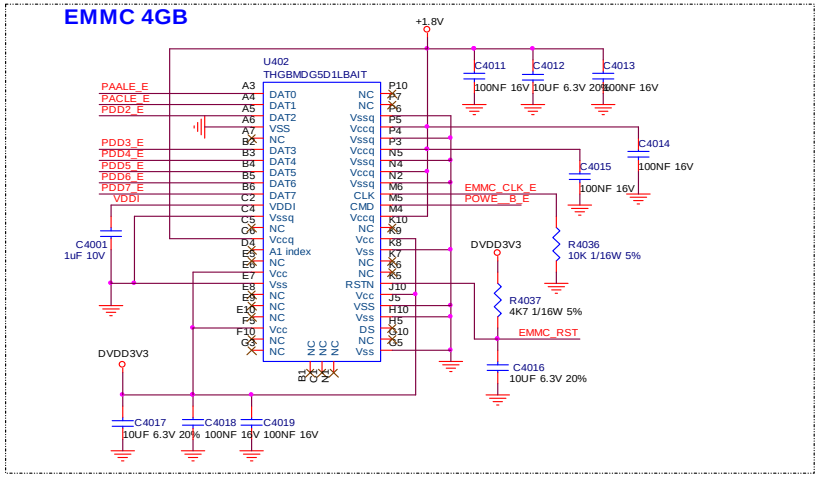
8-3-3 Peripheral

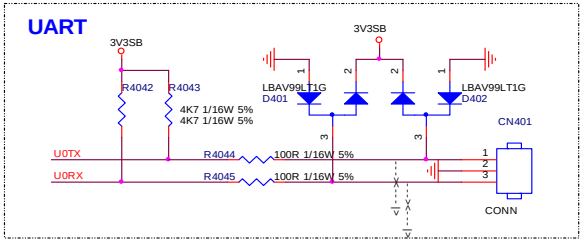


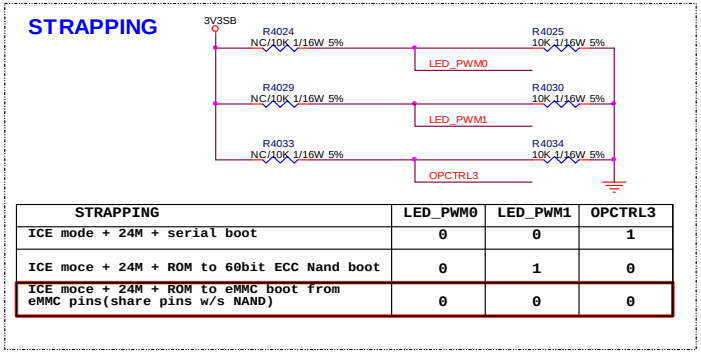




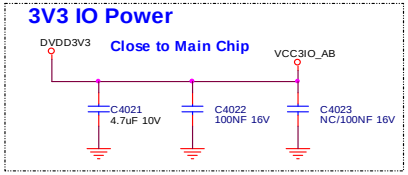


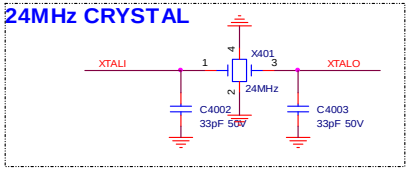


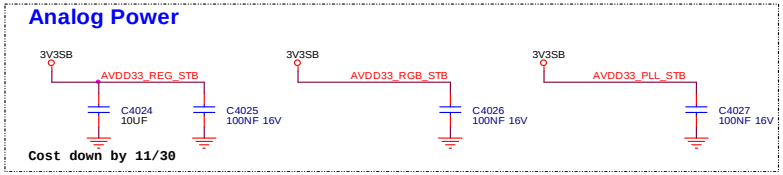




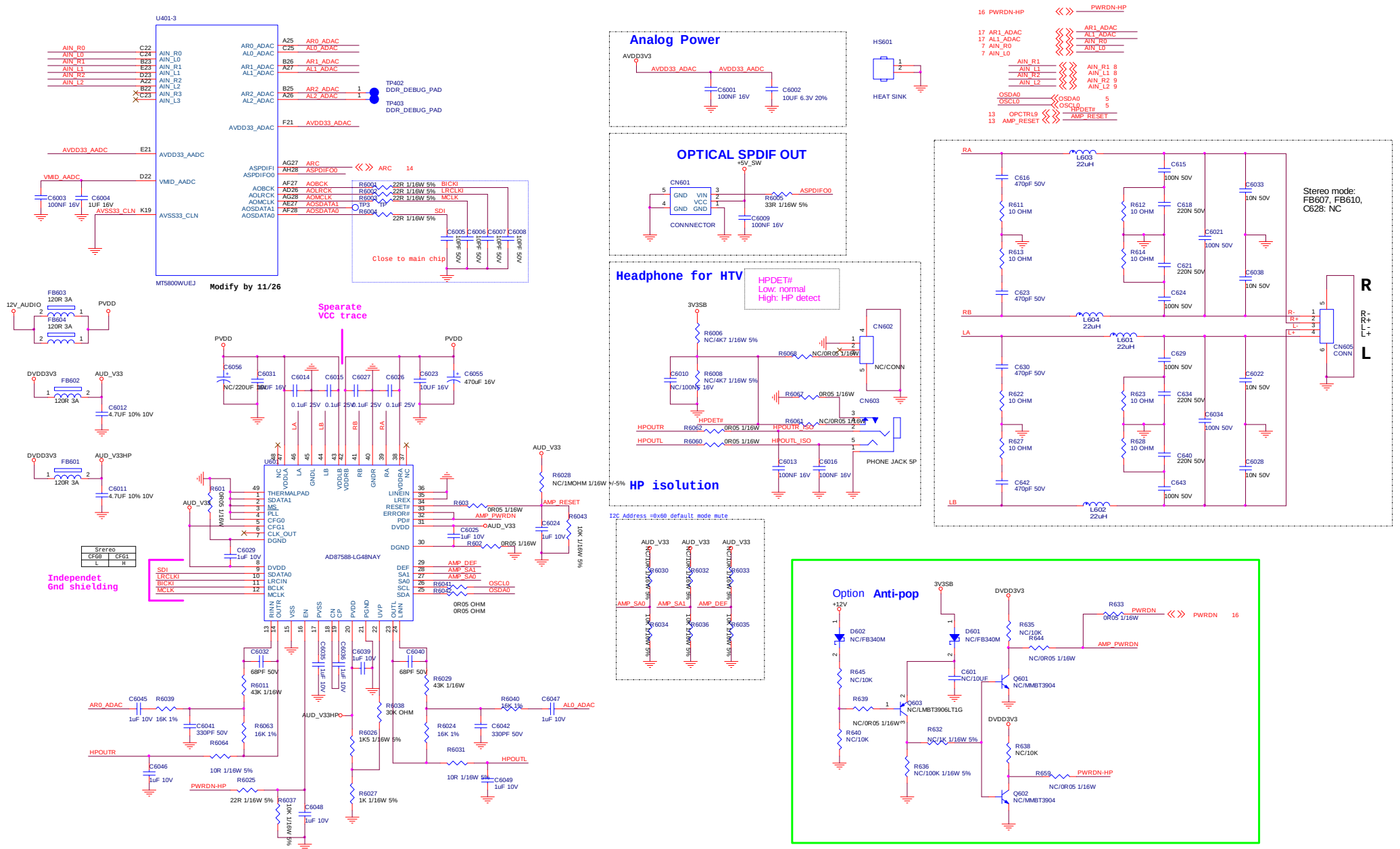
STRAPPING	LED_PWM0	LED_PWM1	OPCTRL3
ICE mode + 24M + serial boot	0	0	1
ICE moce + 24M + ROM to 60bit ECC Nand boot	0	1	0
ICE moce + 24M + ROM to eMMC boot from eMMC pins(share pins w/s NAND)	0	0	0



