Colour Television

Chassis

TPS19.1E

EU

Service
Service
Service

ServiceManual

Chassis name	Platform	Model name
TPS19.1E LA	MSD92L	22PFS5304/60
		24PHS4304/12
		24PHS4304/60
		24PHS4354/12
		24PHT4304/05
		24PHT4354/05
		32PHS4503/12
		32PHS4504/12
		32PHT4503/12
		32PHT4504/05
		43PFS5503/12
		43PFT5503/12

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1. Product information

Product information is subject to change without notice.
For detailed product information, please visit www.philips.com/support

Display Input Resolution

For PHx series TV

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)

- 640 x 480p – 60Hz
- 800 x 600p – 60Hz
- 1024 x 768p – 60Hz
- 1280 x 768p – 60Hz
- 1360 x 768p – 60Hz

For PFx series TV

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)

- 640 x 480p – 60Hz
- 800 x 600p – 60Hz
- 1024 x 768p – 60Hz
- 1280 x 768p – 60Hz
- 1360 x 768p – 60Hz
- 1280 x 1024p – 60Hz
- 1920 x 1080p – 60Hz

Connectivity

For 24PHx43x4

TV Rear

- HDMI 1 ARC: HDMI Audio Return Channel
- HDMI 2
- DIGITAL AUDIO OUT: SPDIF
- VGA
- AUDIO IN (DVI/VGA): Stereo 3.5mm mini-jack
- SCART (RGB/CVBS): SCART adaptor
- TV ANTENNA: 75 ohm coaxial (IEC)
- Network LAN - RJ45 (for Freeview HD)*

TV Side

- CI: Common Interface
- USB
- Headphones: Stereo 3.5mm mini-jack

For 32PHS4x03, xxPFS5503

TV Rear

- HDMI 1 ARC: HDMI Audio Return Channel
- HDMI 2
- DIGITAL AUDIO OUT: SPDIF
- AUDIO IN (DVI): Stereo 3.5mm mini-jack
- SCART (RGB/CVBS): SCART adaptor
- TV ANTENNA: 75 ohm coaxial (IEC)
- Satellite

TV Side

- CI: Common Interface
- USB
- Headphones: Stereo 3.5mm mini-jack

For 32PHT4x03, xxPFT5503

TV Rear

- HDMI 1 ARC: HDMI Audio Return Channel
- HDMI 2
- DIGITAL AUDIO OUT: SPDIF
- AUDIO IN (DVI): Stereo 3.5mm mini-jack
- SCART (RGB/CVBS): SCART adaptor
- TV ANTENNA: 75 ohm coaxial (IEC)
- Network LAN - RJ45 (for Freeview HD)*

TV Side

- CI: Common Interface
- USB
- Headphones: Stereo 3.5mm mini-jack

* Network port is only for UK models

Display Type

Diagonal screen size

- 55 cm / 22 inch
- 60 cm / 24 inch
- 80 cm / 32 inch
- 108 cm / 43 inch

Display resolution

- 1366 x 768
- - PFx5403: 1920x1080
- **4503/4504 series TV**

Reception

For PxT series TV

- 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), HEVC*
- Digital audio playback (ISO/IEC 13818-3)

* Only for DVB-T2

For PxS series TV

- 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), HEVC*
- 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-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 burst mode, LNB current 300mA max

* Only for DVB-T2, DVB-S2

Sound

- Output power (RMS) :
  24” series: 6W
- Dolby Audio
- DTS 2.0+ Digital out ™

4503, 4203, 5503 series TV

- Output power (RMS) : 32" - 10W, 43"/50" - 16W
- Dolby Audio
- DTS 2.0+ Digital out ™

Multimedia

Supported USB file systems

- USB (FAT / FAT 32 / NTFS): only connect USB devices that consume 500 mA of power or less.

Playback formats

- Image Codec : JPEG, GIF, PNG, BMP
- Audio Codec: MP3, WAV, WMA (v2 up to v9.2), AC3, AAC, HE-AAC, DTS 2.0
- Video Codec: AVI, MKV, H.264/MPEG-4 AVC, MPEG1, MPEG2, MPEG4, WMV9/VC1, HEVC
- Subtitle: SRT, SMI, SSA, SUB, ASS, TXT

Power

- Mains power: AC 220-240V +/-10%
- Ambient temperature: 5°C to 35°C

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 60065 Ed.8.0).

2. Precautions, Notes, and Abbreviation List

2.1 Safety Instructions

Safety regulations require the following during a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
  1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
  2. Set the Mains/AC Power switch to the “on” position (keep the Mains/AC Power cord unplugged!).
  3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
  4. Switch “off” the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched “on”.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊓) aerial signal. Measure the voltages in the power supply section both in normal operation (◐) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.

2.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kΩ).
- Resistor values with no multiplier may be indicated with either an “E” or an “R” (e.g. 220E or 220R indicates 220 Ω).
- All capacitor values are given in micro-farads (μ = x10^{-6}), nano-farads (n = x10^{-9}), or pico-farads (p = x10^{-12}).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An “asterisk” (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed on the Philips Spare Parts Web Portal.

2.3.3 Spare parts

For the latest spare part overview, consult your Philips Spare Part web portal.

2.3.4 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: http://www.atyourservice-magazine.com. Select “Magazine”, then go to “Repair downloads”. Here you will find Information on how to deal with BGA-ICs.

BGA Temperature Profiles

For BGA-ICs, you must use the correct temperature-profile. Where applicable and available, this profile is added to the

IC Data Sheet information section in this manual.

2.3.5 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
  - To reach a solder-tip temperature of at least 400°C.
  - To stabilize the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to avoid mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

2.3.6 Alternative BOM identification

It should be noted that on the European Service website, “Alternative BOM” is referred to as “Design variant”.

The third digit in the serial number (example: AG2B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.

By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number “1” (example: AG1B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a “2” (example: AG2B0335000001), then the set has been produced according to B.O.M. no. 2. This is important for ordering the correct spare parts!

For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26= 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production centre (e.g. SN is Lysomice, RJ is Kobierzyce), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2010 week 10 / 2010 week 17). The 6 last digits contain the serial number.

Figure 3-1 Serial number (example)

2.3.7 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.

If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

2.3.8 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.

- **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

2.4 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV),6 = play 16 : 9 format, 12 = play 4 : 3 format
DNR	Digital Noise Reduction: noise reduction feature of the set
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that ontrols the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
AV	External Audio Video
AVC	Audio Video Controller
AVIP	Audio Video Input Processor
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BDS	Business Display Solutions (iTV)
BLR	Board-Level Repair
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue TeleteXT
C	Centre channel (audio)
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections
CL	Constant Level: audio output to connect with an external amplifier
CLR	Component Level Repair
ComPair	Computer aided rePair
CP	Connected Planet / Copy Protection
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DCM	Data Communication Module. Also referred to as System Card or Smartcard (for iTV).
DDC	See “E-DDC”
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFI	Dynamic Frame Insertion
DFU	Directions For Use: owner's manual
DMR	Digital Media Reader: card reader
DMSD	Digital Multi Standard Decoding
DNM	Digital Natural Motion
DRAM	Dynamic RAM
DRM	Digital Rights Management
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for service technicians
DTCP	Digital Transmission Content Protection; A protocol for protecting digital audio/video content that is traversing a high speed serial bus, such as IEEE-1394
DVB-C	Digital Video Broadcast - Cable
DVB-T	Digital Video Broadcast - Terrestrial
DVD	Digital Versatile Disc
DVI(-d)	Digital Visual Interface (d= digital only)
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information form the display.

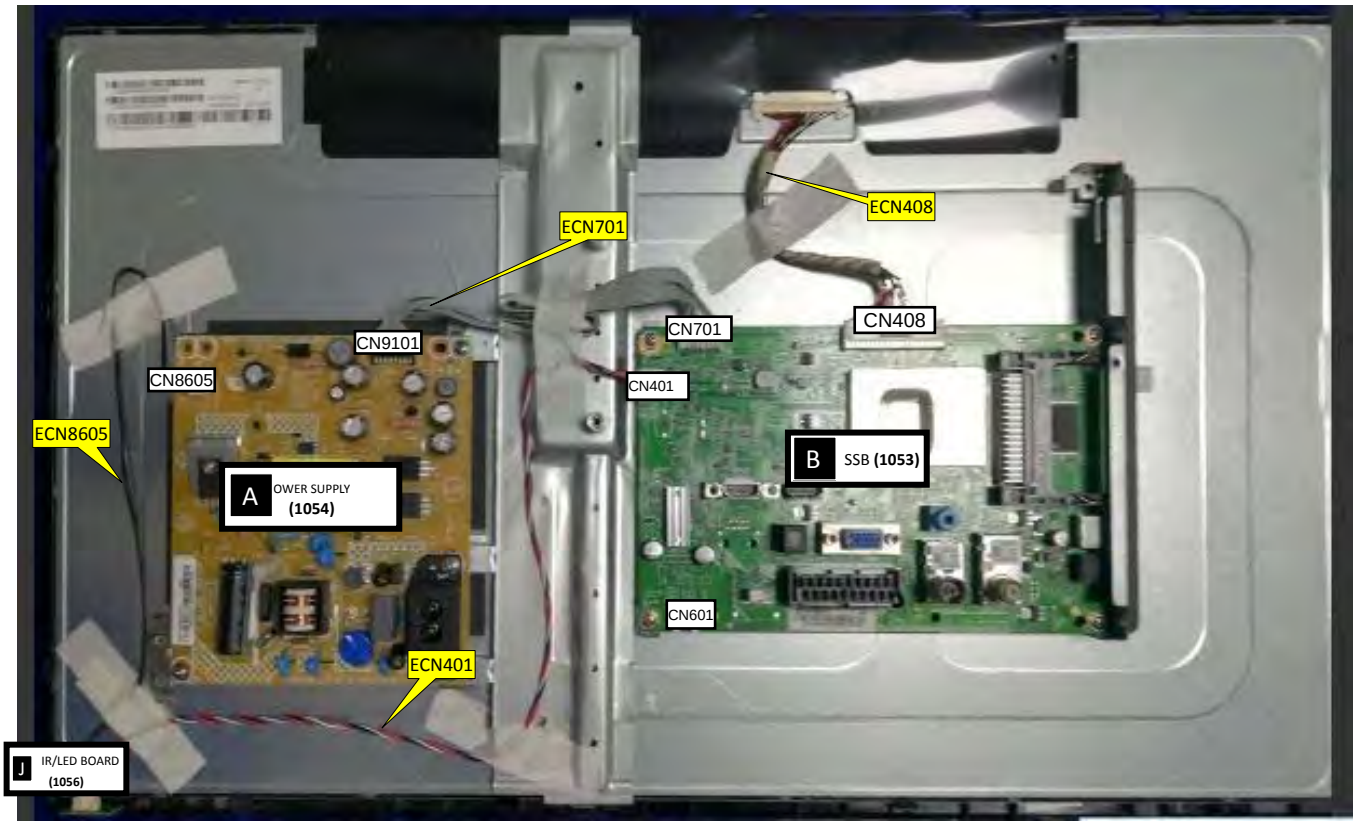
EDID	Extended Display Identification Data (VESA standard)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EMI	Electro Magnetic Interference
EPG	Electronic Program Guide
EPLD	Erasable Programmable Logic Device
EU	Europe
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FDS	Full Dual Screen (same as FDW)
FDW	Full Dual Window (same as FDS)
FLASH	FLASH memory
FM	Field Memory or Frequency Modulation
FPGA	Field-Programmable Gate Array
FTV	Flat TeleVision
Gb/s	Giga bits per second
G-TXT	Green TeleteXT
H	H_sync to the module
HD	High Definition
HDD	Hard Disk Drive
HDCP	High-bandwidth Digital Content Protection: A “key” encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a “snow vision” mode or changed to a low resolution. For normal content distribution the source and the display device must be enabled for HDCP “software key” decoding.
HDMI	High Definition Multimedia Interface
HP	HeadPhone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I^2C	Inter IC bus
I^2D	Inter IC Data bus
I^2S	Inter IC Sound bus
IF	Intermediate Frequency
IR	Infra Red
IRQ	Interrupt Request
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video. Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
iTV	Institutional TeleVision; TV sets for hotels, hospitals etc.
LS	Last Status; The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences
LATAM	Latin America
LCD	Liquid Crystal Display
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LPL	LG.Philips LCD (supplier)
LS	Loudspeaker
LVDS	Low Voltage Differential Signalling
Mbps	Mega bits per second
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonly used as a language to describe interactive television services
MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
MOP	Matrix Output Processor
MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
MPEG	Motion Pictures Experts Group
MPIF	Multi Platform InterFace
MUTE	MUTE Line
MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTC	Negative Temperature Coefficient, non-linear resistor

NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non-Volatile Memory: IC containing TV related data such as alignments
O/C	Open Circuit
OSD	On Screen Display
OAD	Over the Air Download. Method of software upgrade via RF transmission. Upgrade software is broadcasted in TS with TV channels.
OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
P50	Project 50: communication protocol between TV and peripherals
PAL	Phase Alternating Line. Color system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit Board (same as “PWB”)
PCM	Pulse Code Modulation
PDP	Plasma Display Panel
PFC	Power Factor Corrector (or Pre-conditioner)
PIP	Picture In Picture
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)
POR	Power On Reset, signal to reset the uP
PSDL	Power Supply for Direct view LED backlight with 2D-dimming
PSL	Power Supply with integrated LED drivers
PSLS	Power Supply with integrated LED drivers with added Scanning functionality
PTC	Positive Temperature Coefficient, non-linear resistor
PWB	Printed Wiring Board (same as “PCB”)
PWM	Pulse Width Modulation
QRC	Quasi Resonant Converter
QTNR	Quality Temporal Noise Reduction
QVCP	Quality Video Composition Processor
RAM	Random Access Memory
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.
RC	Remote Control
RC5 / RC6	Signal protocol from the remote control receiver
RESET	RESET signal
ROM	Read Only Memory
RSDS	Reduced Swing Differential Signalling data interface
R-TXT	Red TeleteXT
SAM	Service Alignment Mode
S/C	Short Circuit
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs
SCL	Serial Clock I^2C
SCL-F	CLock Signal on Fast I^2C bus
SD	Standard Definition
SDA	Serial Data I^2C
SDA-F	DAta Signal on Fast I^2C bus
SDI	Serial Digital Interface, see “ITU-656”
SDRAM	Synchronous DRAM
SECAM	SEequence Couleur Avec Mémoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SMPS	Switched Mode Power Supply
SoC	System on Chip
SOG	Sync On Green
SOPS	Self Oscillating Power Supply
SPI	Serial Peripheral Interface bus; a 4-wire synchronous serial data link standard
S/PDIF	Sony Philips Digital InterFace
SRAM	Static RAM
SRP	Service Reference Protocol
SSB	Small Signal Board
SSC	Spread Spectrum Clocking, used to reduce the effects of EMI
STB	Set Top Box
STBY	STand-BY
SVGA	800 × 600 (4:3)
SVHS	Super Video Home System
SW	Software
SWAN	Spatial temporal Weighted Averaging Noise reduction
SXGA	1280 × 1024

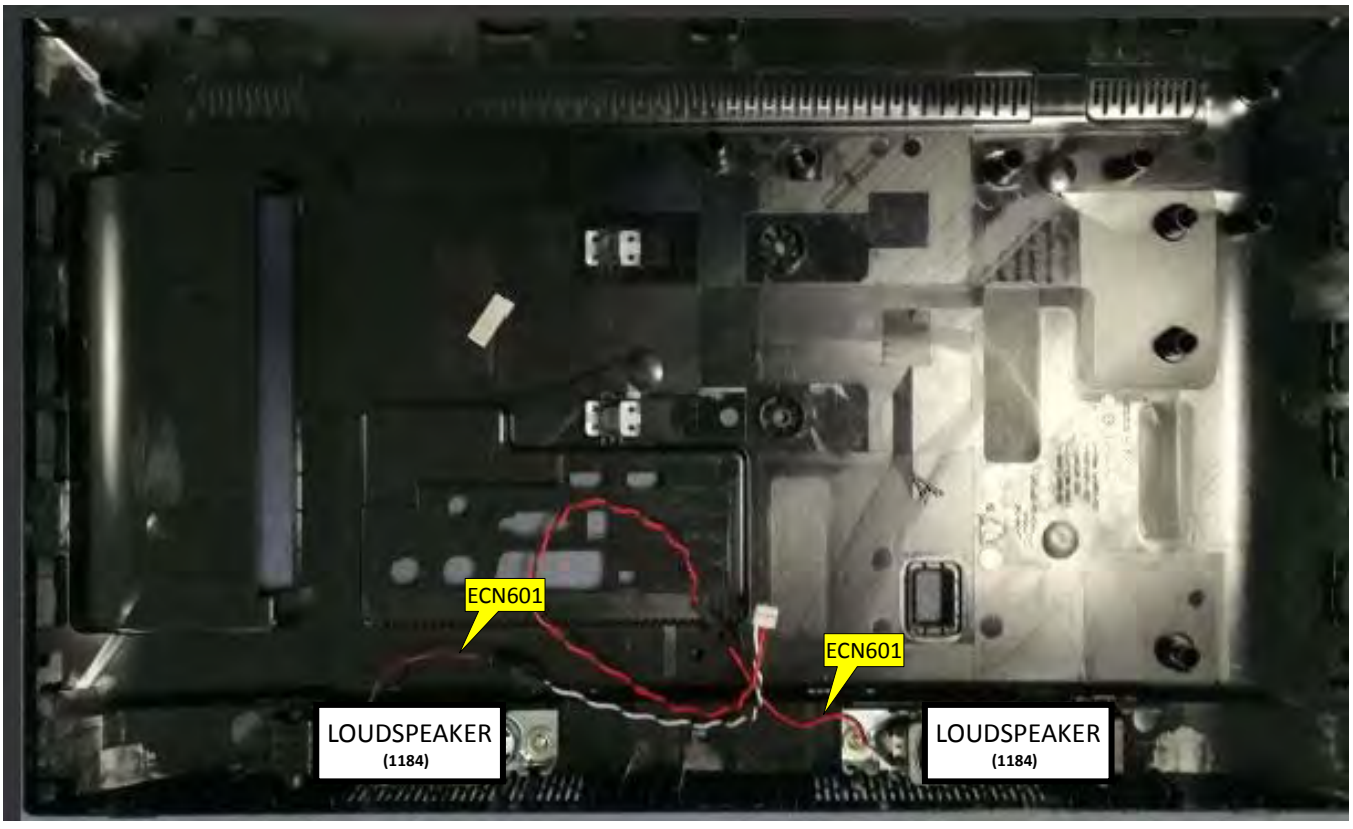
TFT	Thin Film Transistor
THD	Total Harmonic Distortion
TMDS	Transmission Minimized Differential Signalling
TS	Transport Stream
TXT	TeleteXT
TXT-DW	Dual Window with TeleteXT
UI	User Interface
uP	Microprocessor
UXGA	1600 × 1200 (4:3)
V	V-sync to the module
VESA	Video Electronics Standards Association
VGA	640 × 480 (4:3)
VL	Variable Level out: processed audio output toward external amplifier
VSB	Vestigial Side Band; modulation method
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
WXGA	1280 × 768 (15:9)
XTAL	Quartz crystal
XGA	1024 × 768 (4:3)
Y	Luminance signal
Y/C	Luminance (Y) and Chrominance (C) signal
YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
YUV	Component video

3. Mechanical Instructions

3.1 Cable Dressing

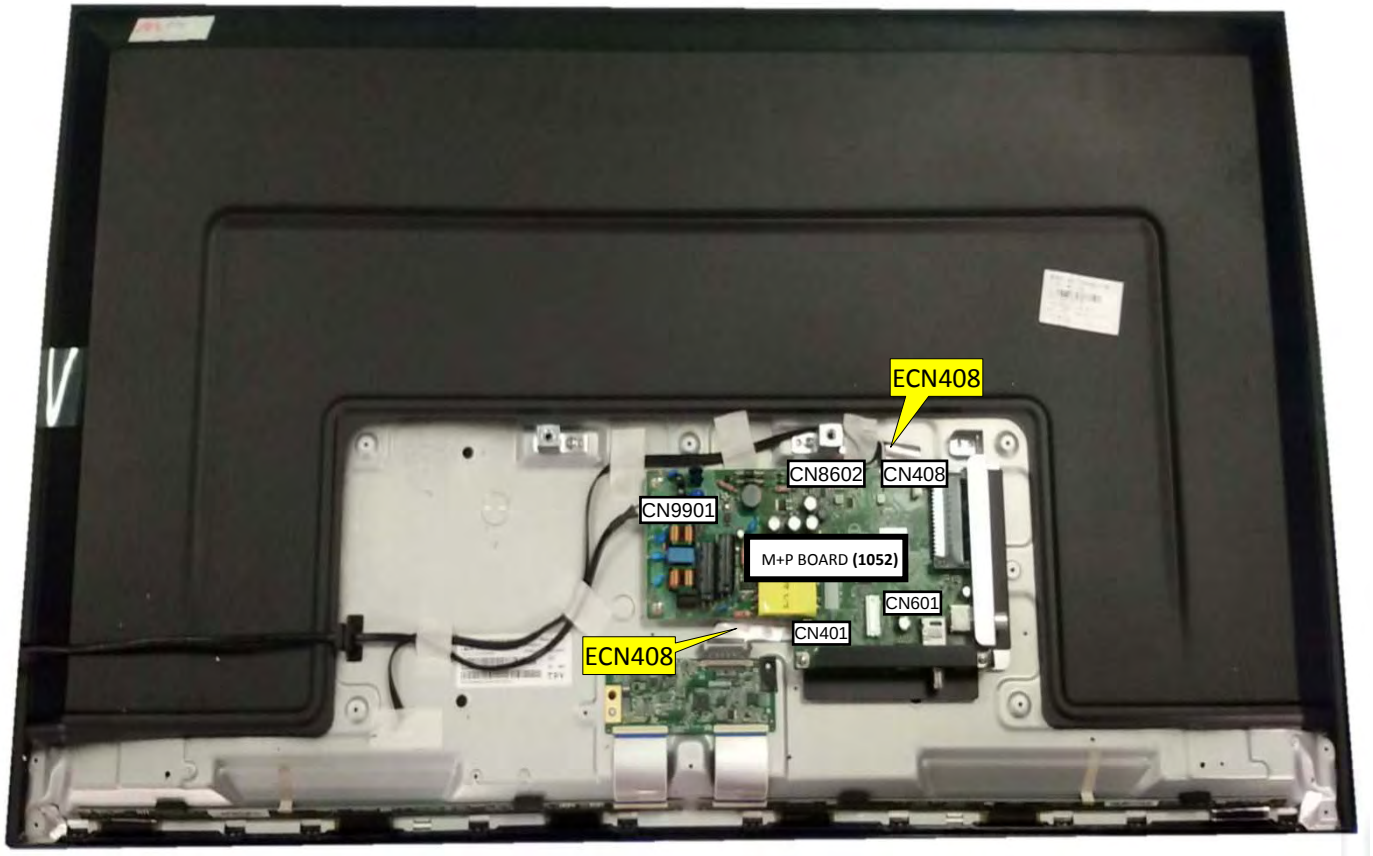


Cable dressing (24" series)

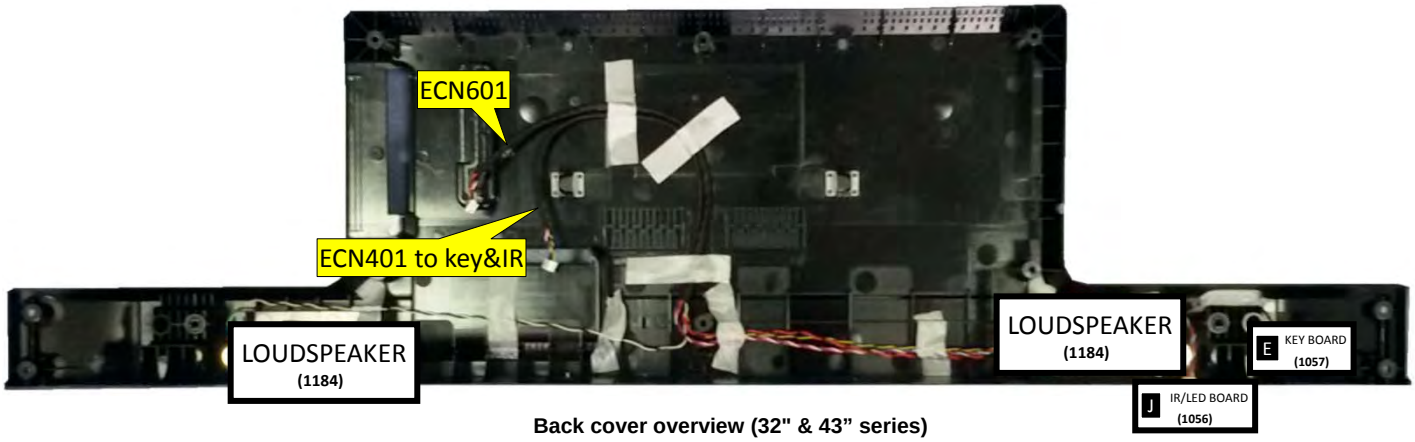


Back cover overview (24" series)

Cable dressing (32" series)



Cable dressing (43" series)



Back cover overview (32" & 43" series)

3.2 Assembly/Panel Removal

3.2.1 Stand removal

Notes: Figures below can deviate slightly from the actual situation due to the different set executions.

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

(22"/24" series)

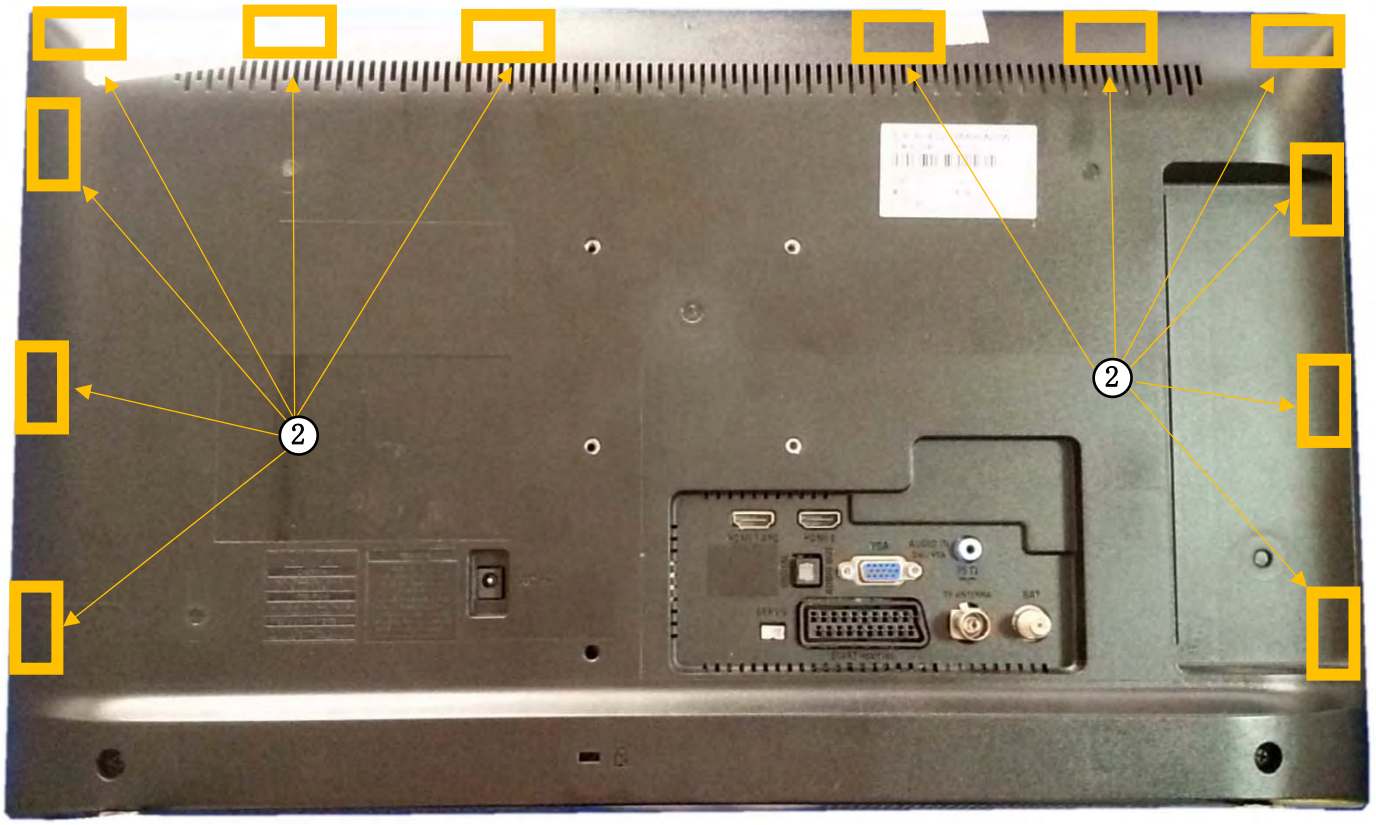
(32"&43" series)

3.2.2 Rear Cover

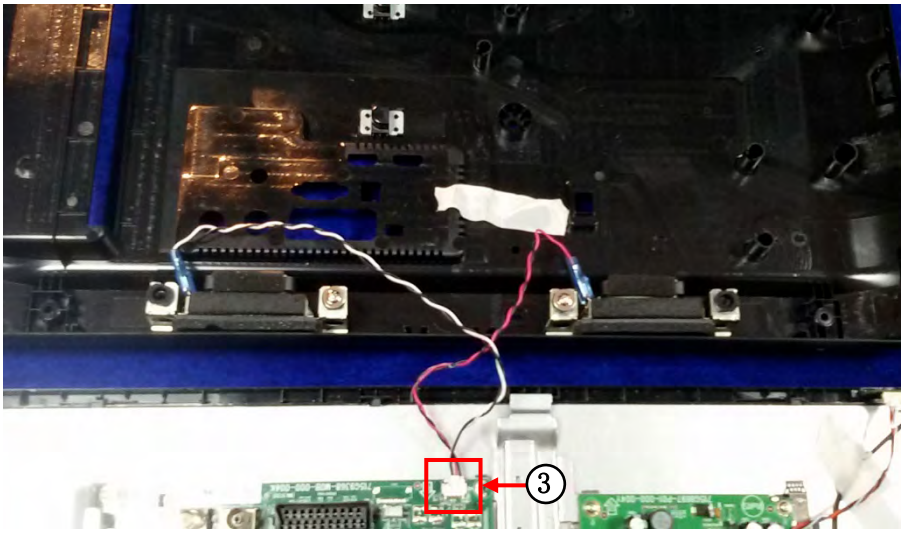
Warning: Disconnect the mains power cord before removing the rear cover.

22"/24" series

1. Releasing the clips carefully at the indicated areas [2] that secure the back cover.
2. Unplug connector [3] carefully, as the speaker is catch on back cover.
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.

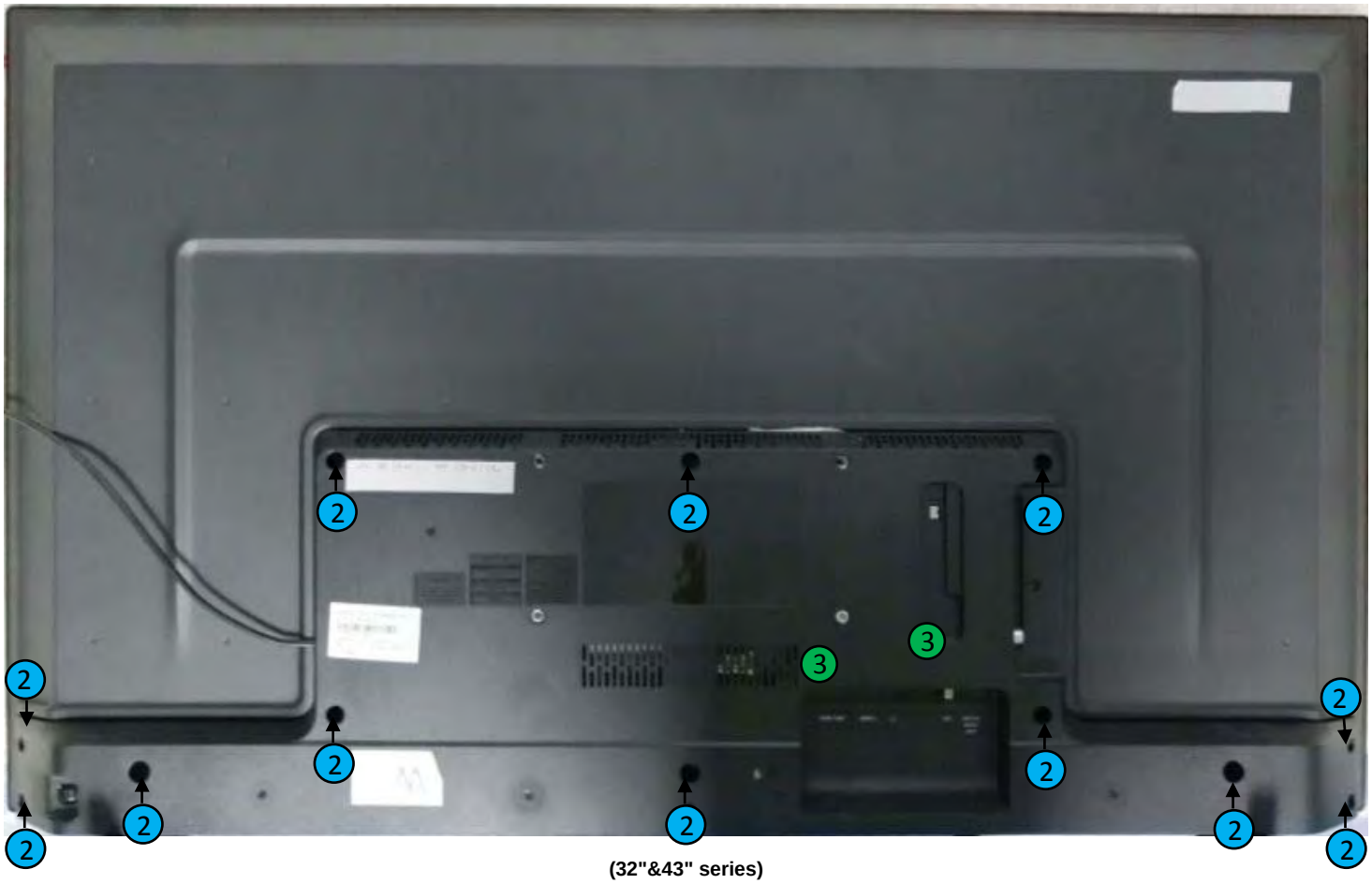


(22"/24" series)



32” 4503, 43/50” 5503 Series:

1. Remove all fixation screws [2] and [3] that secure the Back cover assy.
2. Unplug the connector [2] that marked by red box below 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.



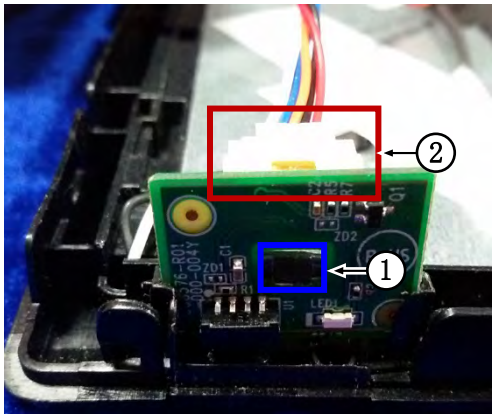
(32"&43" series)

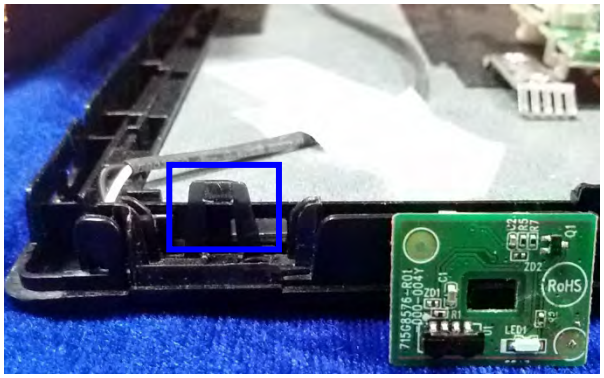
3.2.3 IR board Control Unit

22"/24" series

1. Unplug the connector [2] from the IR board.
2. Press the snap that marked by blue box below backward then take out the IR board.

When defective, replace the whole unit.





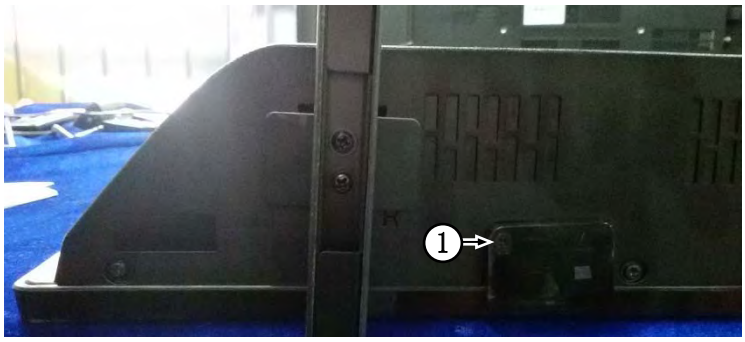
32” 4503/4504, 43” 5503 Series:

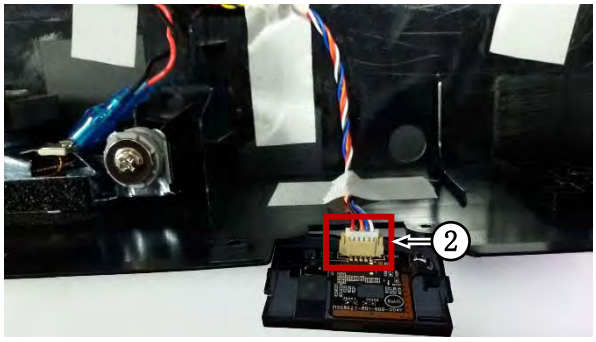
1. Unplug the connector from the SSB.

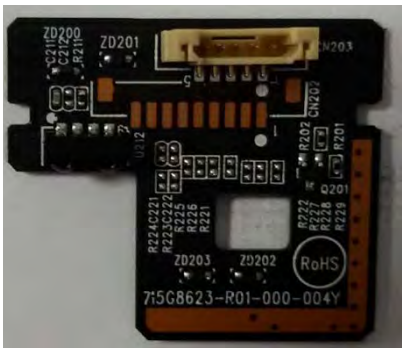
   Caution: be careful, as these are very fragile connectors!

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

When defective, replace the whole unit.



