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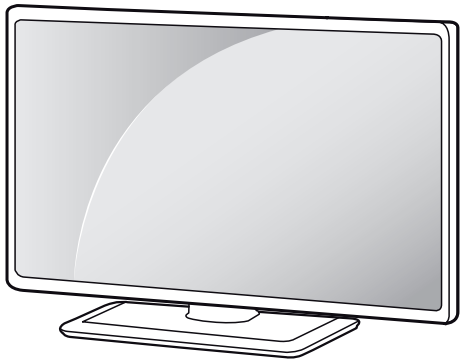
PLASMA TV
SERVICE MANUAL

CHASSIS : PD41C

MODEL : 50PB560B 50PB560B-ZA

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL68062601 (1404-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

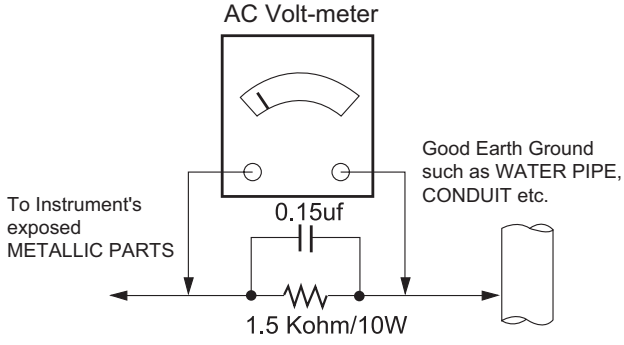
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1
*Base on Adjustment standard

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This spec sheet is applied all of the PDP TV with PD41C chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

(1) Temperature: 25 °C ± 5 °C(77 °F ± 9 °F), CST: 40 °C ± 5 °C
(2) Relative Humidity: 65 % ± 10 %
(3) Power Voltage
: Standard input voltage (AC 100-240 V~, 50/60 Hz)
* Standard Voltage of each products is marked by models.
(4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
(5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

(1) Performance: LGE TV test method followed
(2) Demanded other specification
- Safety : CE, IEC specification
- EMC : CE, IEC

4. Module General Specification

- 50" HD

No	Item	Specification	Remark
1	Display Screen Device	127 cm (50 inch) wide Color Display Module	PDP
2	Aspect Ratio	16:9	
3	PDP Module	PDP50T6####, RGB Closed (Well) Type, Glass Filter (43%) Pixel Format: 1024 horiz. By 768 ver.	
4	Operating Environment	1) Temp. : 0 ~ 40 deg 2) Humidity : 20 ~ 80%	LGE SPEC
5	Storage Environment	1) Temp. : -20 ~ 60 deg 2) Humidity : 10 ~ 90 %	
6	Input Voltage	AC100 ~ 240V, 50/60Hz	Maker LG

5. Model General Specification

No	Item	Specification	Remark
1	Market	Albania, Austria, Belgium, Bosnia, Bulgaria, Coratia, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Luxembourg, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovenia, Spain, Sweden, Slovakia, Switzerland, Turkey, Ukraine, UK	36 Country
		Australia, New Zealand, Malaysia, Indonesia, Singapore, South Africa, Israel, Iran, Vietnam, Kenya, Asia,Non-EU analog, CHINA(cormmercial)	Non-EU
2	Broadcasting system	1) PAL/SECAM BG 2) PAL/SECAM DK 3) PAL I / II 4) SECAM L/L' 5) DVB T 6) DVB C 7) DVB T2 8) DVB S2	Programme Coverage (EU) Digital TV - PD41B are not support SECAM L/L` - Only PD41B support DVB-T2/S2 Analogue TV VHF: E2 to E12, UHF: E21 to E69, CATV: S1 to S20, HYPER: S21 to S47
		1) PAL/SECAM BG 2) PAL/SECAM DK 3) PAL I 4) NTSC M 5) DVB T	Programme Coverage (NON-EU) Digital TV VHF 04 to 13, UHF 27 to 69 Analogue TV VHF/UHF 1 to 78, CATV 01 to 71
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM	
4	Scart Jack (1EA)	PAL, SECAM	EU ONLY
5	Component Input (1EA)	Y/Cb/Cr, Y/ Pb/Pr	
6	RGB Input (1EA)	RGB-PC	Commercial Model ONLY
7	RS232C (1EA)	SVC	Commercial Model ONLY
8	AV (2EA)	CVBS (Hybrid :1)	EU model have 1 AV (Hybrid)
9	HDMI Input (2 or 3EA)	HDMI-PC HDMI-DTV HDMI-MHL	HDMI/PC/MHL 1
10	Audio Input (1EA)	DVI Audio, Component	L/R Input
11	SPDIF Out (1 EA)	SPDIF Out	
12	USB (1EA)	for SVC, S/W Download, DivX	
13	LAN	only DVB-T2 (UK, Irend) Model	
14	PCMCI (1EA)	DVB-T/C Decryption Interface, CI+	EU ONLY