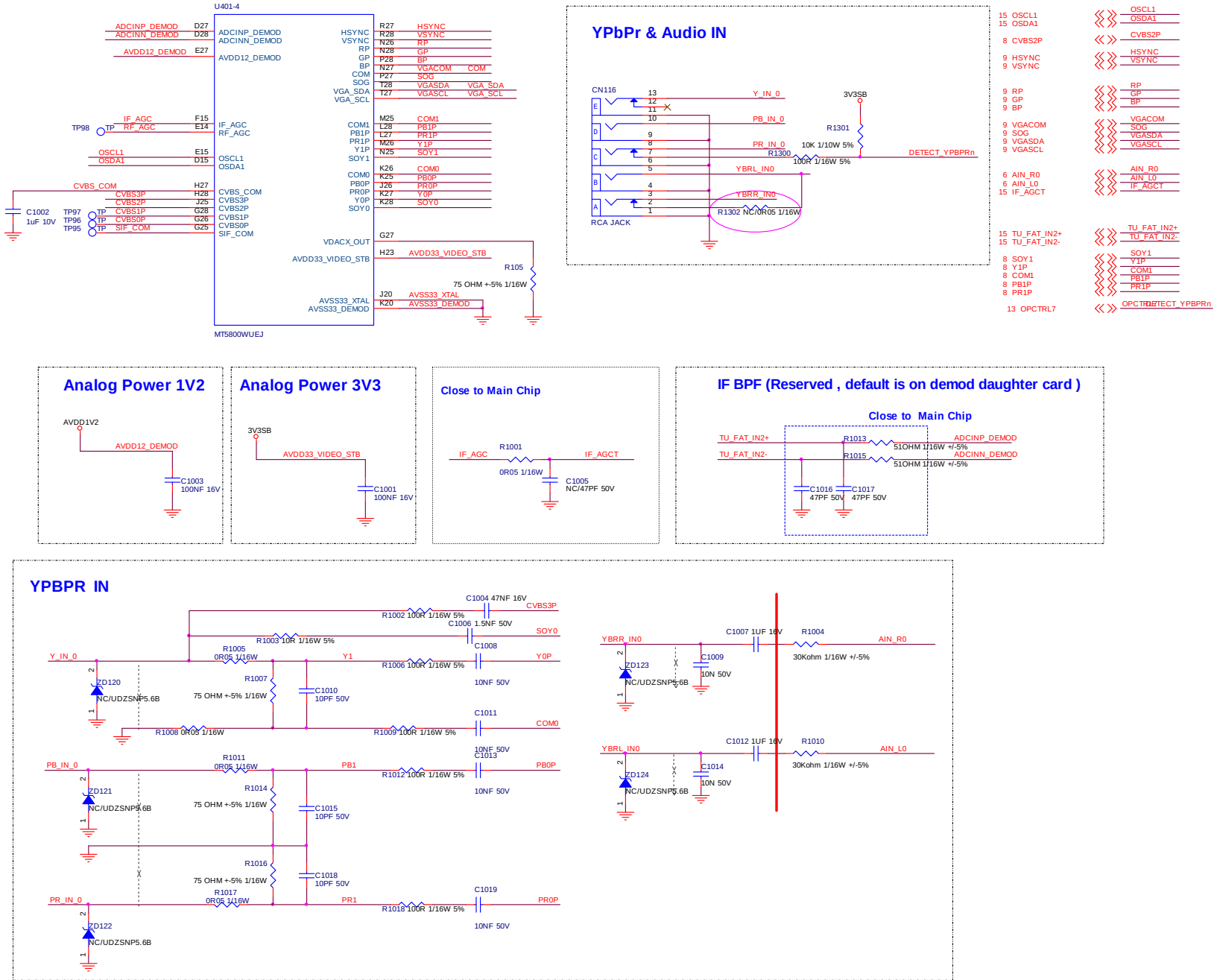




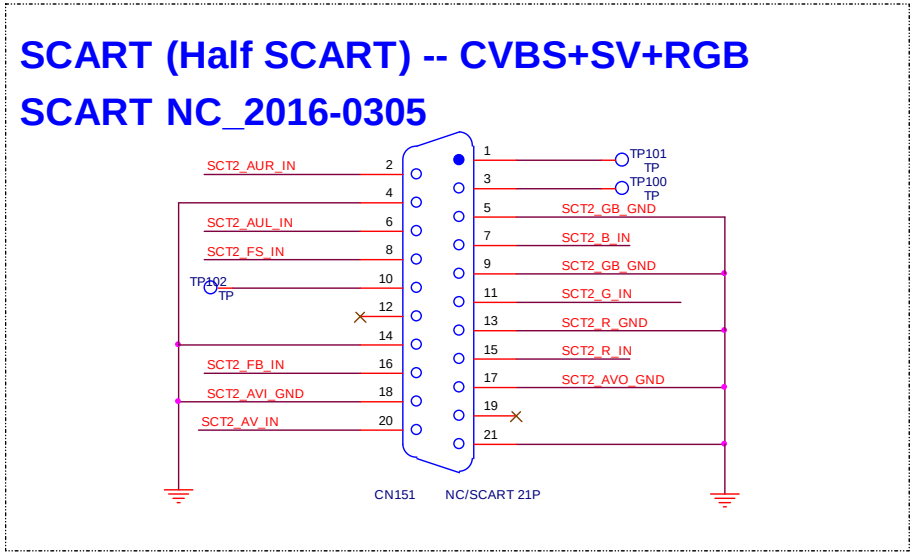
8-3-4 Audio Interface

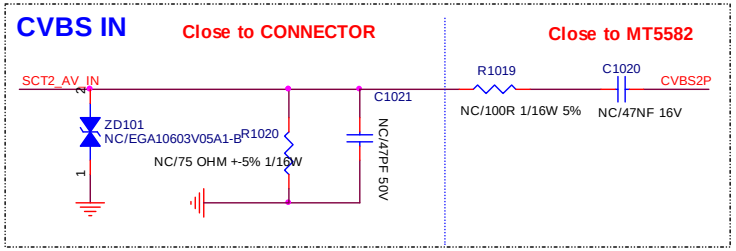


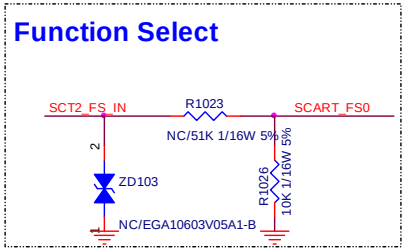
8-3-5 Video Interface/YPbPr/CVBS

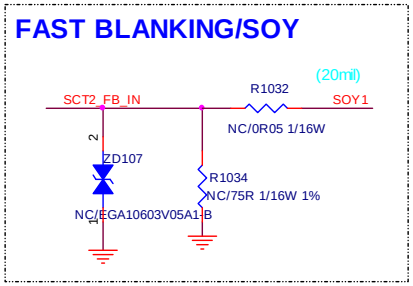


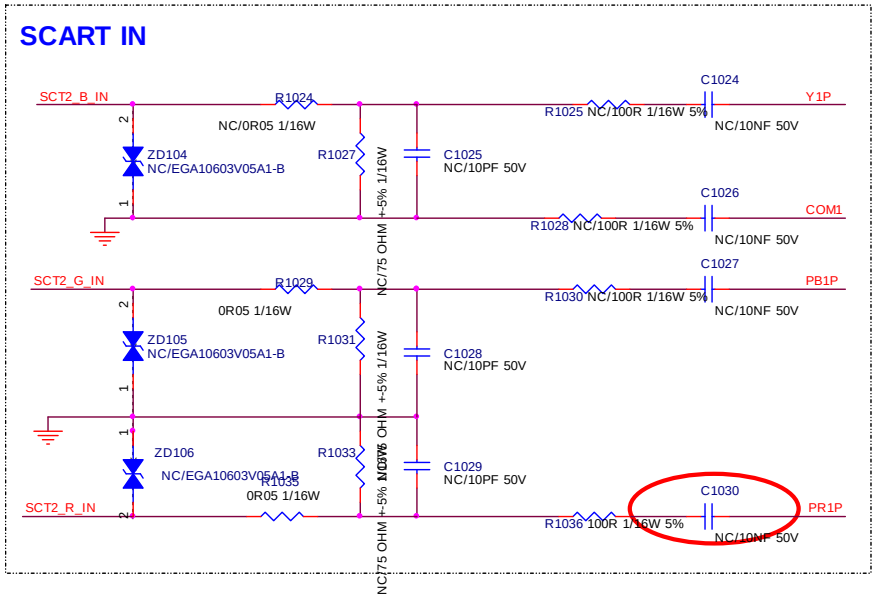
8-3-6 SCART

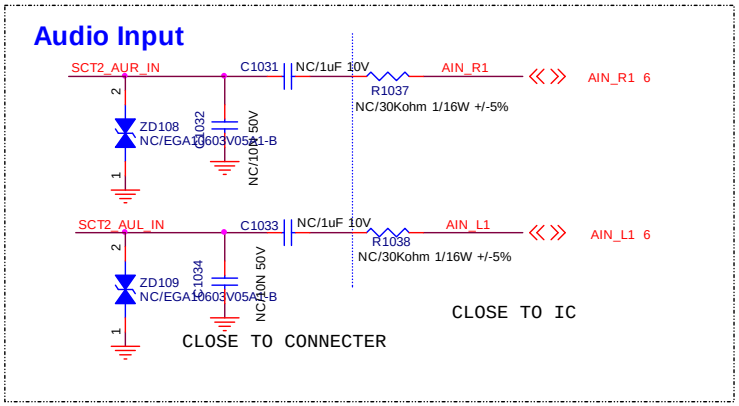












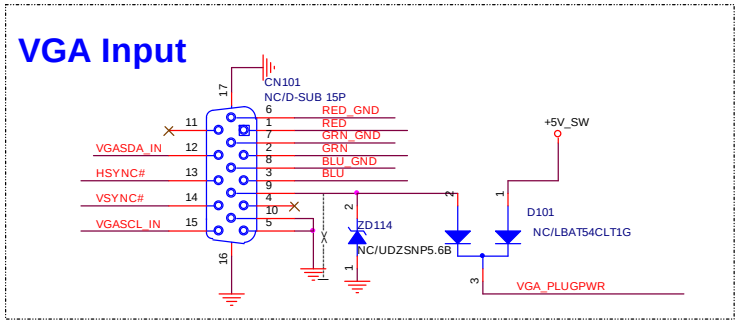
7 SOY1
7 Y1P
7 COM1
7 PB1P
7 PR1P
13 SCART_FS0