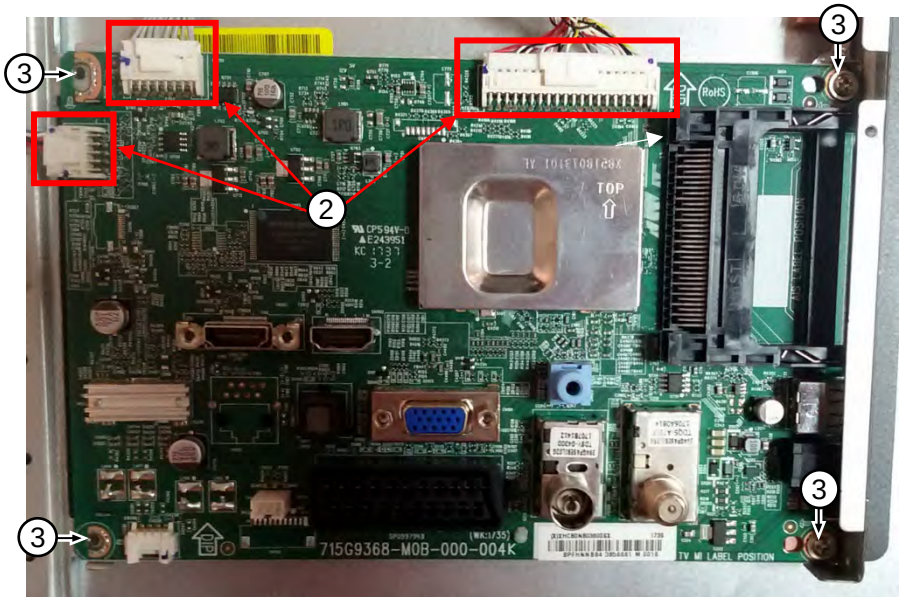




3.2.4 Small Signal Board (SSB)

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. Unplug all connectors [2] from the SSB.
2. Remove all the fixation screws [3] from the SSB.
3. 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 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.

3.2.7 LCD Panel

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

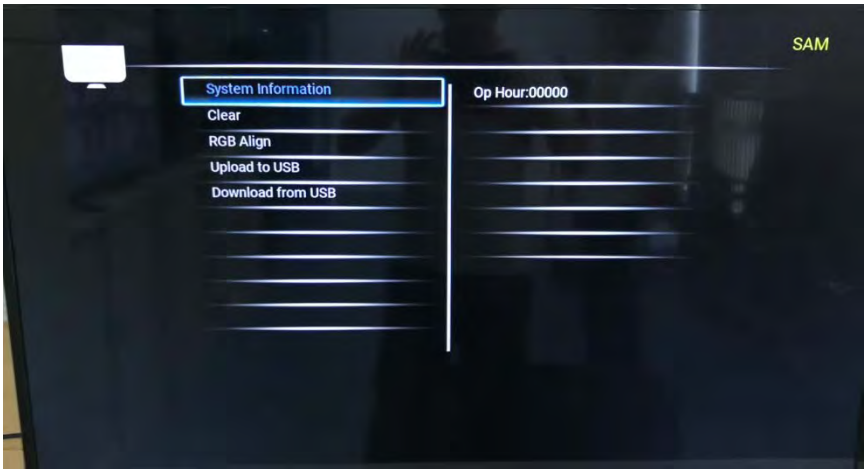
Use one of the following methods:

- 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

(24" series)



(32"&43" series)

Remark: Press following Key Combination to reset the "OP Hour": "**Menu/Home**" + "**101011**" on the remote control transmitter.

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.

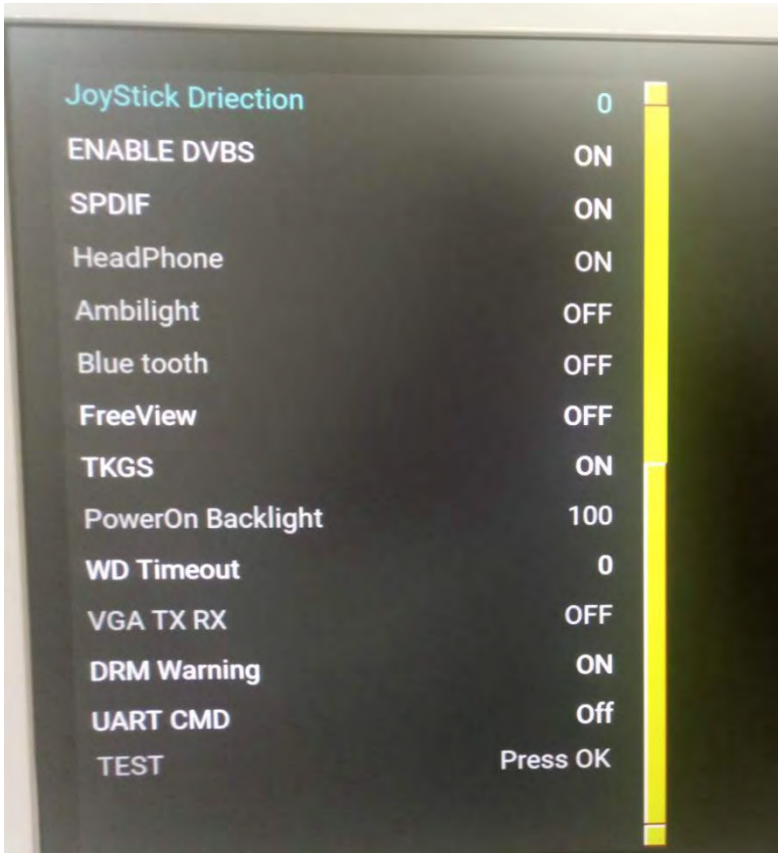
How to Activate the Factory mode

To activate the Factory mode, use the following method:

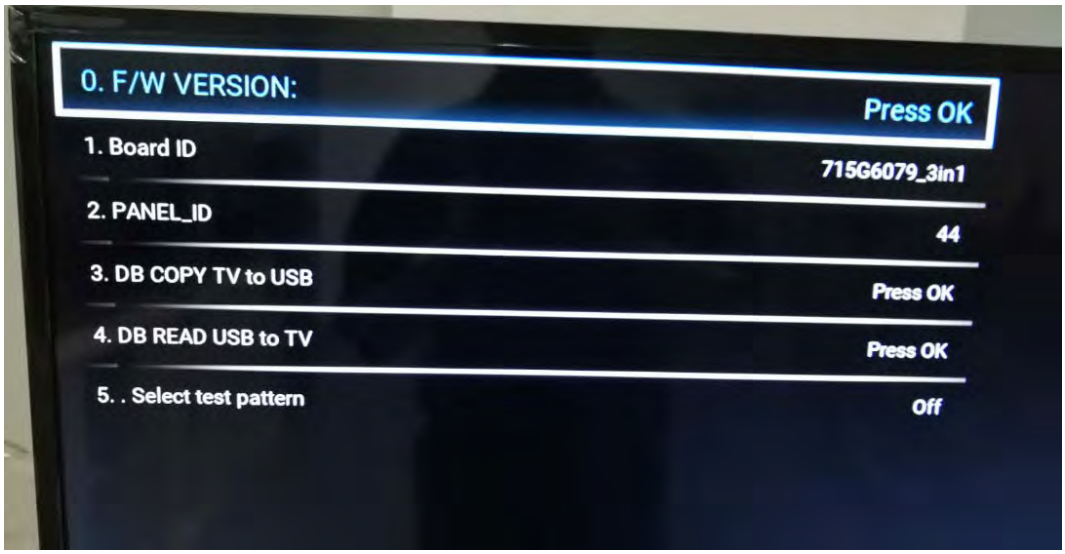
- Press the following key sequence on the remote control transmitter: from the **"Menu/Home"** press **"1999"**, directly followed by the **"Back/Return"** button. Do not allow the display to time out between entries while keying the sequence.

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



(22"/24" series)



(32"&43" series)

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

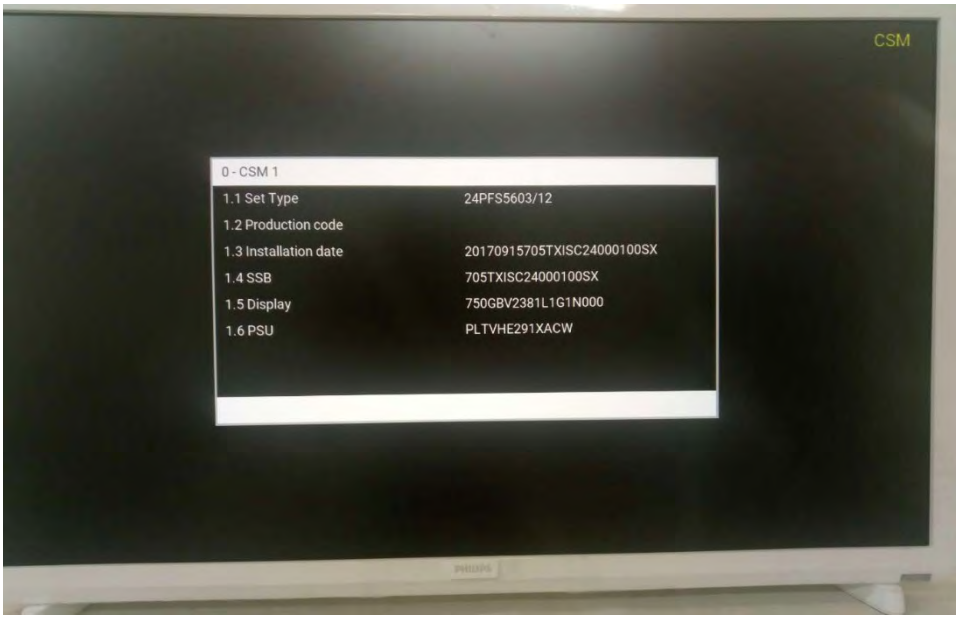
- Ignore “Service unfriendly modes”.
- Line number for every
  line (to make CSM language independent).
- Set the screen mode to full
  screen (all contents on screen is visible).
- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use “CH+” or “CH-” for channel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

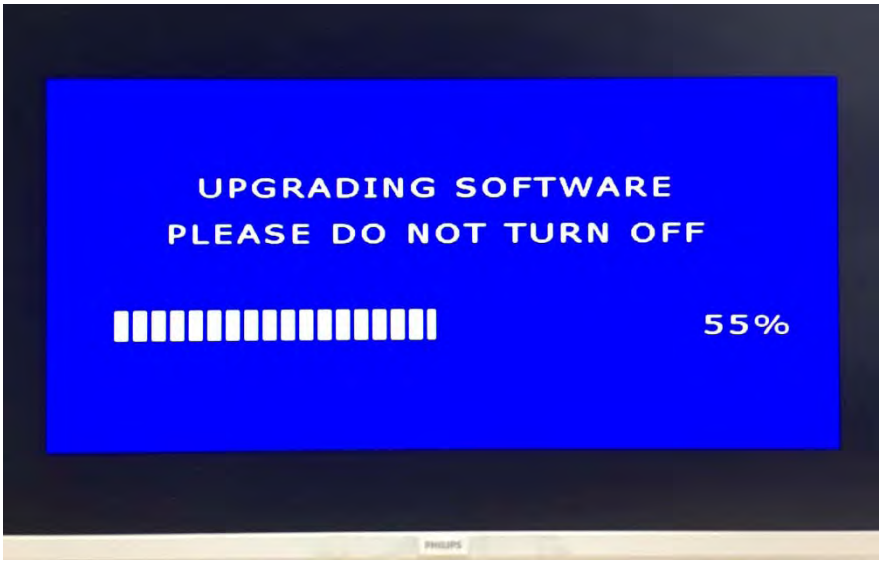
To exit CSM, use one of the following methods.

- 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

5.1.1. The following update is for .pkg file.

1. Rename the file to “upgrade_loader.pkg”.
2. Prepare a USB memory (File format: FLAT, Size: 1G~8G).
3. Copy the software to USB flash disk (root directory).
4. Switch off the TV and Insert the USB memory stick that contains the software update files in one of the TV’s USB 2.0 port.
5. Switch on the TV. The TV will detect the USB memory stick automatically. Then a window jumps out as below:



6. When the TV software is updated, the TV will turn on again automatically. Remove your USB flash drive.
7. We can enter in CSM to check the current software version.

5.1.2. The following update is for .upg file.

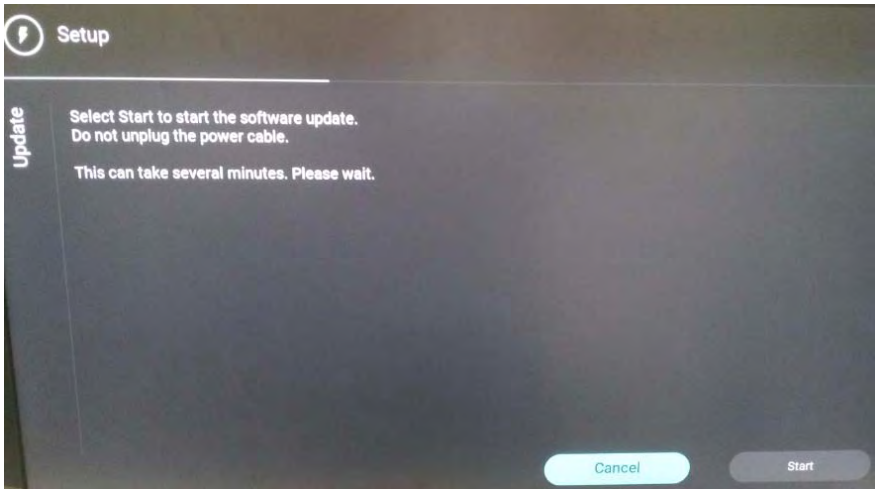
Step 1: Ready for F/W Upgrade

1. Rename the file to “Autorun.upg”.
2. Prepare a USB memory (File format: FLAT, Size: 1G~8G).
3. Copy the software to USB flash disk (root directory).

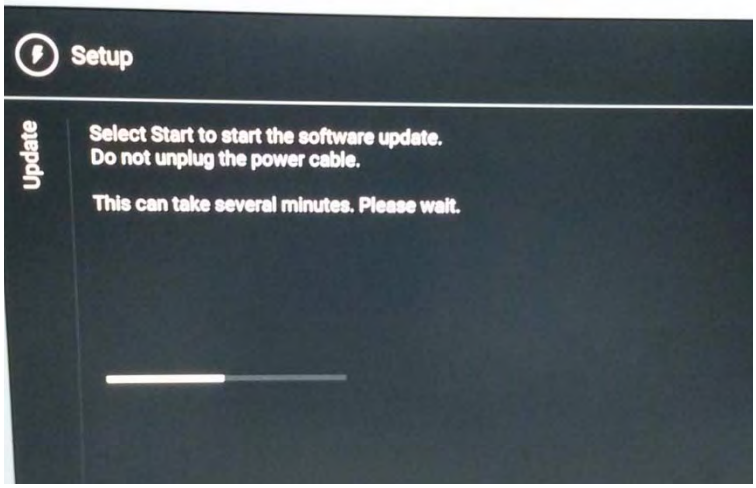
Note the version of this F/W before you change the software file name.

Step 2: F/W Upgrade

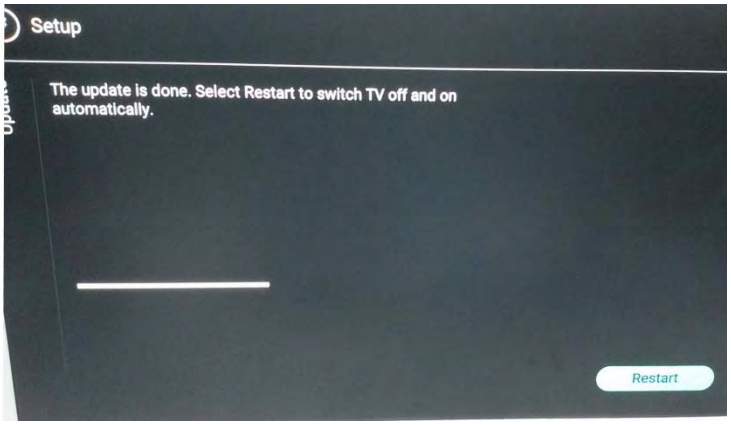
1. Plug the USB memory on the TV’s USB 2.0 port.
2. AC on (Power plug).
3. Press [Start] to start software upgrade



4. Upgrade in progress.

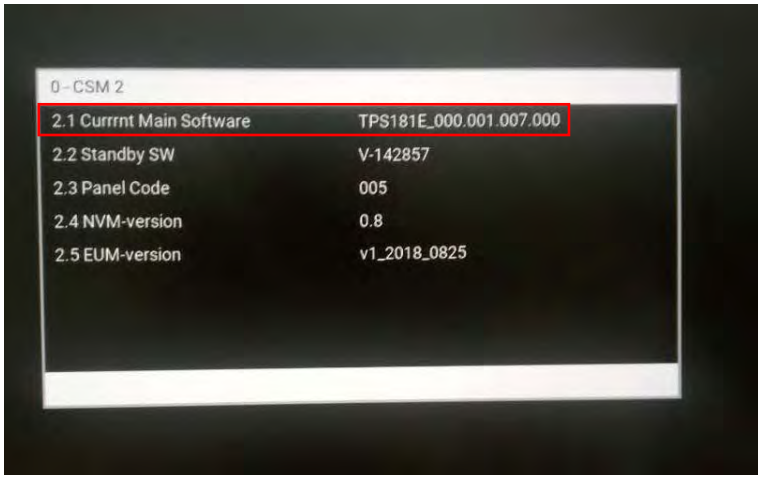


5. After software upgrade complete, select [Restart] to reboot TV.



Step 3: Check the SW version

1. After burning software, TV will restart.
2. Press “123654”, enter Customer Service 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!

5.1 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	LM75	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.

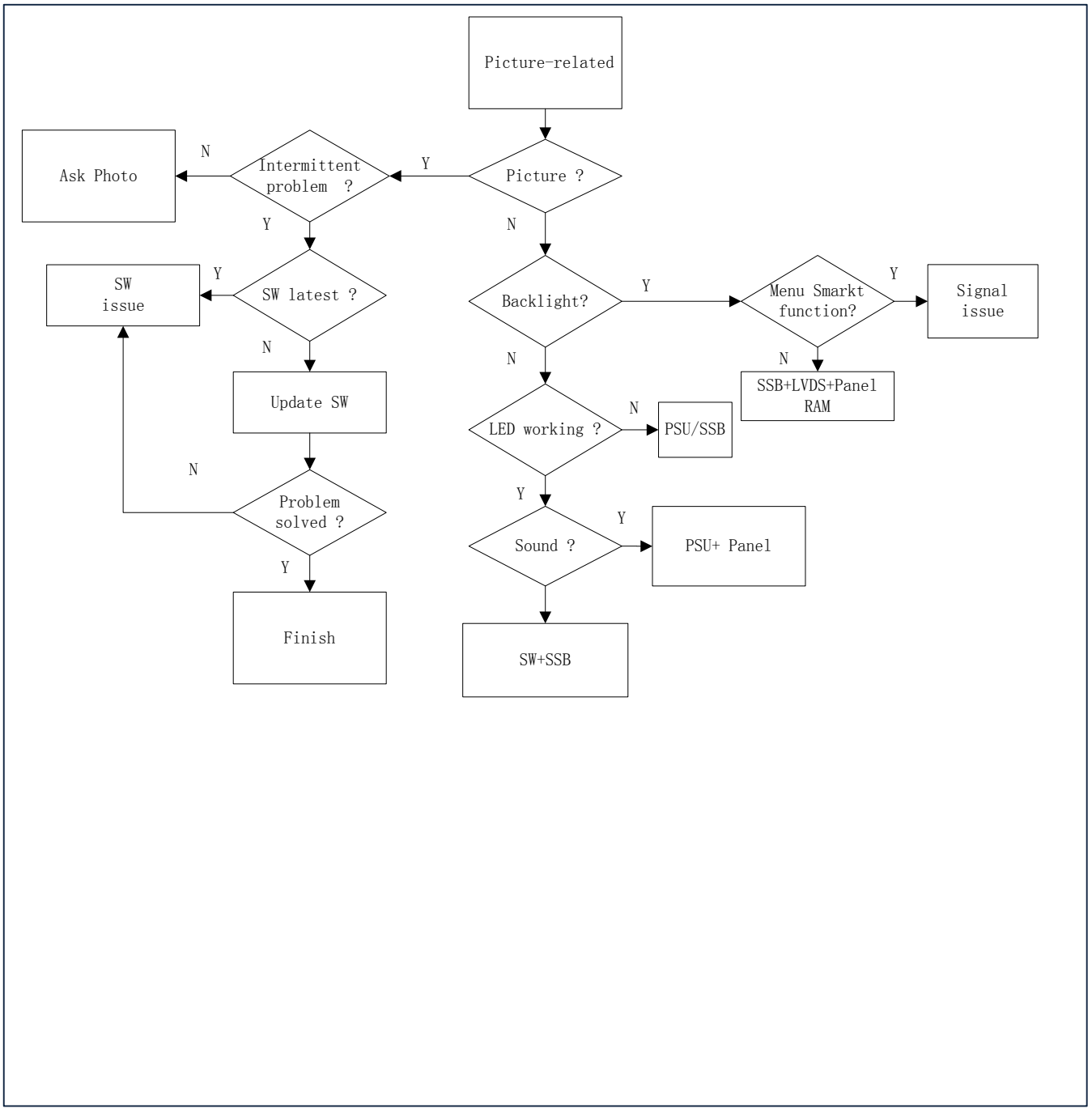
• If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

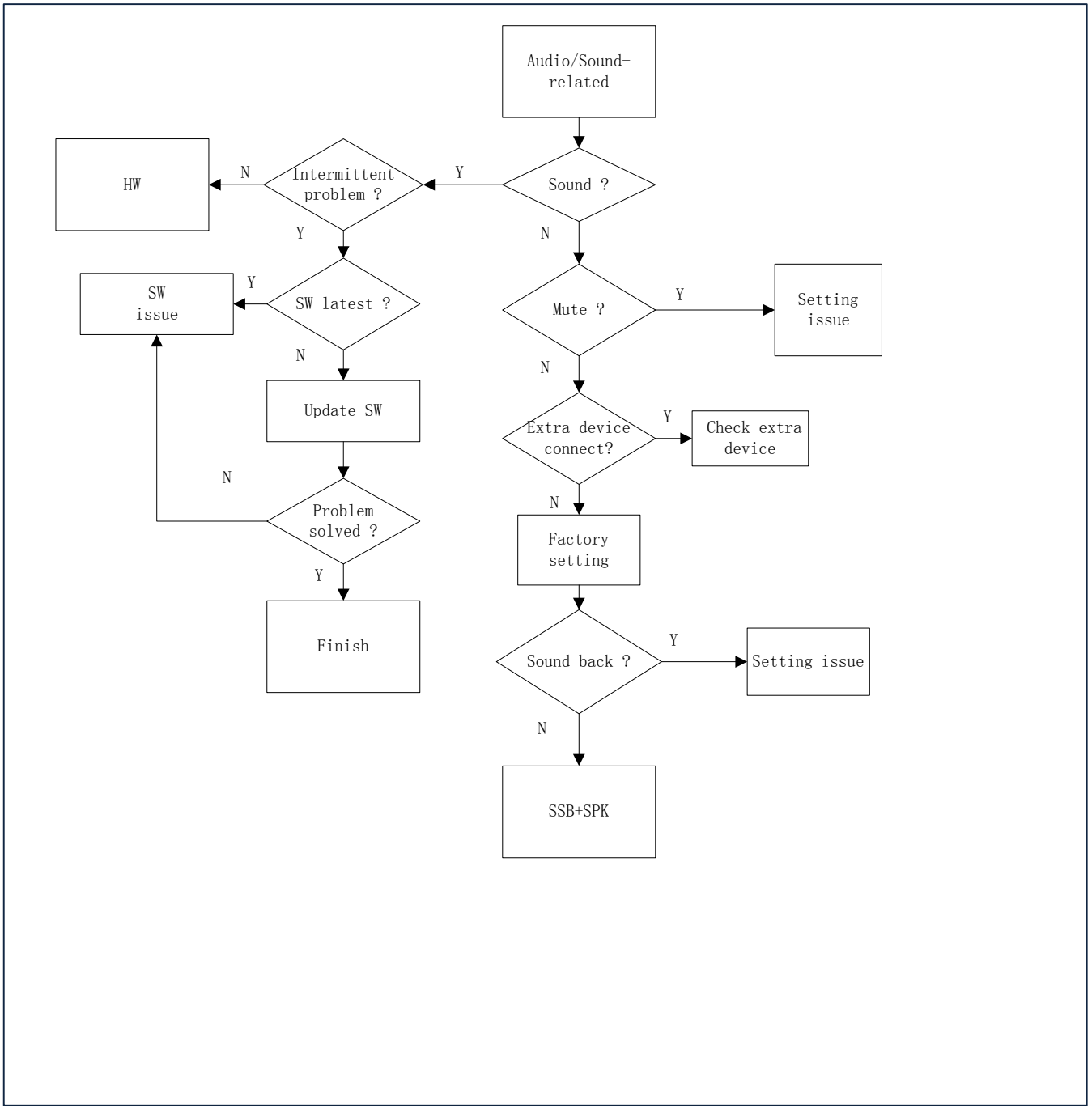
Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.2 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.

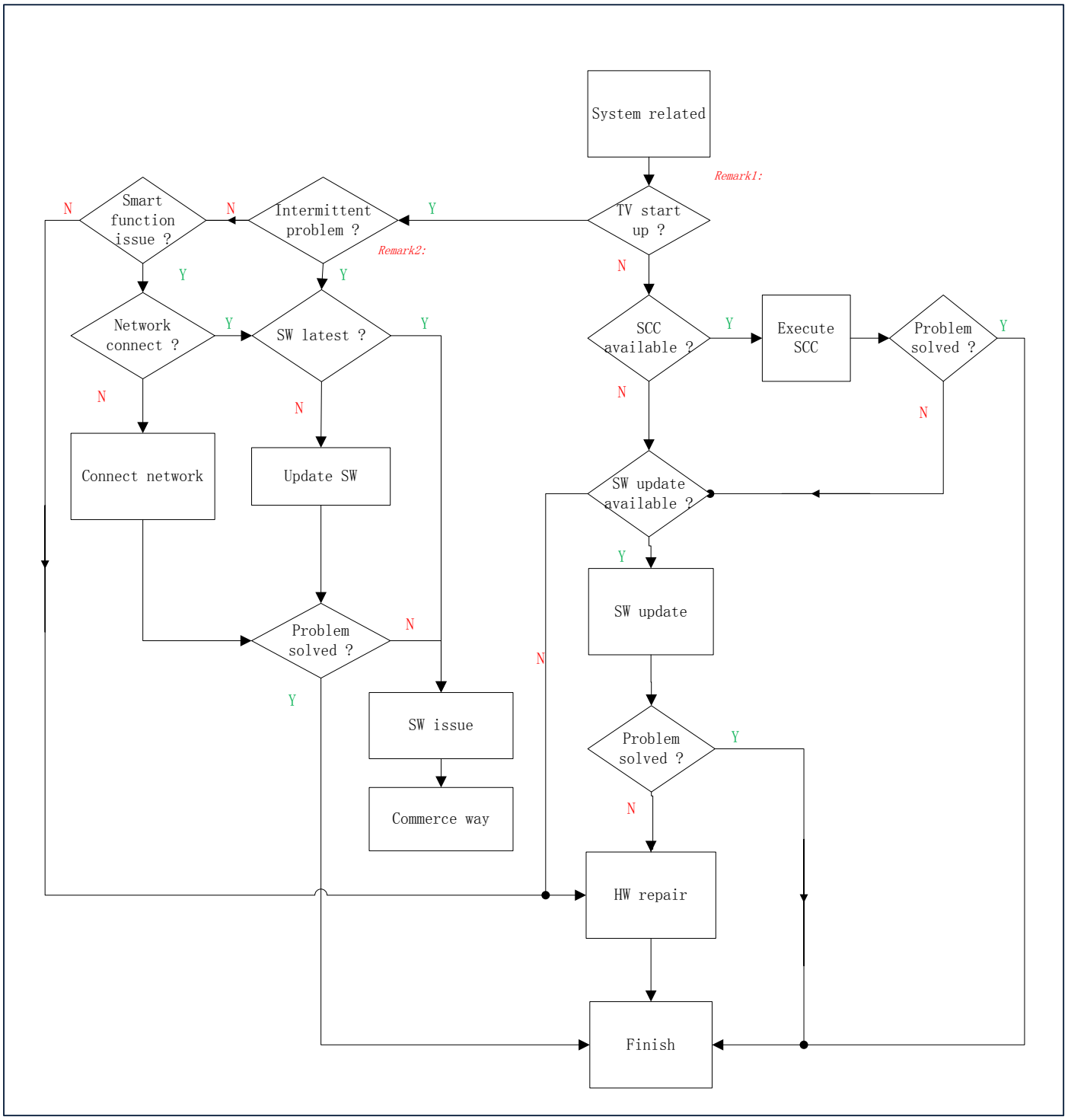
CTN_ALT BOM#	Panel Type	Display Code
22PFS5304/60	TPT215WF1-HVN01.U 102C	10
24PHS4304/12	TPM236WH2-WHBN00.K 5947	17
24PHS4304/12	TPM236WH2-WHBN00.K S5941C	17
24PHS4304/60	TPM236WH2-WHBN00.K S5941C	17
24PHS4354/12	TPM236WH2-WHBN00.K (Rev.5946)	17
24PHT4304/05	TPM236WH2-WHBN00.K 5947	17
24PHT4354/05	TPM236WH2-WHBN00.K (Rev.5946)	17
32PHS4503/12	TPT320B5-DXJSMM.G S3A	12
32PHS4503/12	TPT320B5-H1F01.D S03A	20
32PHS4503/12	TPT320B5-H1F01.D S02K	20
32PHS4504/12	TPT320B5-H1F01.D S03B	20
32PHT4503/12	TPT320B5-DXJSMM.G S3A	12
32PHT4503/12	TPT320B5-H1F01.D S03A	20
32PHT4503/12	TPT320B5-H1F01.D S02K	20
32PHT4504/05	TPT320B5-H1F01.D S03B	20
32PHT4504/05	TPT320B5-H1F01.D S02M	20
43PFS5503/12	TPT430H3-FHBN10.K SA8BU	13
43PFT5503/12	TPT430H3-FHBN10.K SA8BU	13


Picture-related
Picture ?
Y
Intermittent problem ?
N
Ask Photo
Y
SW latest ?
Y
SW issue
N
Update SW
N
Problem solved ?
Y
Finish
N
Backlight?
Y
Menu Smarkt function?
Y
Signal issue
N
SSB+LVDS+Panel RAM
N
LED working ?
N
PSU/SSB
Y
Sound ?
Y
PSU+ Panel
SW+SSB


Audio/Sound-related
Sound ?
Y
Intermittent problem ?
N
HW
Y
SW latest ?
Y
SW issue
N
Update SW
Problem solved ?
N
Y
Finish
N
Mute ?
Y
Setting issue
N
Extra device connect?
Y
Check extra device
N
Factory setting
Sound back ?
Y
Setting issue
N
SSB+SPK

Trouble shooting system

2016/12/11



Remark1 : What is System related issue ?

1.Permanent reboots
2.Intermittent reboots
3.No function, no standby LED (set dead)
4.No function, blinking LED
5.Set freezes, intermittently
6.Slow response to user interaction
7.Switches ON by itself
8.Switches Off by itself
9.Stuck in standby mode / unable to start up
10.Stuck on PHILIPS / ANDROID logo
11.CAM not recognized by TV
12.CAM authentication issue
13.Misc CAM issue
14.IP-EPG issues
15.BC-EPG issues
16.PVR issues w/ BC-EPG
17.PVR issues w/ IP-EPG
18.PVR issues / generic
19.EDFU-related issue
20.Features not available in UI / cannot be activated

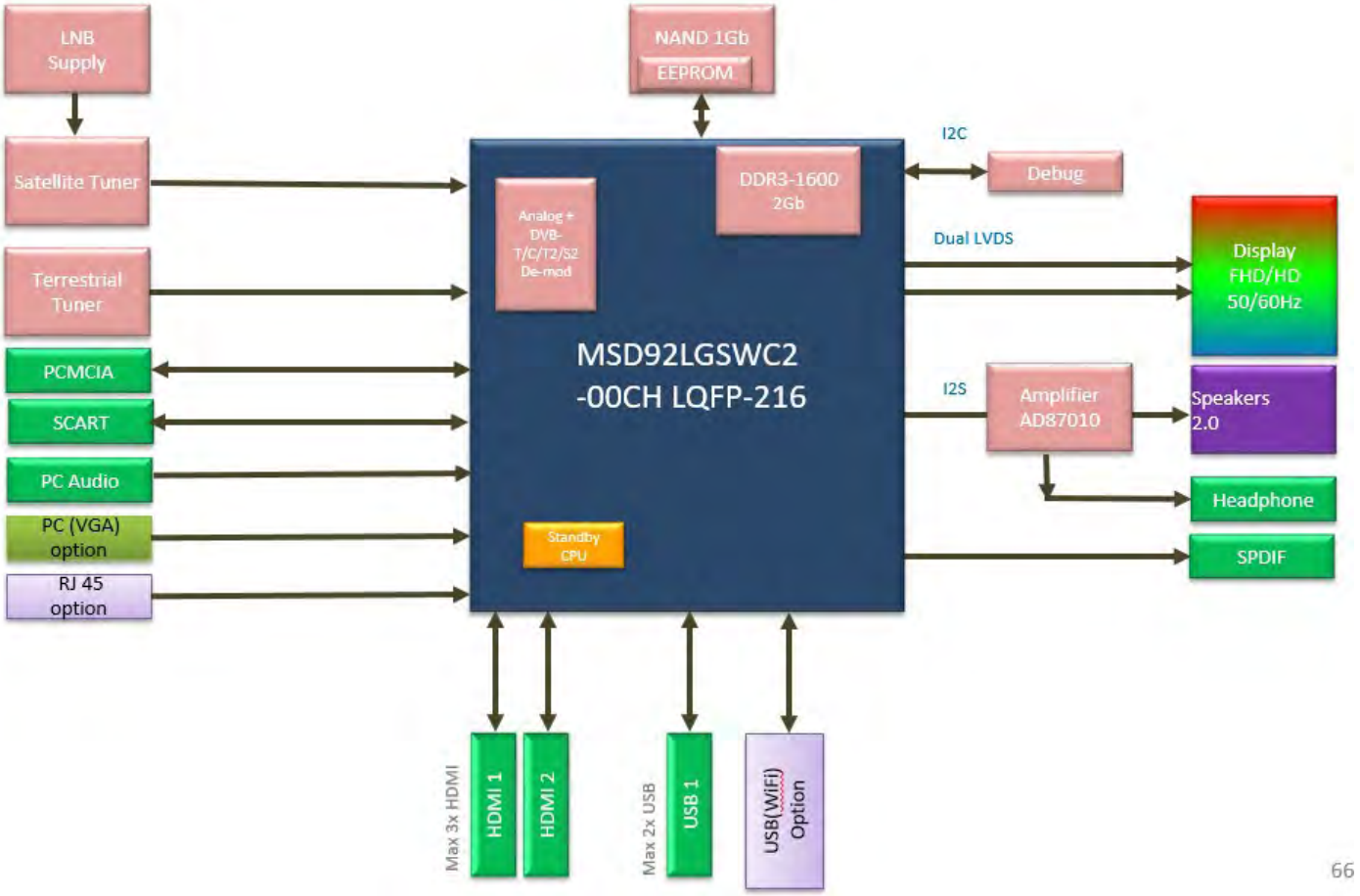
Remark2 : How to judge intermittent issue ?