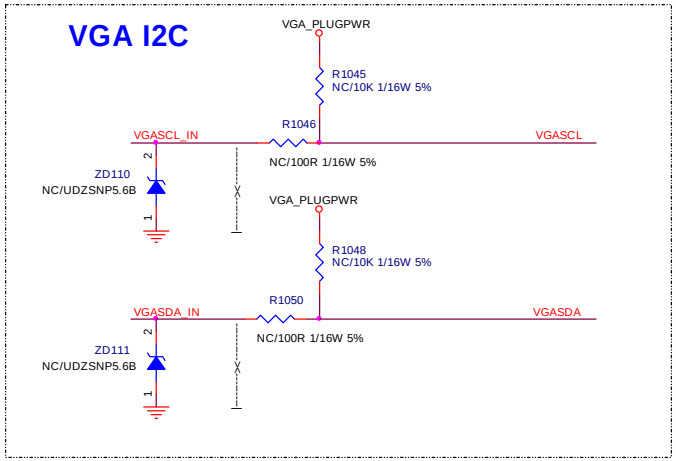
SOY1
Y1P
COM1
PB1P
PR1P
SCART_FS0

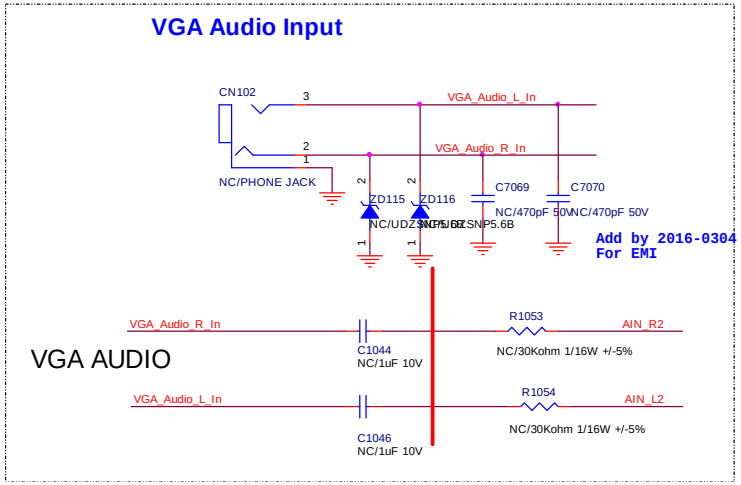
7 CVBS2P

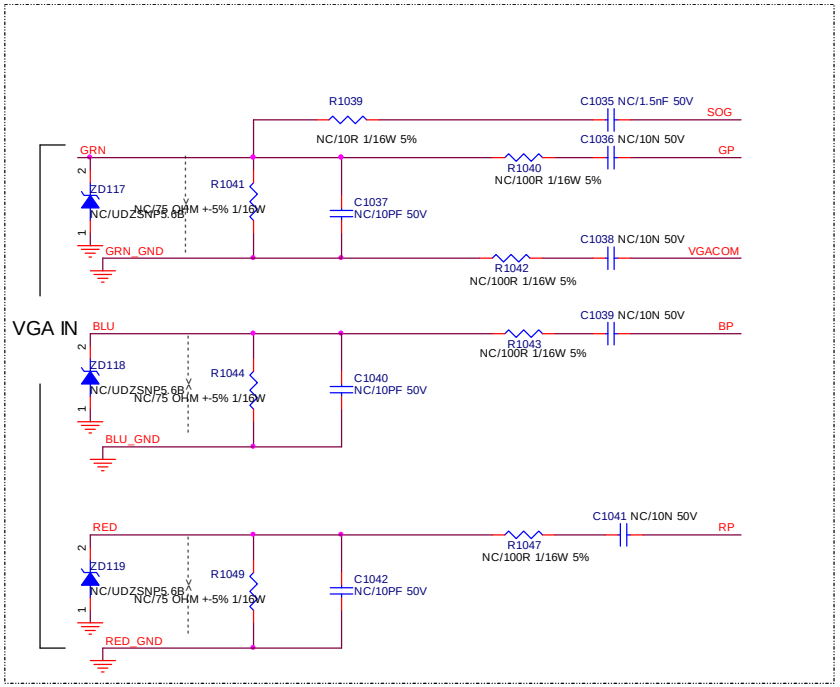
CVBS2P

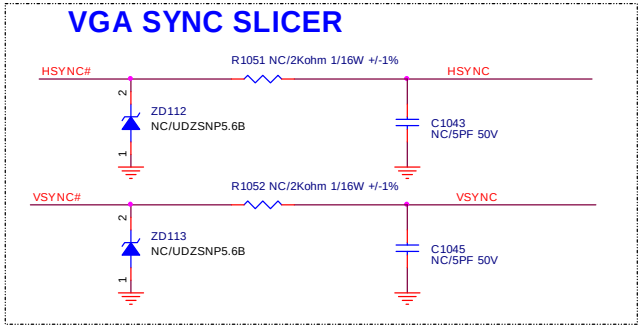
8-3-7 VGA







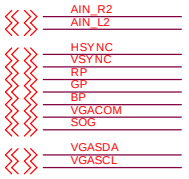




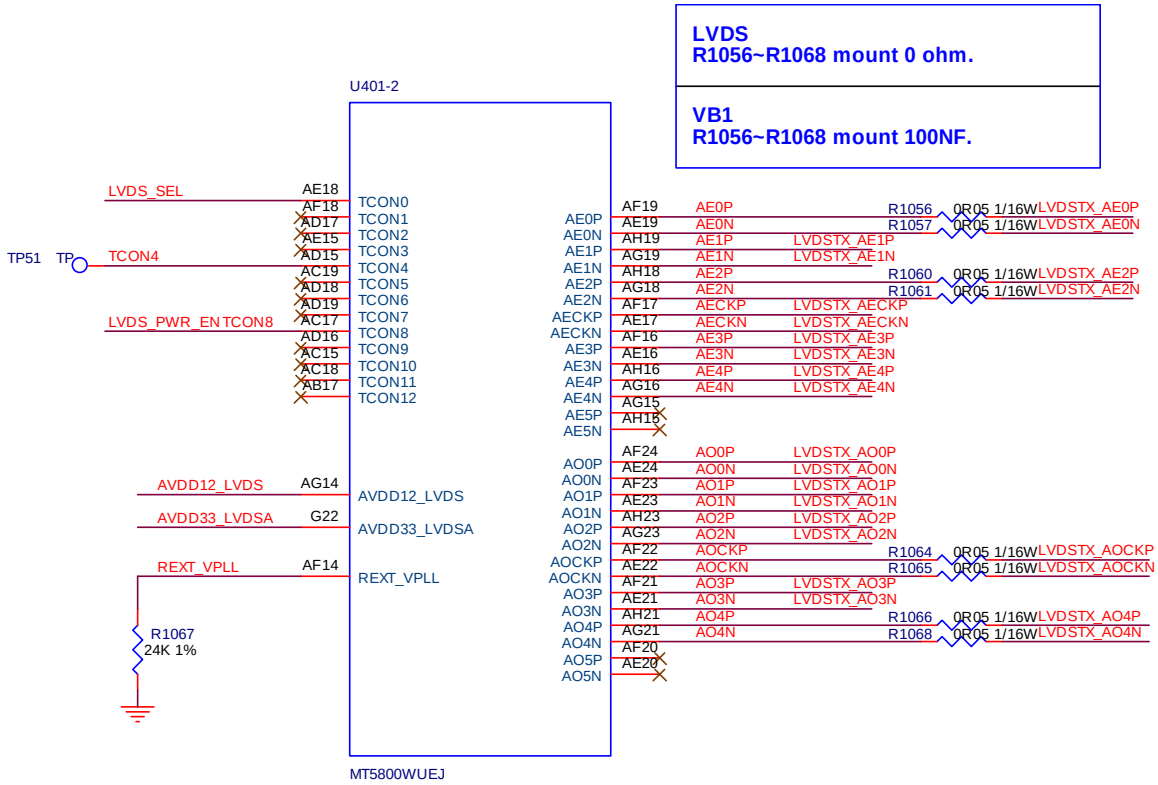
6 AIN_R2
6 AIN_L2

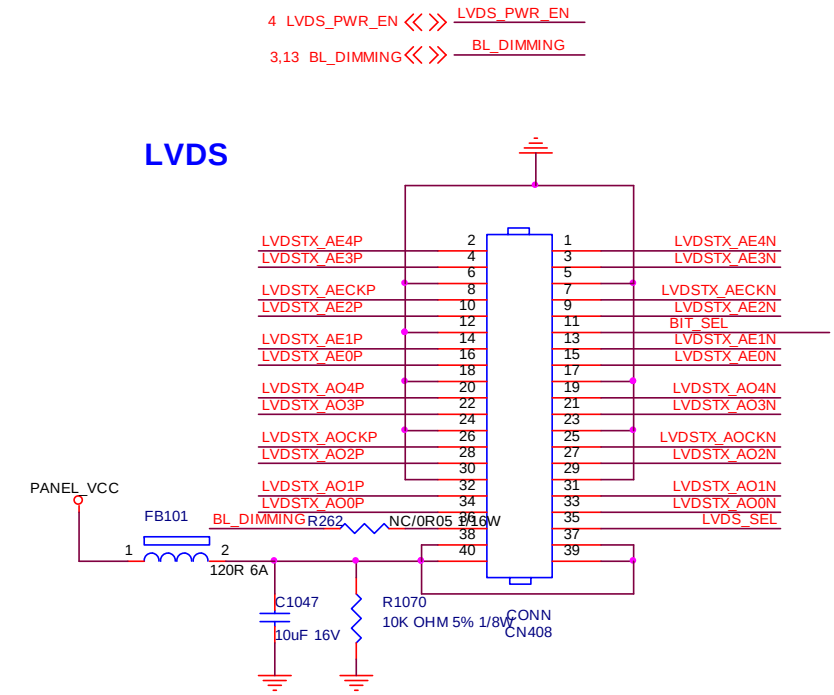
7 HSYNC
7 VSYNC
7 RP
7 GP
7 BP
7 VGACOM
7 SOG

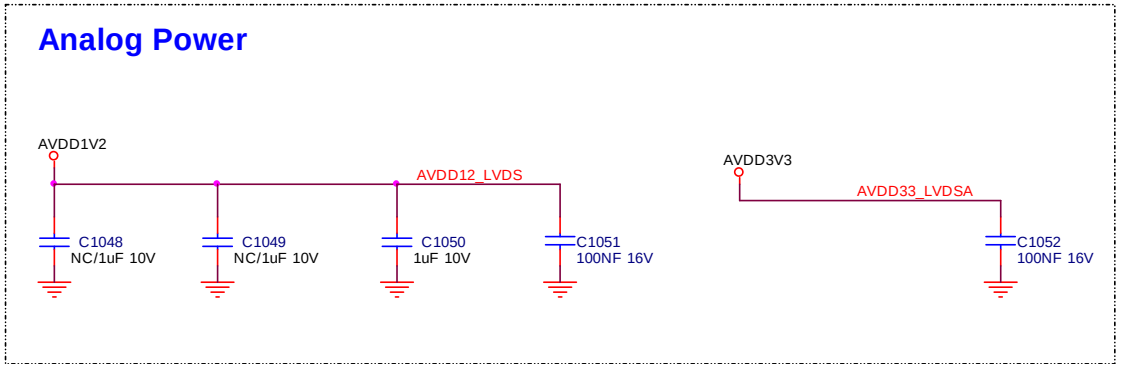
7 VGASDA
7 VGASCL

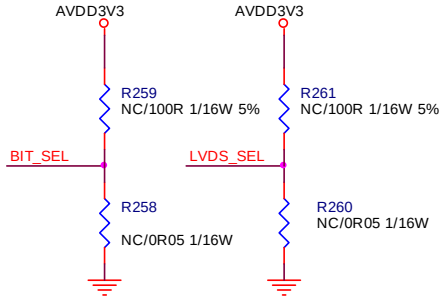


8-3-8 LVDS

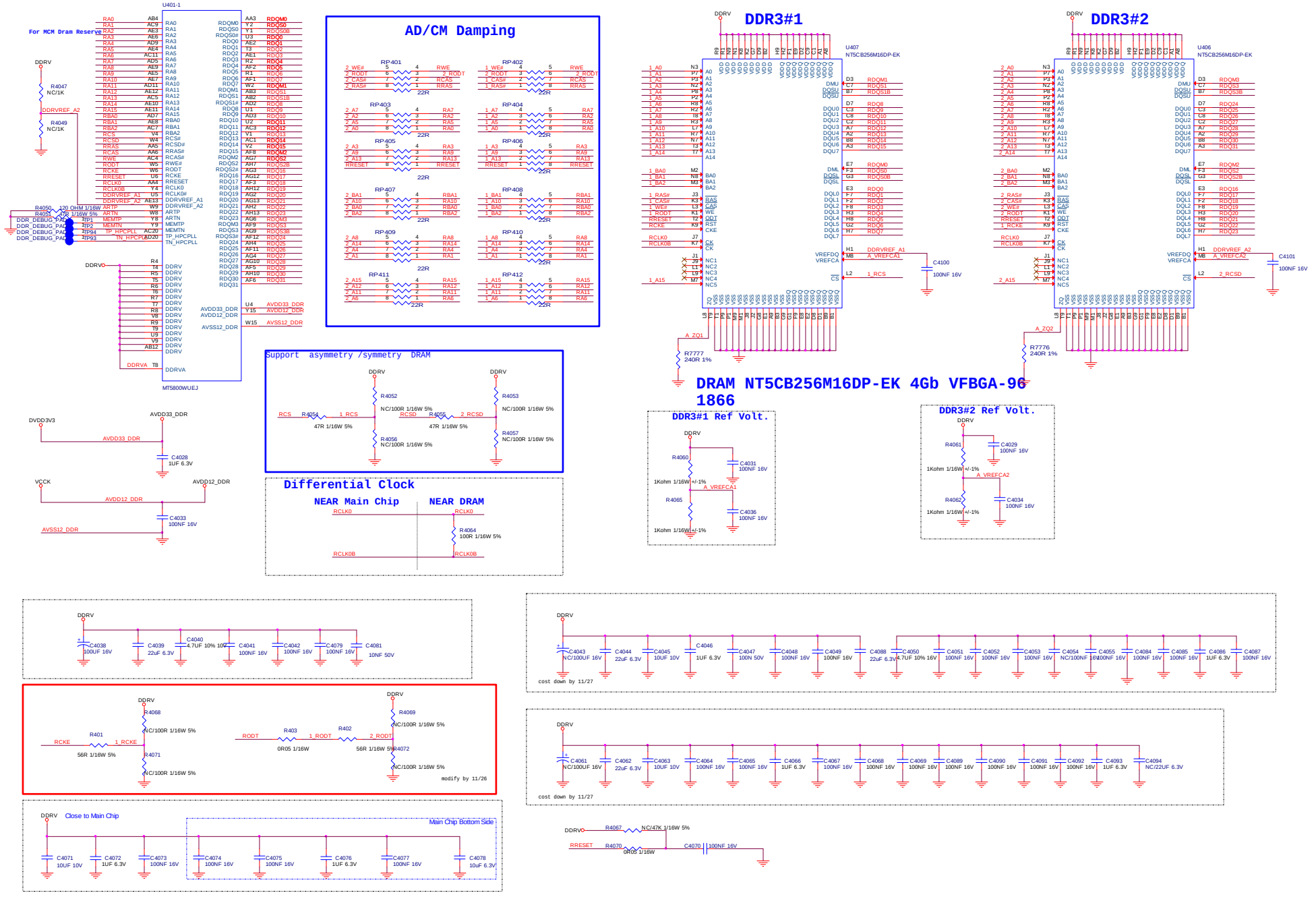

LVDS
R1056~R1068 mount 0 ohm.
VB1
R1056~R1068 mount 100NF.
U401-2
LVDS_SEL
TP51 TP
TCON4
LVDS_PWR_EN TCON8
AVDD12_LVDS
AVDD33_LVDSA
REXT_VPLL
R1067
24K 1%
MT5800WUEJ
R1056 0R05 1/16W LVDSTX_AE0P
R1057 0R05 1/16W LVDSTX_AE0N
R1060 0R05 1/16W LVDSTX_AE2P
R1061 0R05 1/16W LVDSTX_AE2N
R1064 0R05 1/16W LVDSTX_AOCKP
R1065 0R05 1/16W LVDSTX_AOCKN
R1066 0R05 1/16W LVDSTX_AO4P
R1068 0R05 1/16W LVDSTX_AO4N