1.When the problem happened can be solved by:
1)AC off AC on
2)DC off DC on
3)RC switch different source

2.The problem intermittent happened

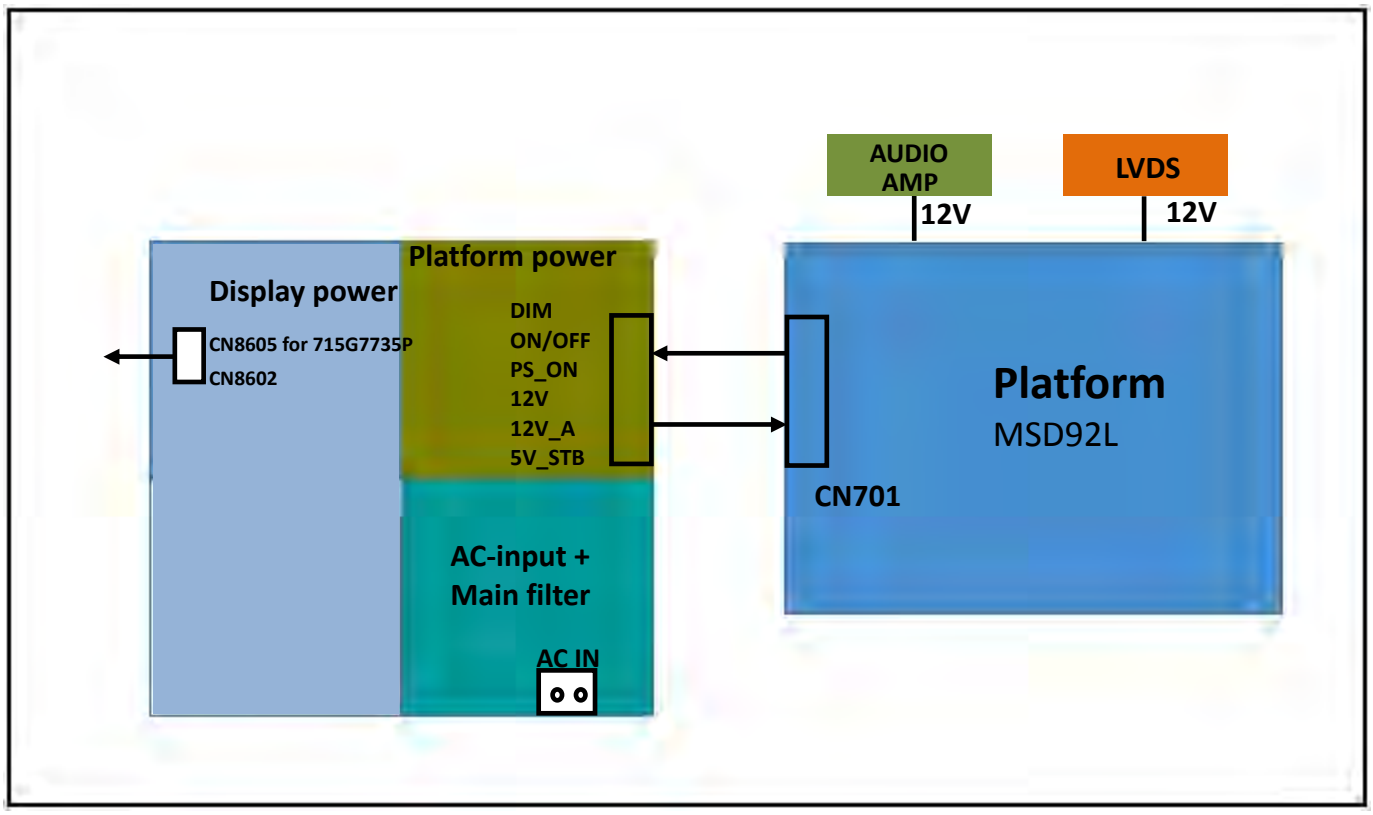
Electrical Diagram

7.1 Block diagram



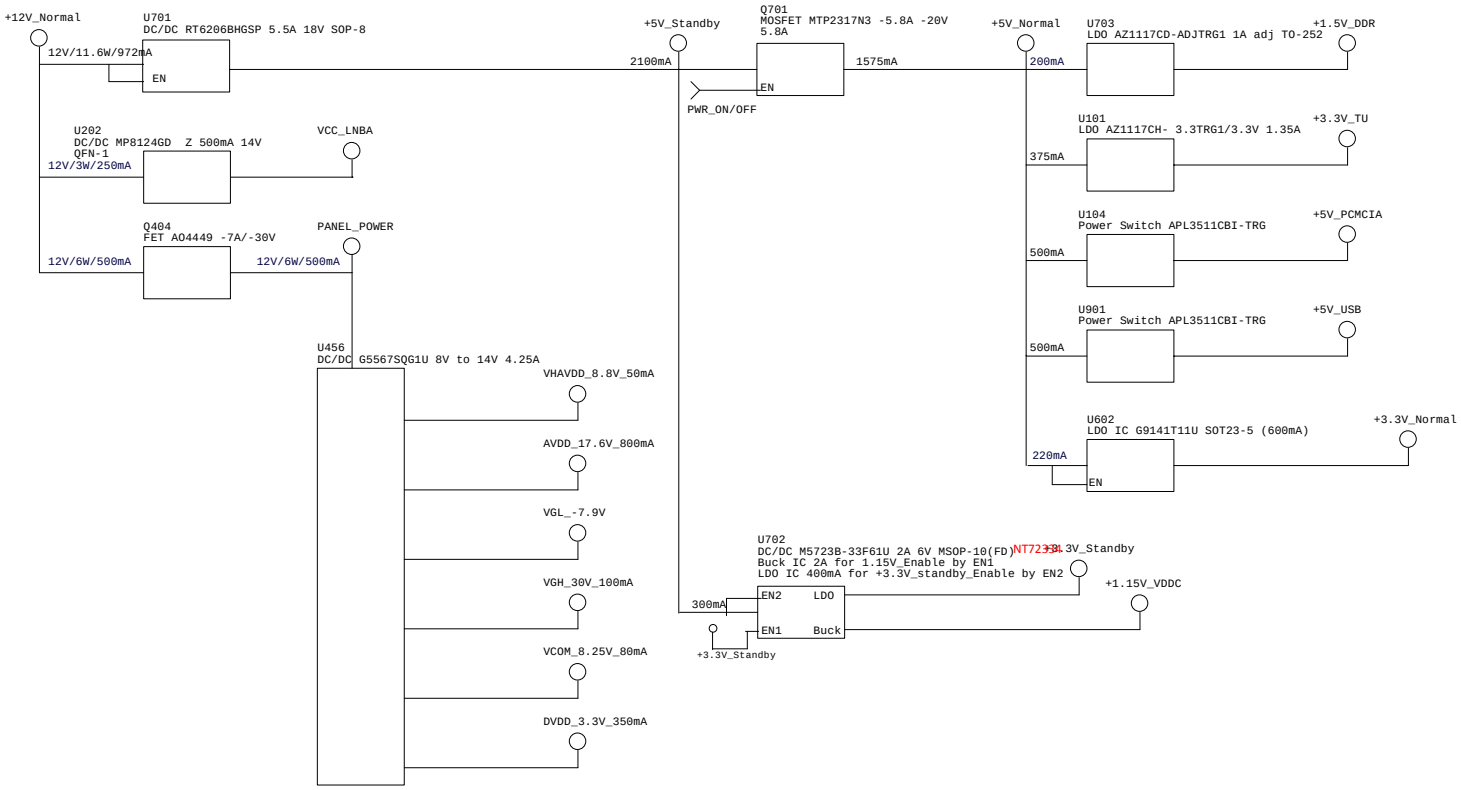
7.2 Power Supply

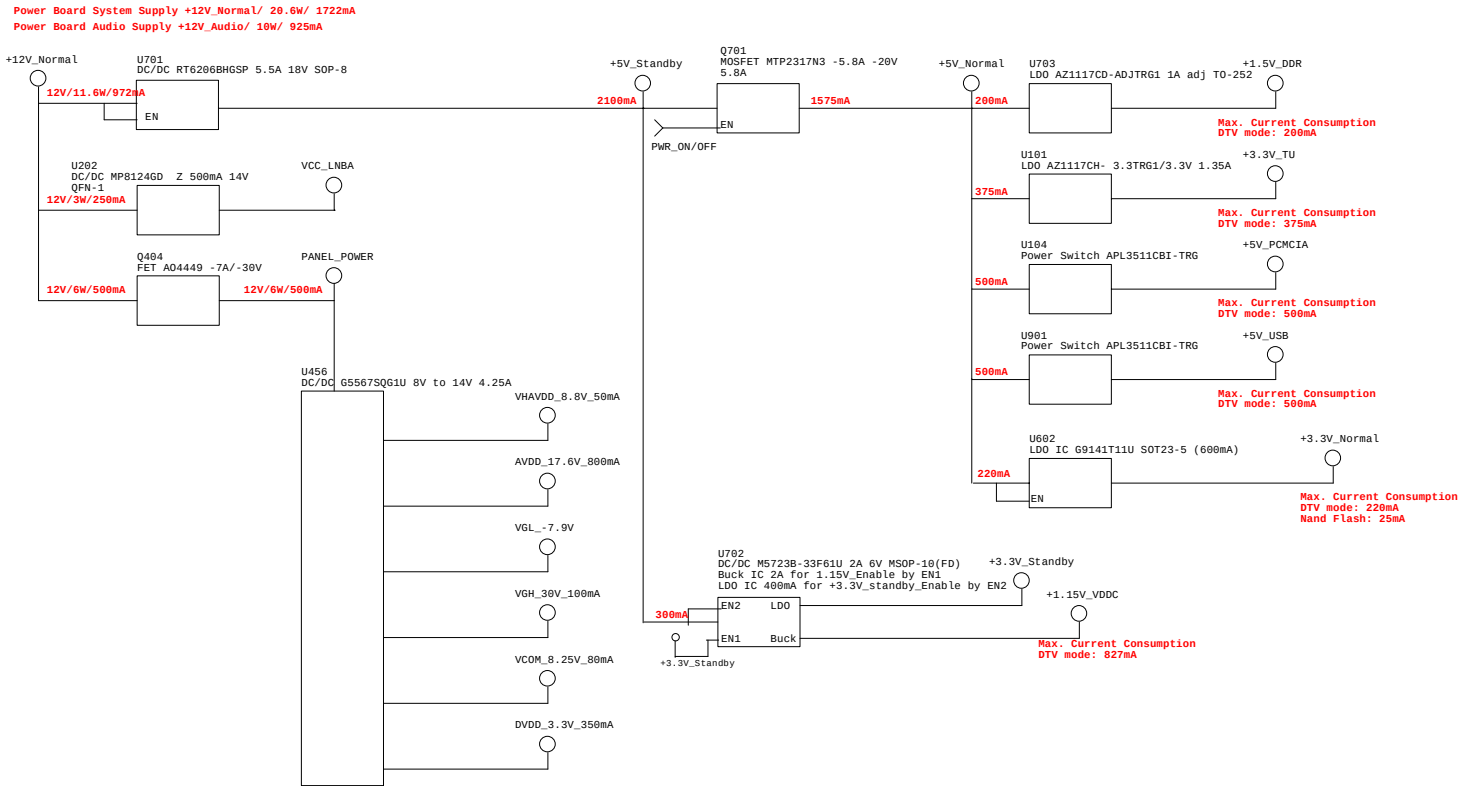
Power architecture of this platform:



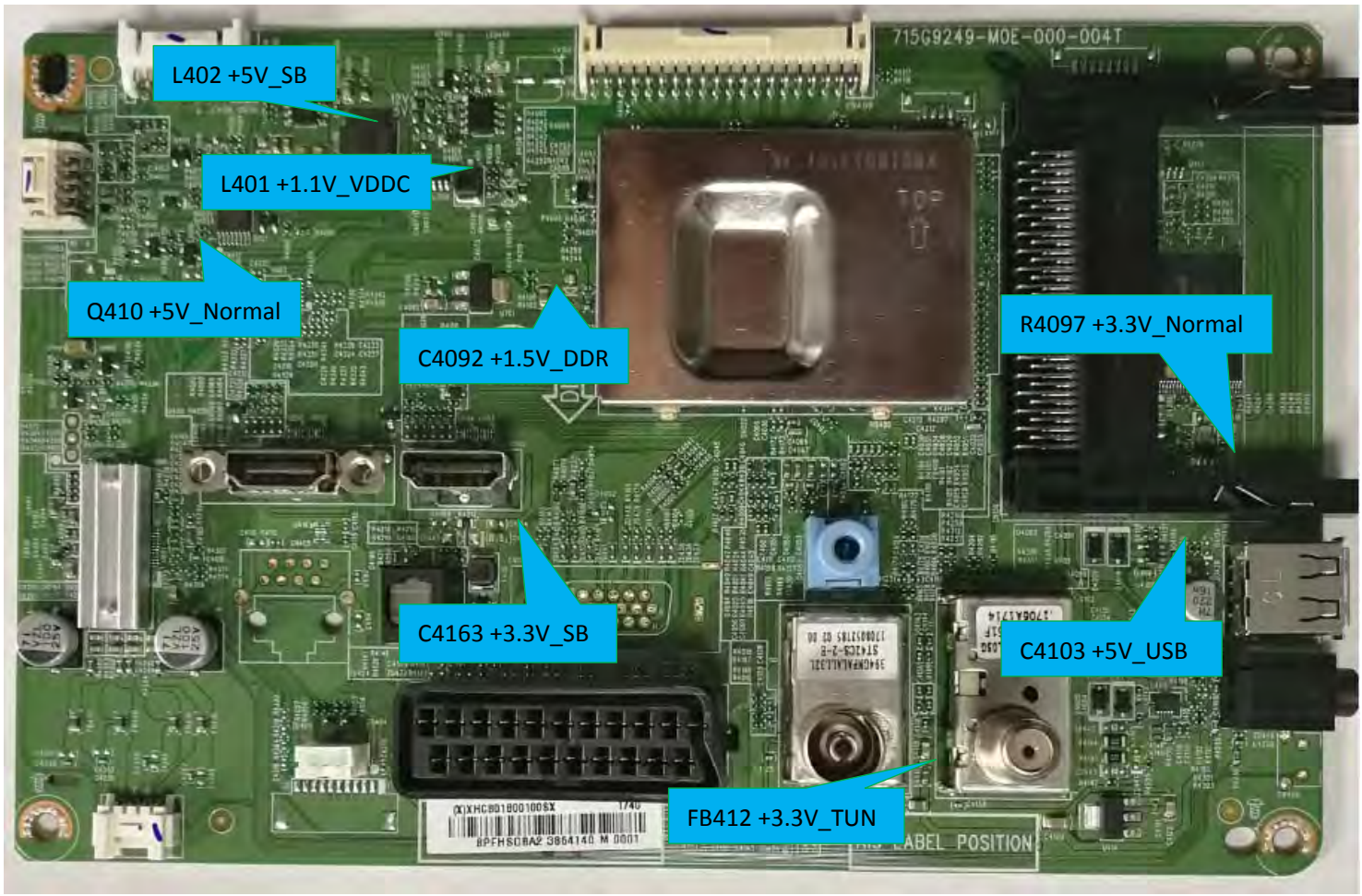
7.3 Power tree

Power Board System Supply +12V_Normal/ 20.6W/ 1722mA
Power Board Audio Supply +12V_Audio/ 10W/ 925mA

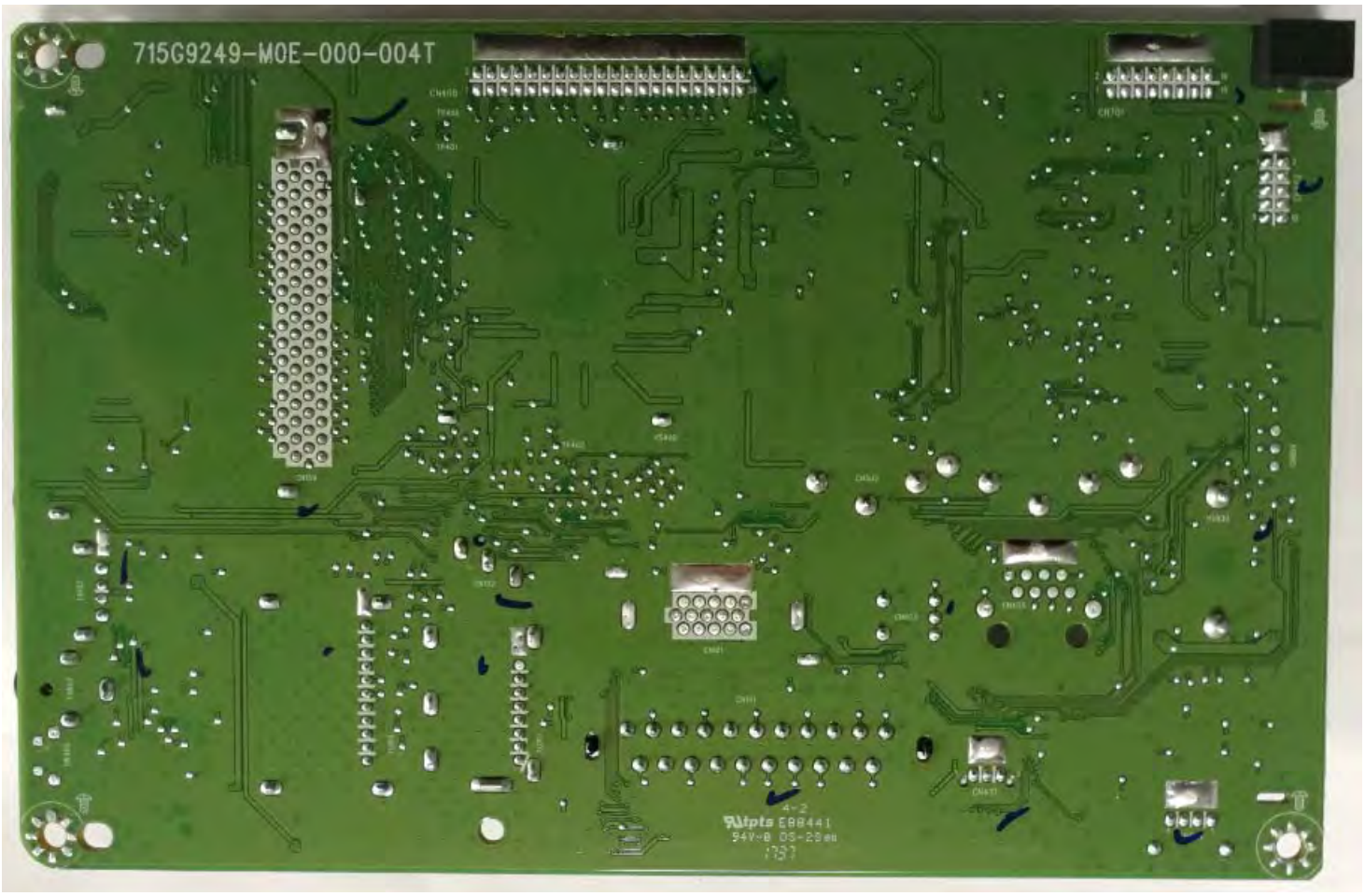




7.4 Power layout SSB



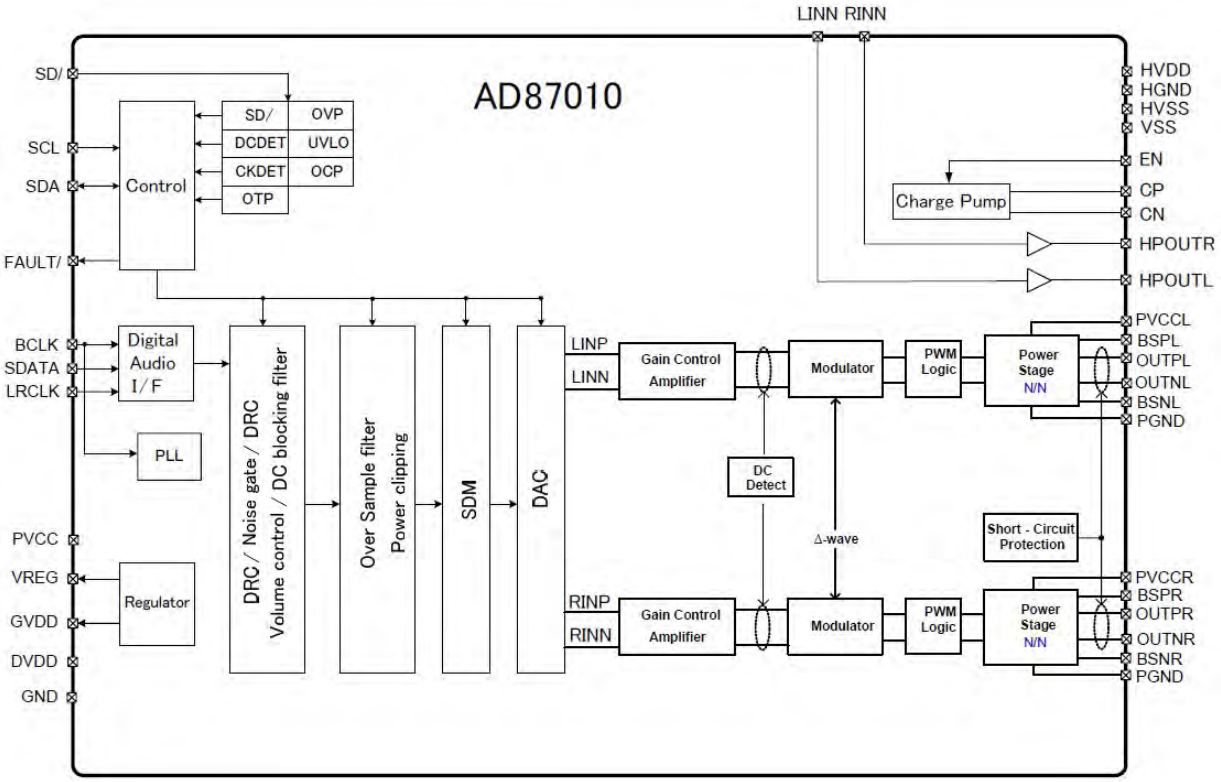
Power SSB Top View

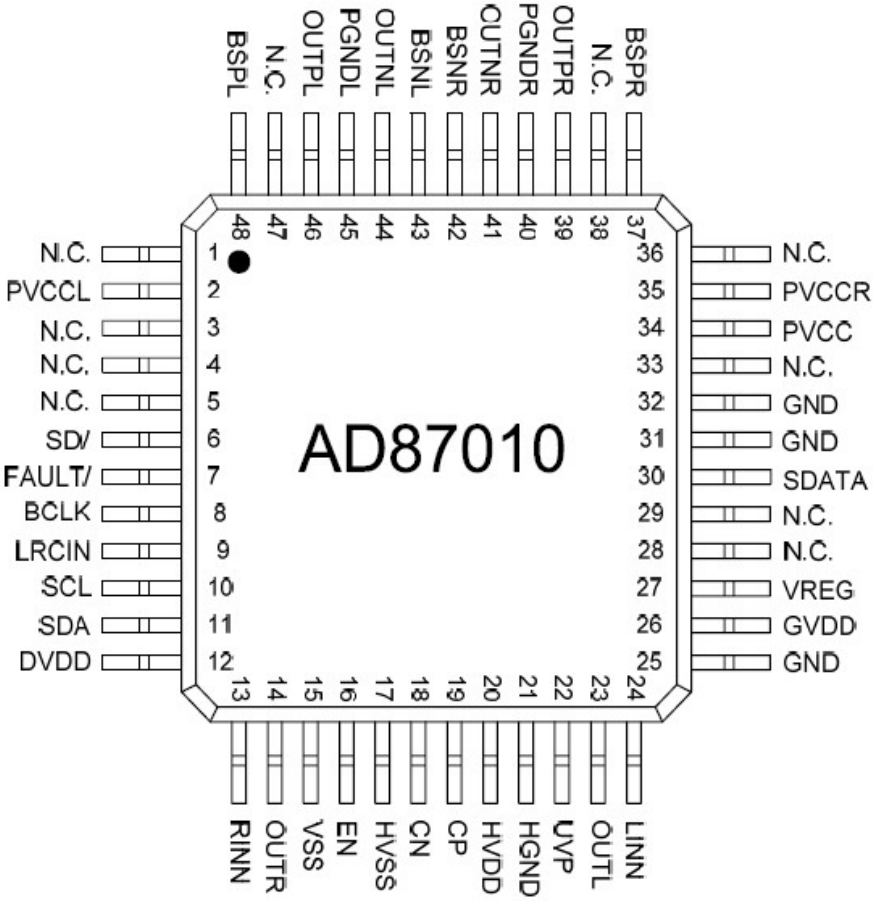


Power SSB Bottom View

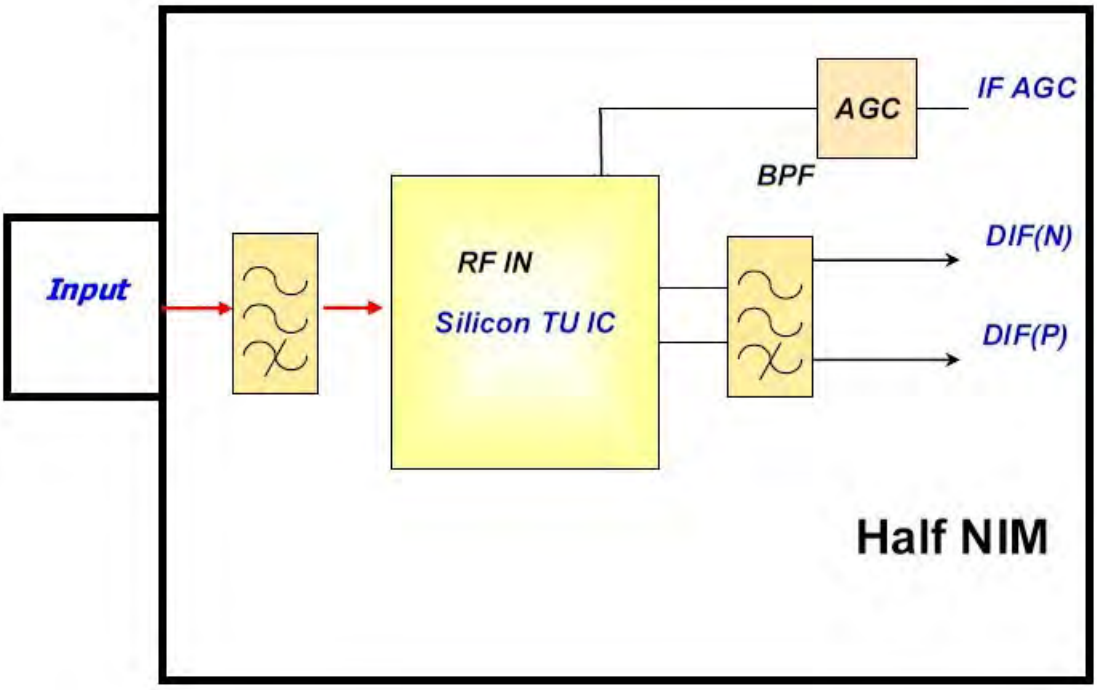
8. IC Data Sheets

8.1 AD87010-LG48NRY (IC U601)





8.2 TDSY-G430D (TU101)



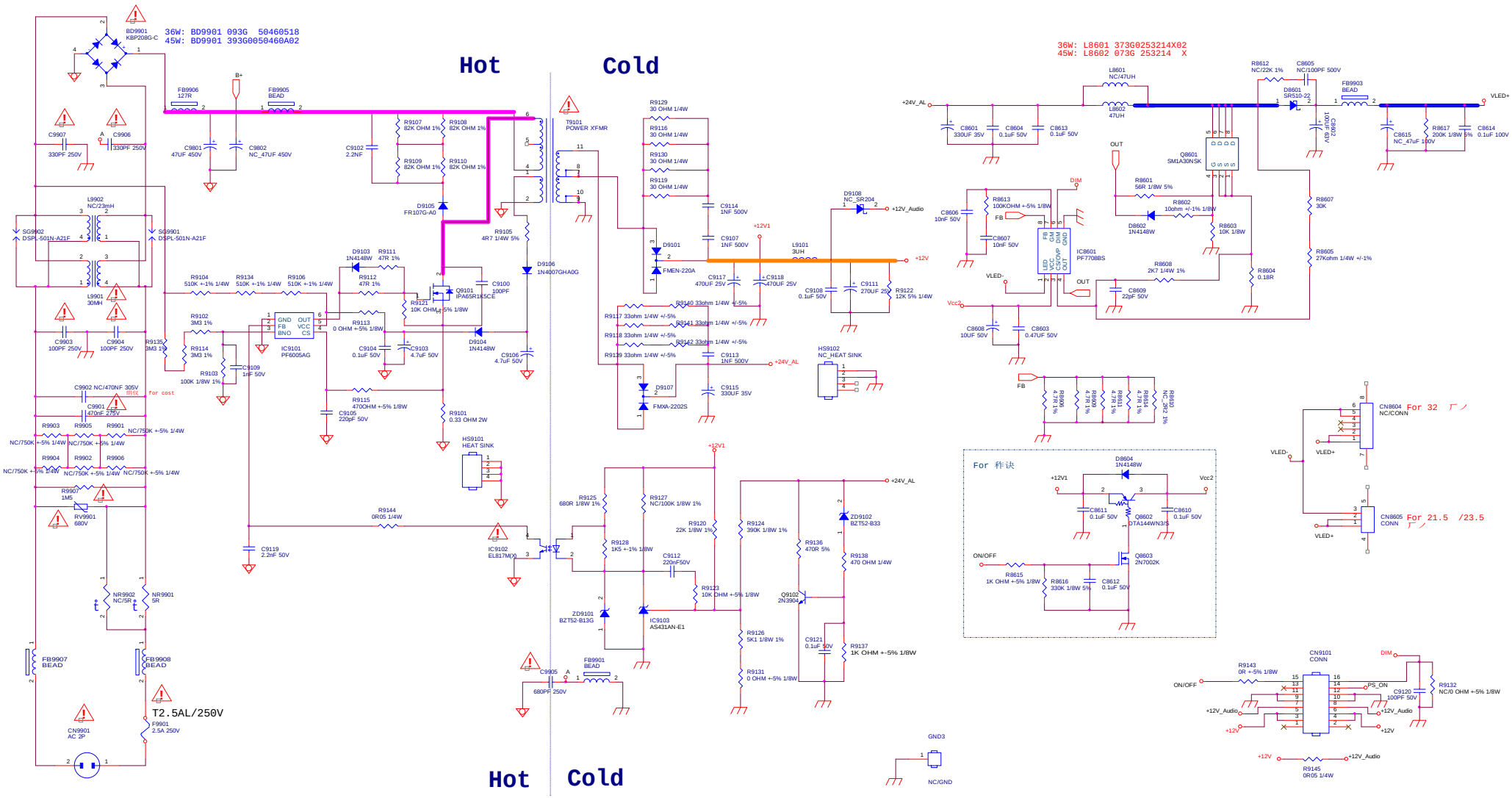
Pin Description

Pin No	Pin Name	Pin Description
1	Ant. PWR	Ant. PWR (Optional)
2	+B1(+3.3V)	+3.3V Supply Voltage
3	SDA	I2C Data
4	SCL	I2C Clock
5	DIF(N)	DIF(N) Output
6	DIF(P)	DIF(P) Output
7	IF AGC	IF AGC Control

9.Circuit Diagrams

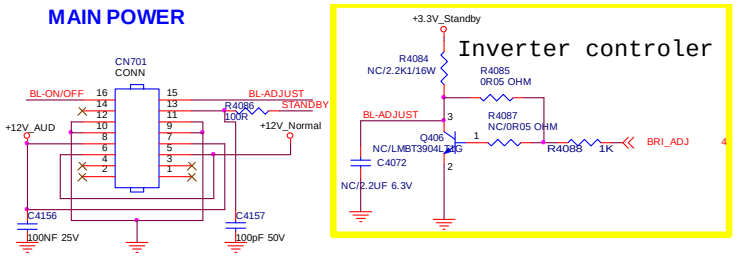
9.1 A 715G7735 PSU (For 24” 5603 Series)

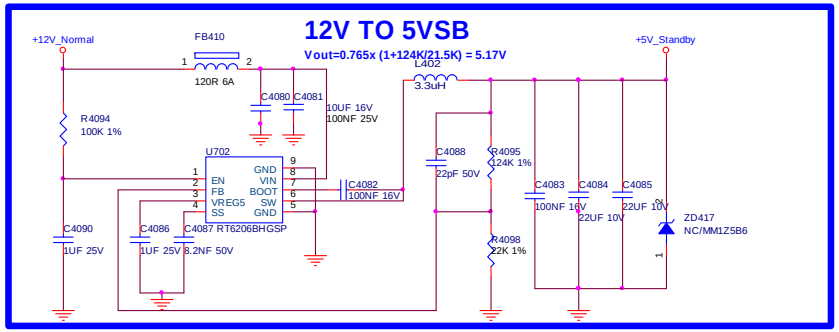
9-1-1 POWER

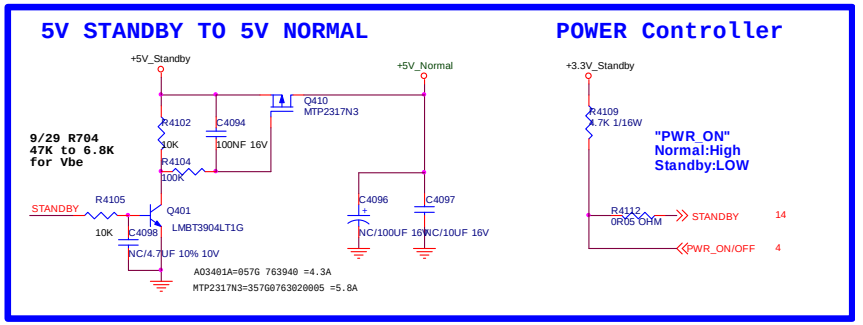


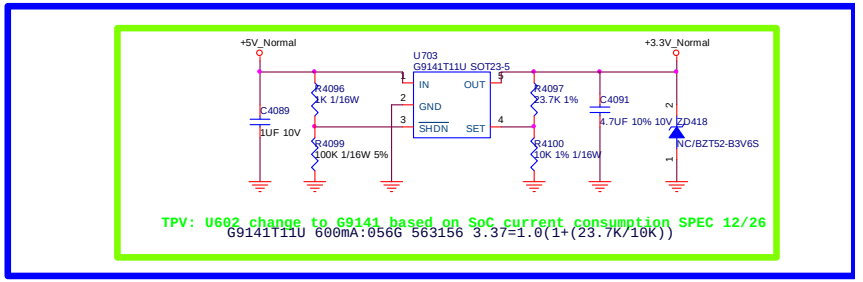
9.2 B 715G9249 SSB (For 24” 43x4 series)