4 LVDS_PWR_EN
LVDS_PWR_EN
3,13 BL_DIMMING
BL_DIMMING
LVDS
PANEL_VCC
FB101
120R 6A
BL_DIMMING
R262
NC/0R05 1/16W
C1047
10uF 16V
R1070
10K OHM 5% 1/8W
CONN
CN408
LVDSTX_AE4N
LVDSTX_AE3N
LVDSTX_AECKN
LVDSTX_AE2N
BIT_SEL
LVDSTX_AE1N
LVDSTX_AE0N
LVDSTX_AO4N
LVDSTX_AO3N
LVDSTX_AOCKN
LVDSTX_AO2N
LVDSTX_AO1N
LVDSTX_AO0N
LVDS_SEL

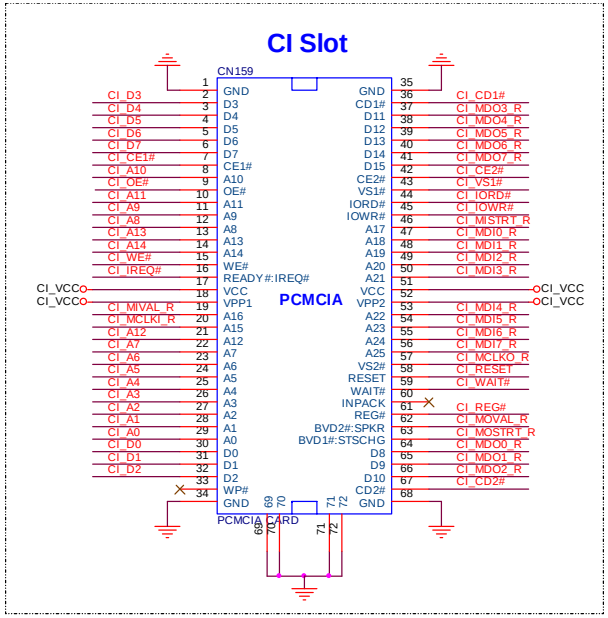

Analog Power
AVDD1V2
AVDD12_LVDS
C1048
NC/1uF 10V
C1049
NC/1uF 10V
C1050
1uF 10V
C1051
100NF 16V
AVDD3V3
AVDD33_LVDSA
C1052
100NF 16V

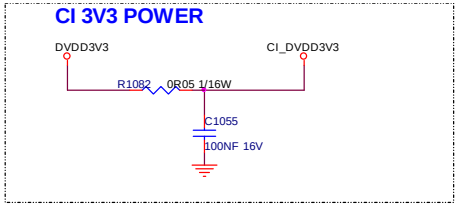

AVDD3V3
AVDD3V3
R259
NC/100R 1/16W 5%
R261
NC/100R 1/16W 5%
BIT_SEL
LVDS_SEL
R258
NC/0R05 1/16W
R260
NC/0R05 1/16W

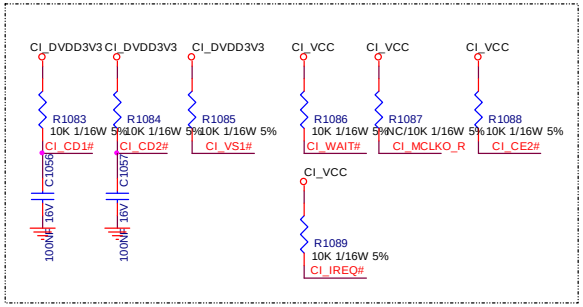
8-3-9 DRAM

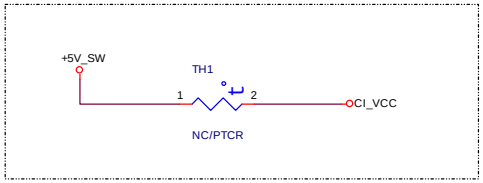

AD/CM Damping
DDR3#1
DDR3#2
DRAM NT5CB256M16DP-EK 4Gb VFBGA-96
1866
DDR3#1 Ref Volt.
DDR3#2 Ref Volt.
Support asymmetry /symmetry DRAM
Differential Clock
NEAR Main Chip
NEAR DRAM
For MCM Dram Reserve
Close to Main Chip
Main Chip Bottom Side
cost down by 11/27
modify by 11/26

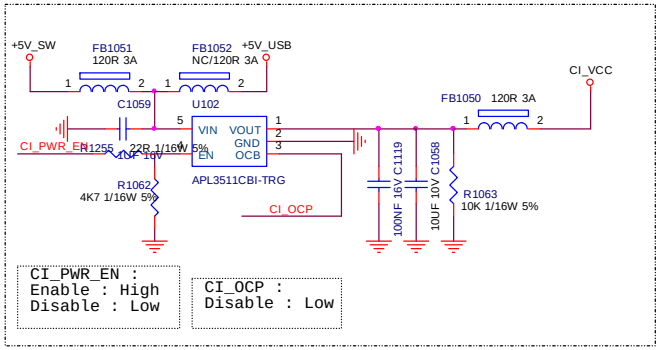
8-3-10 CI Card

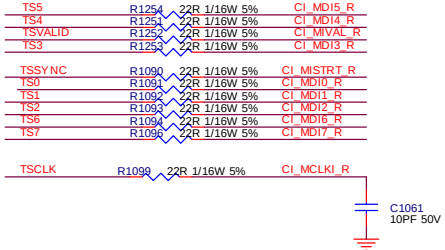

CI Slot
CN159
PCMCIA
PCMCIA CARD
CI_VCC
CI_VCC

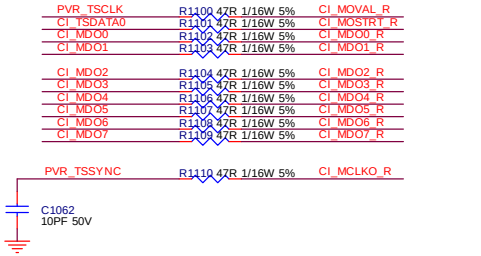

CI 3V3 POWER
DVDD3V3
CI_DVDD3V3
R1082 0R05 1/16W
C1055
100NF 16V

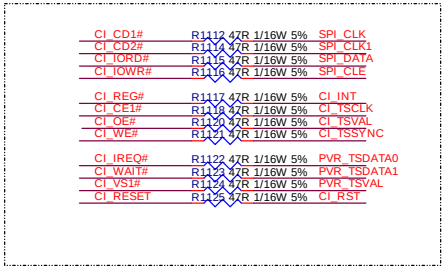

CI_DVDD3V3
CI_VCC
R1083 10K 1/16W 5%
R1084 10K 1/16W 5%
R1085 10K 1/16W 5%
R1086 10K 1/16W 5%
R1087 NC/10K 1/16W 5%
R1088 10K 1/16W 5%
CI_CD1#
CI_CD2#
CI_VS1#
CI_WAIT#
CI_MCLKO_R
CI_CE2#
C1056
C1057
100NF 16V
R1089 10K 1/16W 5%
CI_IREQ#

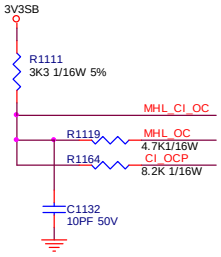

+5V_SW
TH1
CI_VCC
NC/PTCR

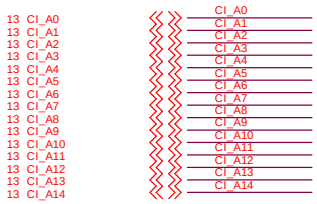

+5V_SW
FB1051 120R 3A
FB1052 NC/120R 3A
+5V_USB
CI_VCC
FB1050 120R 3A
C1059
U102
VIN
VOUT
GND
OCB
EN
APL3511CBI-TRG
CI_PWR_EN
R1255 22R 1/16W 5%
10UF 10V
R1062 4K7 1/16W 5%
CI_OCP
C1119 100NF 16V
C1058 10UF 10V
R1063 10K 1/16W 5%
CI_PWR_EN : Enable : High Disable : Low
CI_OCP : Disable : Low

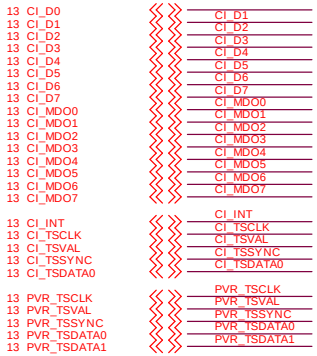

TS5 R1254 22R 1/16W 5% CI_MDI5_R
TS4 R1251 22R 1/16W 5% CI_MDI4_R
TSVALID R1252 22R 1/16W 5% CI_MIVAL_R
TS3 R1253 22R 1/16W 5% CI_MDI3_R
TSSYNC R1090 22R 1/16W 5% CI_MISTRT_R
TS0 R1091 22R 1/16W 5% CI_MDI0_R
TS1 R1092 22R 1/16W 5% CI_MDI1_R
TS2 R1093 22R 1/16W 5% CI_MDI2_R
TS6 R1094 22R 1/16W 5% CI_MDI6_R
TS7 R1096 22R 1/16W 5% CI_MDI7_R
TSCLK R1099 22R 1/16W 5% CI_MCLKI_R
C1061 10PF 50V

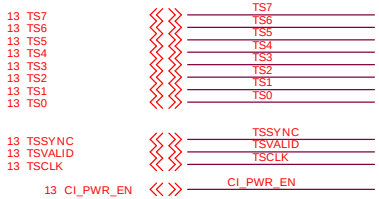

PVR_TSCLK R1100 47R 1/16W 5% CI_MOVAL_R
CI_TSDATA0 R1101 47R 1/16W 5% CI_MOSTRT_R
CI_MDO0 R1102 47R 1/16W 5% CI_MDO0_R
CI_MDO1 R1103 47R 1/16W 5% CI_MDO1_R
CI_MDO2 R1104 47R 1/16W 5% CI_MDO2_R
CI_MDO3 R1105 47R 1/16W 5% CI_MDO3_R
CI_MDO4 R1106 47R 1/16W 5% CI_MDO4_R
CI_MDO5 R1107 47R 1/16W 5% CI_MDO5_R
CI_MDO6 R1108 47R 1/16W 5% CI_MDO6_R
CI_MDO7 R1109 47R 1/16W 5% CI_MDO7_R
PVR_TSSYNC R1110 47R 1/16W 5% CI_MCLKO_R
C1062 10PF 50V

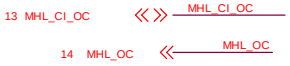

CI_CD1# R1112 47R 1/16W 5% SPI_CLK
CI_CD2# R1114 47R 1/16W 5% SPI_CLK1
CI_IORD# R1115 47R 1/16W 5% SPI_DATA
CI_IOWR# R1116 47R 1/16W 5% SPI_CLE
CI_REG# R1117 47R 1/16W 5% CI_INT
CI_CE1# R1118 47R 1/16W 5% CI_TSCLK
CI_OE# R1120 47R 1/16W 5% CI_TSVAL
CI_WE# R1121 47R 1/16W 5% CI_TSSYNC
CI_IREQ# R1122 47R 1/16W 5% PVR_TSDATA0
CI_WAIT# R1123 47R 1/16W 5% PVR_TSDATA1
CI_VS1# R1124 47R 1/16W 5% PVR_TSVAL
CI_RESET R1125 47R 1/16W 5% CI_RST