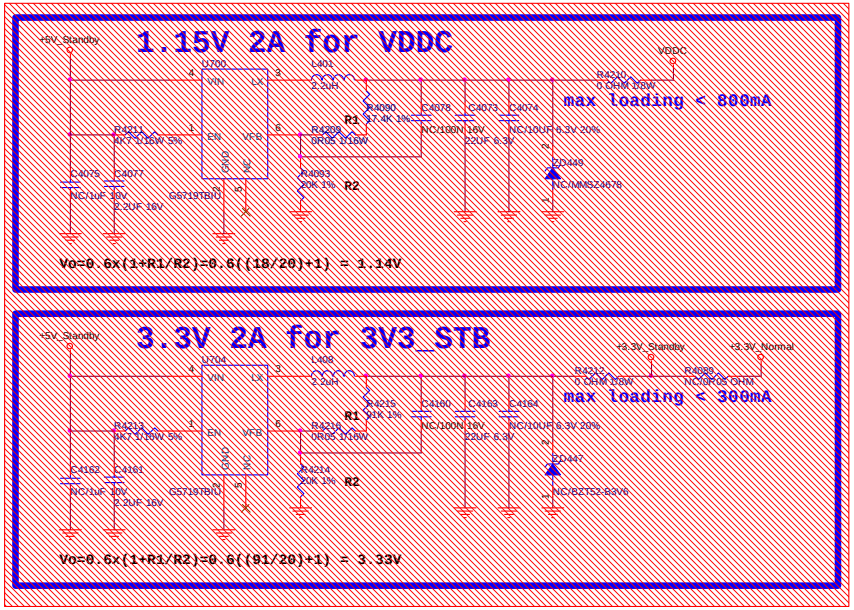
9-2-1 System Power

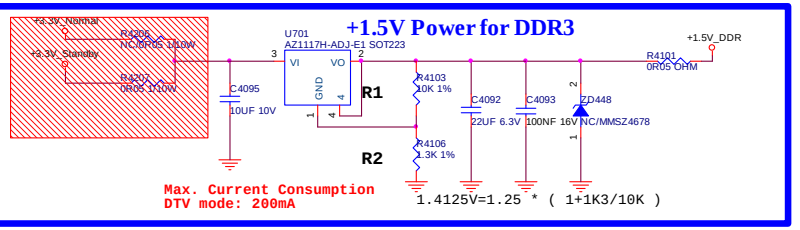


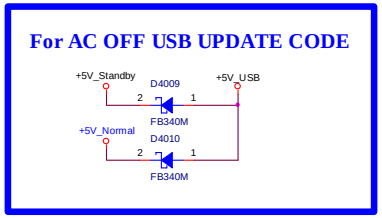


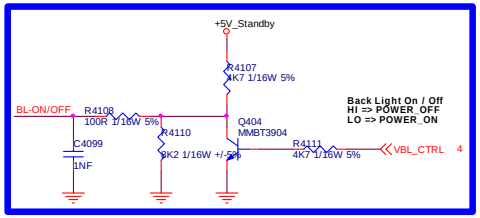




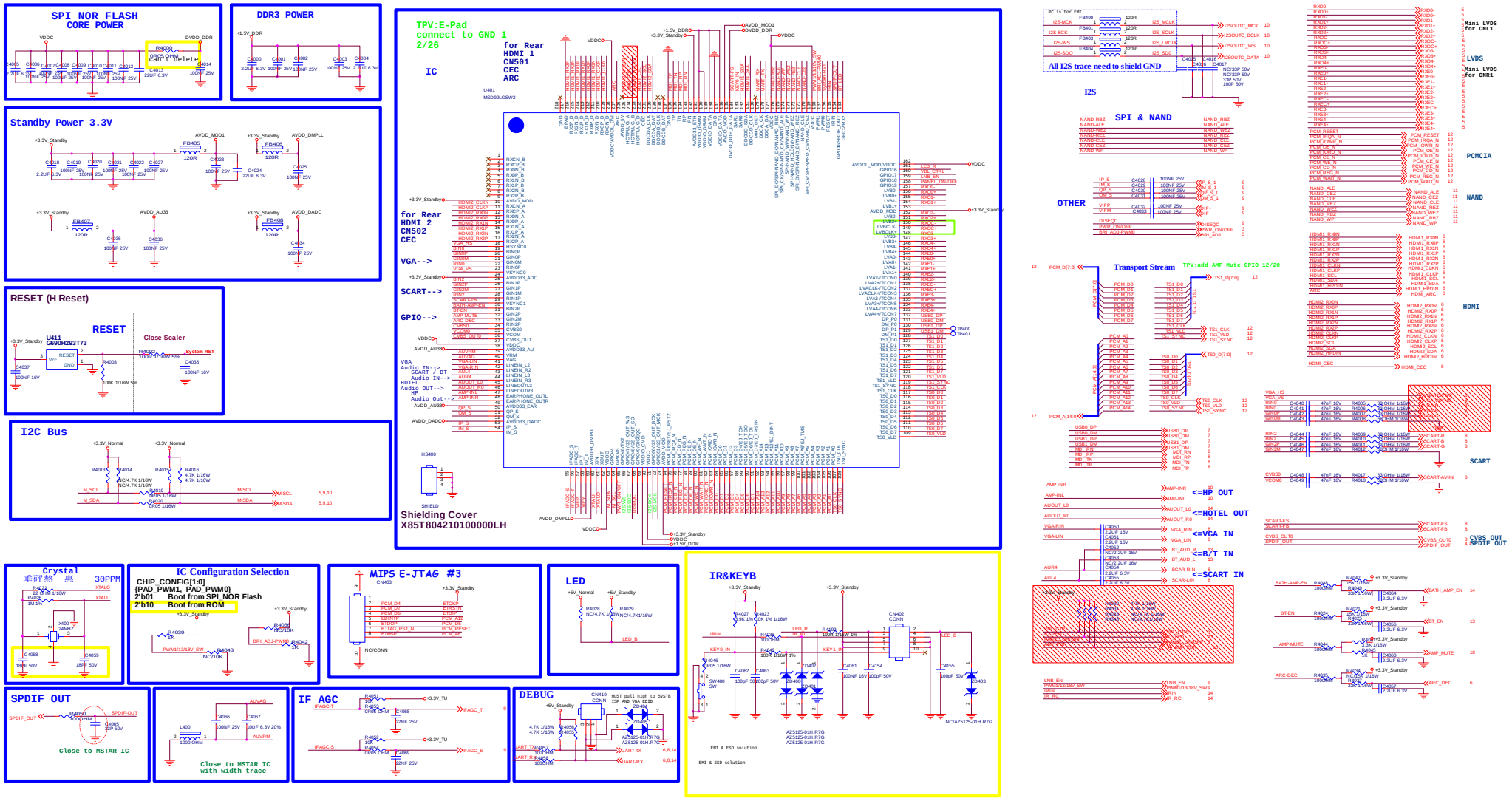




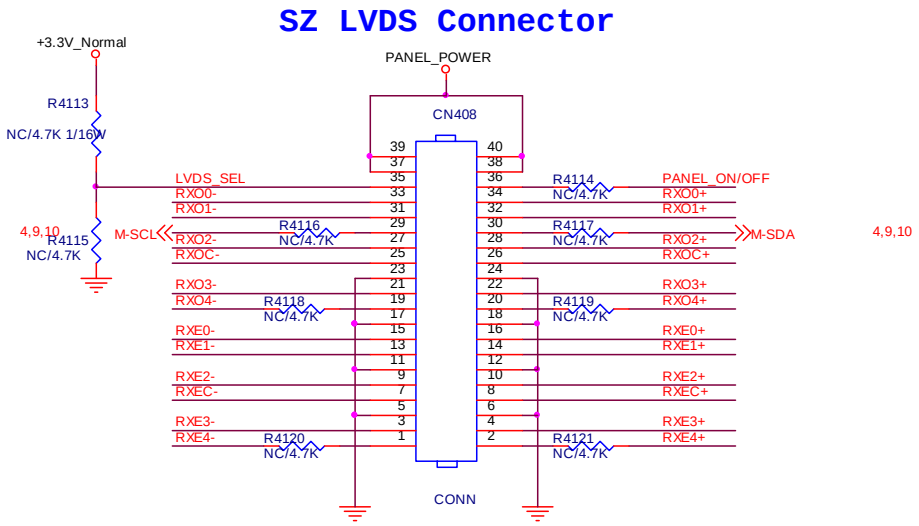


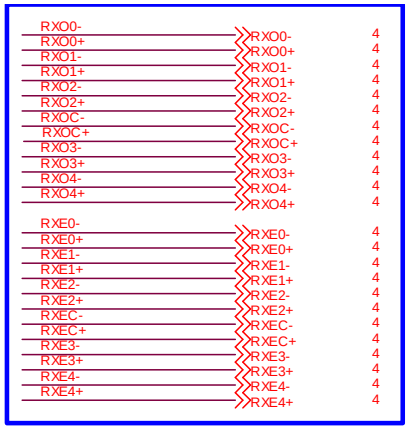


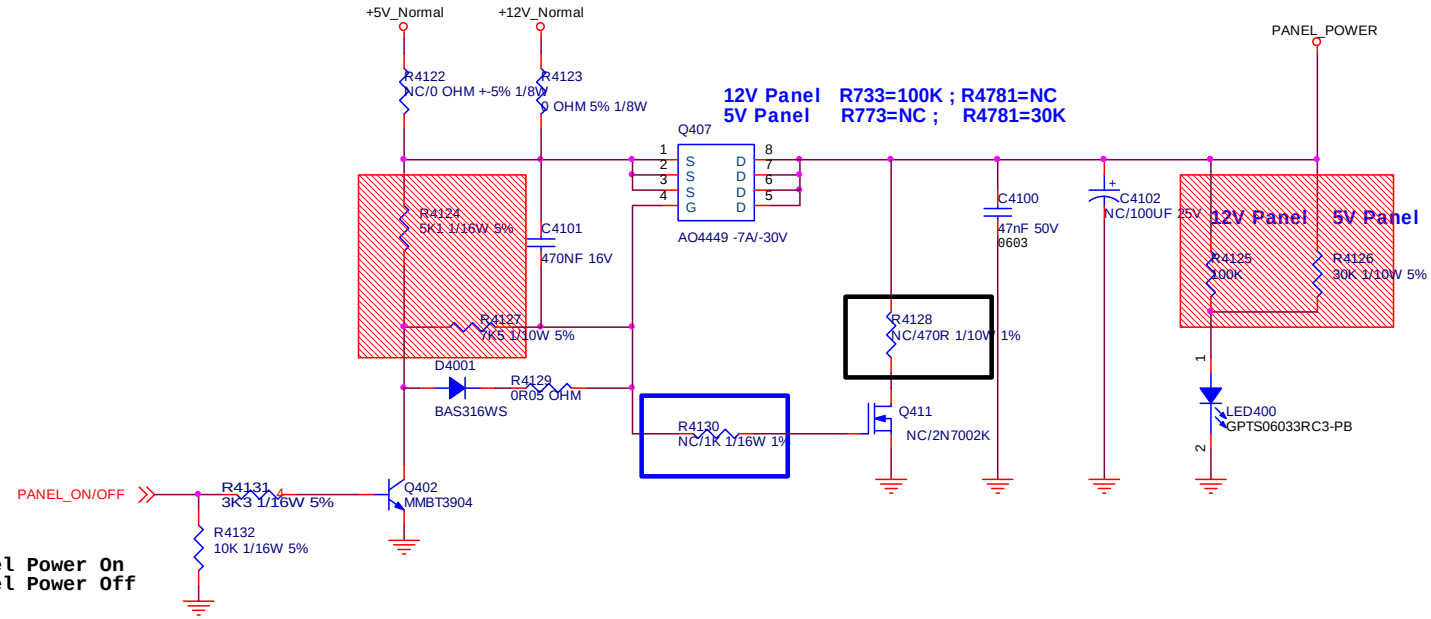
9-2-2 MSD92LGSW2



9-2-3 LVDS

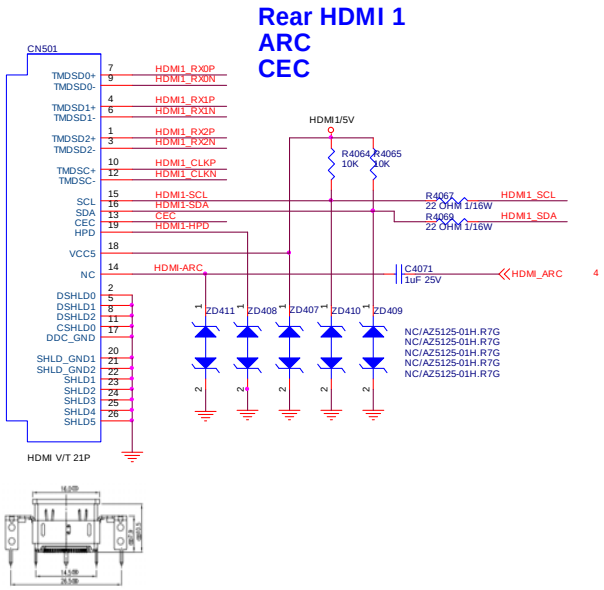


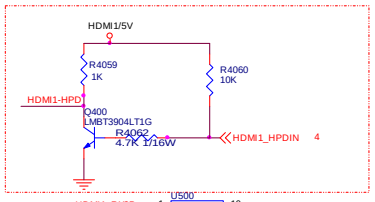


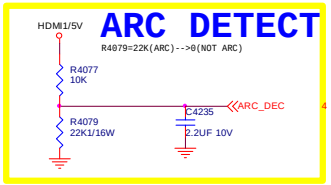


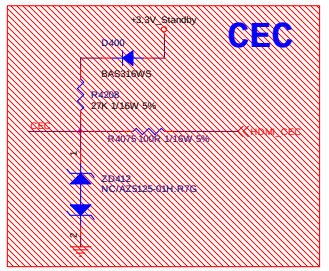
High: Panel Power On
Low : Panel Power Off

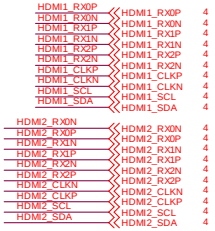
9-2-4 HDMI/ARC/UART

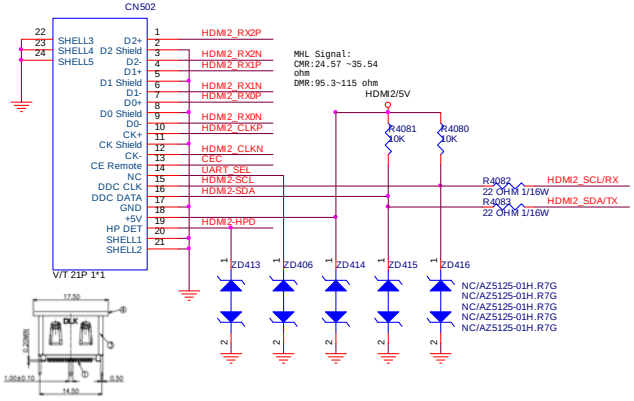


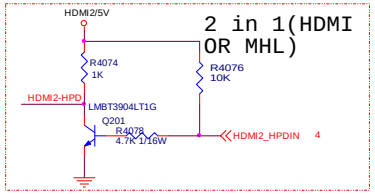


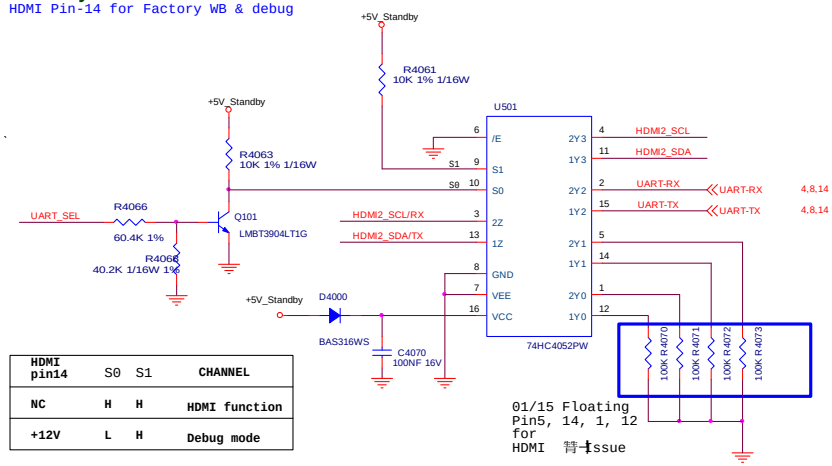






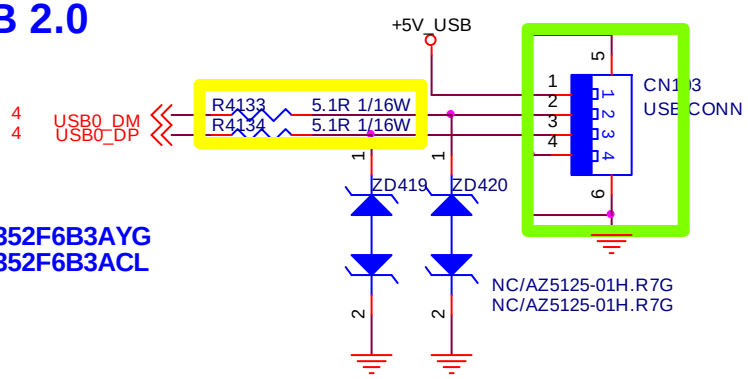




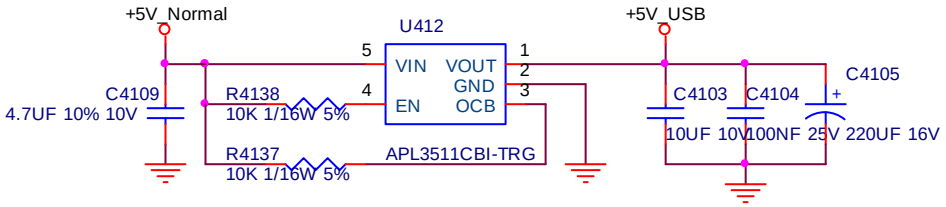


9-2-5 USB/SPDIF

USB 2.0

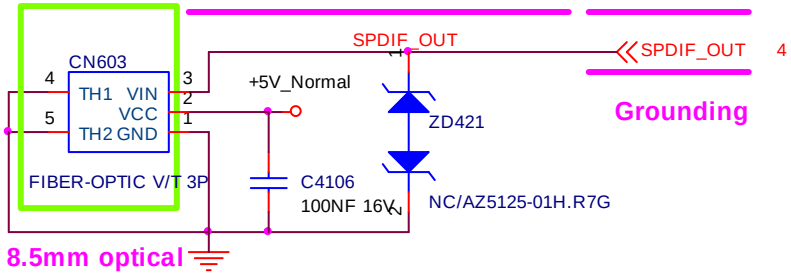


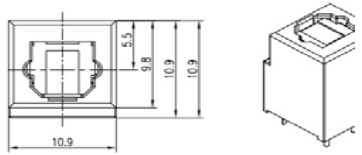
USB
088G352F6B3AYG
088G352F6B3ACL

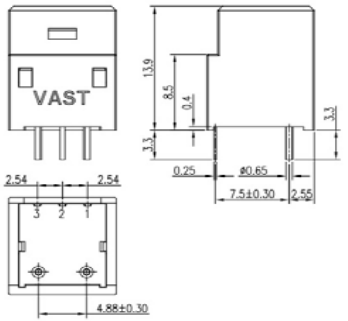


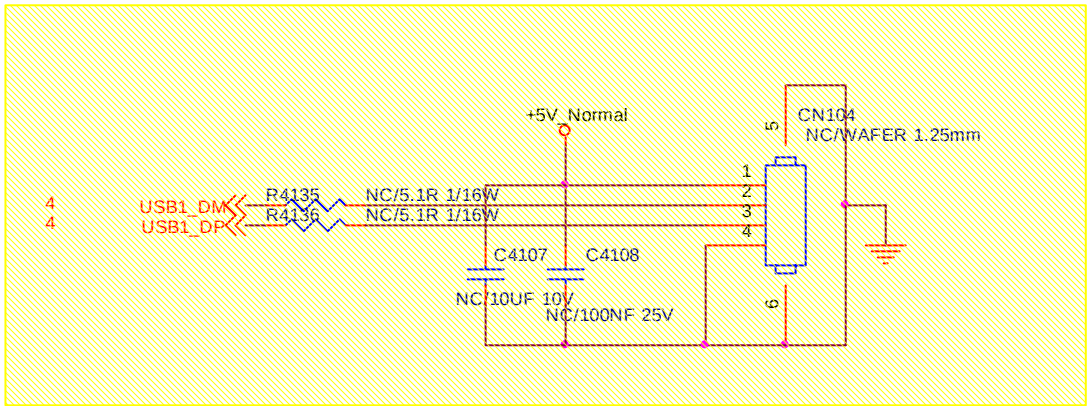
SPDIF-OPTICAL

SPDIF
388G359J5B1VAT
388G359J5B1VYG

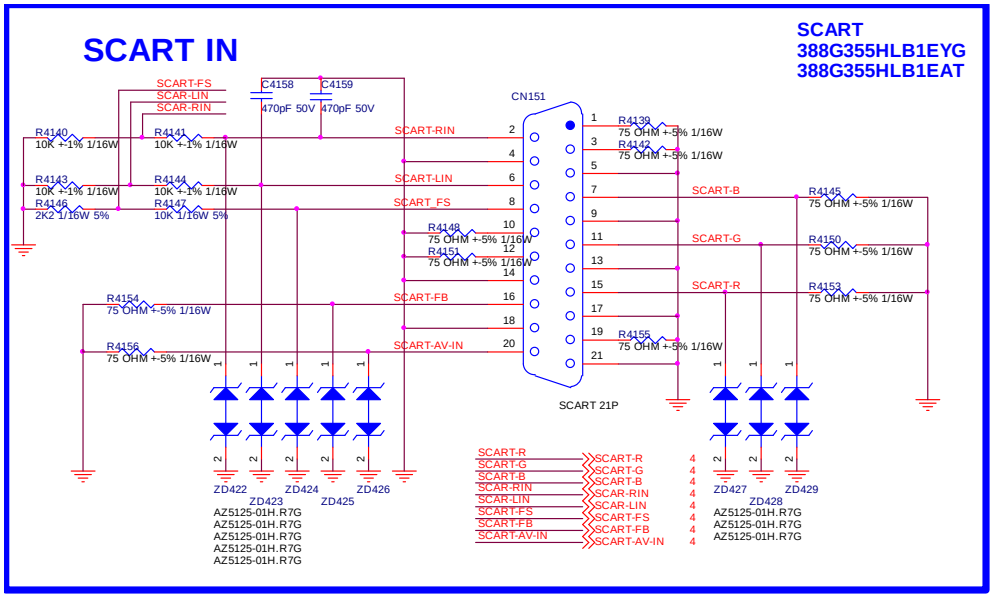


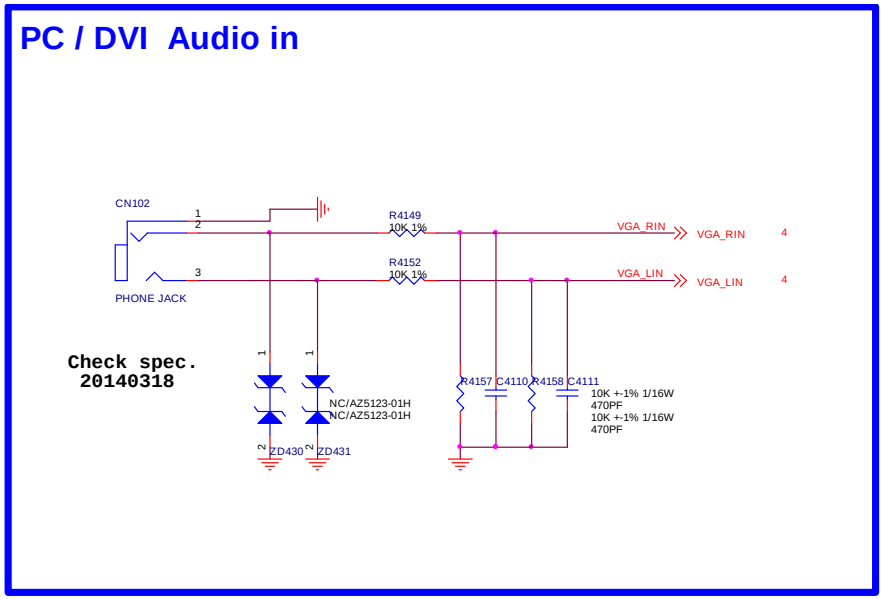


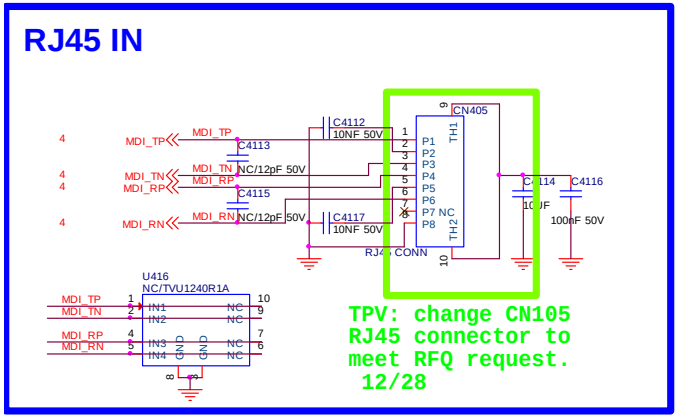


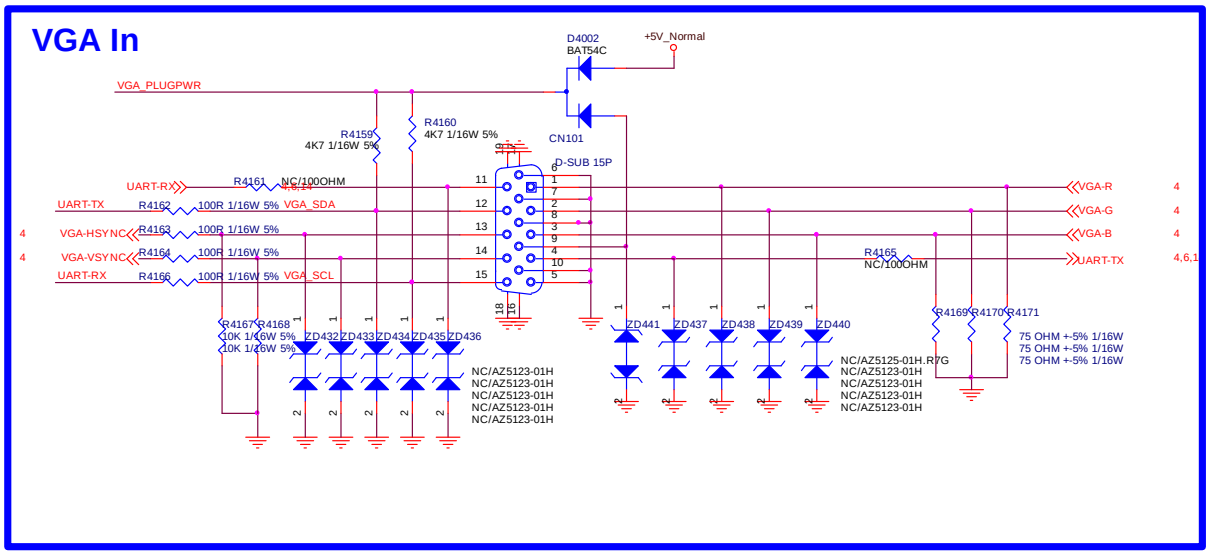


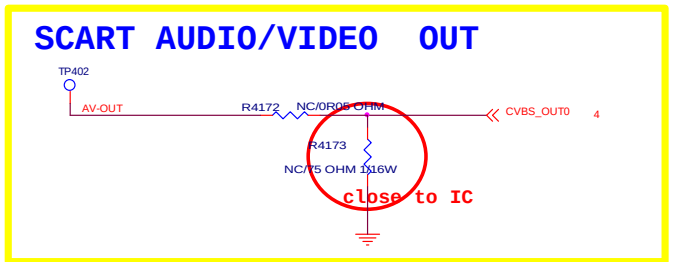
9-2-6 SCART/VGA/RJ45/Audio_in



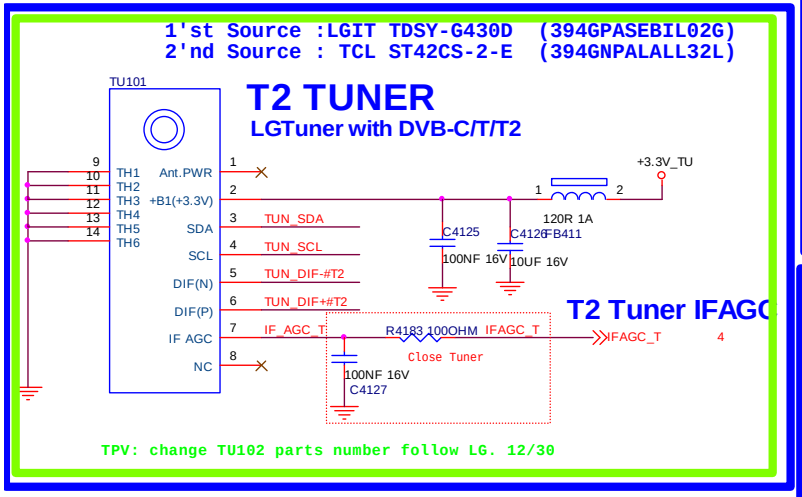


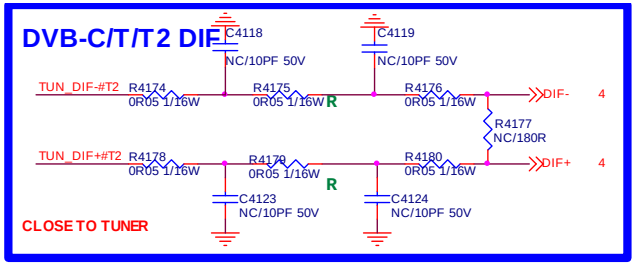


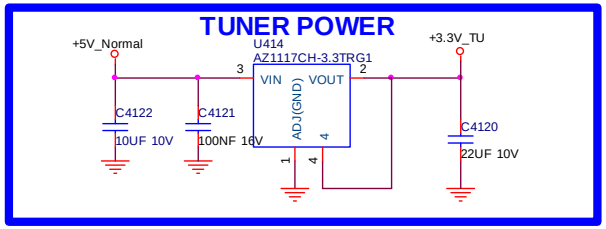


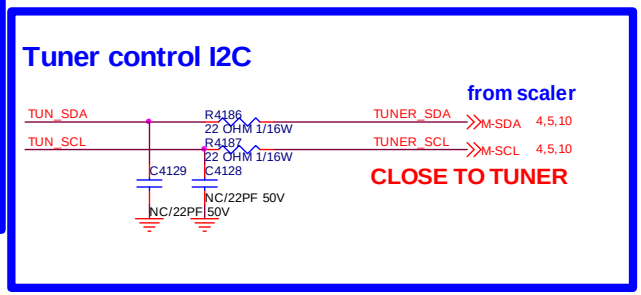


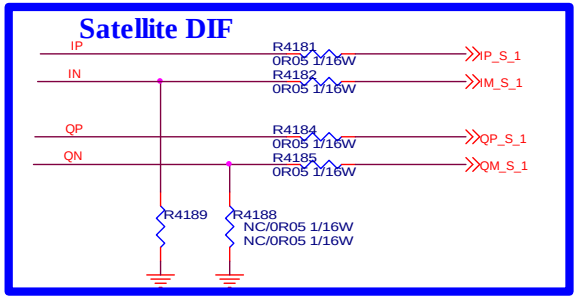
9-2-7 Tuner

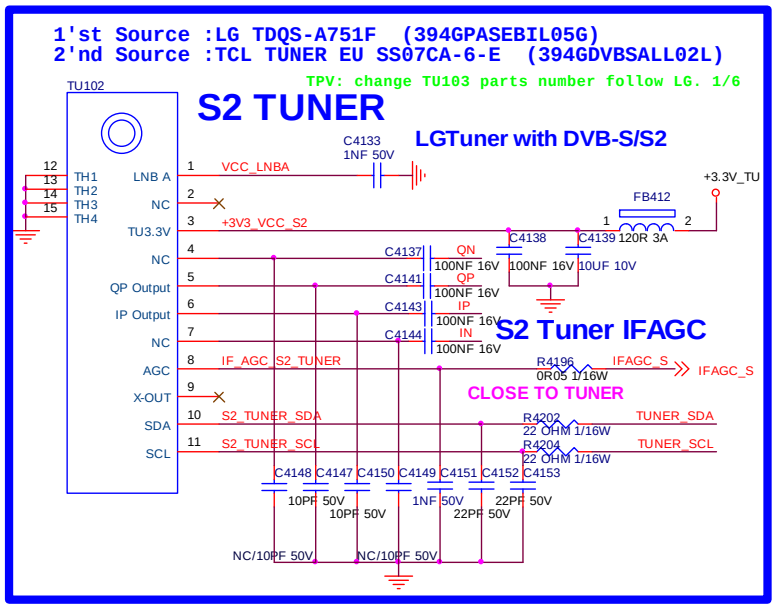

1'st Source :LGIT TDSY-G430D (394GPASEBIL02G)
2'nd Source : TCL ST42CS-2-E (394GNPALALL32L)
T2 TUNER
LGTuner with DVB-C/T/T2
TU101
TH1
TH2
TH3
TH4
TH5
TH6
Ant.PWR
+B1(+3.3V)
SDA
SCL
DIF(N)
DIF(P)
IF AGC
NC
TUN_SDA
TUN_SCL
TUN_DIF-#T2
TUN_DIF+#T2
IF_AGC_T
+3.3V_TU
C4125
100NF 16V
C4126
10UF 16V
120R 1A
FB411
R4183 100OHM IFAGC_T
Close Tuner
C4127
100NF 16V
T2 Tuner IFAGC
IFAGC_T
TPV: change TU102 parts number follow LG. 12/30

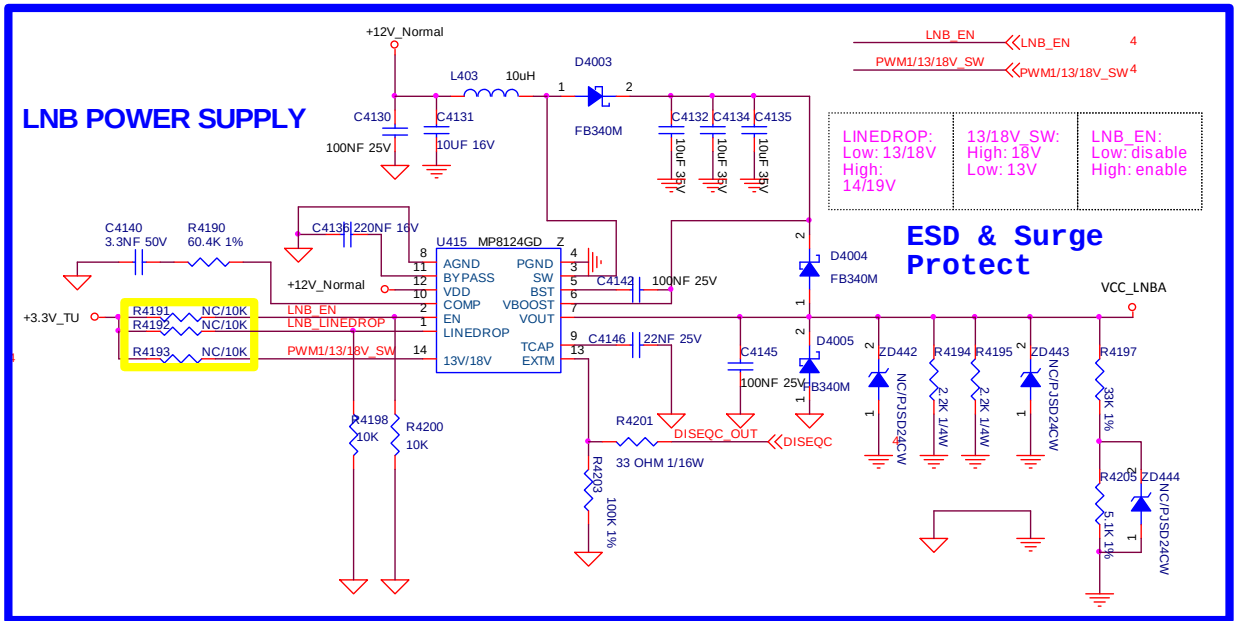

DVB-C/T/T2 DIF
C4118
NC/10PF 50V
C4119
NC/10PF 50V
TUN_DIF-#T2
R4174
0R05 1/16W
R4175
0R05 1/16W
R
R4176
0R05 1/16W
DIF-
R4177
NC/180R
TUN_DIF+#T2
R4178
0R05 1/16W
R4179
0R05 1/16W
R
R4180
0R05 1/16W
DIF+
C4123
NC/10PF 50V
C4124
NC/10PF 50V
CLOSE TO TUNER


TUNER POWER
+5V_Normal
U414
AZ1117CH-3.3TRG1
VIN
VOUT
ADJ(GND)
+3.3V_TU
C4122
10UF 10V
C4121
100NF 16V
C4120
22UF 10V

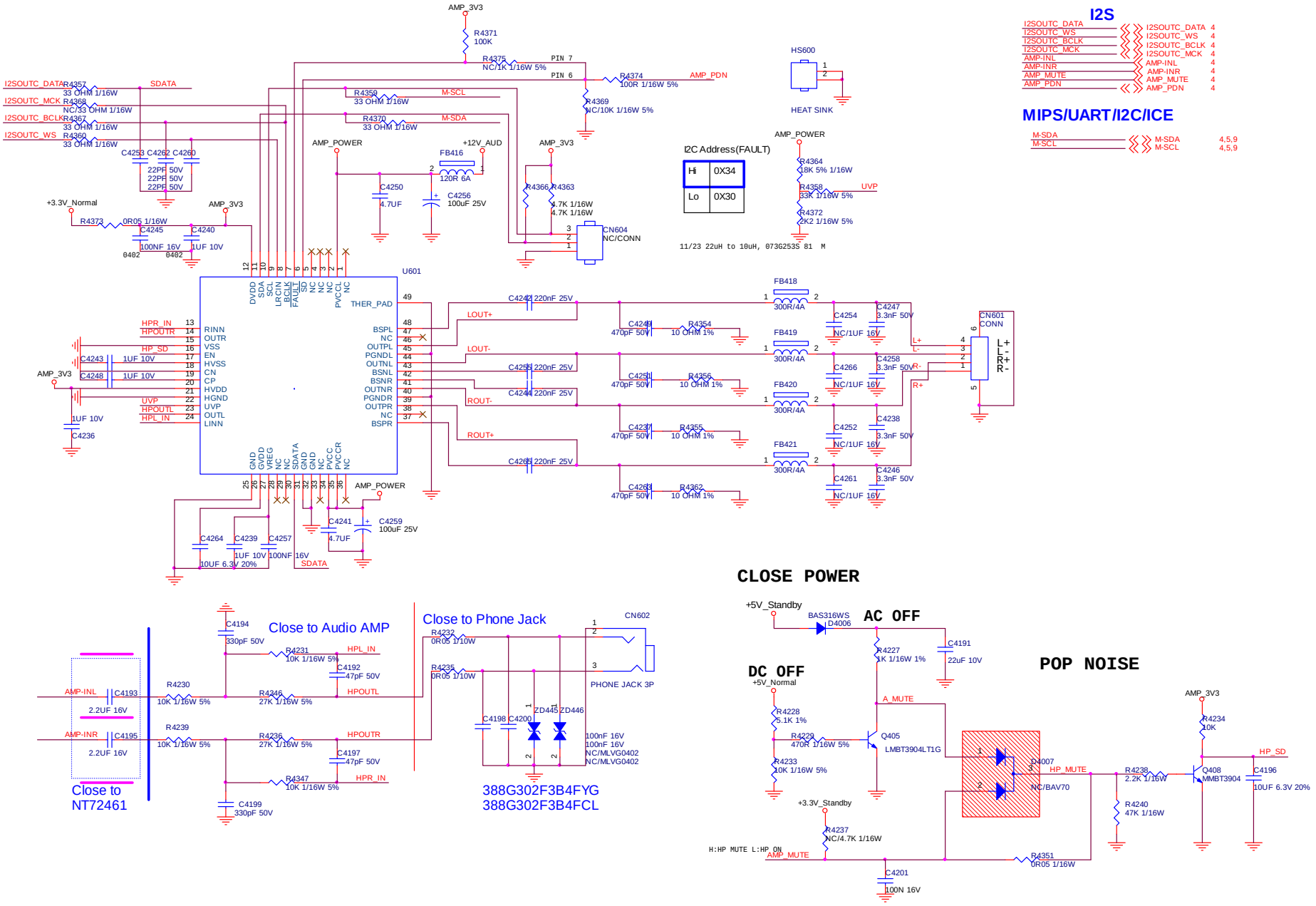

Tuner control I2C
from scaler
TUN_SDA
TUN_SCL
R4186
22 OHM 1/16W
R4187
22 OHM 1/16W
TUNER_SDA
TUNER_SCL
M-SDA
M-SCL
4,5,10
C4129
NC/22PF 50V
C4128
NC/22PF 50V
CLOSE TO TUNER


Satellite DIF
IP
IN
QP
QN
R4181
0R05 1/16W
R4182
0R05 1/16W
R4184
0R05 1/16W
R4185
0R05 1/16W
IP_S_1
IM_S_1
QP_S_1
QM_S_1
R4189
R4188
NC/0R05 1/16W
NC/0R05 1/16W

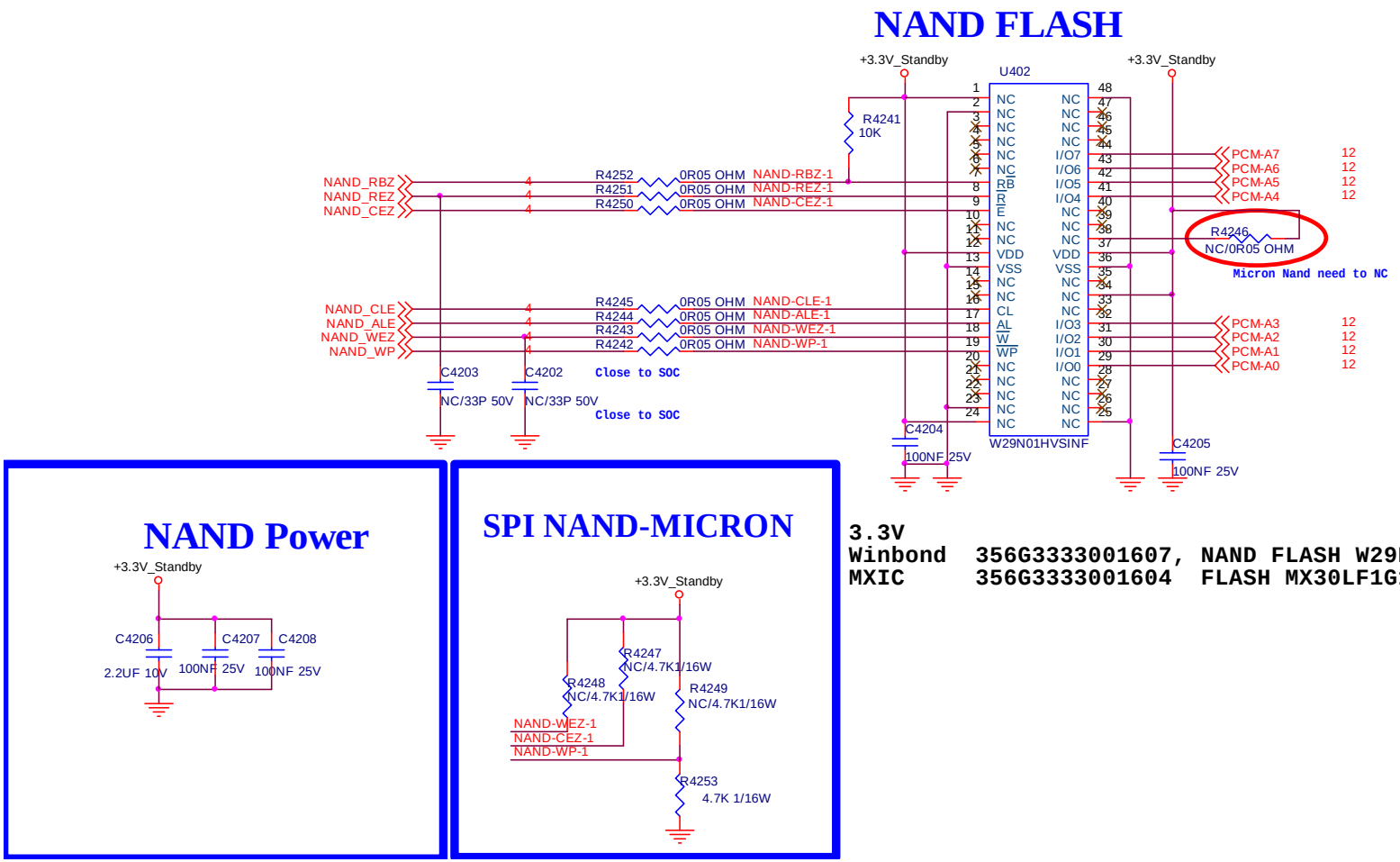

1'st Source :LG TDQS-A751F (394GPASEBIL05G)
2'nd Source :TCL TUNER EU SS07CA-6-E (394GDVBSALL02L)
TPV: change TU103 parts number follow LG. 1/6
S2 TUNER
LGTuner with DVB-S/S2
TU102
TH1
TH2
TH3
TH4
LNB A
NC
TU3.3V
QP Output
IP Output
AGC
X-OUT
SDA
SCL
VCC_LNBA
+3V3_VCC_S2
IF_AGC_S2_TUNER
S2_TUNER_SDA
S2_TUNER_SCL
C4133
1NF 50V
FB412
+3.3V_TU
C4137
QN
C4141
QP
C4143
IP
C4144
IN
100NF 16V
C4138
C4139 120R 3A
10UF 10V
R4196
0R05 1/16W
IFAGC_S
S2 Tuner IFAGC
CLOSE TO TUNER
R4202
R4204
22 OHM 1/16W
TUNER_SDA
TUNER_SCL
C4148
C4147
C4150
C4149
C4151
C4152
C4153
10PF 50V
1NF 50V
22PF 50V
NC/10PF 50V


LNB POWER SUPPLY
+12V_Normal
L403
10uH
D4003
FB340M
C4130
100NF 25V
C4131
10UF 16V
C4132
C4134
C4135
10UF 35V
LINEDROP:
Low: 13/18V
High: 14/19V
13/18V_SW:
High: 18V
Low: 13V
LNB_EN:
Low: disable
High: enable
LNB_EN
PWM1/13/18V_SW
C4140
3.3NF 50V
R4190
60.4K 1%
C4136
220NF 16V
U415 MP8124GD
AGND
BYPASS
VDD
COMP
EN
LINEDROP
PGND
SW
BST
VBOOST
VOUT
TCAP
EXTM
13V/18V
C4142
100NF 25V
D4004
FB340M
ESD & Surge Protect
VCC_LNBA
+3.3V_TU
R4191
R4192
R4193
NC/10K
LNB_EN
LNB_LINEDROP
PWM1/13/18V_SW
C4146
22NF 25V
C4145
100NF 25V
D4005
FB340M
ZD442
NC/PJSD24CW
R4194
2.2K 1/4W
R4195
2.2K 1/4W
ZD443
NC/PJSD24CW
R4197
33K 1%
R4198
10K
R4200
10K
R4201
33 OHM 1/16W
DISEQC_OUT
DISEQC
R4203
100K 1%
R4205
5.1K 1%
ZD444
NC/PJSD24CW

9-2-8 Amplifier/HP

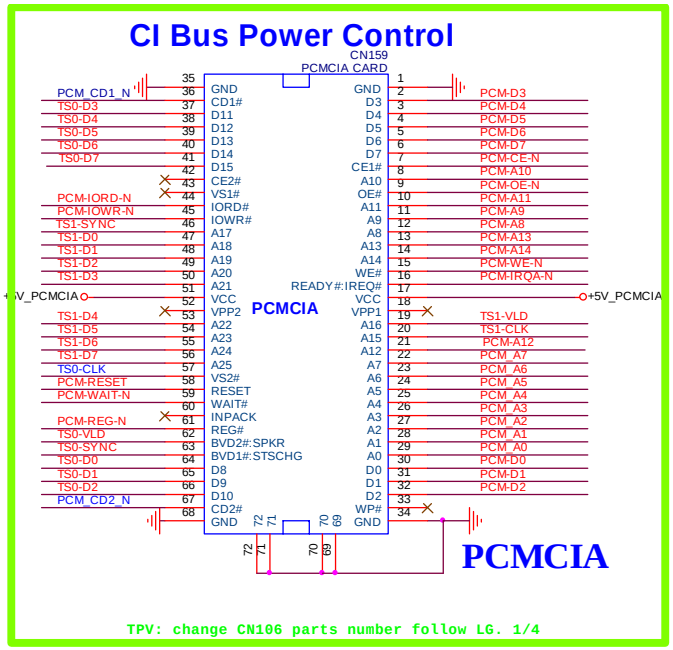


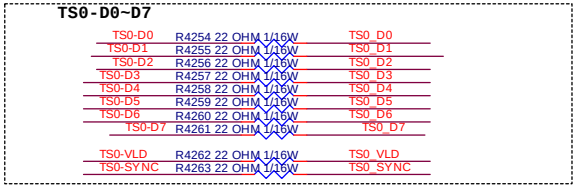
9-2-9 NAND Flash

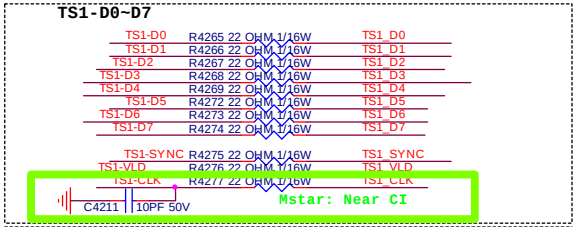


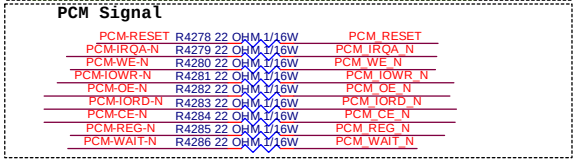
3.3V
Winbond 356G3333001607, NAND FLASH W29N01HVSINF 1Gb TSOP-48 ECC 4 bit
MXIC 356G3333001604 FLASH MX30LF1G18AC

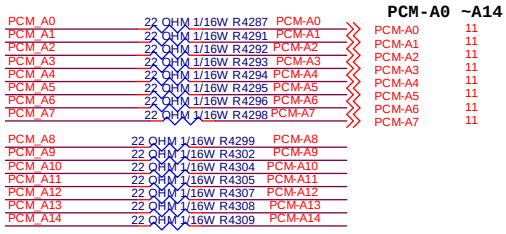
9-2-10 PCMCI

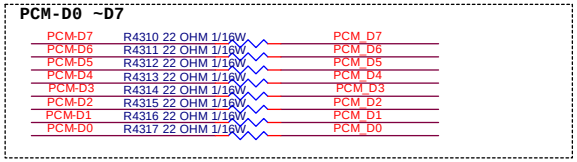


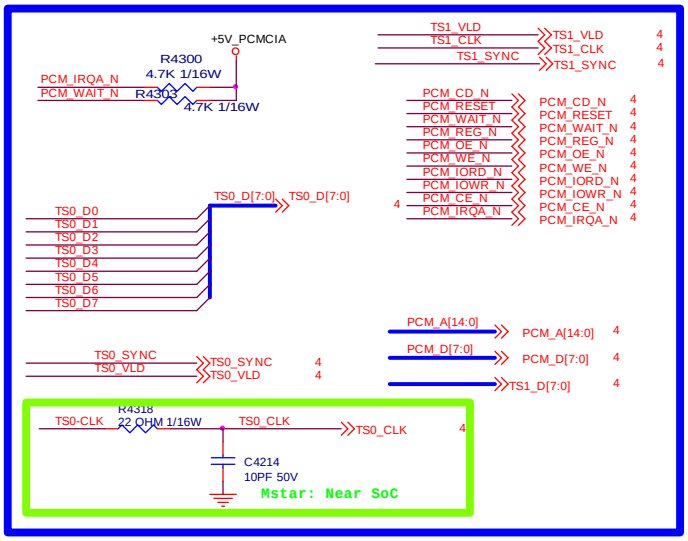


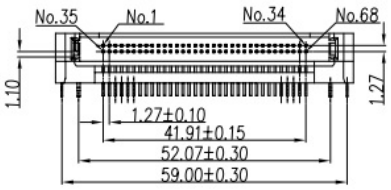


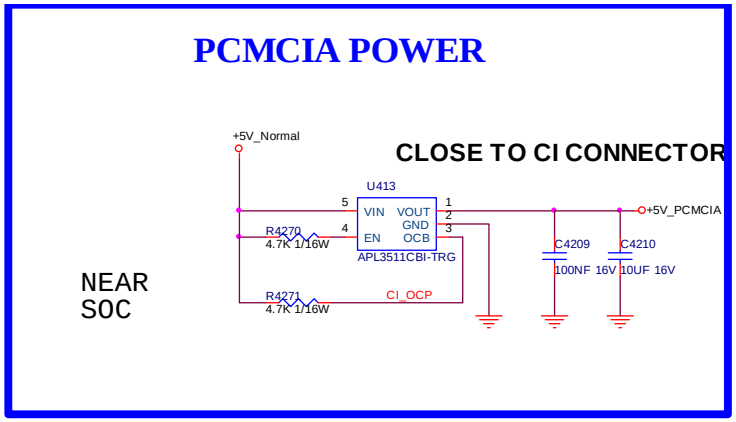


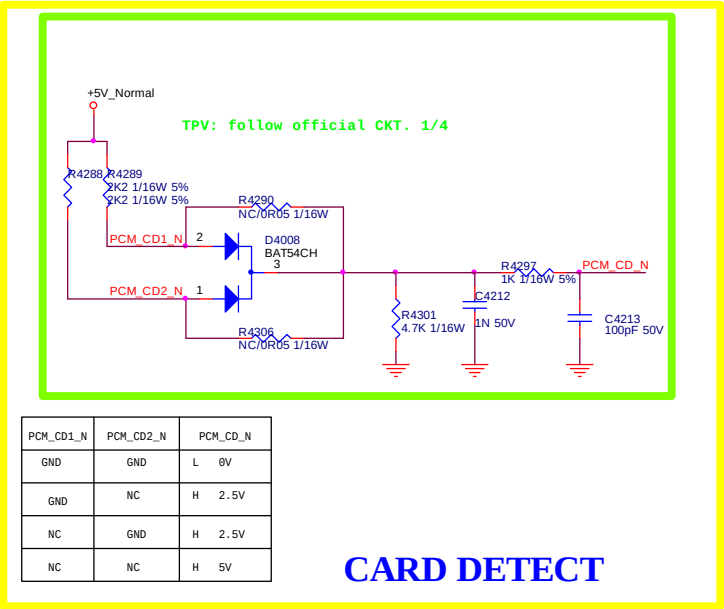








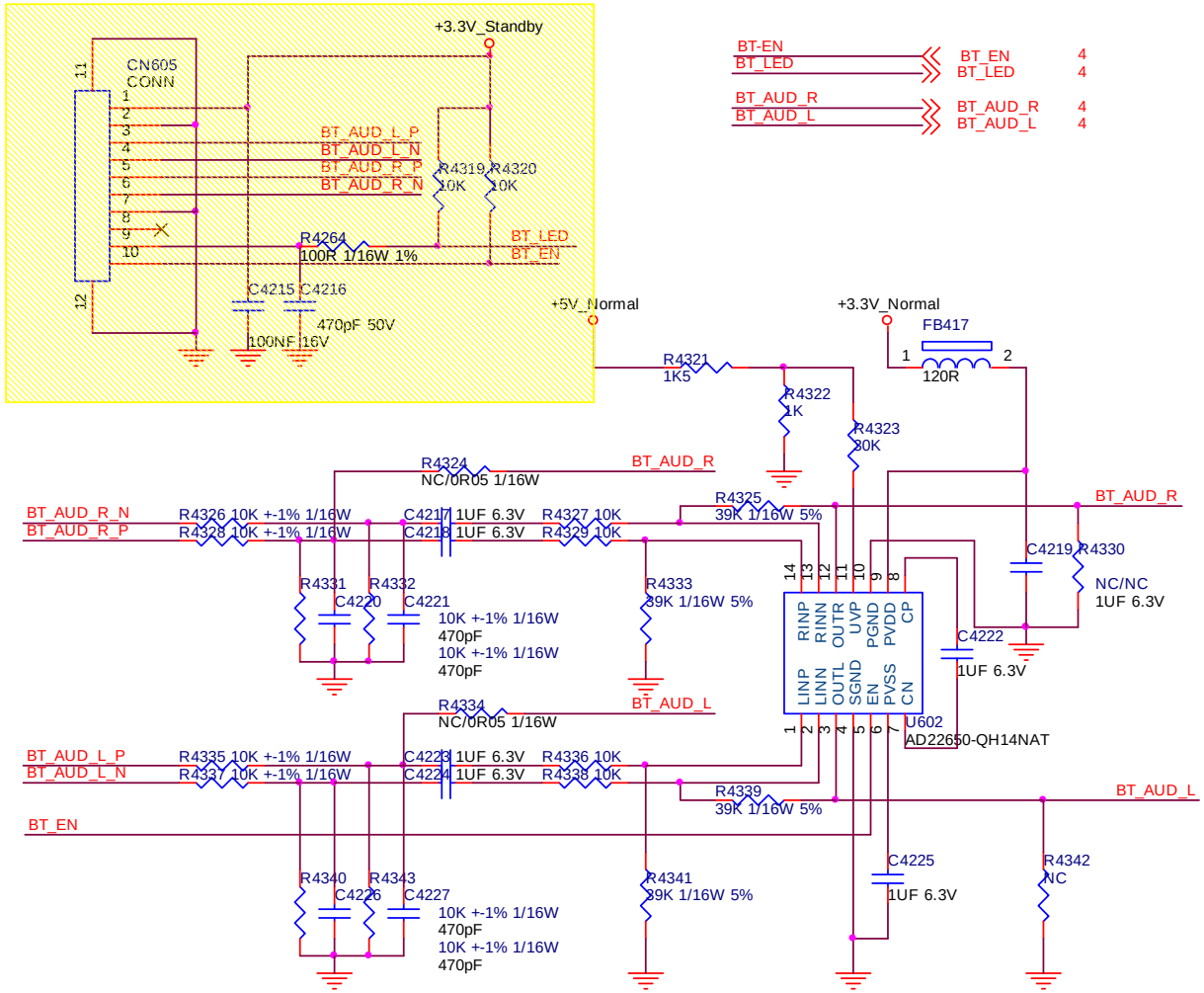




PCM_CD1_N	PCM_CD2_N	PCM_CD_N
GND	GND	L 0V
GND	NC	H 2.5V
NC	GND	H 2.5V
NC	NC	H 5V

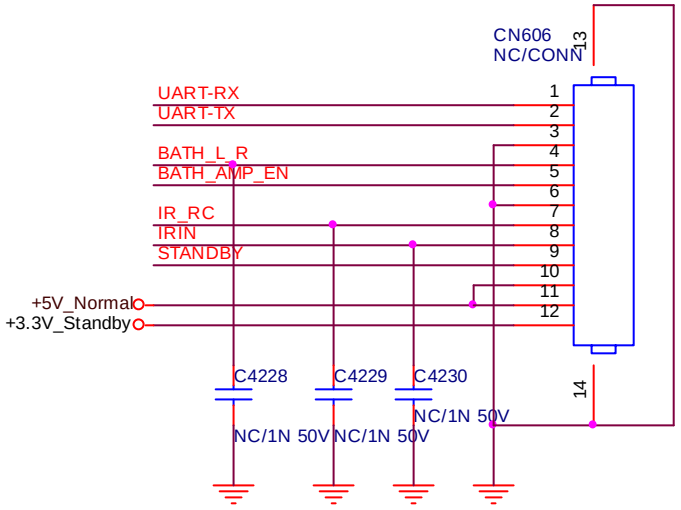
B/T FUNCTION

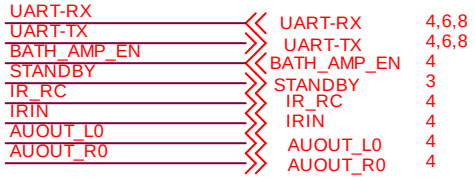
for EMI solution
NC , C640 , C641, C642 , C643
BT_LED trace (connector 狠)
糟 470pF bypass cap.



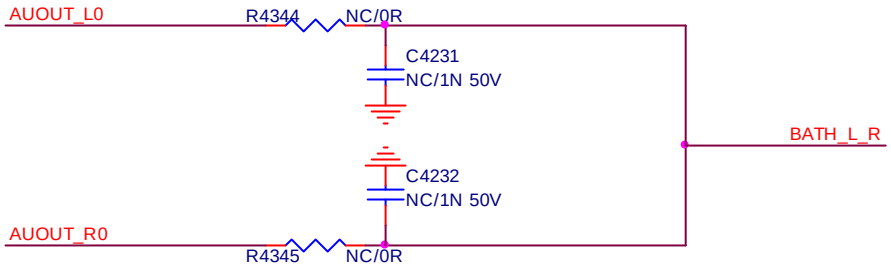
9-2-12 HOTEL function

For BUH daughter board





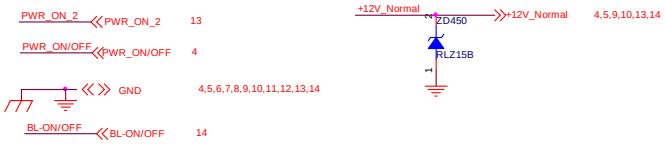
Bathroom SPK audio out for BUH



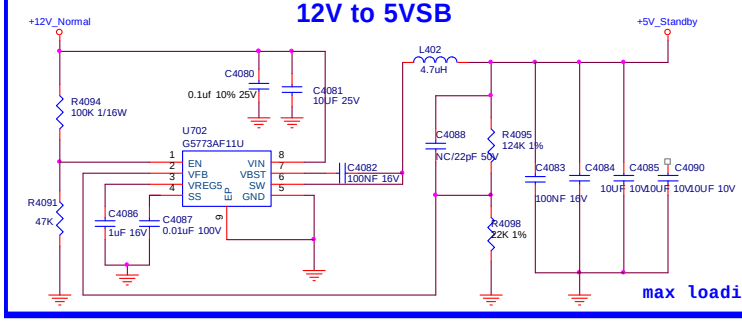
9.3 B 715G9916 SSB (For 32” 4503/4504 Series)

9-3-1 System Power

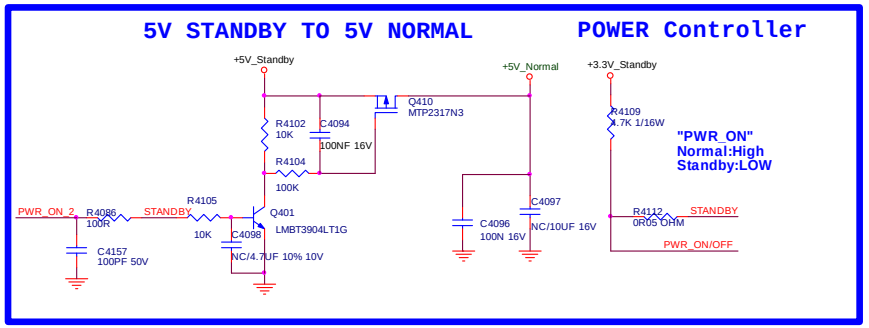
MAIN POWER

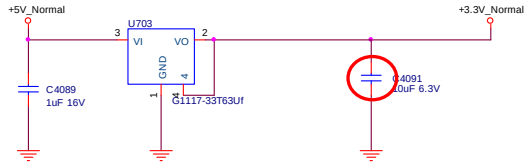


12V to 5VSB

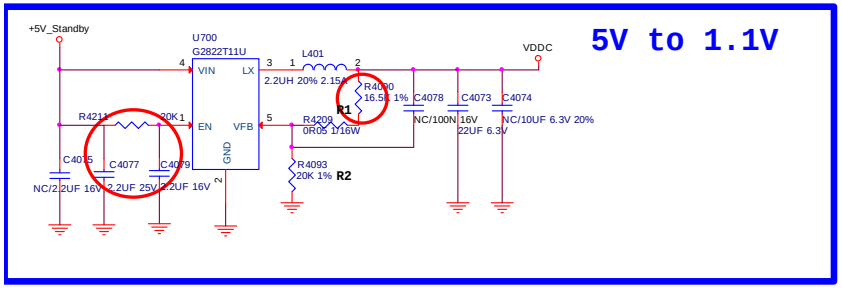


5V STANDBY TO 5V NORMAL POWER Controller

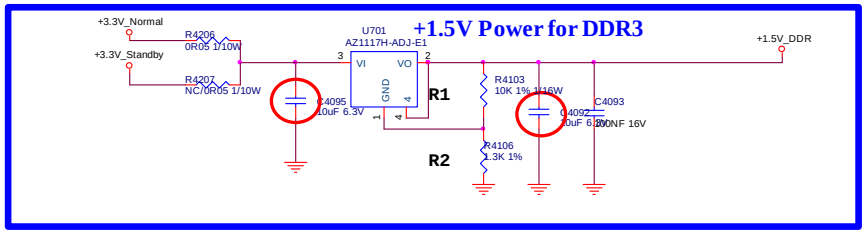




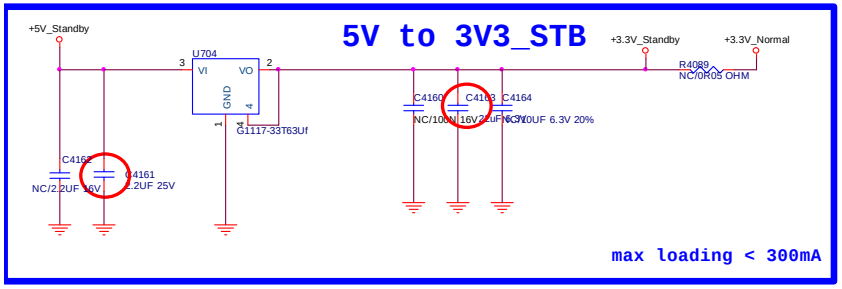
5V to 1.1V



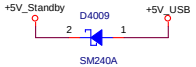
+1.5V Power for DDR3

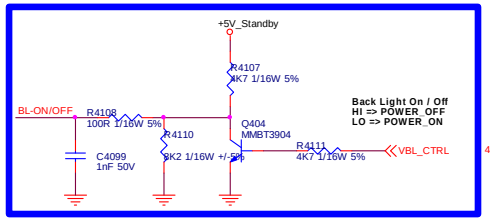


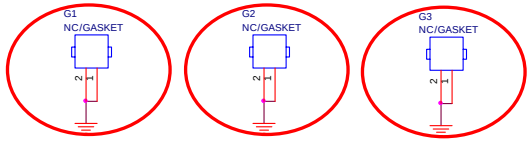
5V to 3V3_STB



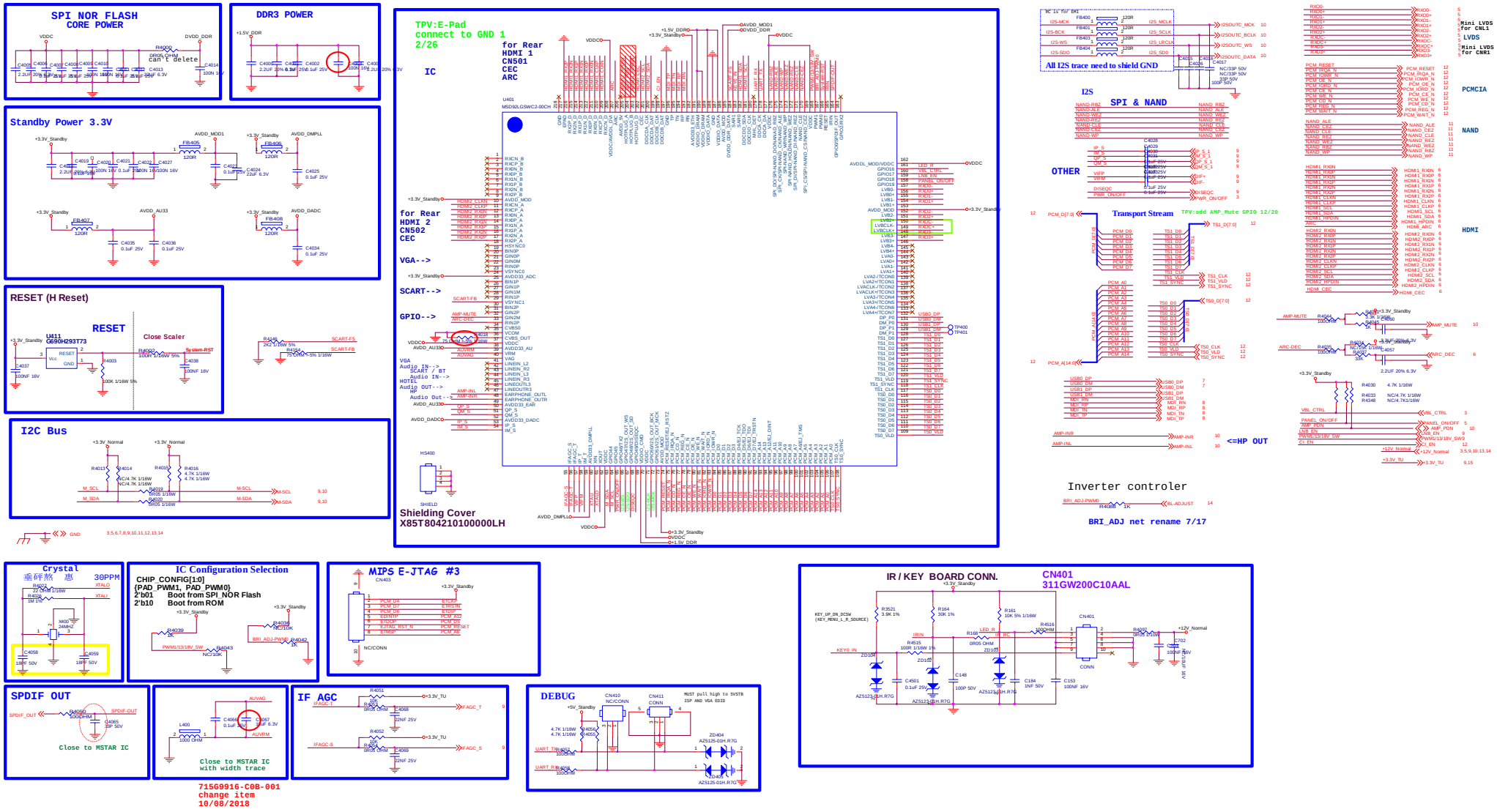
For AC OFF USB UPDATE CODE



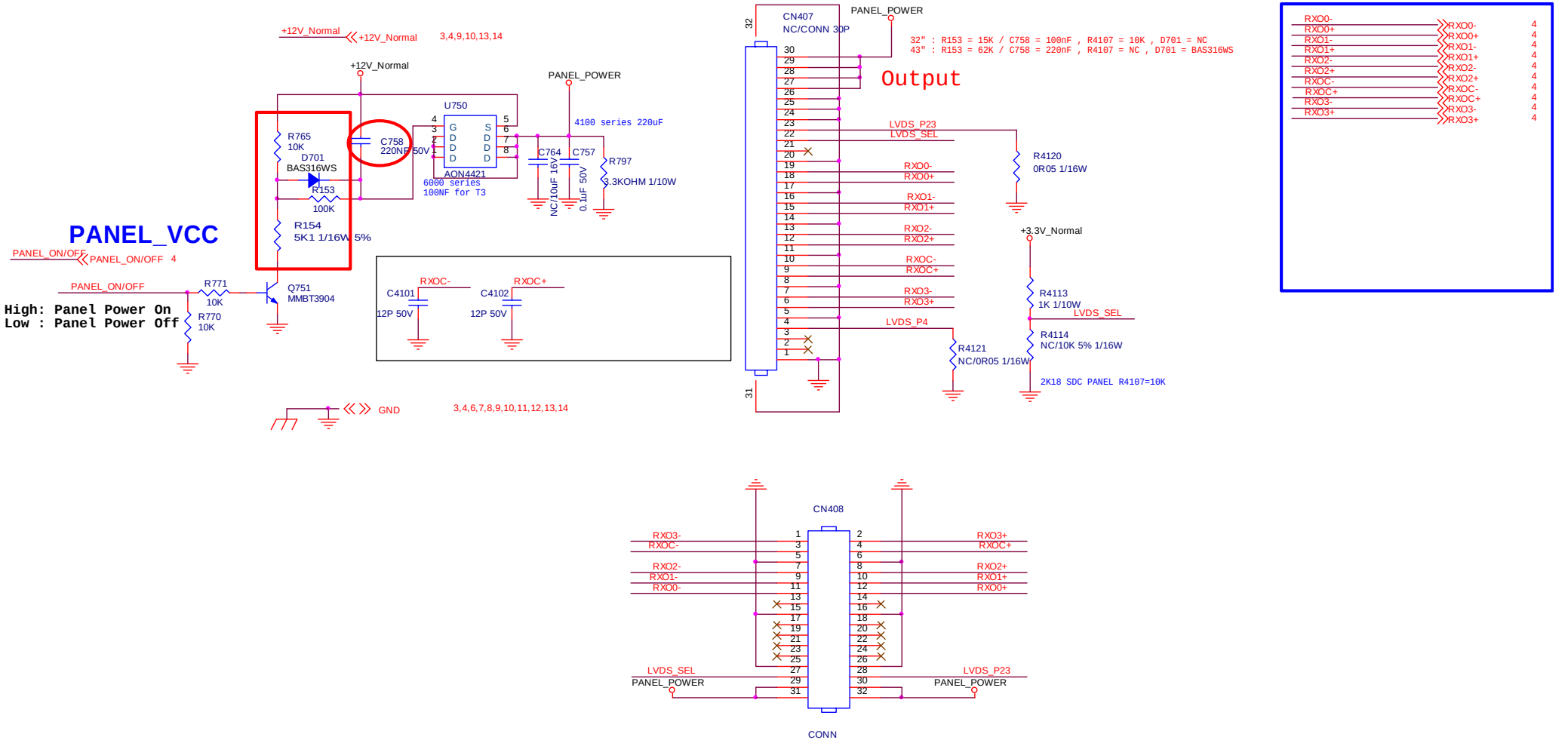




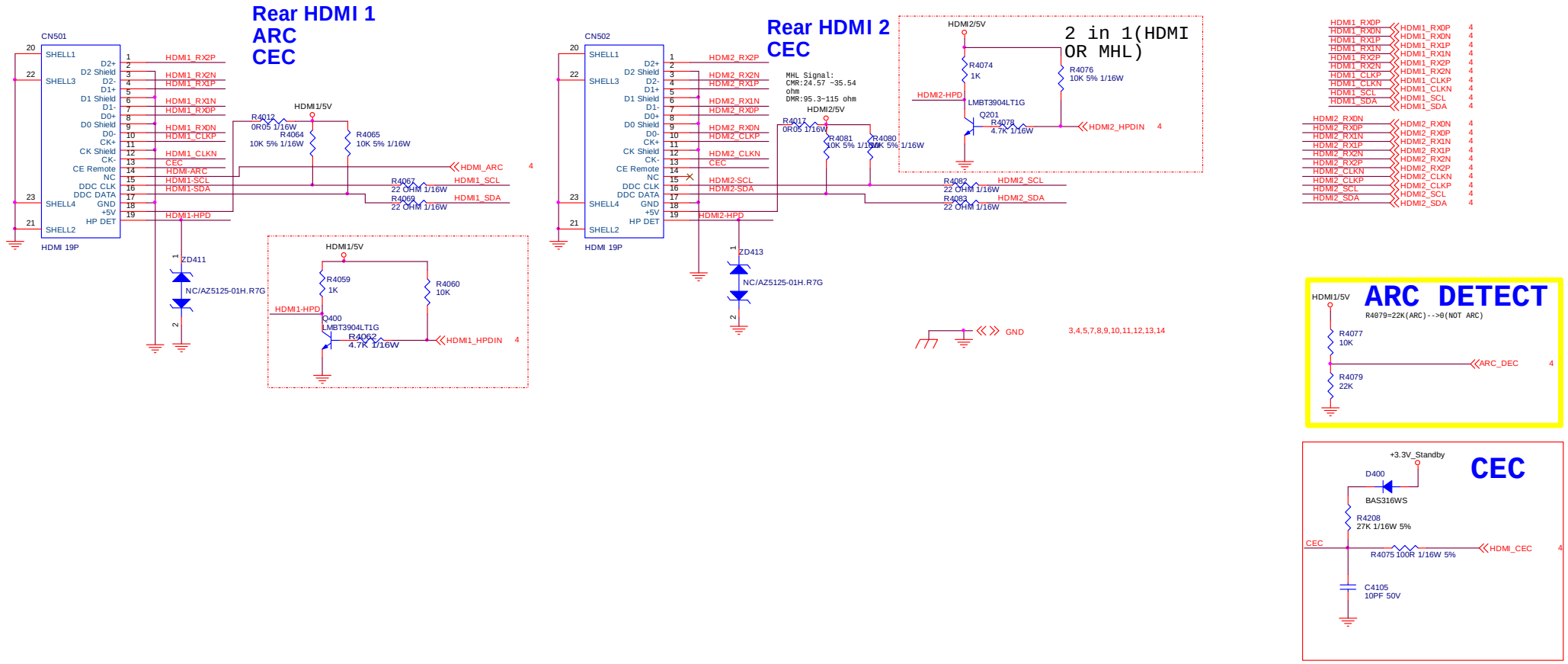
9-3-2 MSD92LGSW2



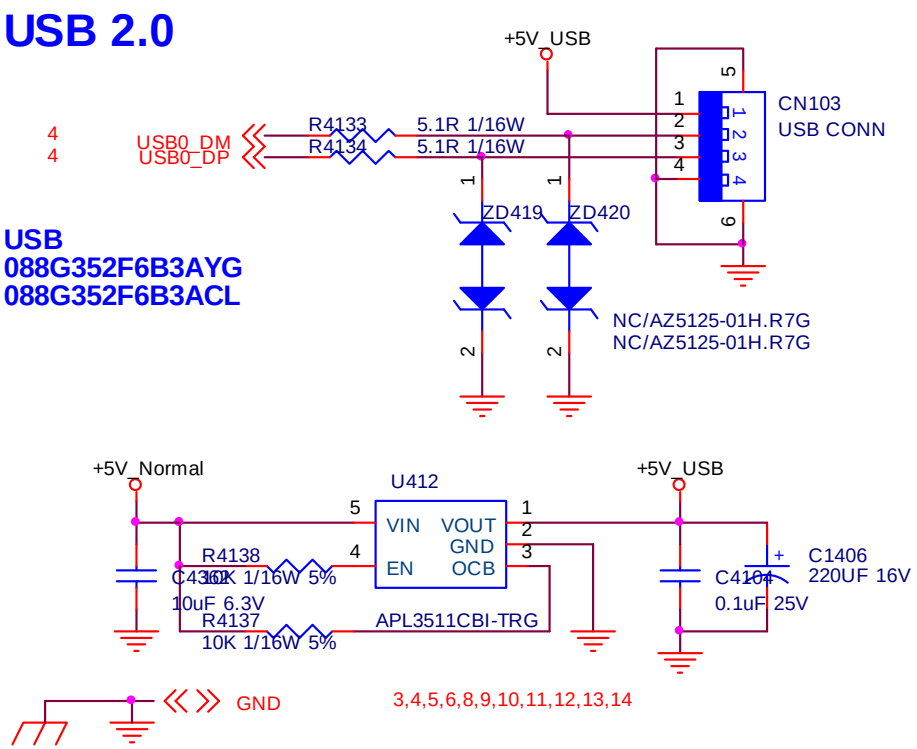
9-3-3 LVDS

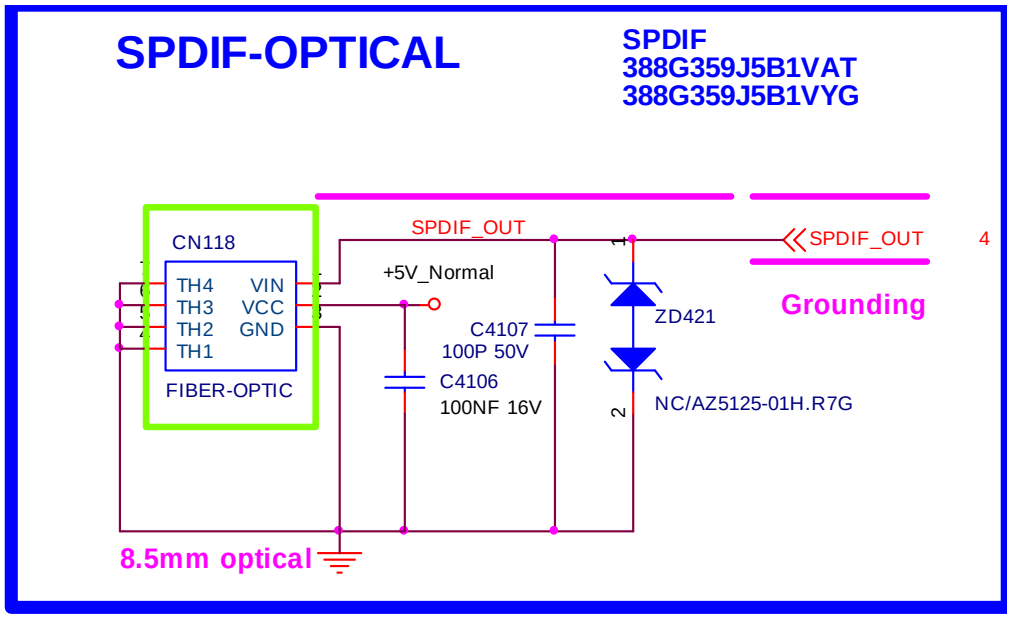

+12V_Normal
+12V_Normal 3,4,9,10,13,14
+12V_Normal
PANEL_POWER
U750
4100 series 220uF
R765
10K
D701
BAS316WS
C758
220NF 50V
R153
100K
R154
5K1 1/16W 5%
AON4421
6000 series
100NF for T3
C764
NC/10uF 16V
C757
0.1uF 50V
R797
3.3KOHM 1/10W
PANEL_VCC
PANEL_ON/OFF
PANEL_ON/OFF 4
PANEL_ON/OFF
R771
10K
Q751
MMBT3904
R770
10K
High: Panel Power On
Low : Panel Power Off
RXOC-
RXOC+
C4101
12P 50V
C4102
12P 50V
GND
3,4,6,7,8,9,10,11,12,13,14
CN407
NC/CONN 30P
PANEL_POWER
32" : R153 = 15K / C758 = 100nF , R4107 = 10K , D701 = NC
43" : R153 = 62K / C758 = 220nF , R4107 = NC , D701 = BAS316WS
Output
LVDS_P23
LVDS_SEL
R4120
0R05 1/16W
RXO0-
RXO0+
RXO1-
RXO1+
RXO2-
RXO2+
RXOC-
RXOC+
RXO3-
RXO3+
LVDS_P4
R4121
NC/0R05 1/16W
+3.3V_Normal
R4113
1K 1/10W
LVDS_SEL
R4114
NC/10K 5% 1/16W
2K18 SDC PANEL R4107=10K
RXO0-
RXO0+
RXO1-
RXO1+
RXO2-
RXO2+
RXOC-
RXOC+
RXO3-
RXO3+
CN408
RXO3-
RXOC-
RXO2-
RXO1-
RXO0-
RXO3+
RXOC+
RXO2+
RXO1+
RXO0+
LVDS_SEL
PANEL_POWER
LVDS_P23
PANEL_POWER
CONN