3V3SB
R1111 3K3 1/16W 5%
MHL_CI_OC
R1119 MHL_OC 4.7K1/16W
R1164 CI_OCP 8.2K 1/16W
C1132 10PF 50V

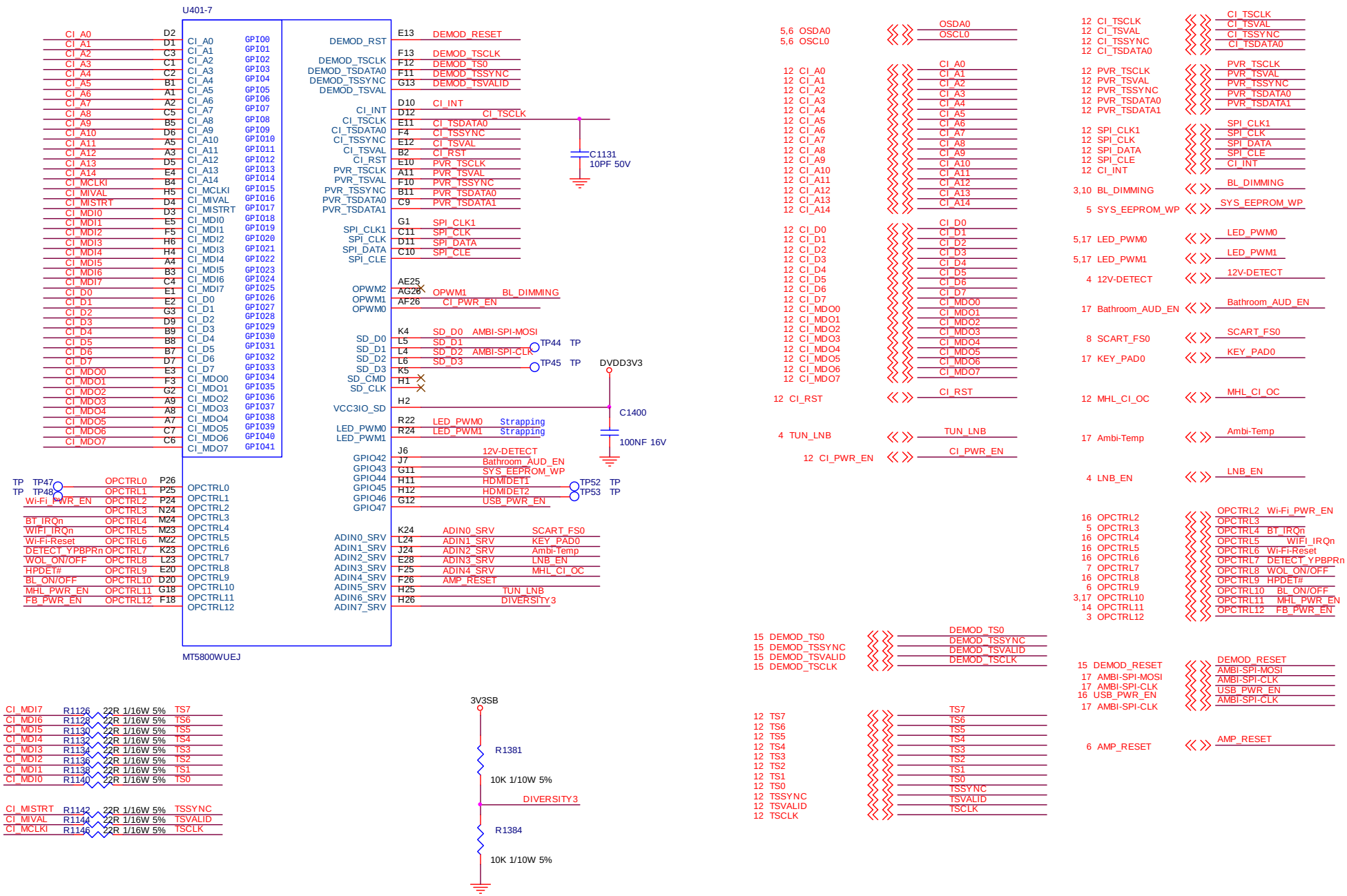

13 CI_A0
13 CI_A1
13 CI_A2
13 CI_A3
13 CI_A4
13 CI_A5
13 CI_A6
13 CI_A7
13 CI_A8
13 CI_A9
13 CI_A10
13 CI_A11
13 CI_A12
13 CI_A13
13 CI_A14
CI_A0
CI_A1
CI_A2
CI_A3
CI_A4
CI_A5
CI_A6
CI_A7
CI_A8
CI_A9
CI_A10
CI_A11
CI_A12
CI_A13
CI_A14


13 CI_D0
13 CI_D1
13 CI_D2
13 CI_D3
13 CI_D4
13 CI_D5
13 CI_D6
13 CI_D7
13 CI_MDO0
13 CI_MDO1
13 CI_MDO2
13 CI_MDO3
13 CI_MDO4
13 CI_MDO5
13 CI_MDO6
13 CI_MDO7
CI_D1
CI_D2
CI_D3
CI_D4
CI_D5
CI_D6
CI_D7
CI_MDO0
CI_MDO1
CI_MDO2
CI_MDO3
CI_MDO4
CI_MDO5
CI_MDO6
CI_MDO7
13 CI_INT
13 CI_TSCLK
13 CI_TSVAL
13 CI_TSSYNC
13 CI_TSDATA0
CI_INT
CI_TSCLK
CI_TSVAL
CI_TSSYNC
CI_TSDATA0
13 PVR_TSCLK
13 PVR_TSVAL
13 PVR_TSSYNC
13 PVR_TSDATA0
13 PVR_TSDATA1
PVR_TSCLK
PVR_TSVAL
PVR_TSSYNC
PVR_TSDATA0
PVR_TSDATA1
13 SPI_CLK1
13 SPI_CLK
13 SPI_DATA
13 SPI_CLE
SPI_CLK1
SPI_CLK
SPI_DATA
SPI_CLE
13 CI_RST
CI_RST

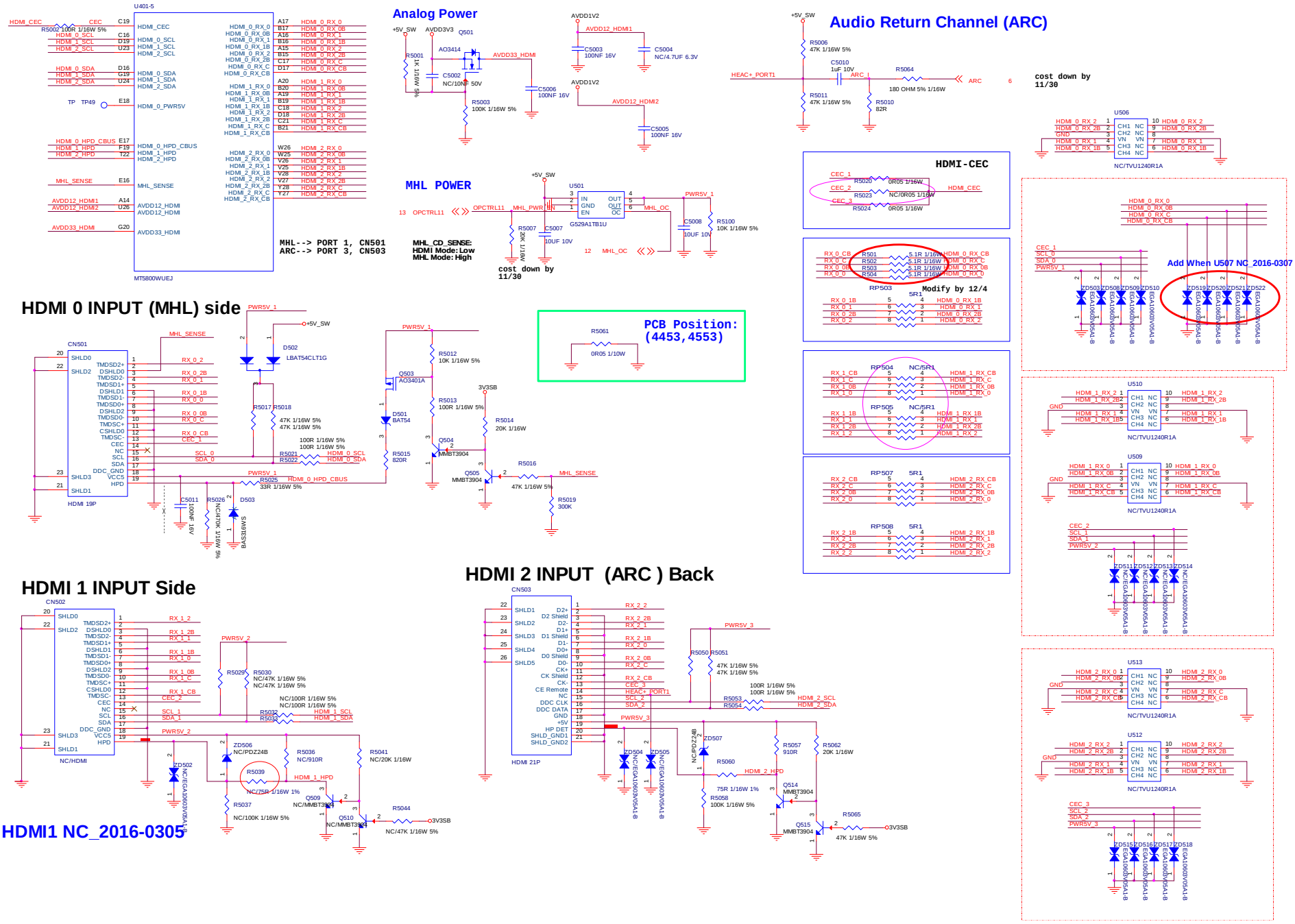

13 TS7
13 TS6
13 TS5
13 TS4
13 TS3
13 TS2
13 TS1
13 TS0
TS7
TS6
TS5
TS4
TS3
TS2
TS1
TS0
13 TSSYNC
13 TSVALID
13 TSCLK
TSSYNC
TSVALID
TSCLK
13 CI_PWR_EN
CI_PWR_EN


13 MHL_CI_OC
MHL_CI_OC
14 MHL_OC
MHL_OC

8-3-11 MII/GPIO/ServAD2

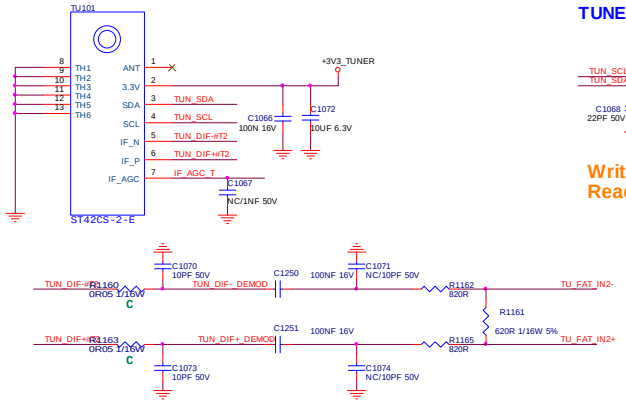


8-3-12 HDMI

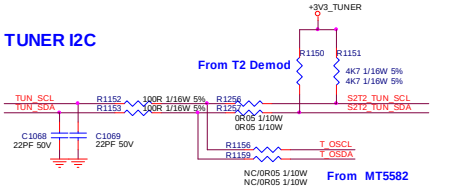

Analog Power
Audio Return Channel (ARC)
MHL POWER
HDMI-CEC
MHL--> PORT 1, CN501
ARC--> PORT 3, CN503
MHL_CD_SENSE:
HDMI Mode: Low
MHL Mode: High
cost down by 11/30
HDMI 0 INPUT (MHL) side
PCB Position: (4453,4553)
Modify by 12/4
Add When U507 NC_2016-0307
HDMI 2 INPUT (ARC) Back
HDMI 1 INPUT Side
HDMI1 NC_2016-0305