9-3-4 HDMI/ARC/UART

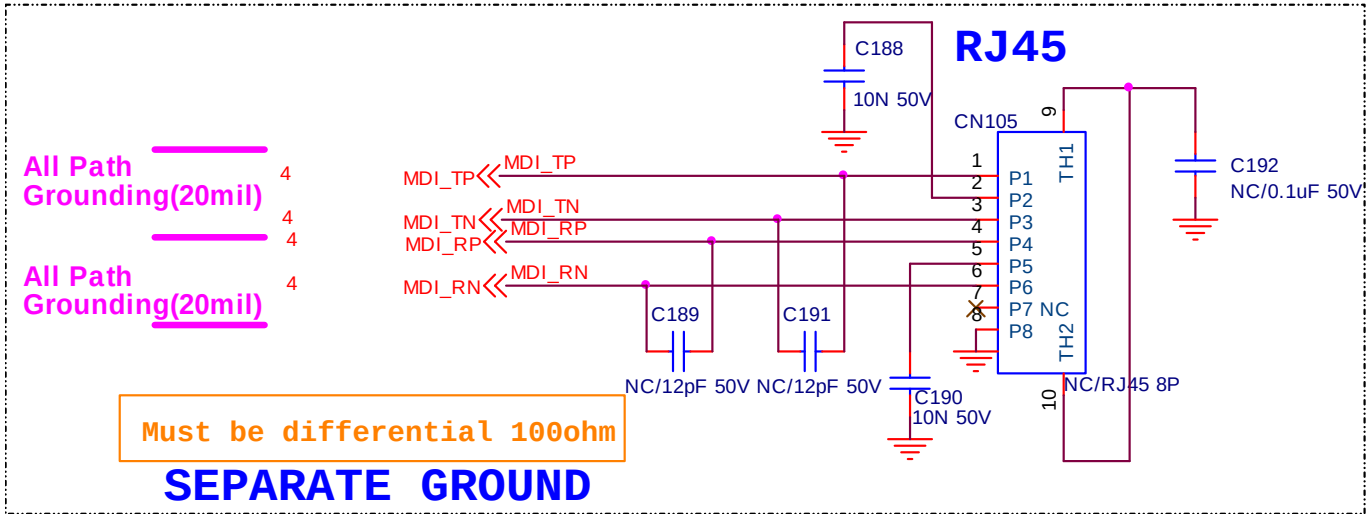


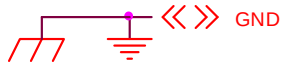
9-3-5 USB/SPDIF





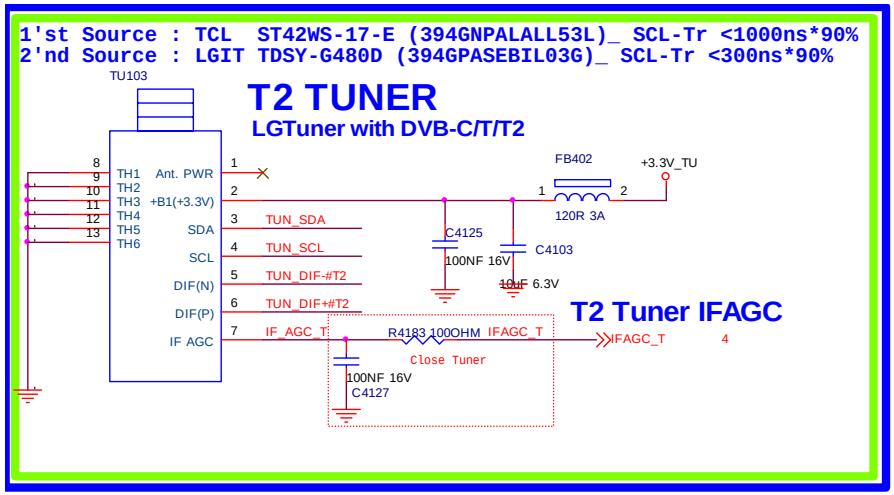
9-3-6 RJ45

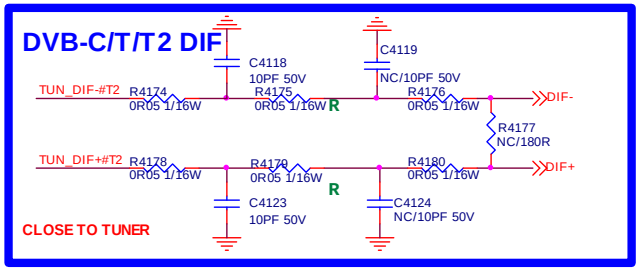


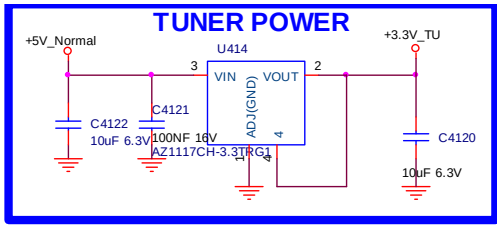


3,4,5,6,7,9,10,11,12,13,14

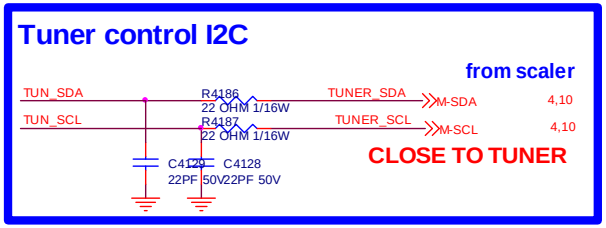
9-3-7 Tuner

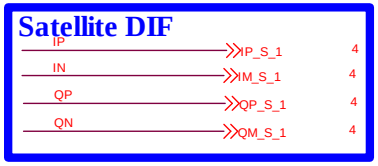


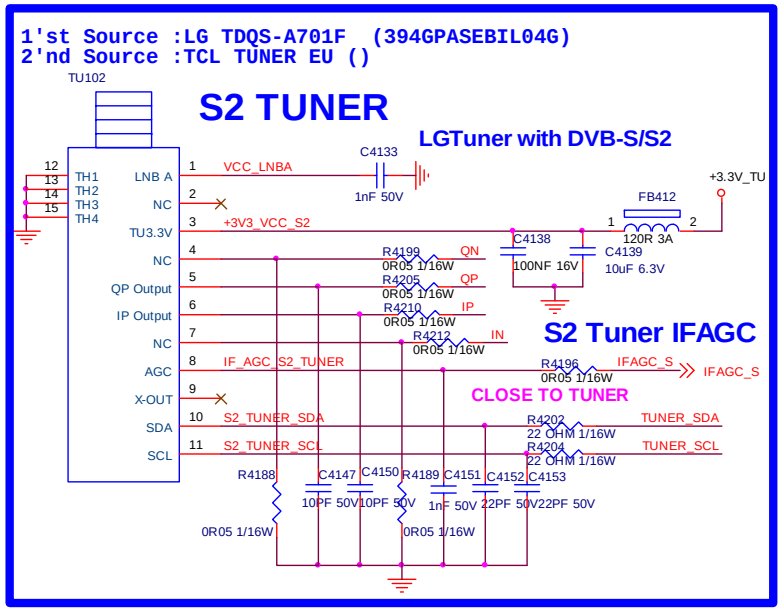


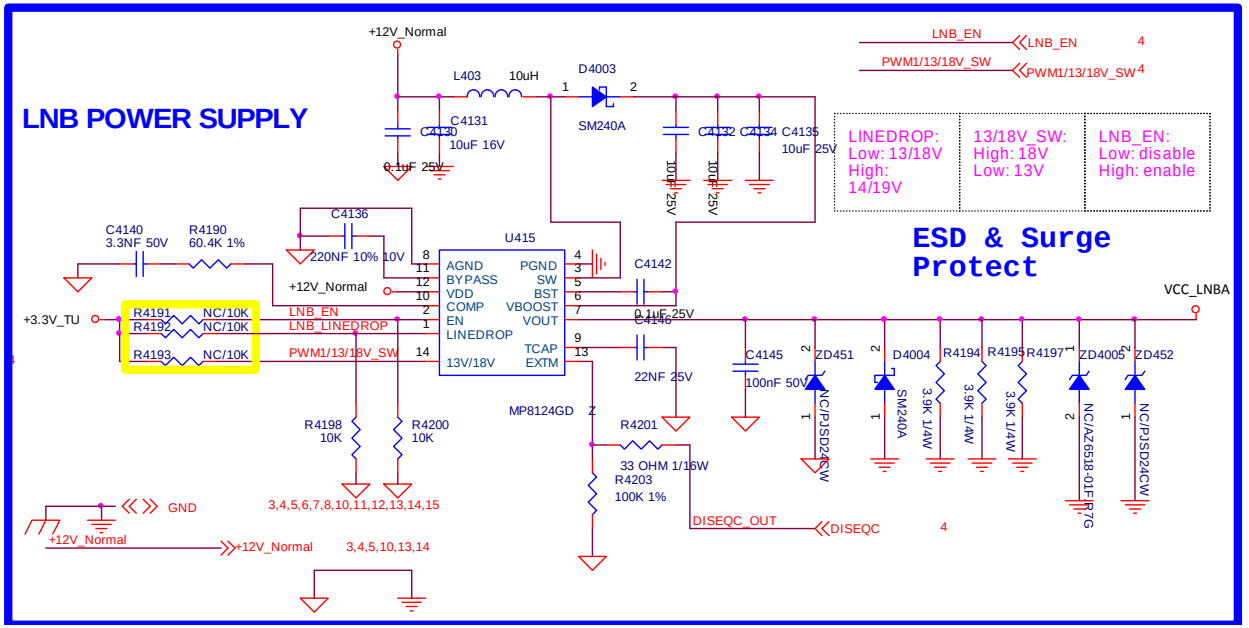


4,15 +3.3V_TU

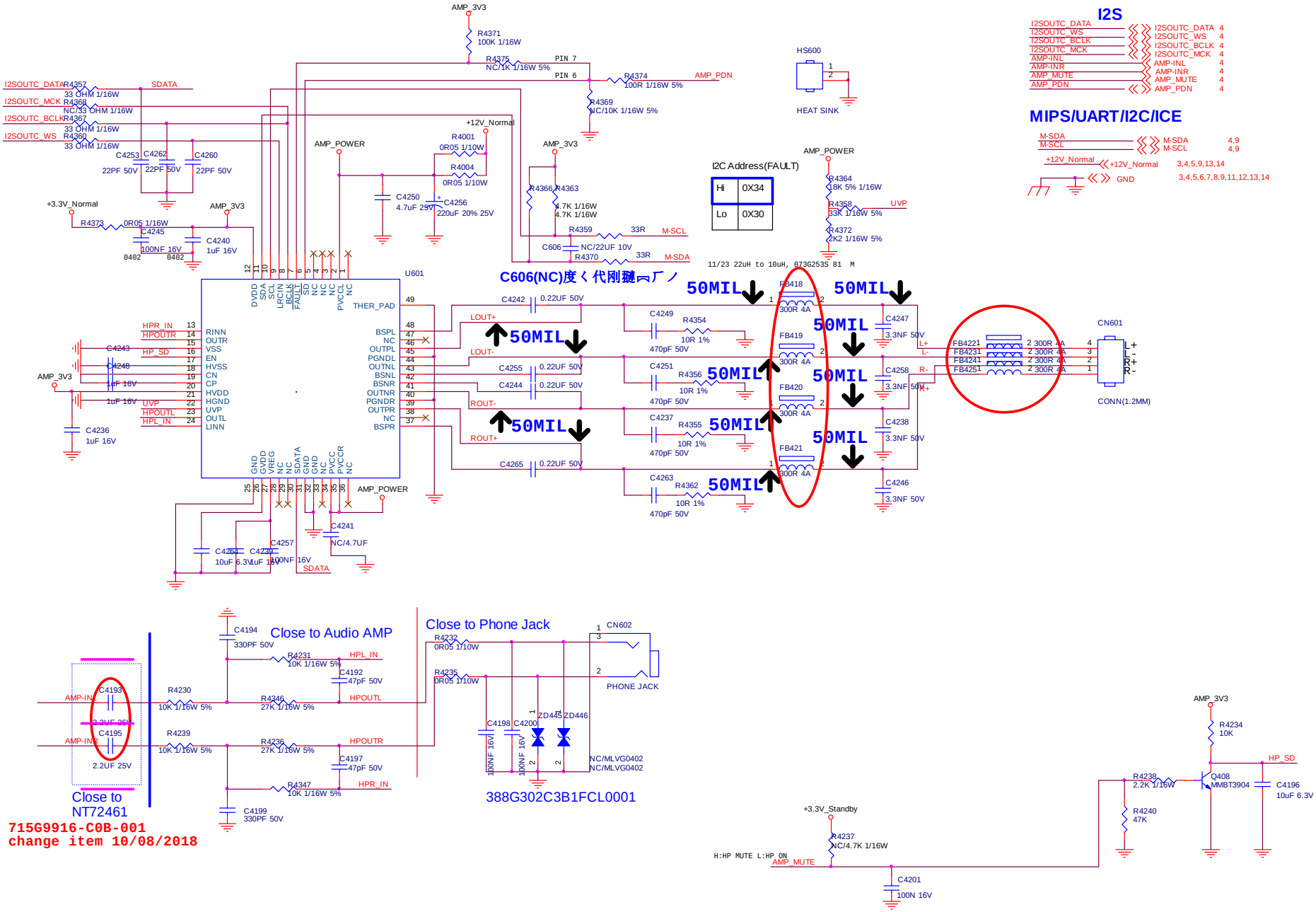




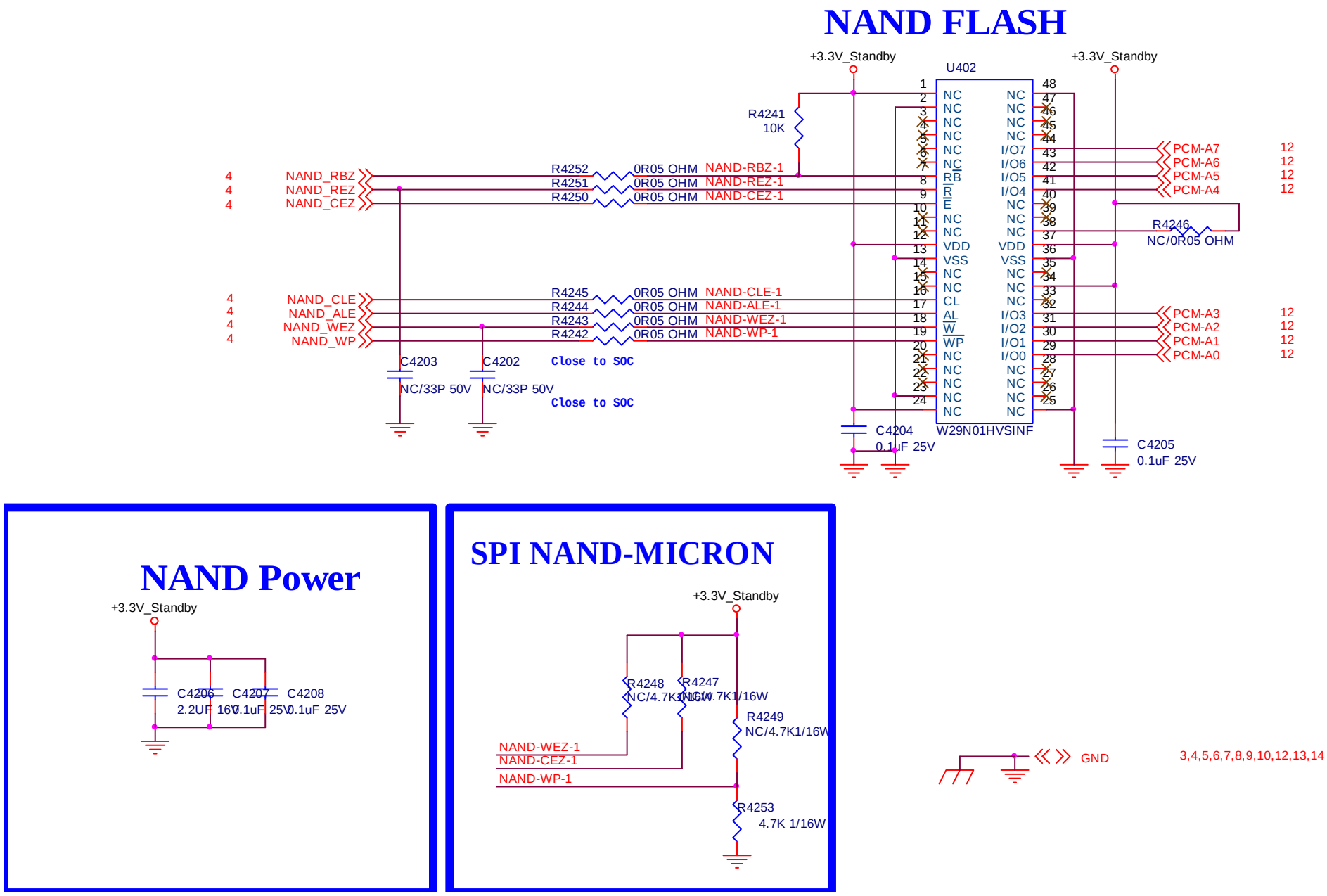




9-3-8 Amplifier/HP

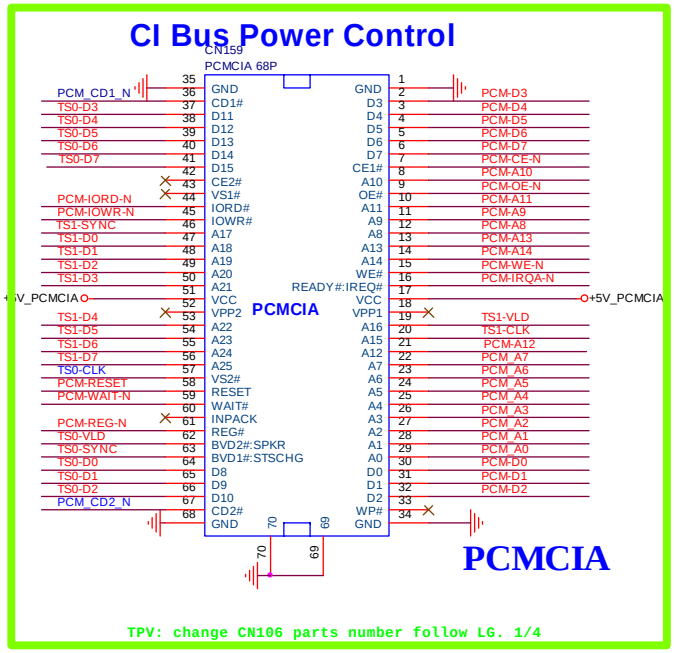


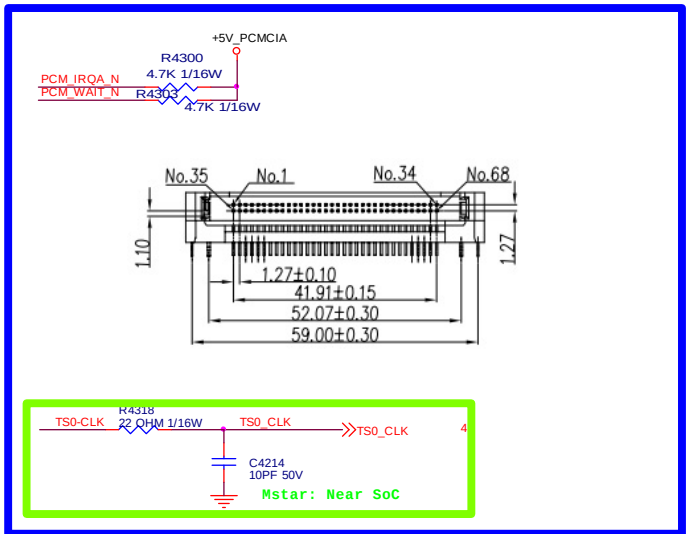
9-3-9 NAND Flash

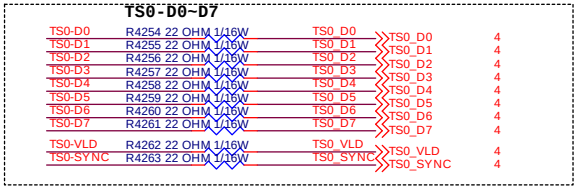


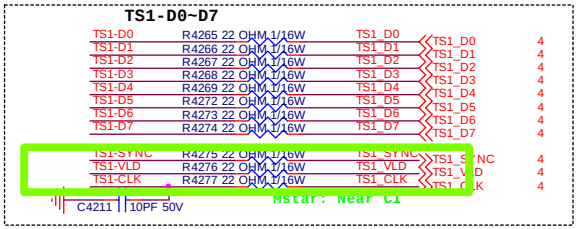
3,4,5,6,7,8,9,10,12,13,14

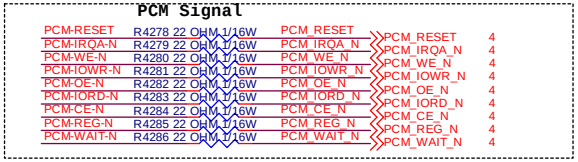
9-3-10 PCMCI

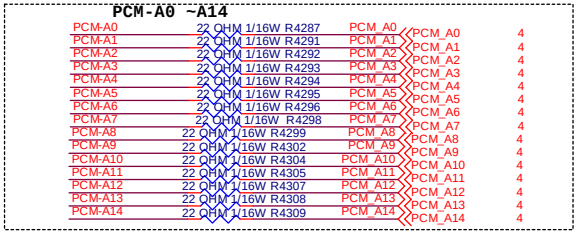


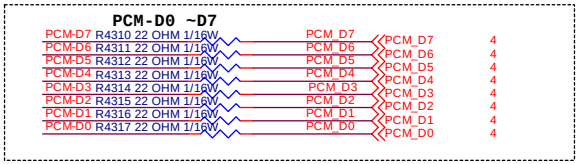


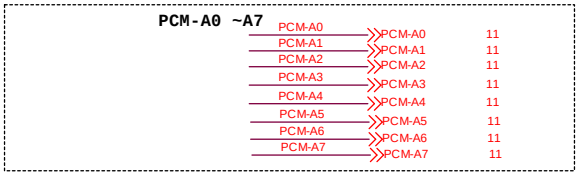


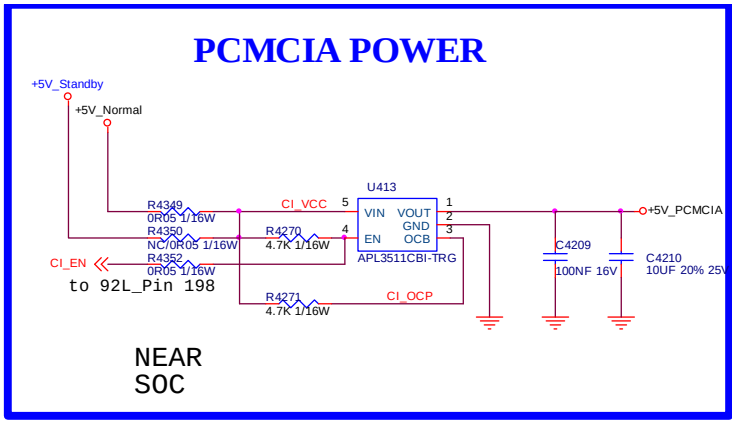


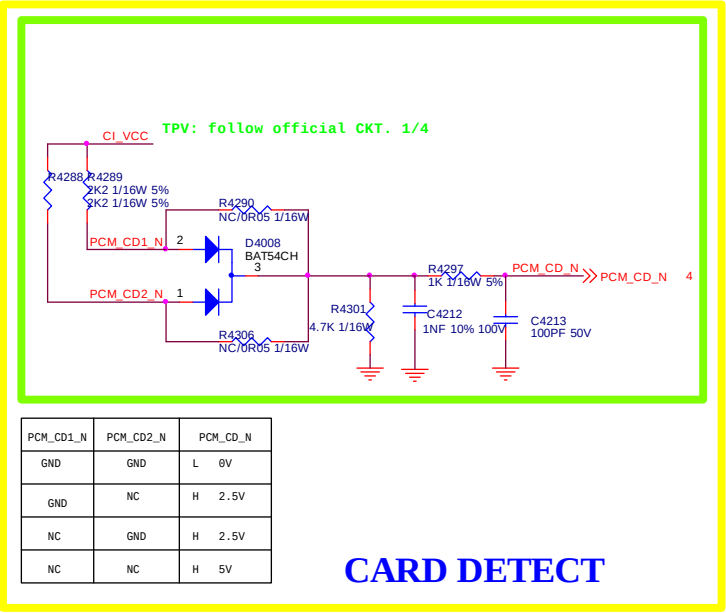






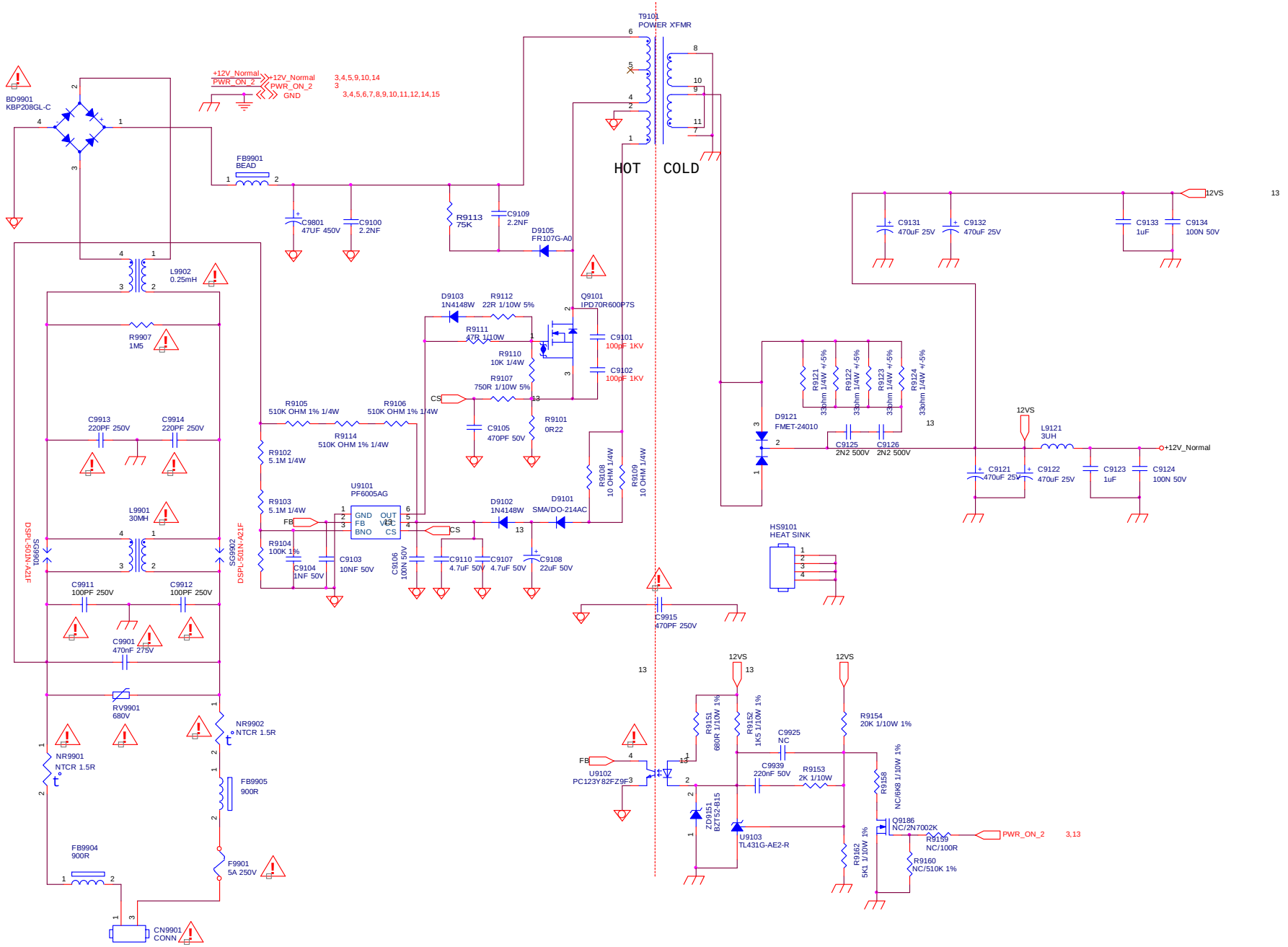




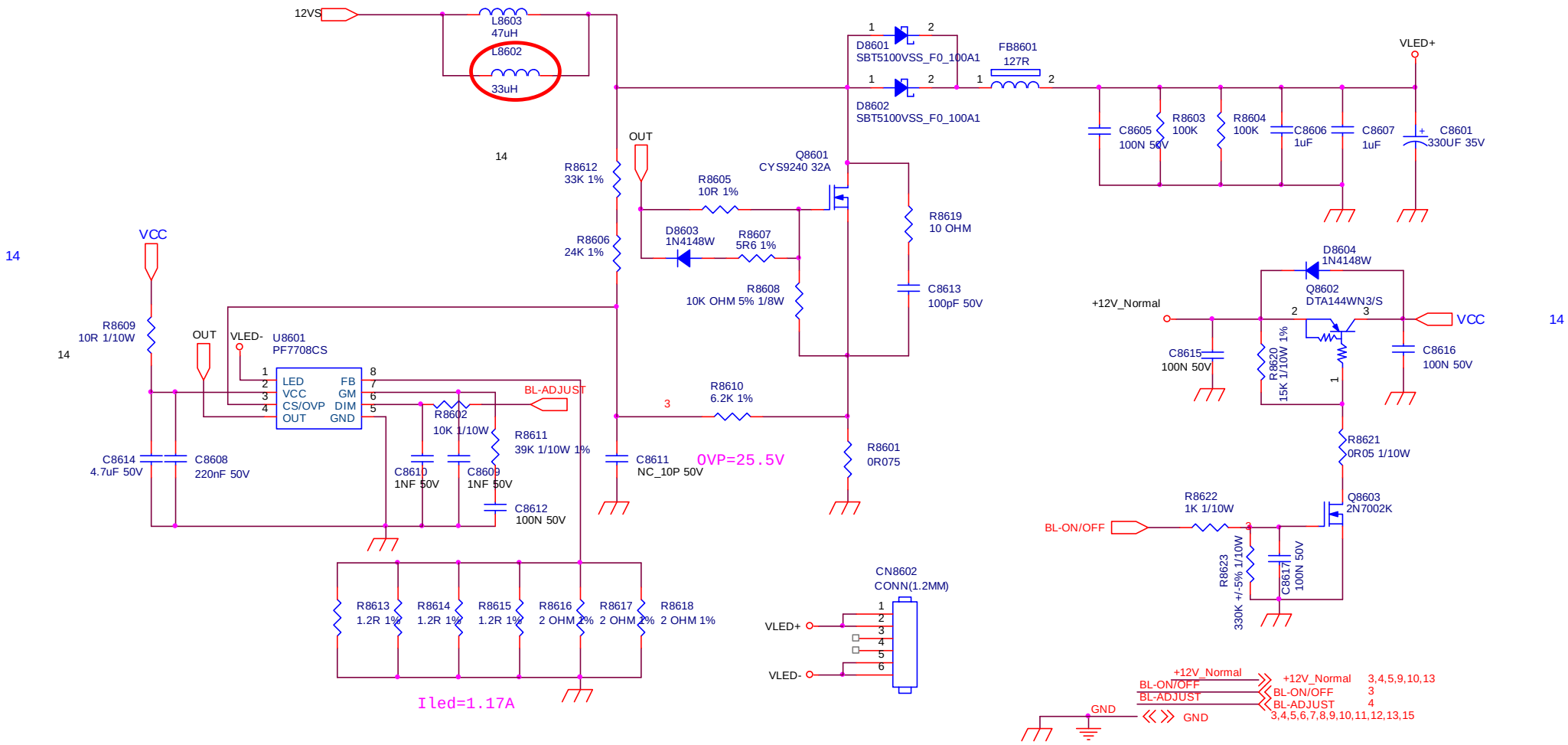


PCM_CD1_N	PCM_CD2_N	PCM_CD_N
GND	GND	L 0V
GND	NC	H 2.5V
NC	GND	H 2.5V
NC	NC	H 5V

9-3-11 AC Power



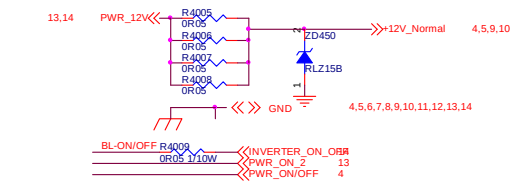
9-3-12 LED Driver



9.4 B 715G9993 SSB (For 43” 5503 Series)

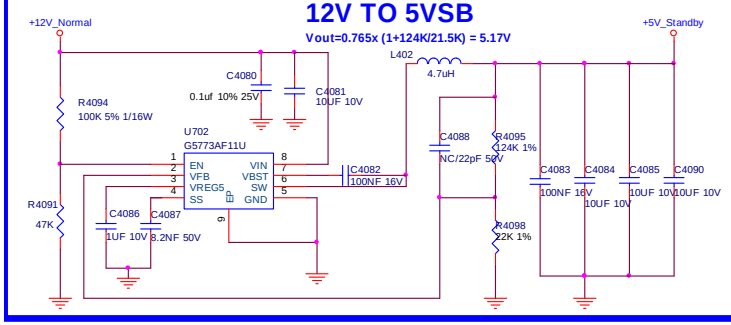
9-4-1 System Power

MAIN POWER

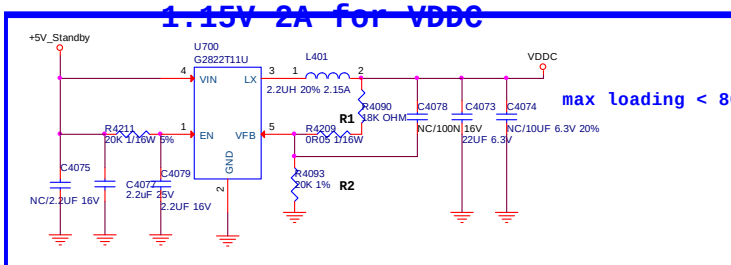


12V TO 5VSB

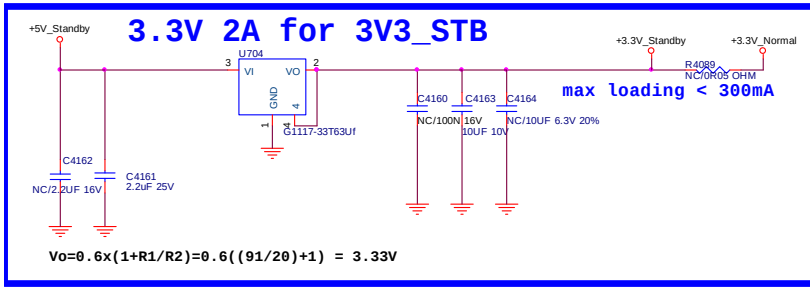
Vout=0.765x (1+124K/21.5K) = 5.17V



1.15V 2A for VDDC

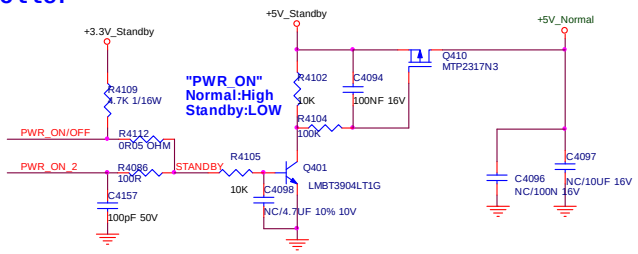


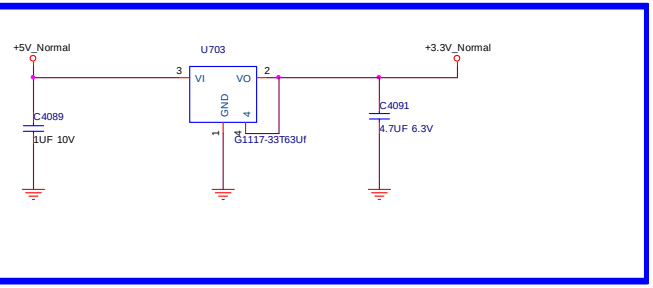
3.3V 2A for 3V3_STB



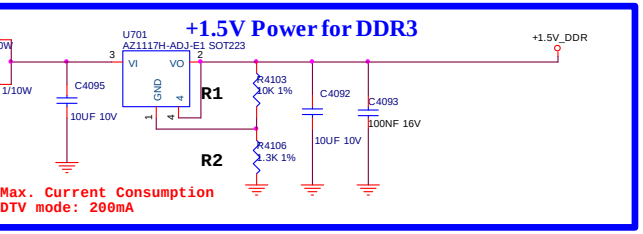
POWER Controller

5V STANDBY TO 5V NORMAL

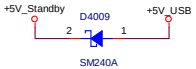


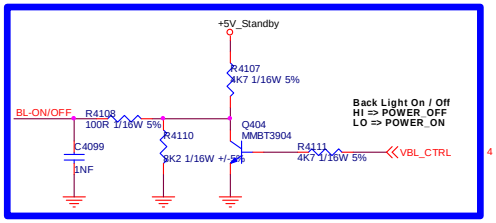


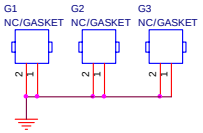
+1.5V Power for DDR3



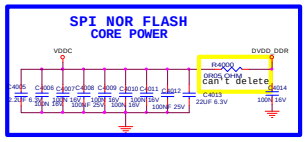
For AC OFF USB UPDATE CODE

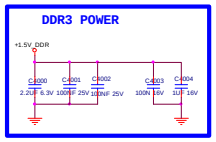


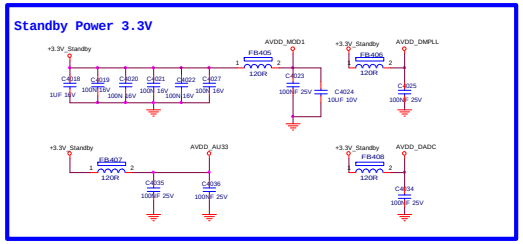


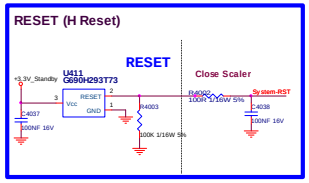


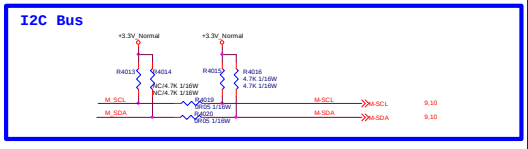
9-4-2 MSD92LGSW2

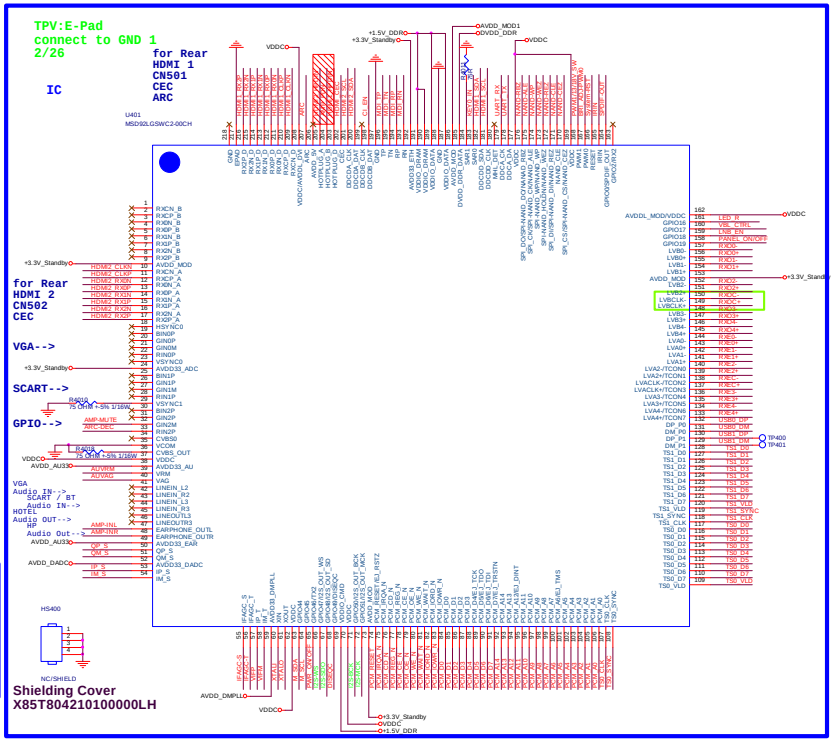


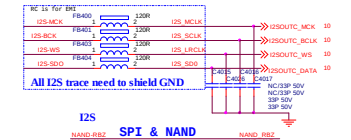


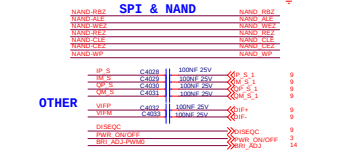


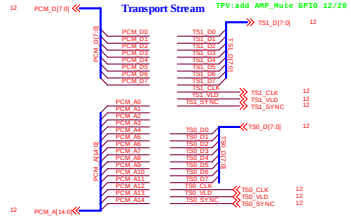


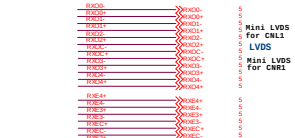


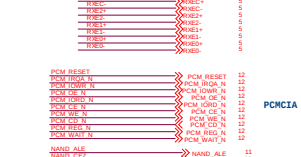


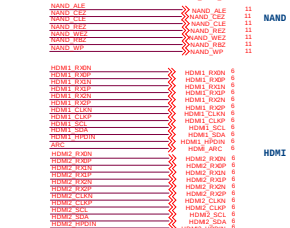


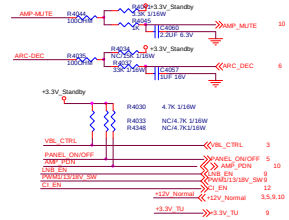


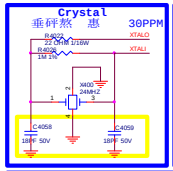


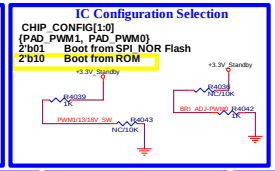


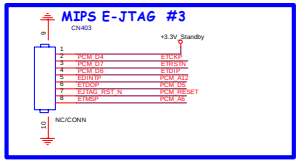


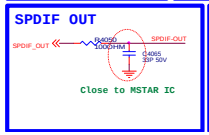


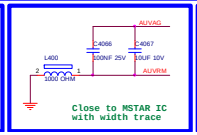


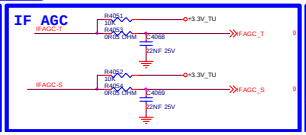


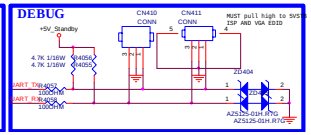


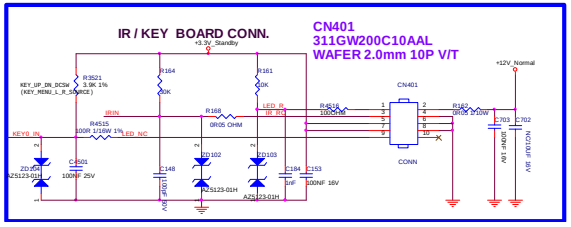




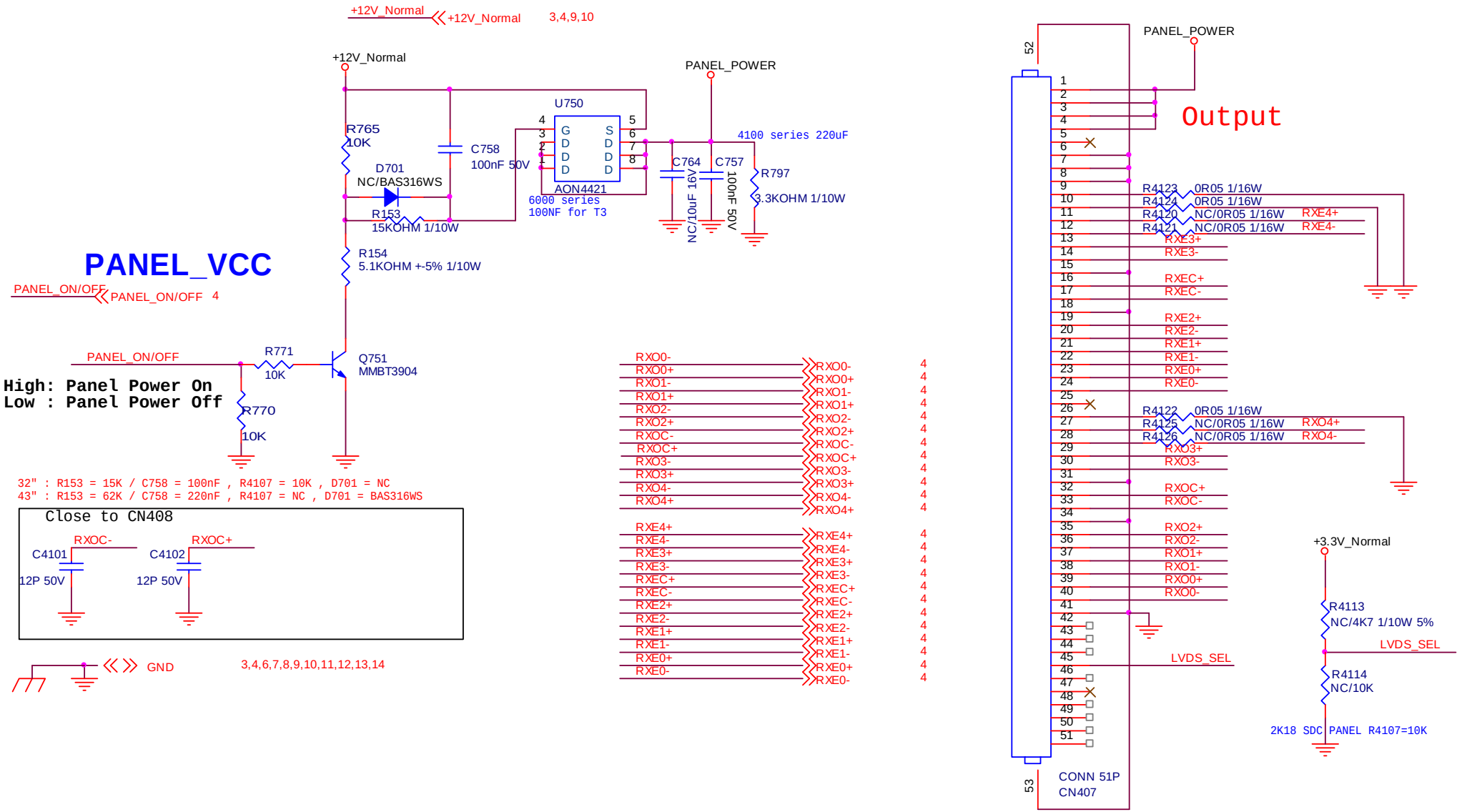




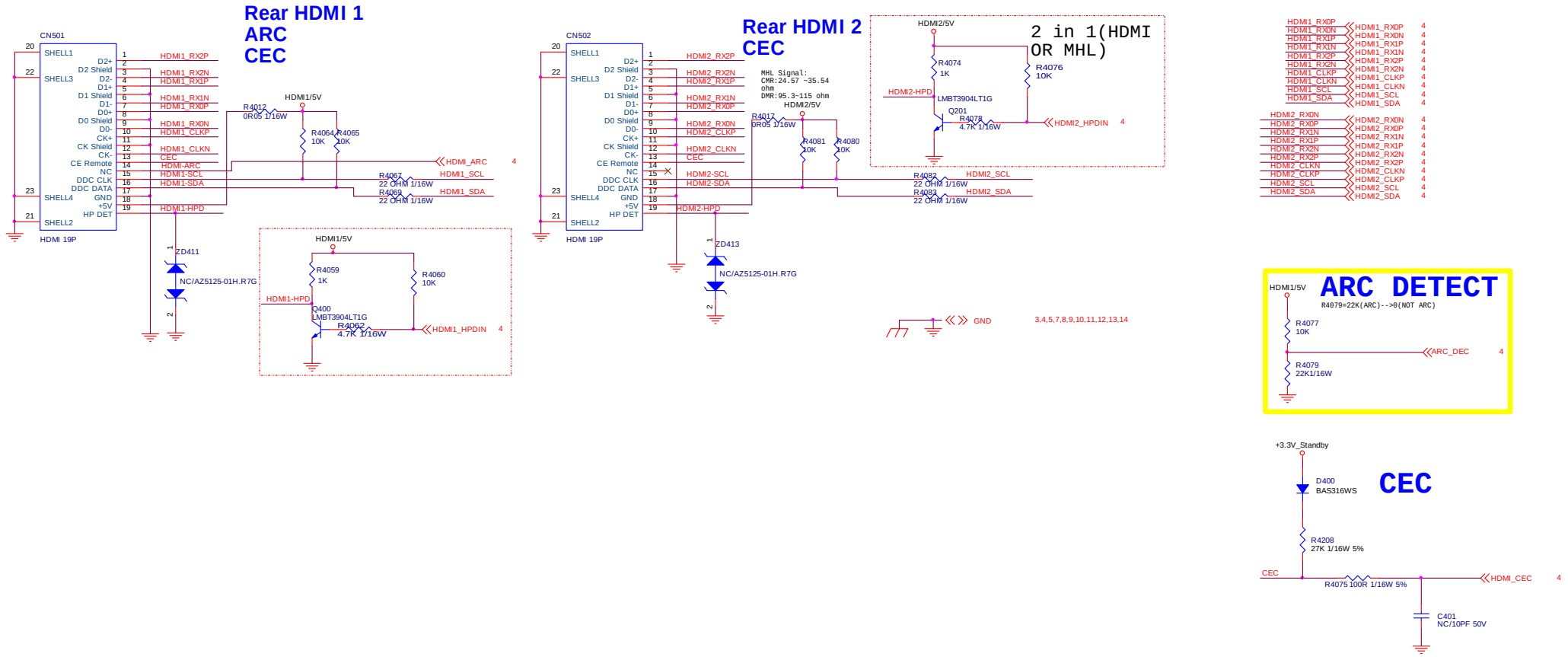




9-4-3 LVDS

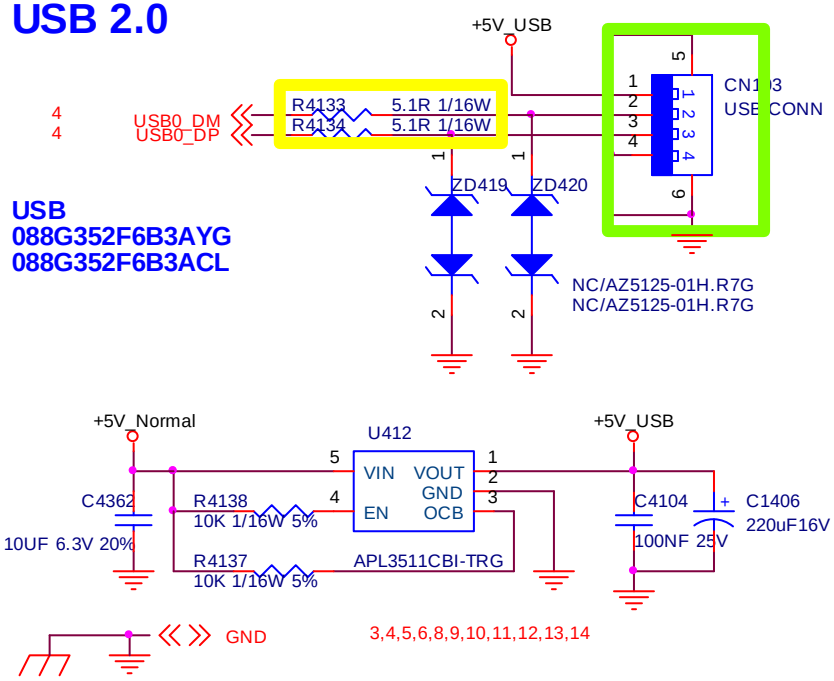

+12V_Normal
+12V_Normal 3,4,9,10
PANEL_POWER
U750
R765
10K
C758
100nF 50V
D701
NC/BAS316WS
R153
15KOHM 1/10W
AON4421
6000 series
100NF for T3
C764
C757
4100 series 220uF
NC/10uF 16V
100nF 50V
R797
3.3KOHM 1/10W
R154
5.1KOHM +-5% 1/10W
PANEL_VCC
PANEL_ON/OFF
PANEL_ON/OFF 4
R771
10K
Q751
MMBT3904
High: Panel Power On
Low : Panel Power Off
R770
10K
32" : R153 = 15K / C758 = 100nF , R4107 = 10K , D701 = NC