8-3-13 Tuner/Demod

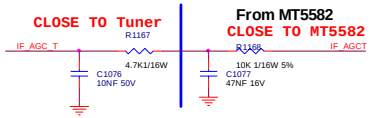
T2 TUNER

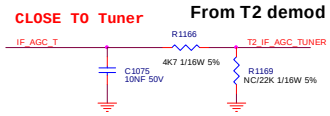


TUNER I2C



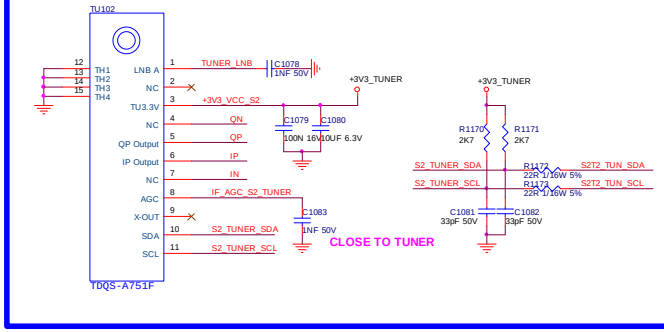
Write:0xC0
Read:0xC1



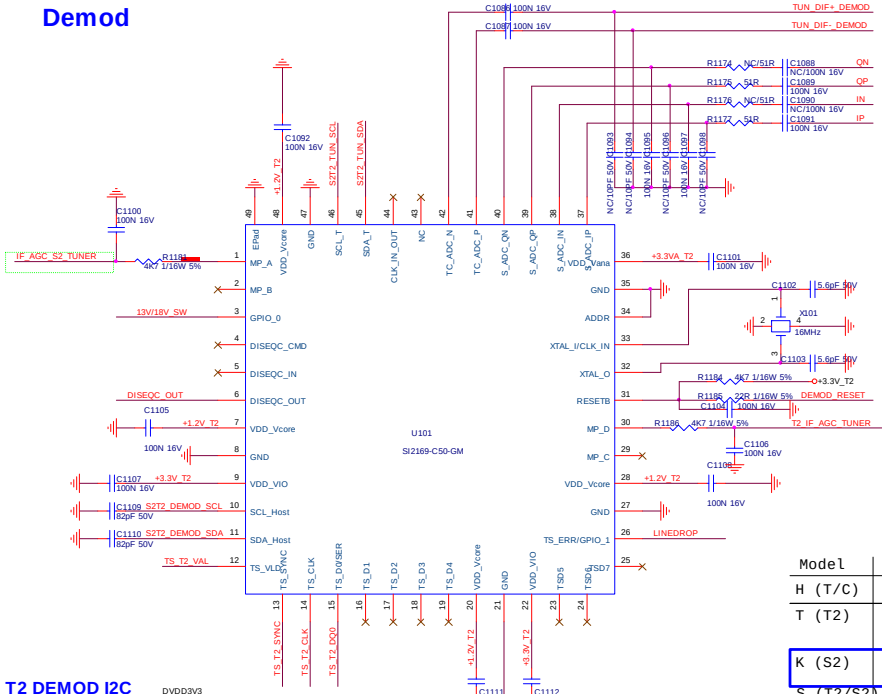


S2 TUNER

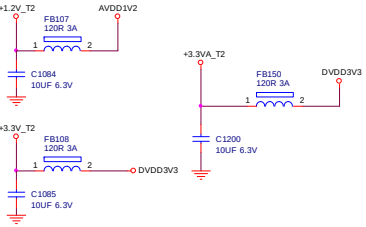
LGTuner with DVB-S/S2 — K model : Samsung DNBU02112IH2

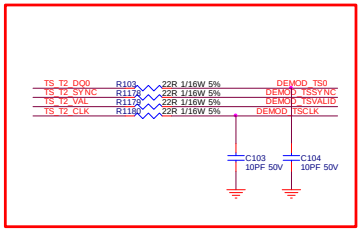


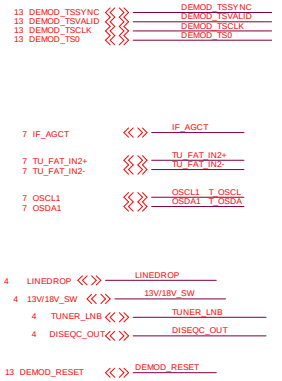
Demod



DEMOD POWER

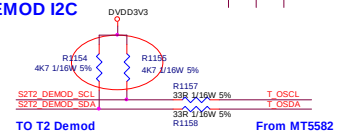




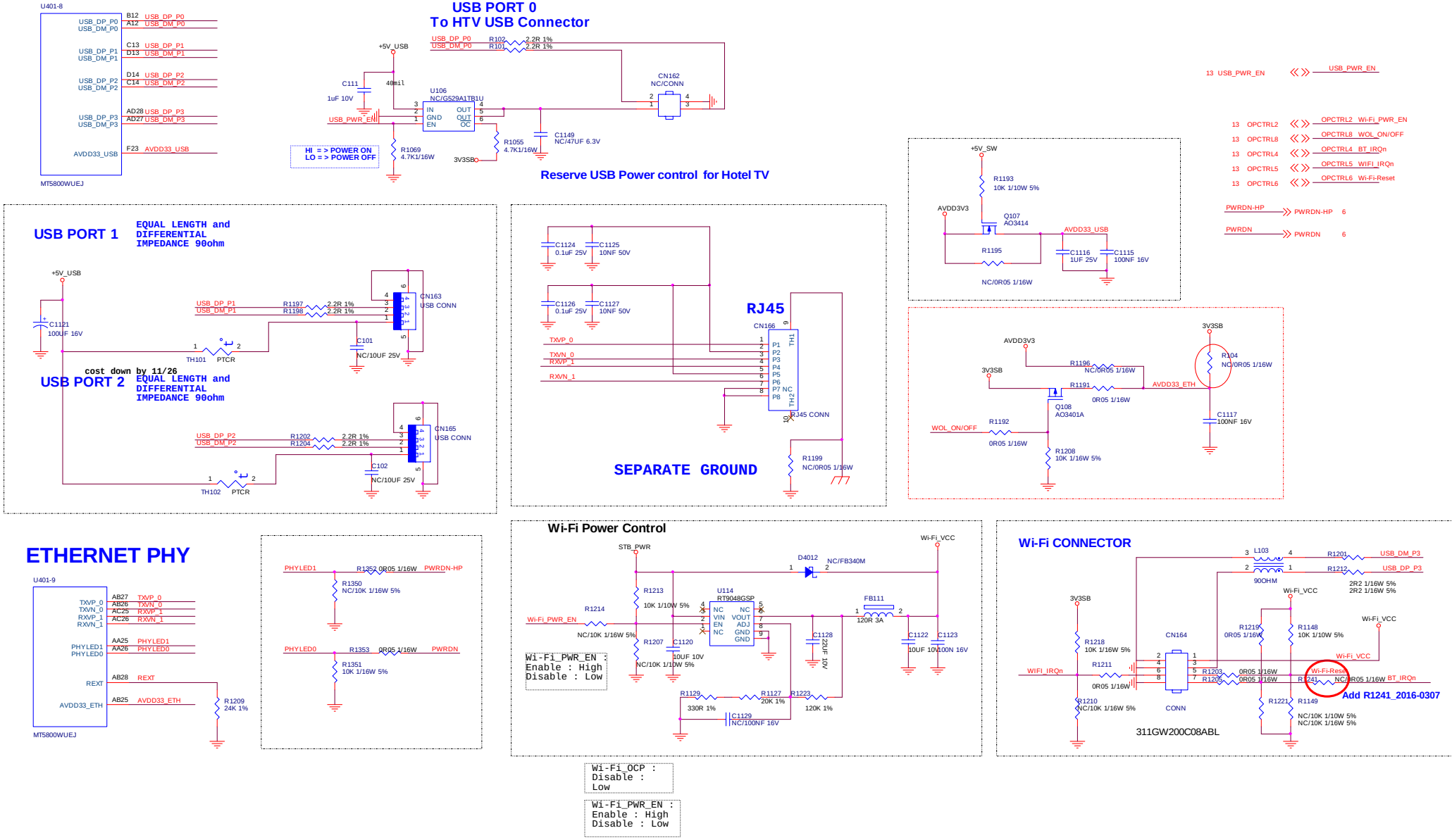


Model	Demod	Tuner
H (T/C)	NC	TU101
T (T2)	T2 Si2168 356G0575048610	TU101
K (S2)	Si2166	TU101/TU102
S (T2/S2)	Si2169 356G0575048613	TU101/TU102