43" : R153 = 62K / C758 = 220nF , R4107 = NC , D701 = BAS316WS
Close to CN408
RXOC-
RXOC+
C4101
C4102
12P 50V
12P 50V
GND
3,4,6,7,8,9,10,11,12,13,14
RXO0-
RXO0+
RXO1-
RXO1+
RXO2-
RXO2+
RXOC-
RXOC+
RXO3-
RXO3+
RXO4-
RXO4+
RXE4+
RXE4-
RXE3+
RXE3-
RXEC+
RXEC-
RXE2+
RXE2-
RXE1+
RXE1-
RXE0+
RXE0-
52
53
CONN 51P
CN407
Output
R4123 0R05 1/16W
R4124 0R05 1/16W
R4120 NC/0R05 1/16W
R4121 NC/0R05 1/16W
RXE4+
RXE4-
RXE3+
RXE3-
RXEC+
RXEC-
RXE2+
RXE2-
RXE1+
RXE1-
RXE0+
RXE0-
R4122 0R05 1/16W
R4125 NC/0R05 1/16W
R4126 NC/0R05 1/16W
RXO4+
RXO4-
RXO3+
RXO3-
RXOC+
RXOC-
RXO2+
RXO2-
RXO1+
RXO1-
RXO0+
RXO0-
LVDS_SEL
+3.3V_Normal
R4113
NC/4K7 1/10W 5%
LVDS_SEL
R4114
NC/10K
2K18 SDC PANEL R4107=10K

9-4-4 HDMI/ARC/UART



9-4-5 USB/SPDIF

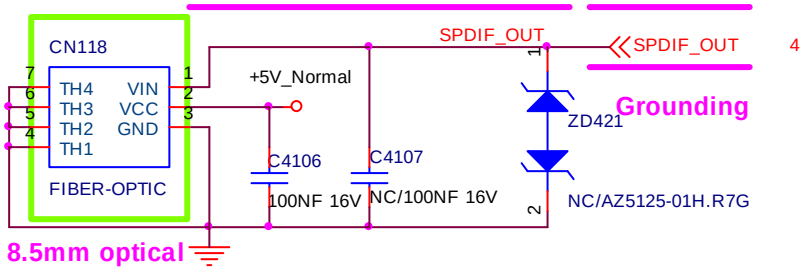
USB 2.0

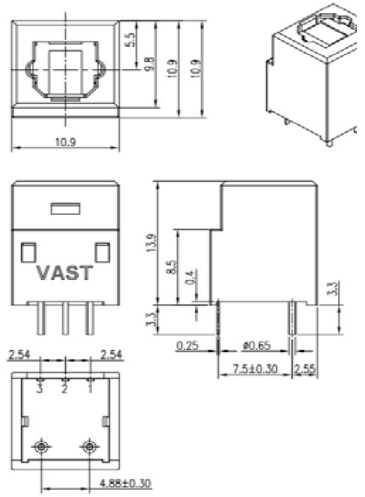


USB
088G352F6B3AYG
088G352F6B3ACL

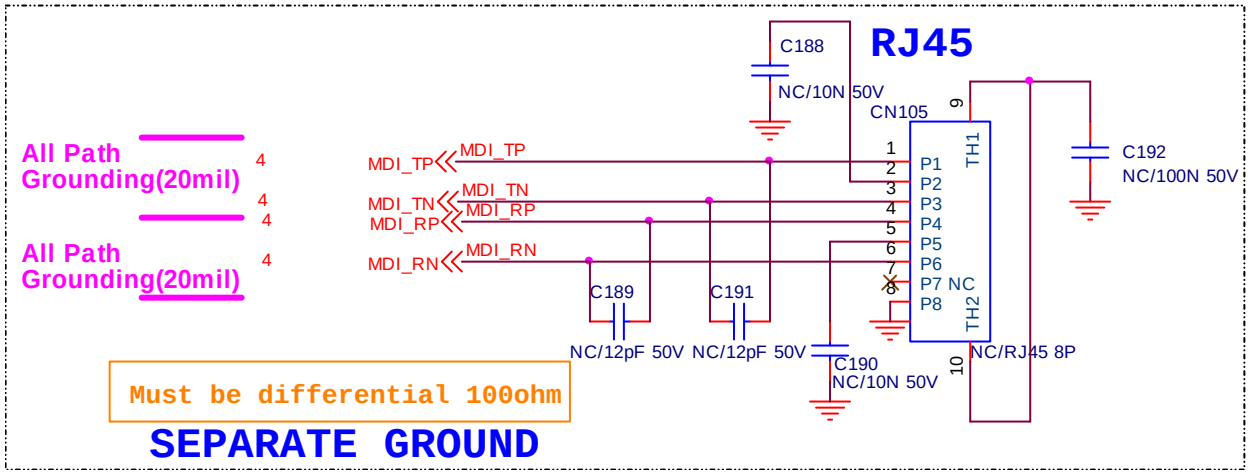
SPDIF-OPTICAL

SPDIF
388G359J5B1VAT
388G359J5B1VYG



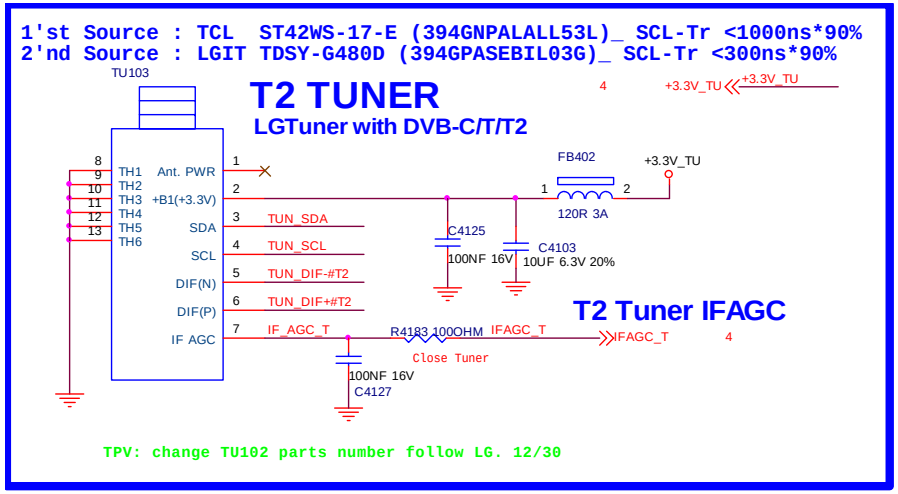


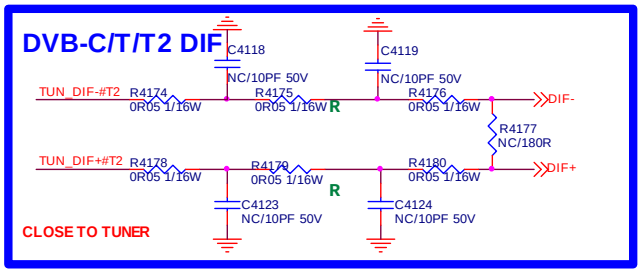
9-4-6 RJ45

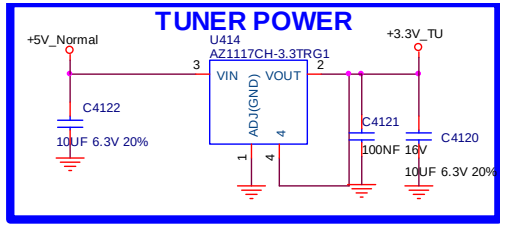


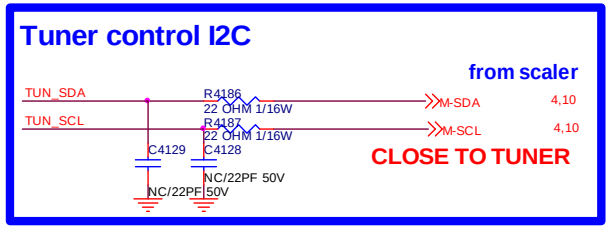
3,4,5,6,7,9,10,11,12,13,14

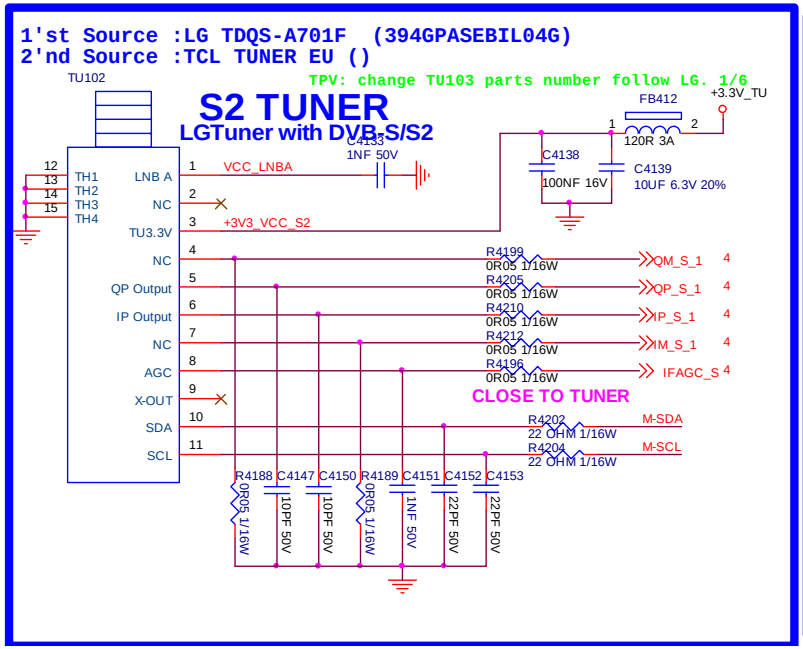
9-4-7 Tuner

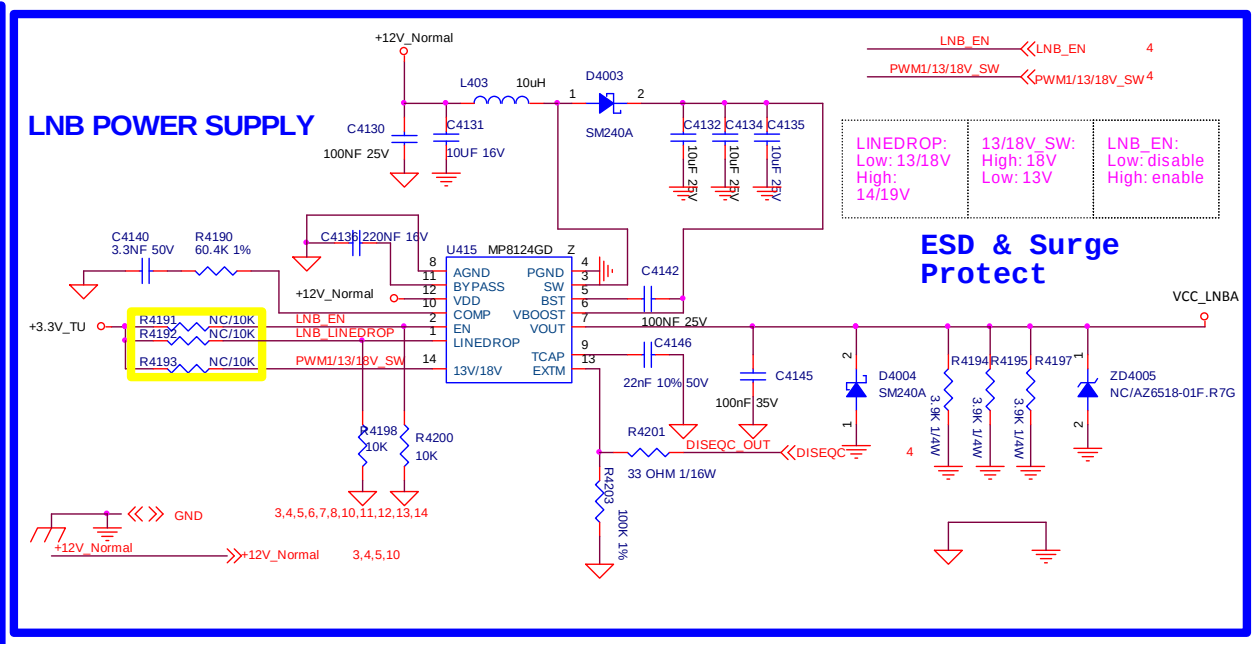

1'st Source : TCL ST42WS-17-E (394GNPALALL53L)_ SCL-Tr <1000ns*90%
2'nd Source : LGIT TDSY-G480D (394GPASEBIL03G)_ SCL-Tr <300ns*90%
T2 TUNER
LGTuner with DVB-C/T/T2
TU103
TH1 TH2 TH3 TH4 TH5 TH6
Ant. PWR
+B1(+3.3V)
SDA
SCL
DIF(N)
DIF(P)
IF AGC
TUN_SDA
TUN_SCL
TUN_DIF-#T2
TUN_DIF+#T2
IF_AGC_T
FB402
120R 3A
+3.3V_TU
C4125
100NF 16V
C4103
10UF 6.3V 20%
T2 Tuner IFAGC
R4183 100OHM
IFAGC_T
Close Tuner
100NF 16V
C4127
TPV: change TU102 parts number follow LG. 12/30


DVB-C/T/T2 DIF
C4118
NC/10PF 50V
C4119
NC/10PF 50V
TUN_DIF-#T2
R4174
0R05 1/16W
R4175
0R05 1/16W
R4176
0R05 1/16W
DIF-
R4177
NC/180R
TUN_DIF+#T2
R4178
0R05 1/16W
R4179
0R05 1/16W
R4180
0R05 1/16W
DIF+
C4123
NC/10PF 50V
C4124
NC/10PF 50V
CLOSE TO TUNER

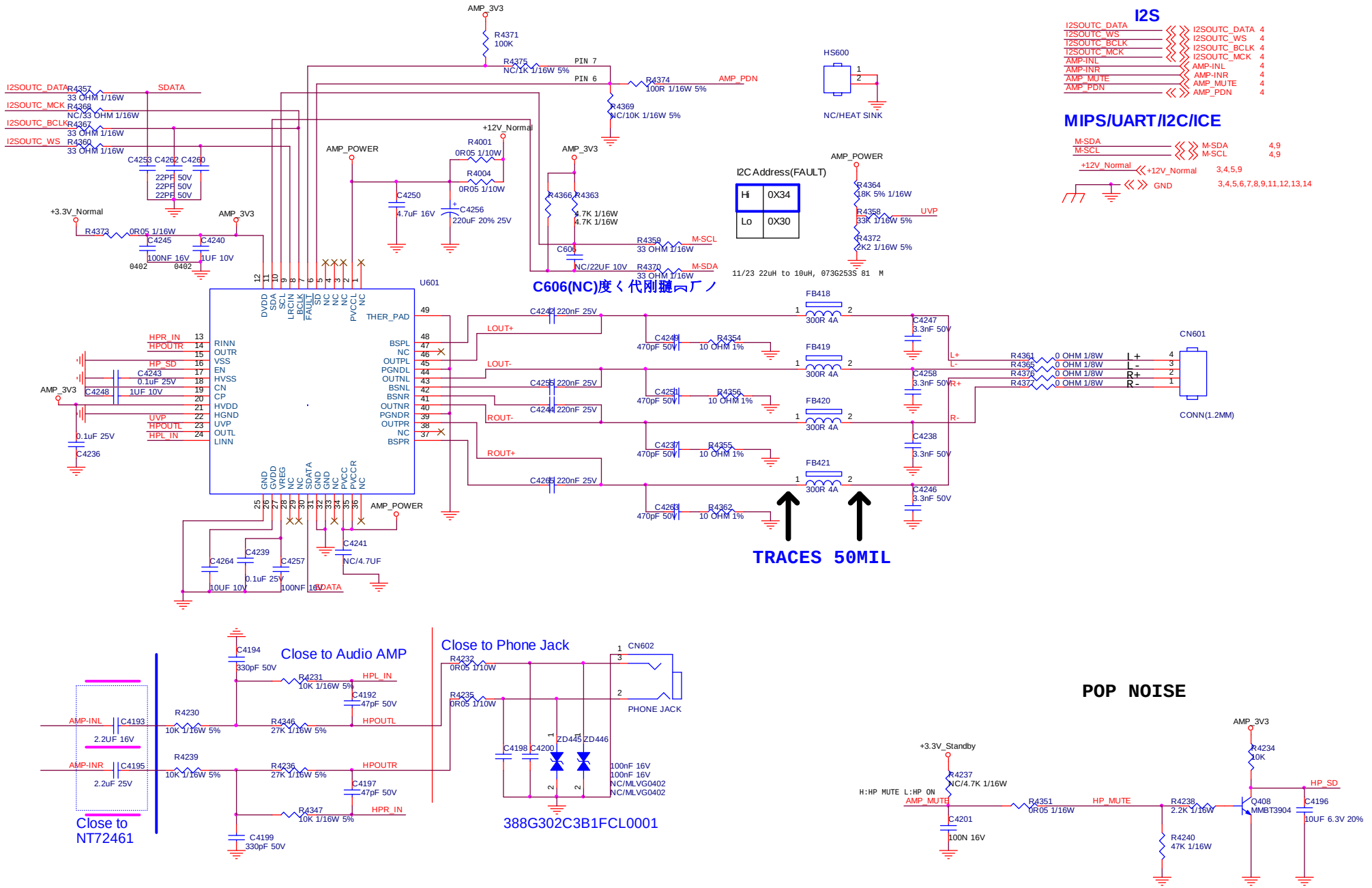

TUNER POWER
+5V_Normal
U414
AZ1117CH-3.3TRG1
VIN
VOUT
ADJ(GND)
+3.3V_TU
C4122
10UF 6.3V 20%
C4121
100NF 16V
C4120
10UF 6.3V 20%


Tuner control I2C
from scaler
TUN_SDA
TUN_SCL
R4186
22 OHM 1/16W
R4187
22 OHM 1/16W
M-SDA
M-SCL
4,10
C4129
C4128
NC/22PF 50V
NC/22PF 50V
CLOSE TO TUNER

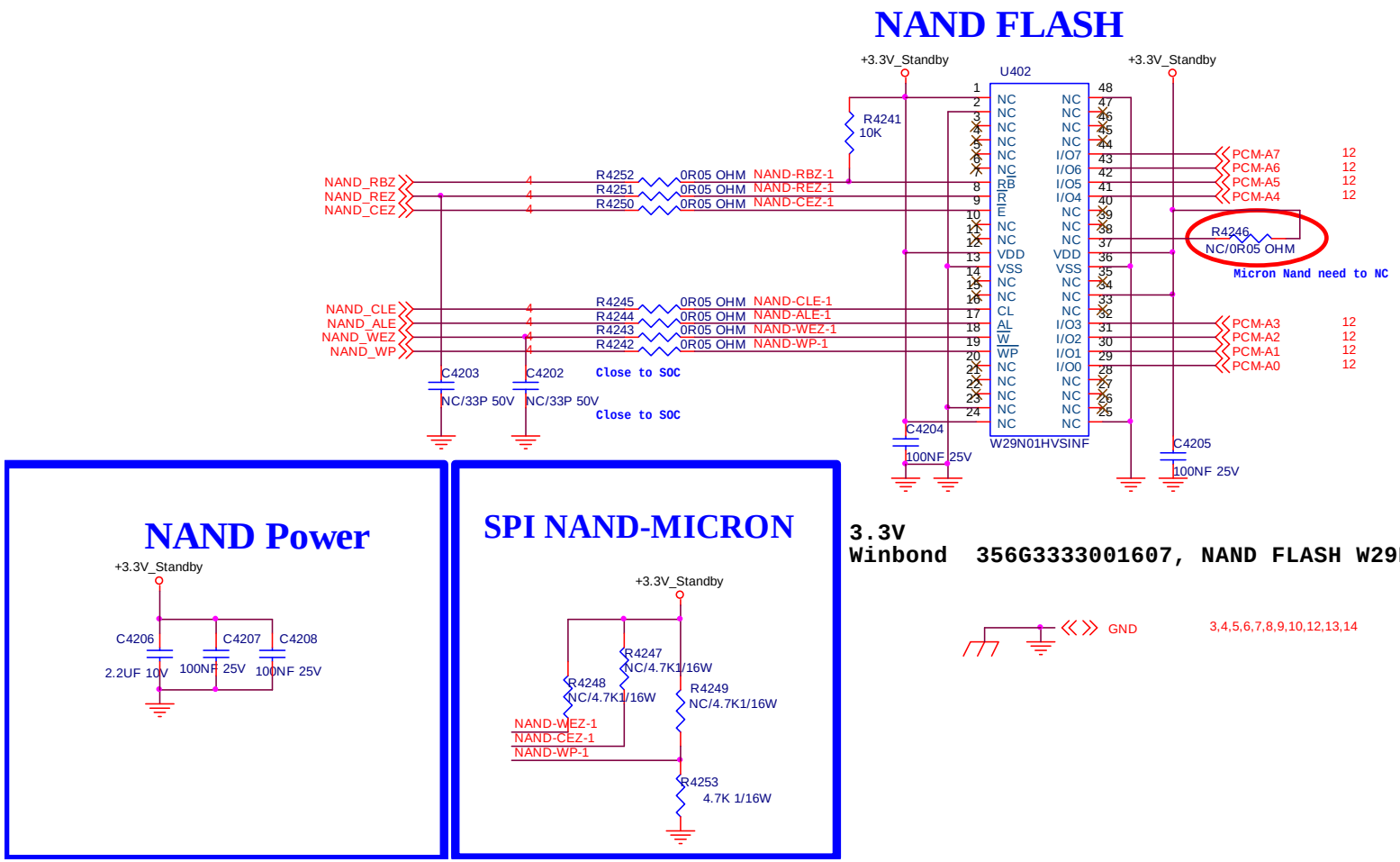

1'st Source :LG TDQS-A701F (394GPASEBIL04G)
2'nd Source :TCL TUNER EU ()
TPV: change TU103 parts number follow LG. 1/6
TU102
S2 TUNER
LGTuner with DVB-S/S2
TH1 TH2 TH3 TH4
LNB A
NC
TU3.3V
QP Output
IP Output
AGC
X-OUT
SDA
SCL
VCC_LNBA
+3V3_VCC_S2
FB412
120R 3A
+3.3V_TU
C4133
1NF 50V
C4138
100NF 16V
C4139
10UF 6.3V 20%
QM_S_1
QP_S_1
IP_S_1
IM_S_1
IFAGC_S
CLOSE TO TUNER
M-SDA
M-SCL
R4202
22 OHM 1/16W
R4204
22 OHM 1/16W
R4188 R4147 C4150 R4189 C4151 C4152 C4153


LNB POWER SUPPLY
+12V_Normal
L403
10uH
D4003
SM240A
C4130
100NF 25V
C4131
10UF 16V
C4132 C4134 C4135
LINEDROP:
Low: 13/18V
High: 14/19V
13/18V_SW:
High: 18V
Low: 13V
LNB_EN:
Low: disable
High: enable
ESD & Surge Protect
C4140
3.3NF 50V
R4190
60.4K 1%
C4136
220NF 16V
U415 MP8124GD Z
AGND
BYPASS
VDD
COMP
EN
LINEDROP
13V/18V
PGND
SW
BST
VBOOST
VOUT
TCAP
EXTM
C4142
100NF 25V
VCC_LNBA
R4191 NC/10K
R4192 NC/10K
R4193 NC/10K
LNB_EN
LNB_LINEDROP
PWM1/13/18V_SW
C4146
22nF 10% 50V
C4145
100nF 35V
D4004
SM240A
R4194 R4195 R4197
ZD4005
NC/AZ6518-01F.R7G
R4198
10K
R4200
10K
R4201
33 OHM 1/16W
DISEQC_OUT
DISEQC
R4203
100K 1%
GND
3,4,5,6,7,8,10,11,12,13,14
3,4,5,10