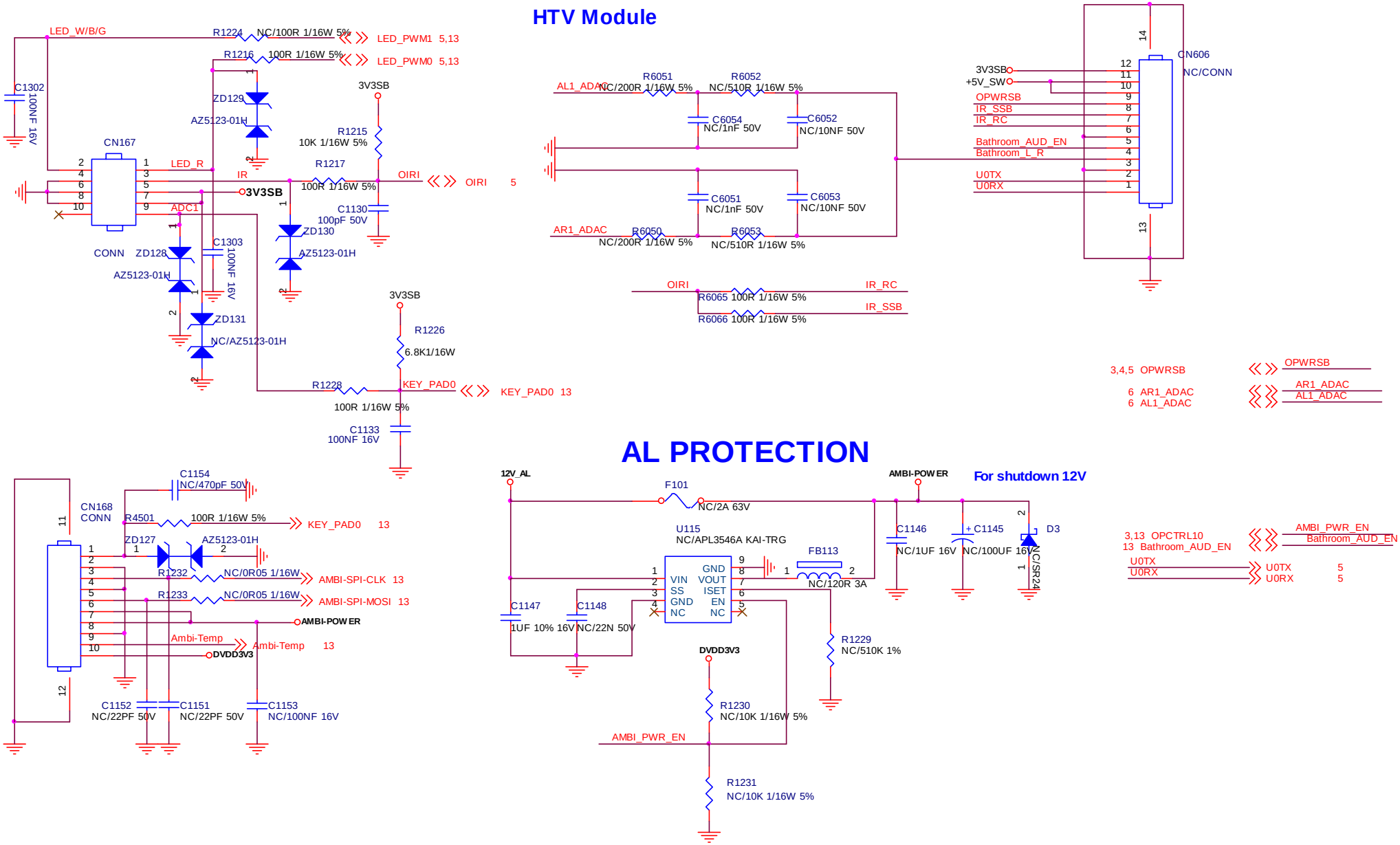
T2 DEMOD I2C



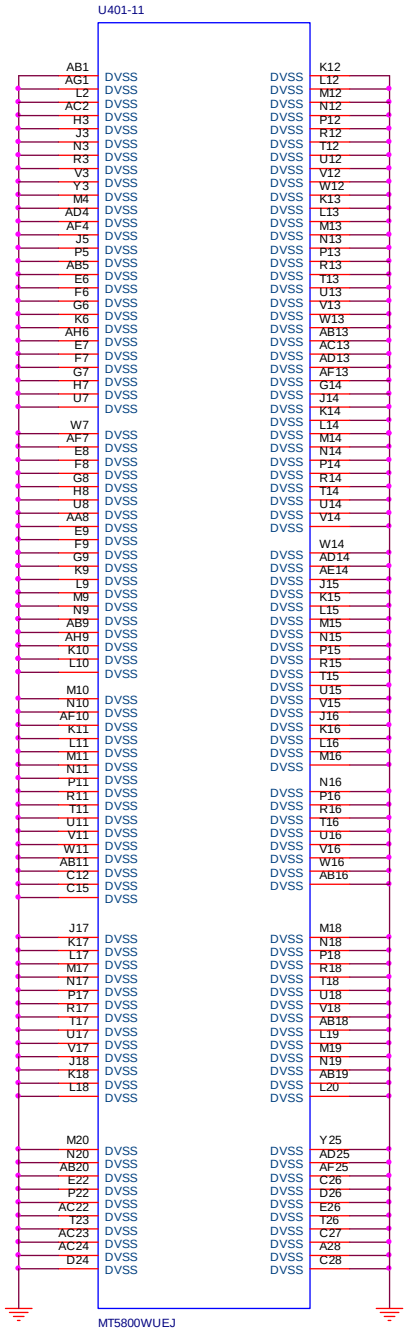
8-3-14 USB/WIFI/RJ45

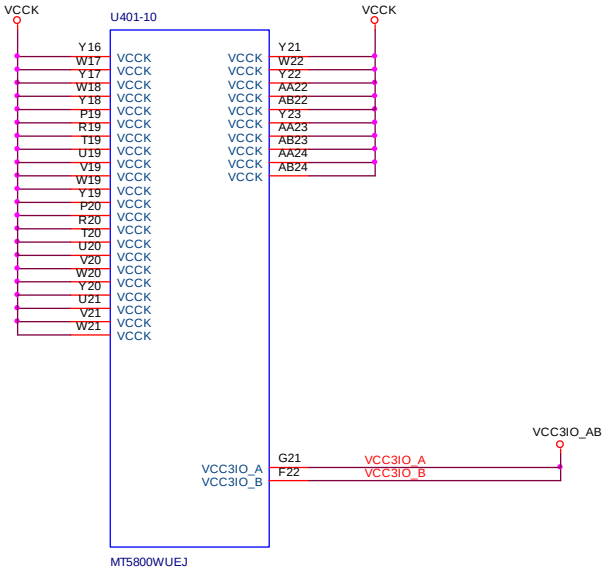


8-3-15 IR/Keypad Conector



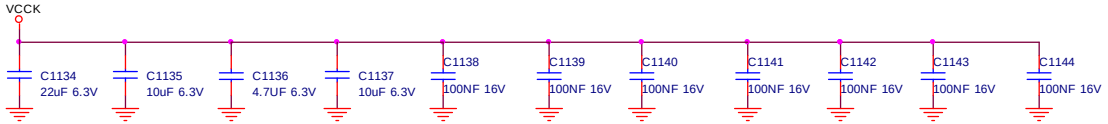
8-3-16 VCCK&DVSS





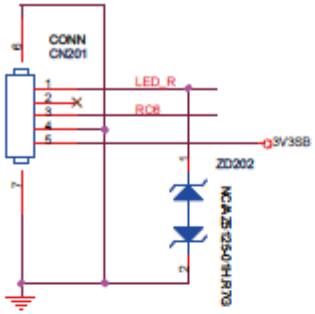
VCCK POWER

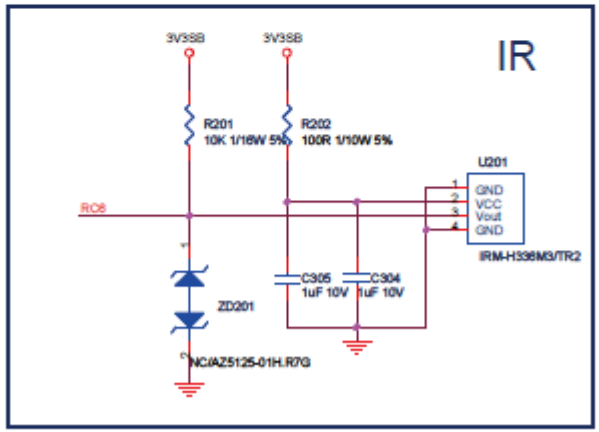
Bottom Side Capacitors

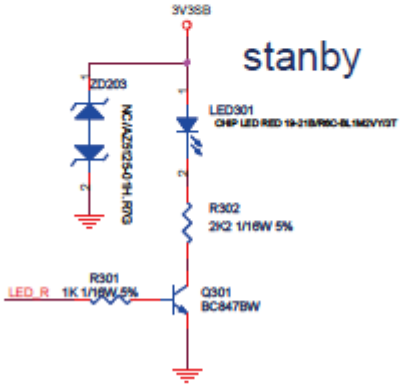


8.4 J 715G7055 IR/LED Panel

8-4-1 LED&IR&3D&Light sensor

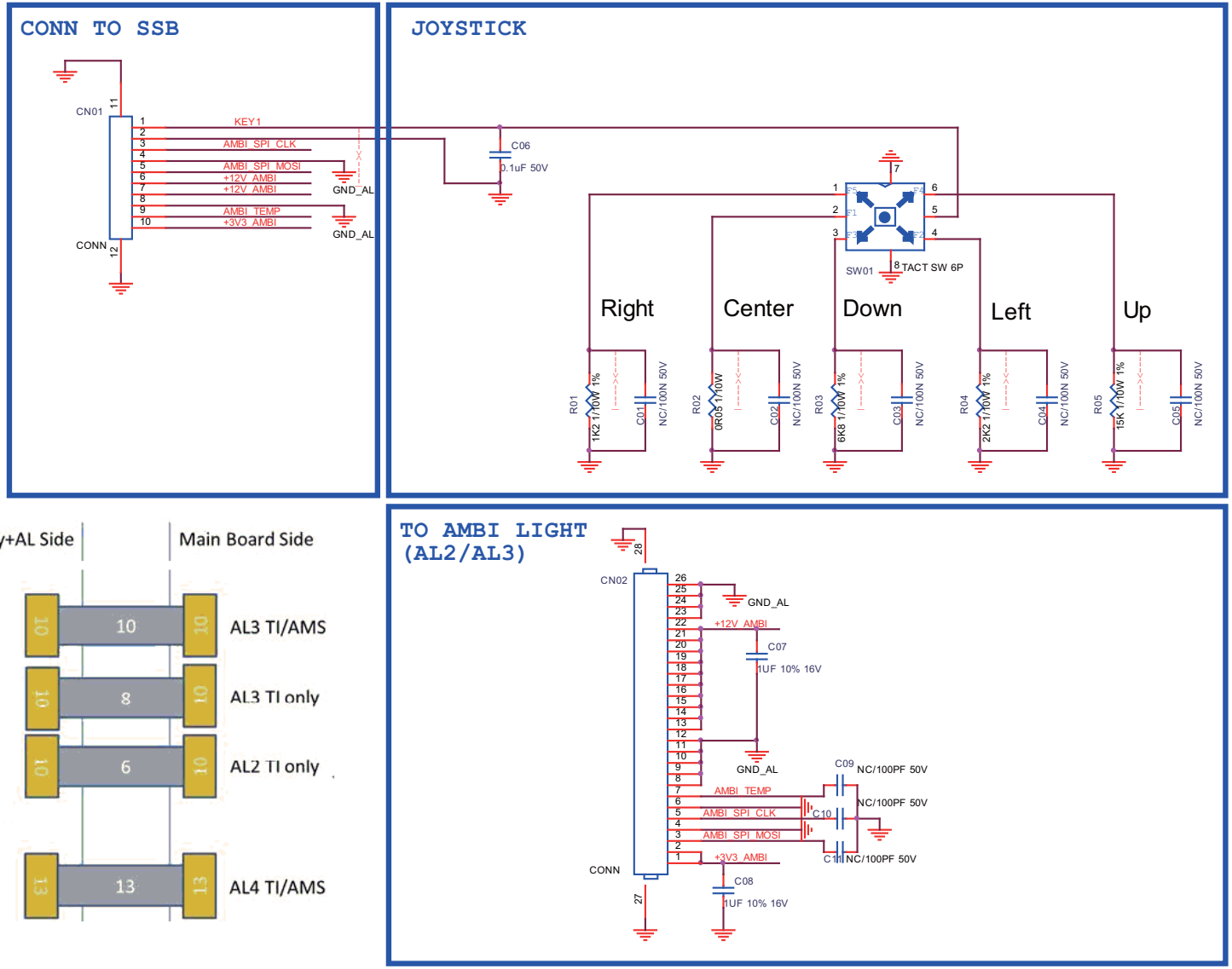






8.5 E 715G7088 Keyboard control panel

8-5-1 Key



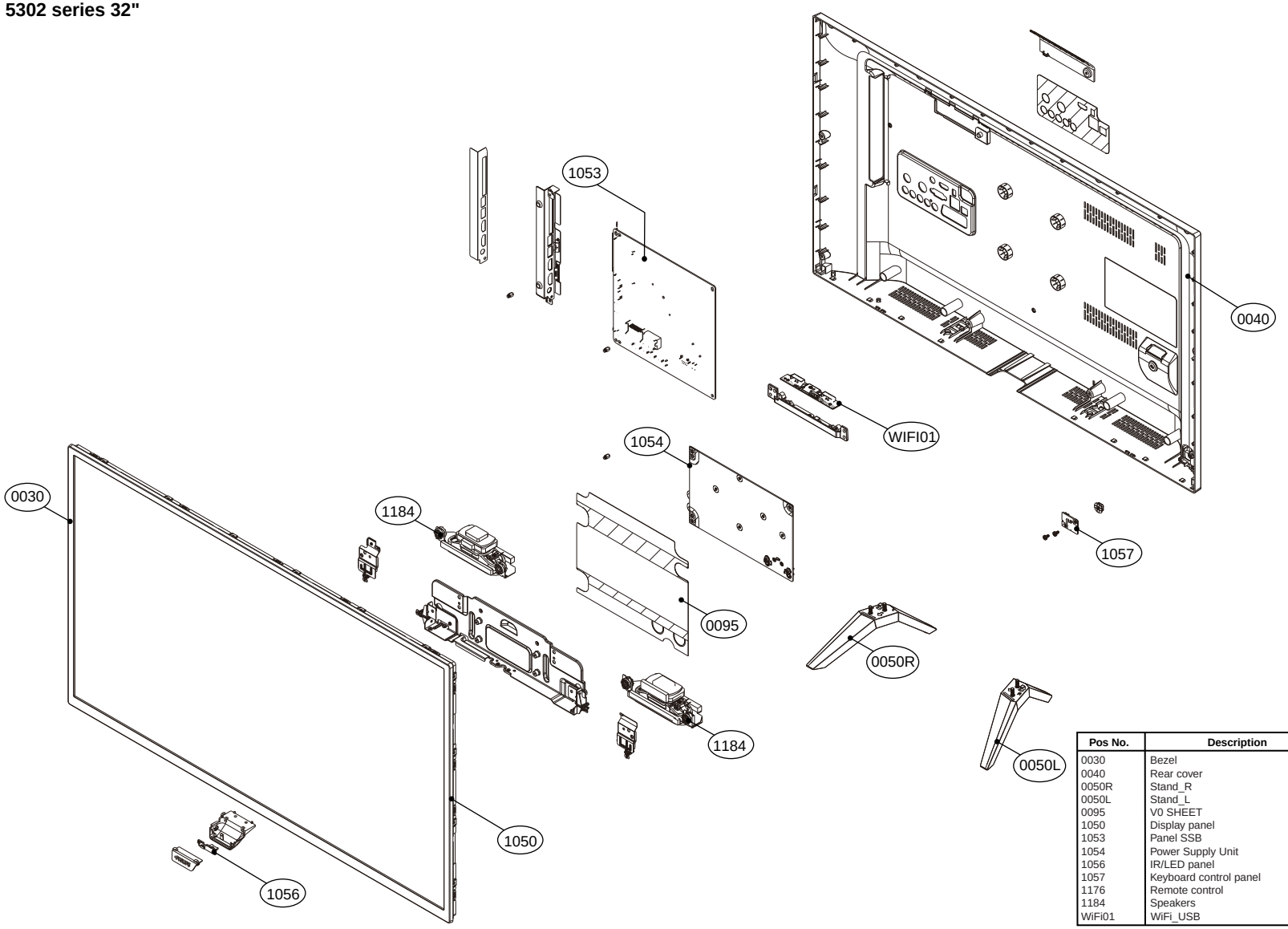
Direction	switch	Key function	Resistance	Voltage
Center	2-5 short	Menu	0R	0V
Right	1-5 short	CH+	1K2	0.5V
Left	4-5 short	CH-	2K2	0.81V
Down	3-5 short	VOL-	6K8	1.65V
Up	6-5 short	VOL+	15K	2.27V
		No function		3.3V

Joystick circuit diagram

	pin1	pin2	pin3	pin4	pin5	pin6
F1		o			o	
F2				o	o	
F3			o		o	
F4					o	o
F5	o				o	

9. Styling Sheets

5302 series 32"

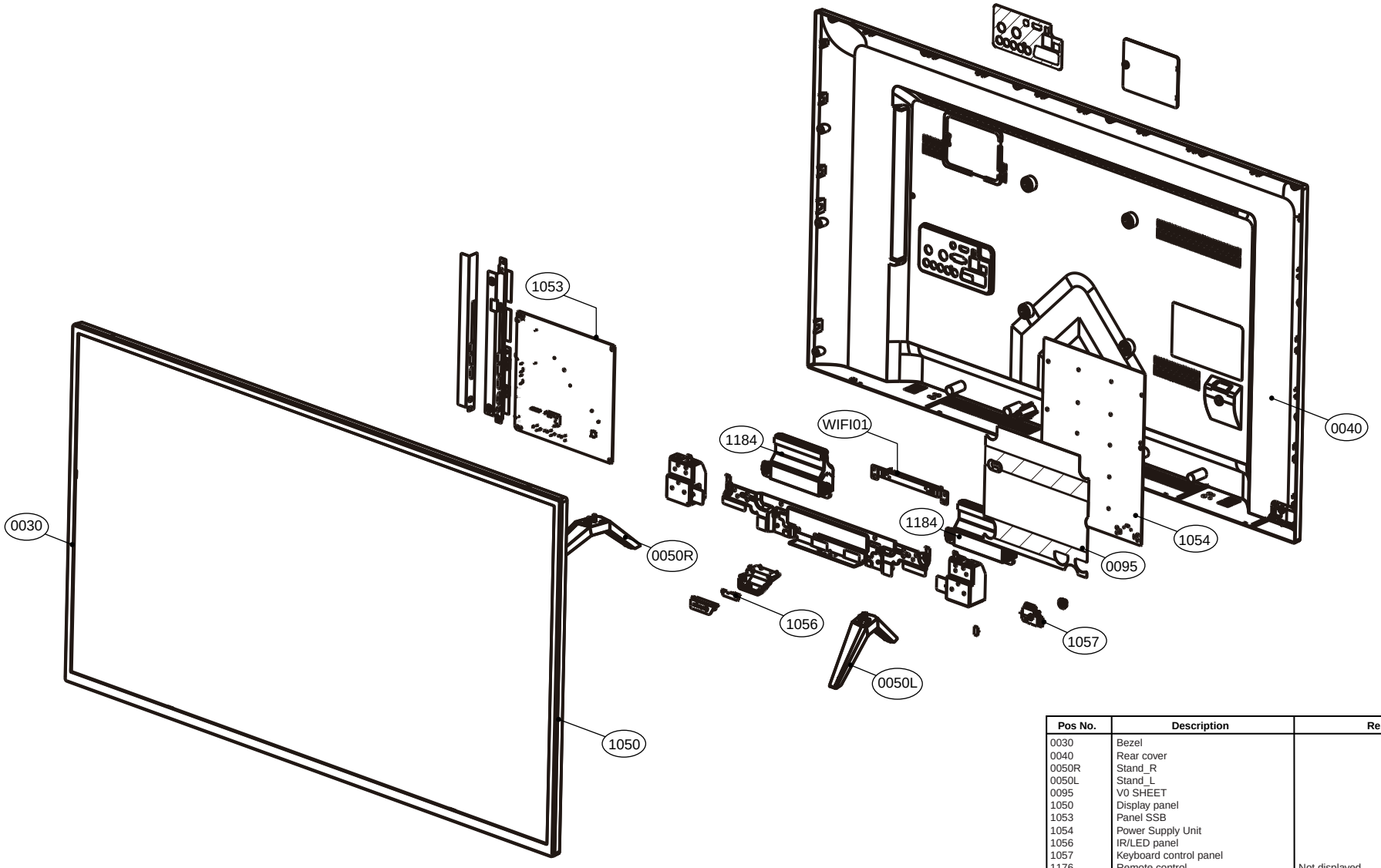


Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

20370_800.eps

5302 series 43"

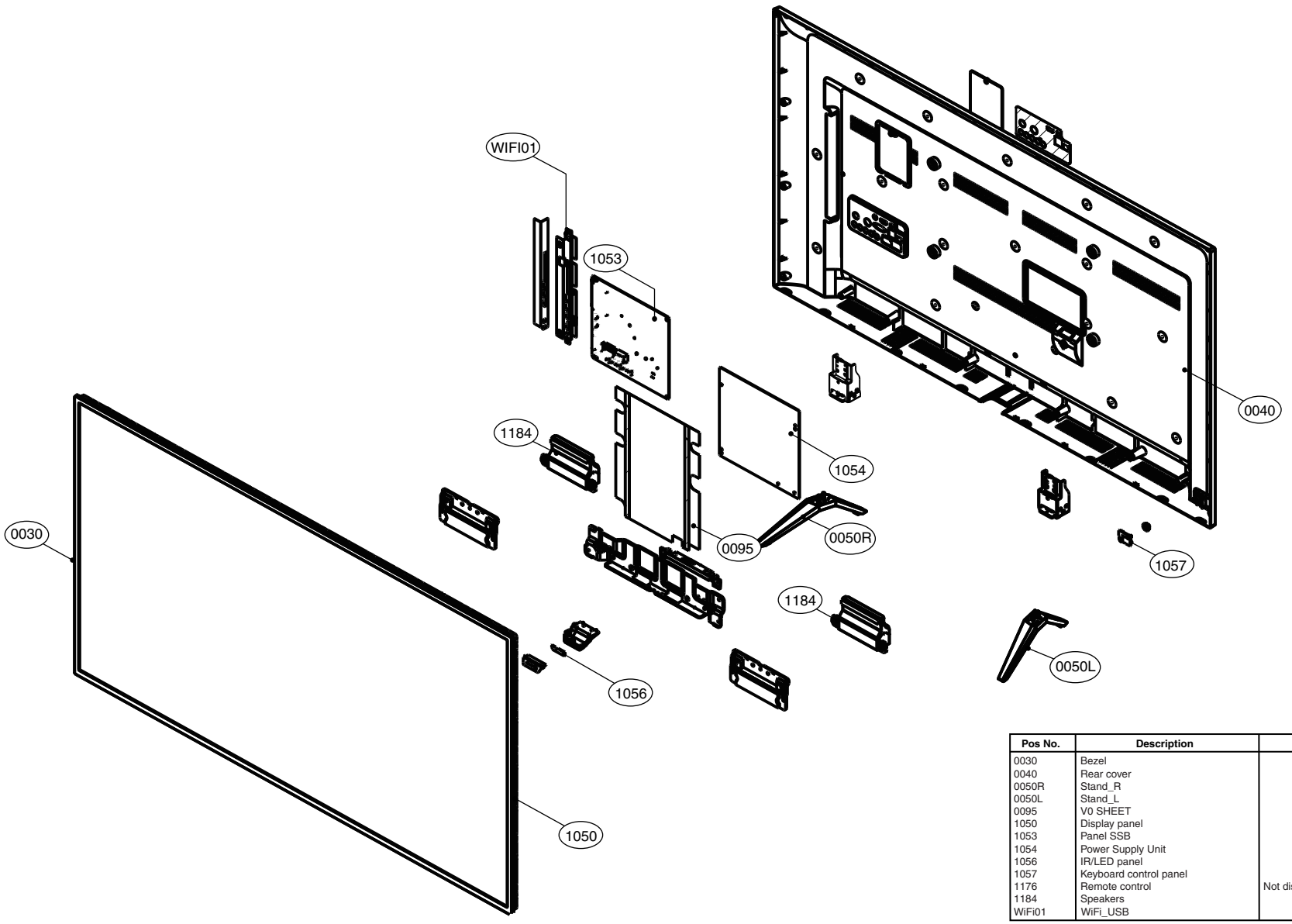


Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

20370_801.eps

5302 series 49"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9