9-4-8 Amplifier/HP

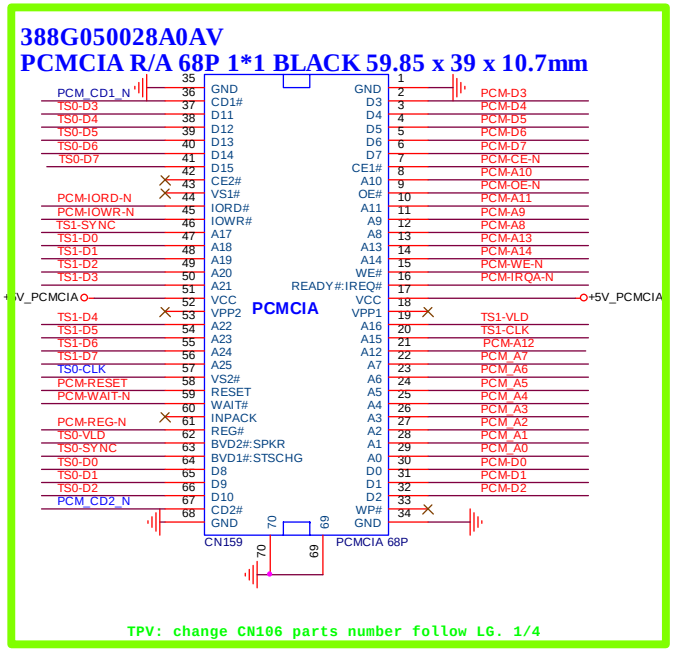


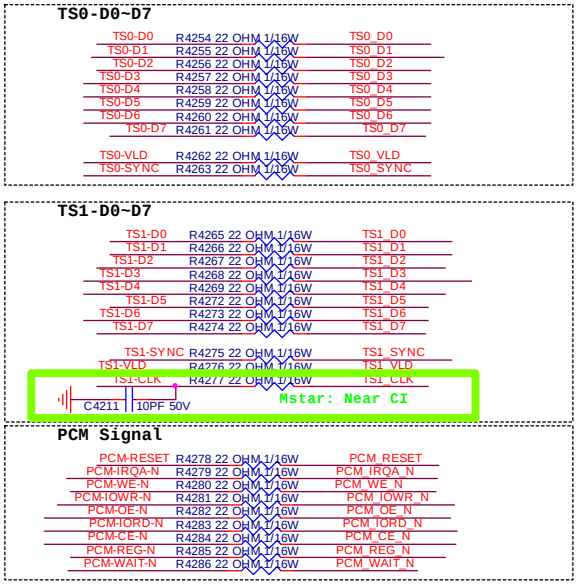
9-4-9 NAND Flash

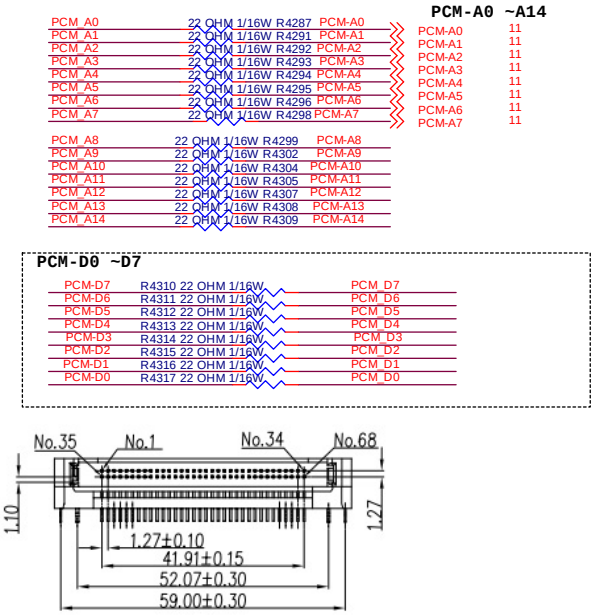


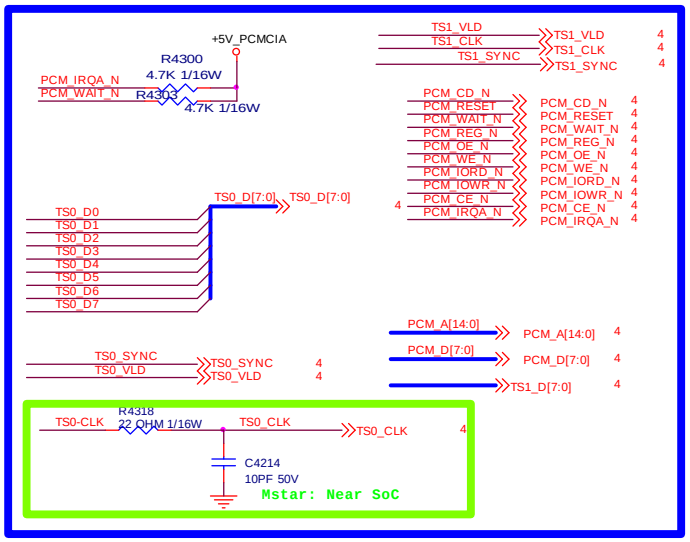
3.3V
Winbond 356G3333001607, NAND FLASH W29N01HVSINF 1Gb TSOP-48 ECC 4 bit

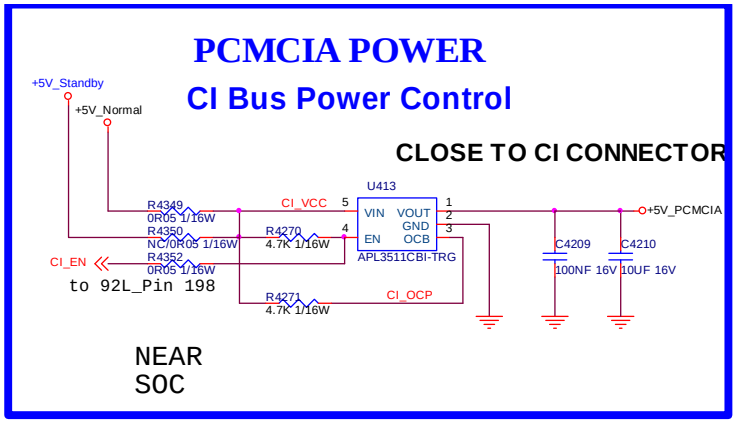
9-4-10 PCMCI

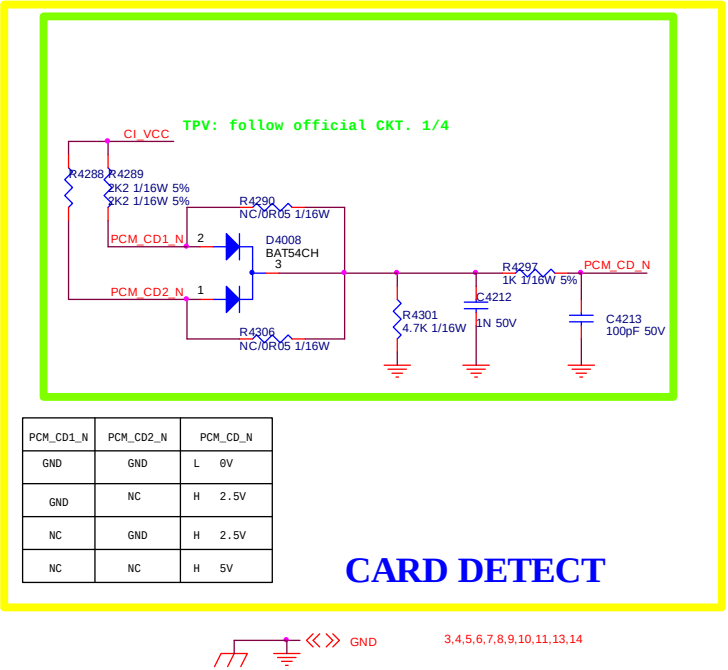








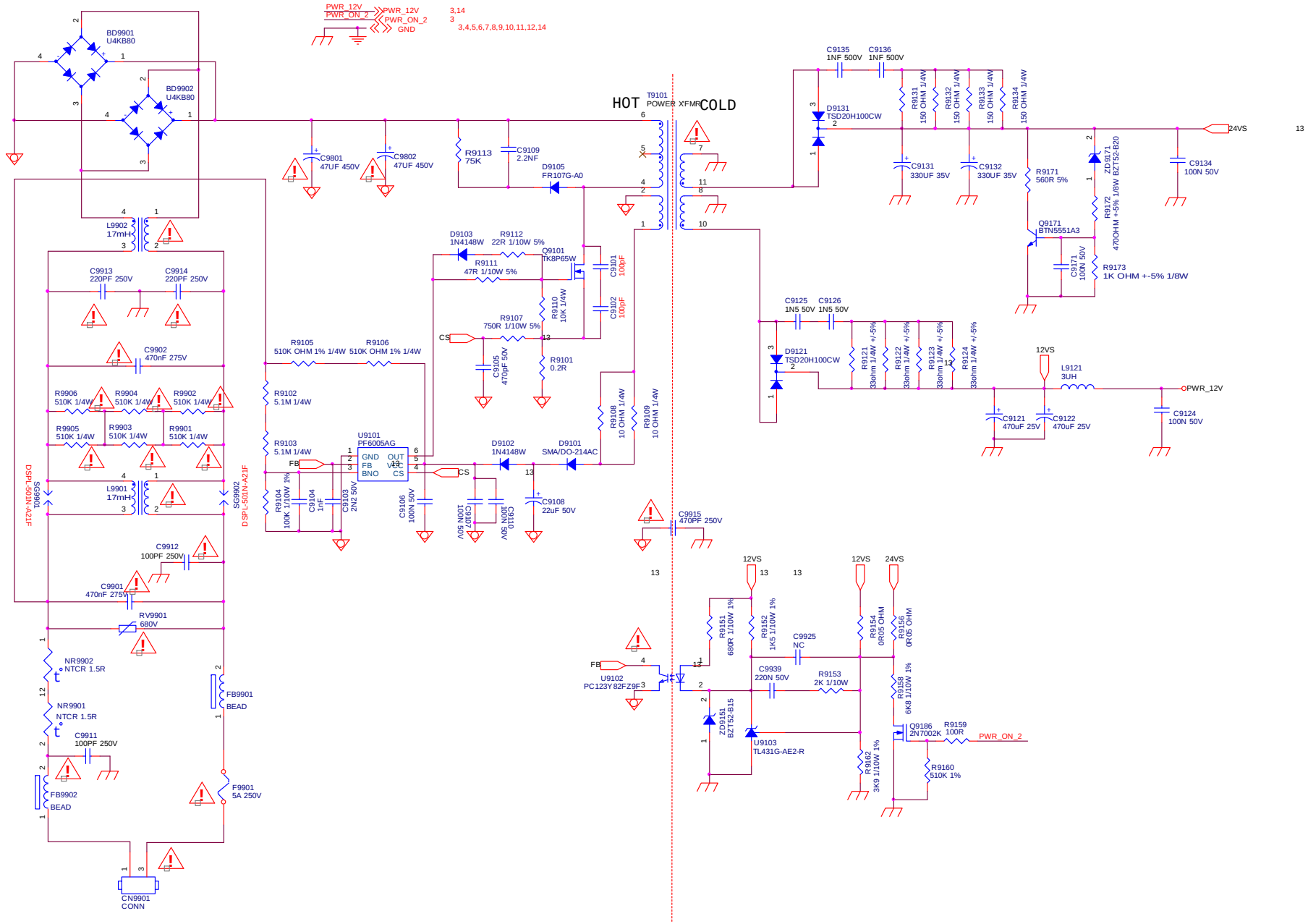




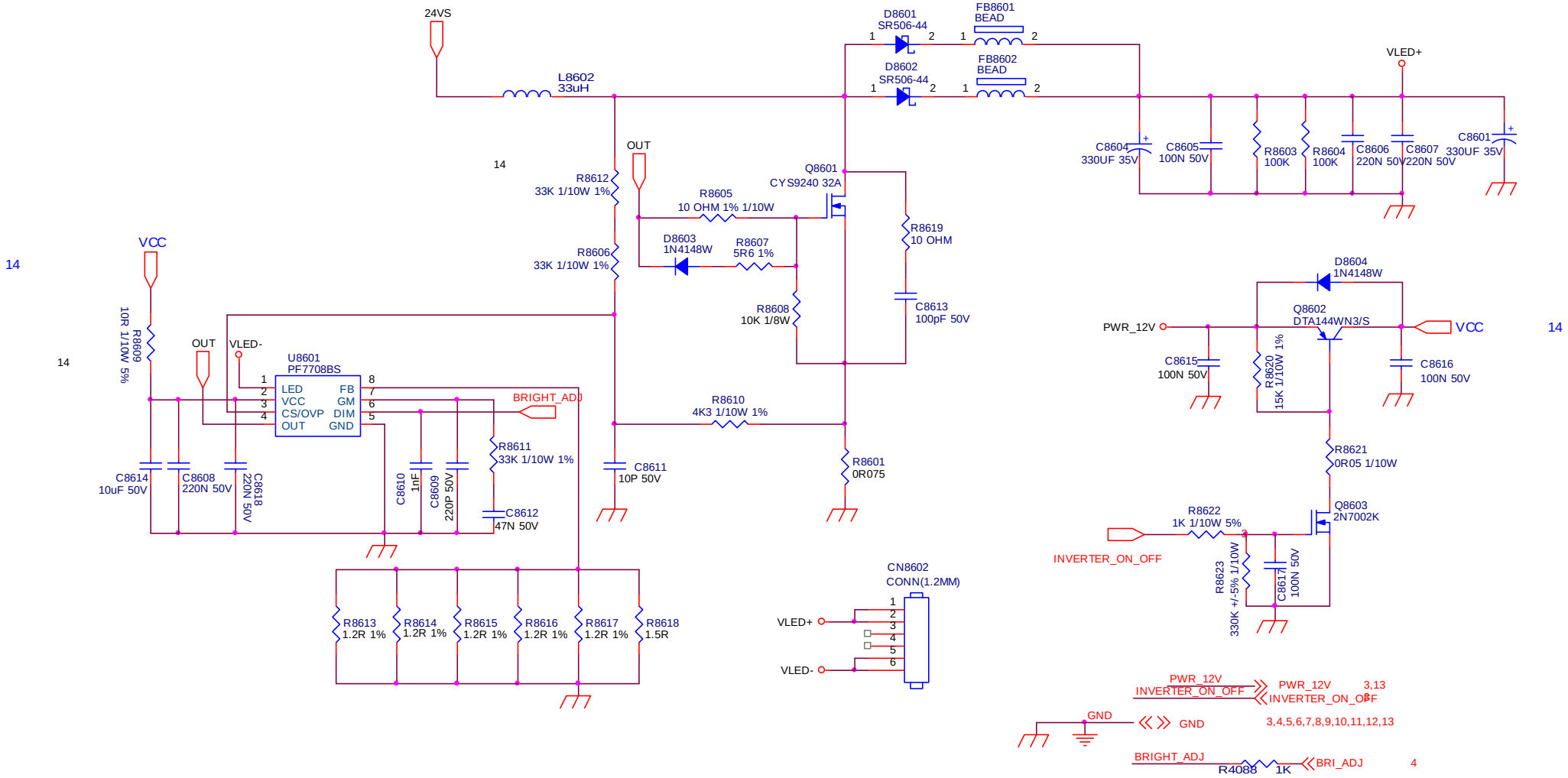
PCM_CD1_N	PCM_CD2_N	PCM_CD_N
GND	GND	L 0V
GND	NC	H 2.5V
NC	GND	H 2.5V
NC	NC	H 5V

GND 3,4,5,6,7,8,9,10,11,13,14

9-4-11 AC Power

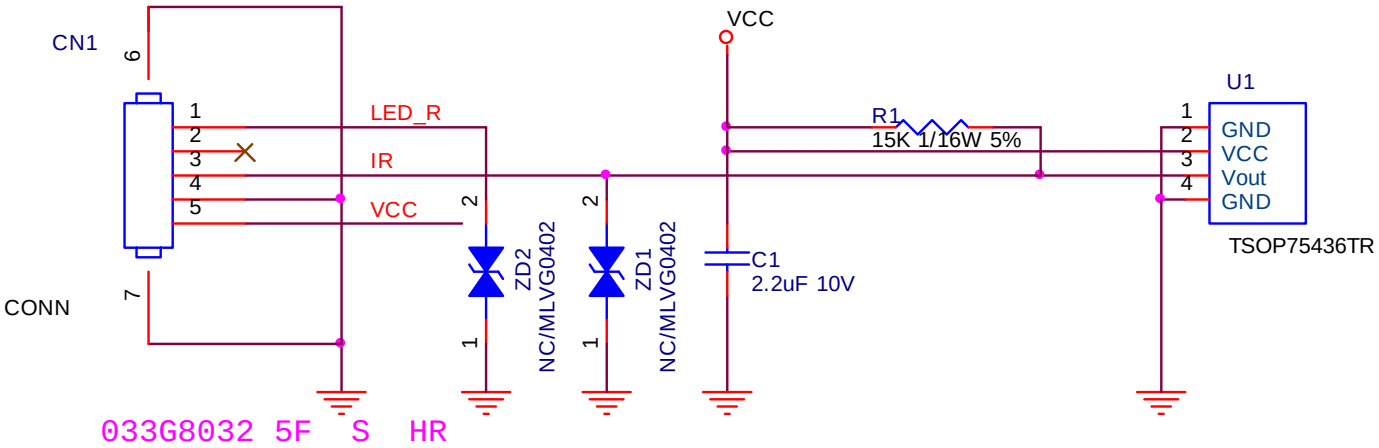


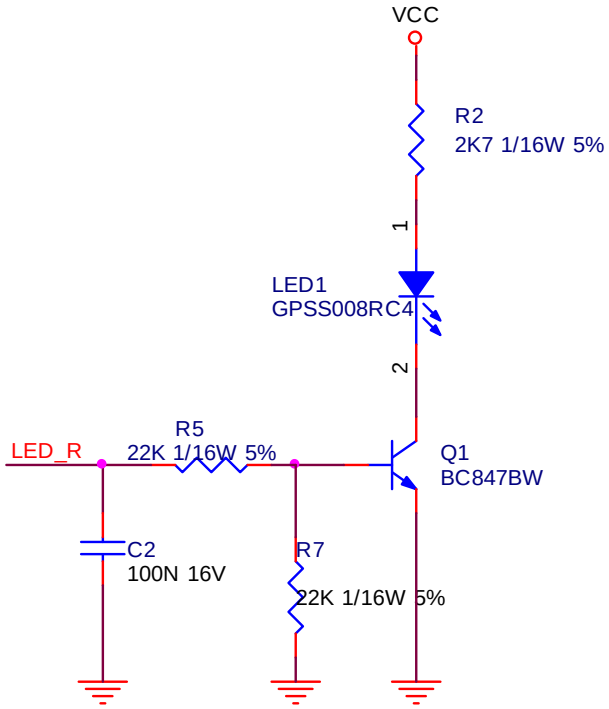
9-4-12 LED Driver



9.5 J 715G8576 IR/LED Panel (For 24” 53x4 Series)

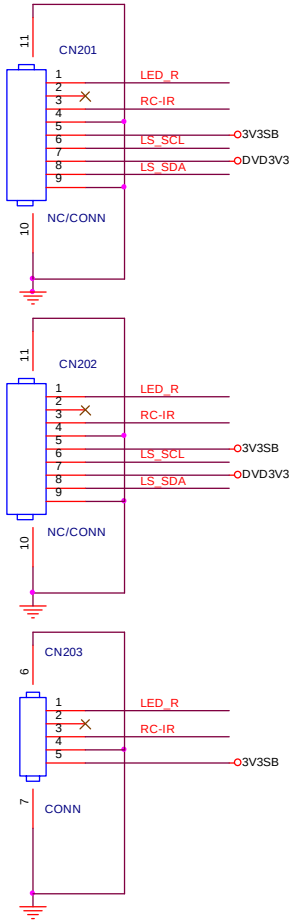
9-5-1 IR LED

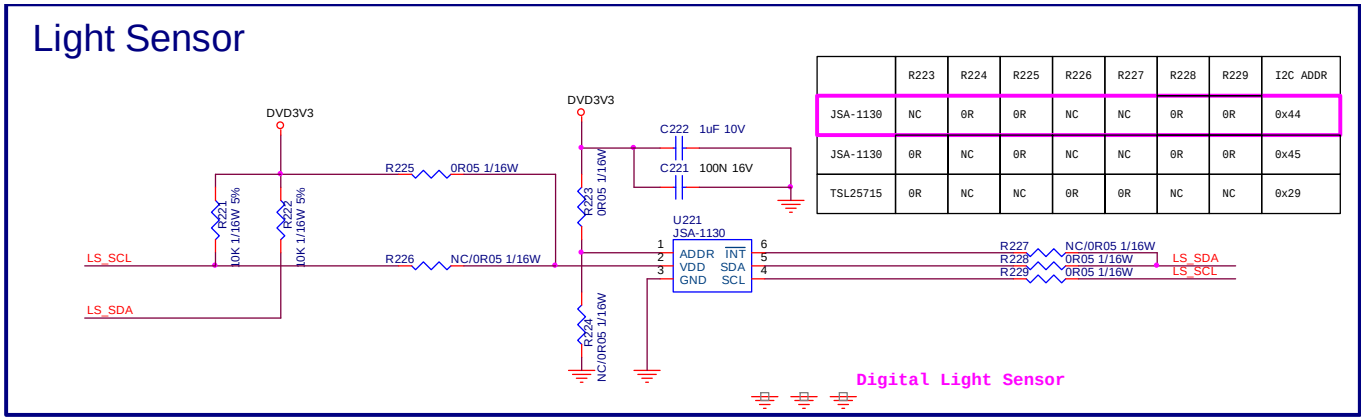




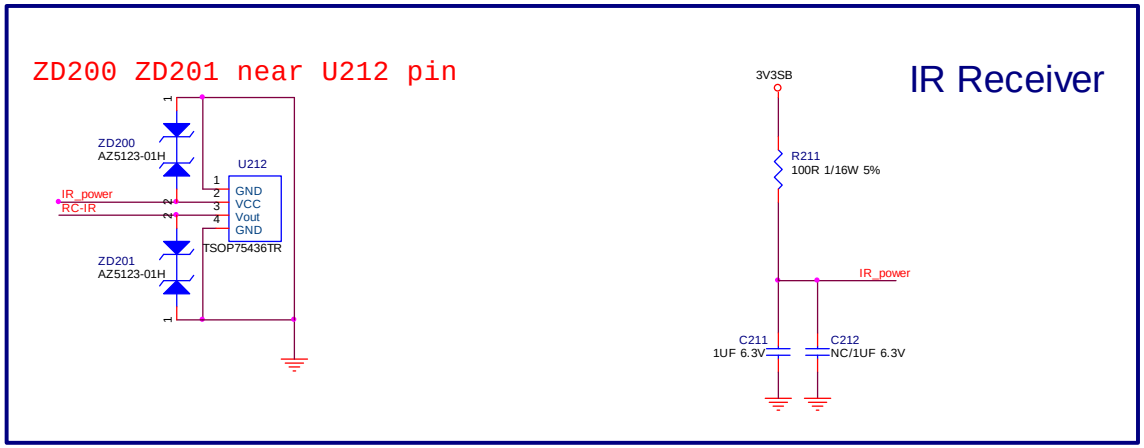
9.6 E 715G8623 IR Board (For 32” 4503/4504 Series)

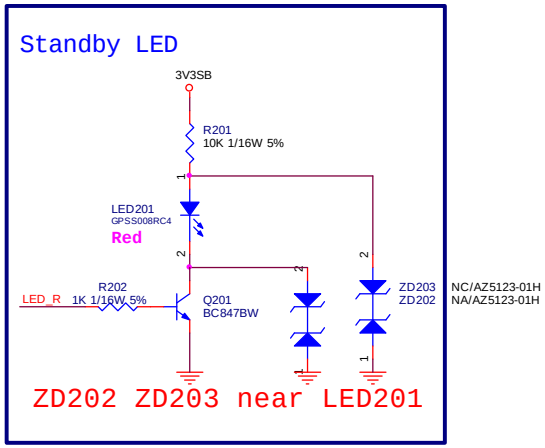
9-6-1 IR





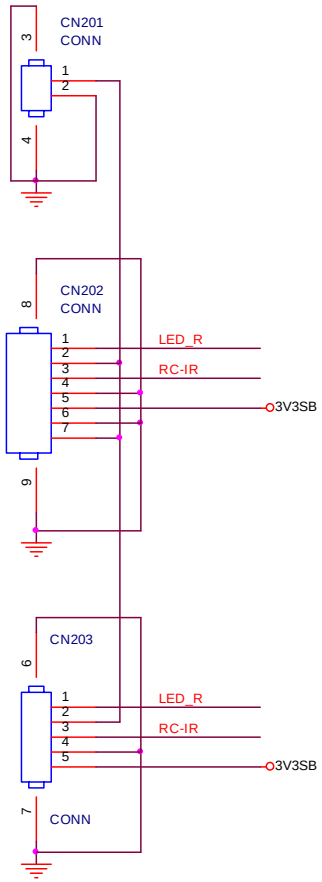
	R223	R224	R225	R226	R227	R228	R229	I2C ADDR
JSA-1130	NC	0R	0R	NC	NC	0R	0R	0x44
JSA-1130	0R	NC	0R	NC	NC	0R	0R	0x45
TSL25715	0R	NC	NC	0R	0R	NC	NC	0x29

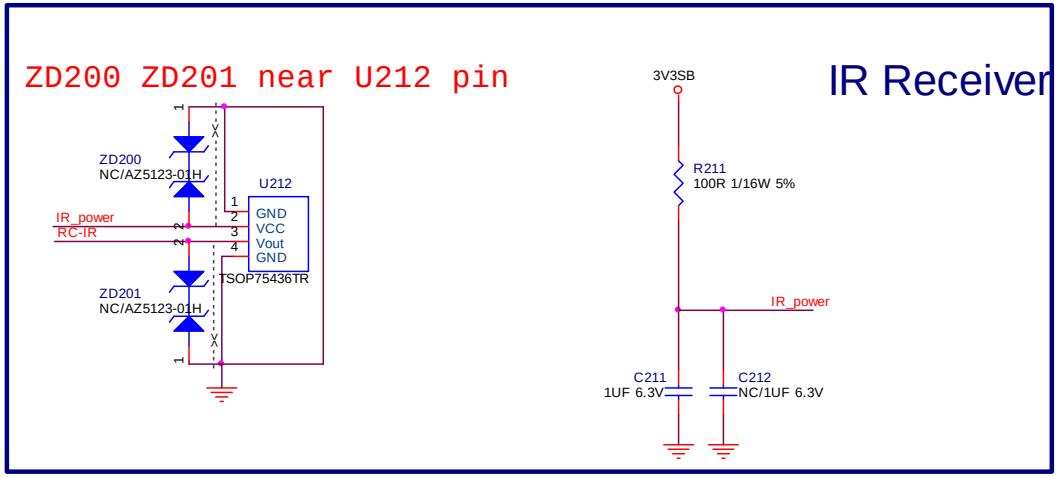


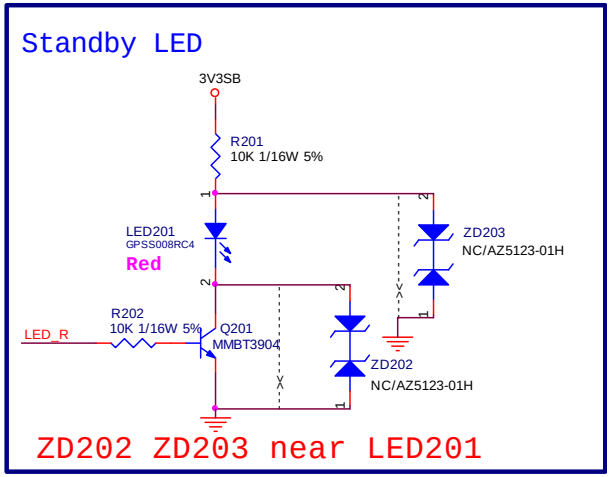


9.7 E 715G9806 IR Board (For 43” 5503 Series)

9-7-1 IR&STB LED

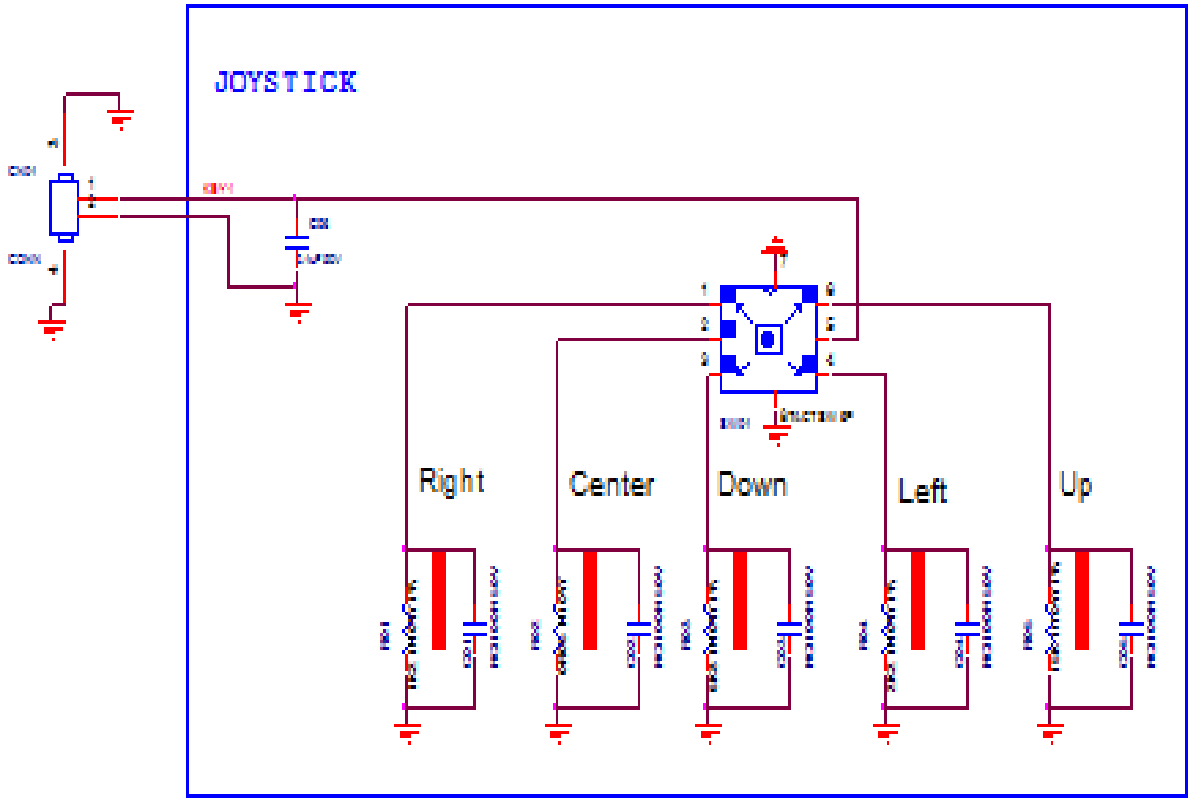






9.8 E 715G9740 Keyboard control panel (For 32” 4503/4504 &43” 5503 Series)

9-8-1 Key



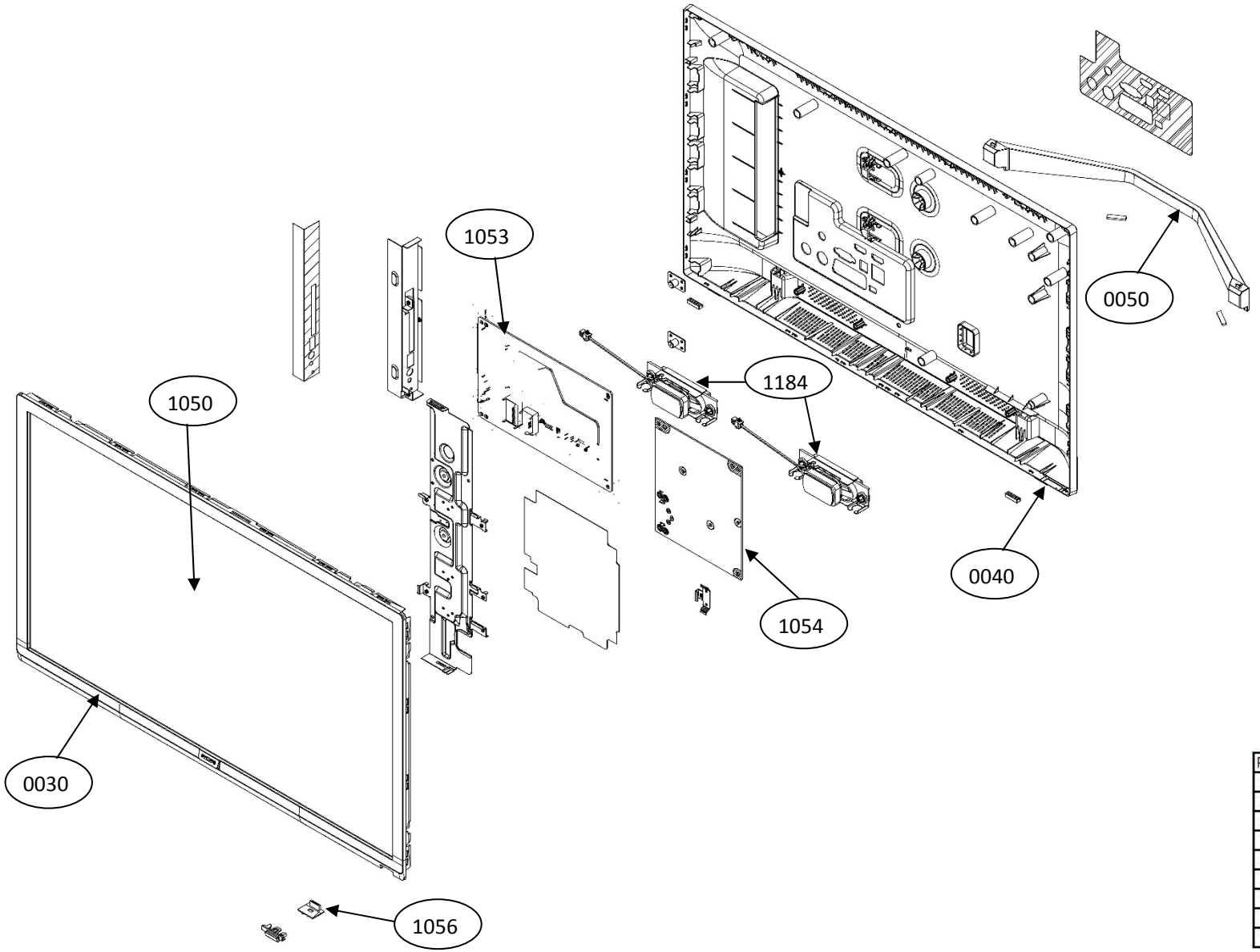
Direction	switch	Key function	Resistance	Voltage	Range
Center	3-5 short	Menu	0R	0V	0 to 0.22V
Right	1-5 short	CH+	1K2	0.5V	0.39 to 0.60 V
Left	4-5 short	CH-	2K2	0.81V	0.67 to 0.95 V
Down	3-5 short	VOL-	6K8	1.65V	1.41 to 1.87 V
Up	6-5 short	VOL+	15K	2.27V	1.92 to 2.65 V
		No function		3.3V	3.135 to 3.465 V

Joystick circuit diagram

	pin1	pin2	pin3	pin4	pin5	pin6
P1		O			O	
P2				O	O	
P3			O		O	
P4					O	O
P5	O				O	

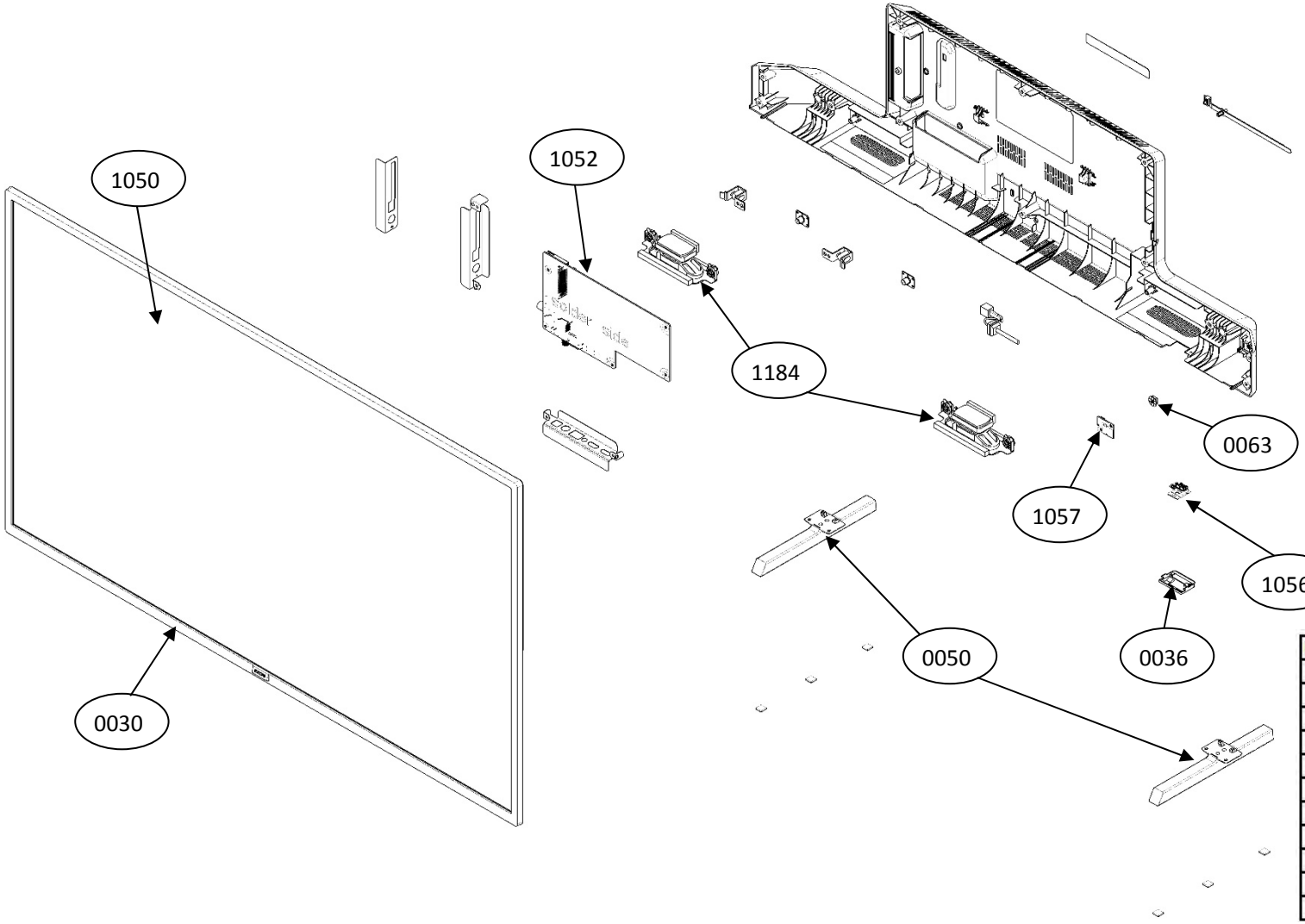
10. Styling Sheets

10.1 43x4 series 22" /24"



Pos NO.	Description	Remark
0030	BEZEL(Integrated with panel)	
0040	REAR_COVER	
0050	BASE ASS'Y	
1050	LCD PANEL	
1053	PANEL SSB	
1054	POWER BOARD	
1056	IR BOARD	
1176	REMOTE CONTROL	Not displayed
1184	SPEAKERS	

10.2 4503/4504 series 32", 5503 series 43”



Pos NO.	Description	Remark
0030	Bezel(Integrated with panel)	
0036	LENS_IR	
0040	REAR_COVER	
0050	EDGE STAND – L/R identical (2)	
0063	KEY_FUNCTION	
1050	LCD PANEL	
1052	M+P BOARD	
1056	IR BOARD	
1057	KEY BOARD	
1176	REMOTE CONTROL	Not displayed
1184	SPEAKERS	