ADJUSTMENT INSTRUCTION

1. Application Range

This spec. sheet applies to PD41C chassis applied PDP TV all models manufactured in TV factory.

2. Designation

(1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
(2) Power adjustment : Free Voltage.
(3) Magnetic Field Condition: Nil.
(4) Input signal Unit: Product Specification Standard.
(5) Reserve after operation: Above 5 Minutes (Heat Run)
Temperature : at 25 °C ± 5 °C
Relative humidity : 65 % ± 10 %
Input voltage : 220V, 60Hz
(6) Adjustment equipments : Color Analyzer (CA-210 or CA-110), DDC Adjustment Jig equipment, SVC remote controller.
(7) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15

- In case of keeping module is in the circumstance of 0°C, it should be placed in the circumstance of above 15°C for 2 hours.
- In case of keeping module is in the circumstance of below -20°C, it should be placed in the circumstance of above 15°C for 3 hours.

■ After RGB Full White in HEAT-RUN Mode, the receiver must be operated prior to the adjustment.
■ Enter into HEAT-RUN MODE
1) Press the POWER ON KEY on R/C for adjustment.
2) OSD display and screen display PATTERN MODE.
● Set is activated HEAT run without signal generator in this mode.
● Single color pattern (WHITE) of HEAT RUN MODE uses to check panel.
● Caution : If you turn on a still screen more than 20 minutes (Especially digital pattern, cross hatch pattern), an after image may be occur in the black level part of the screen.
(8) Push The “IN STOP KEY” – For memory initialization.

Case1 : Software version up
1) After downloading S/W by USB , Multi-vision set will reboot automatically
2) Push “In-stop” key
3) Push “Power on” key
4) Function inspection
5) After function inspection, Push “In-stop” key.

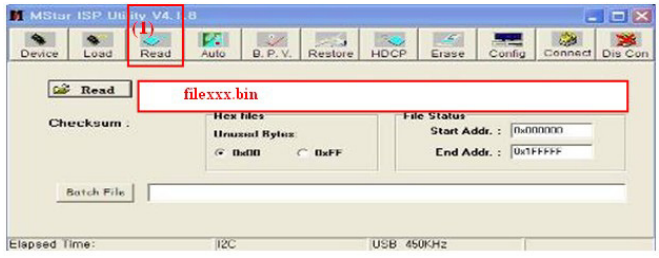
Case2 : Function check at the assembly line
1) When TV set is entering on the assembly line, Push “In-stop” key at first.
2) Push “Power on” key for turning it on.
-> If you push “Power on” key, TV set will recover channel information by itself.
3) After function inspection, Push “In-stop” key.

3. Main PCB check process

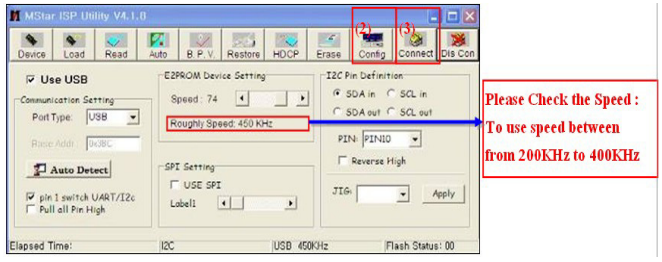
* APC - After Manual-Insult, executing APC

* Boot file Download

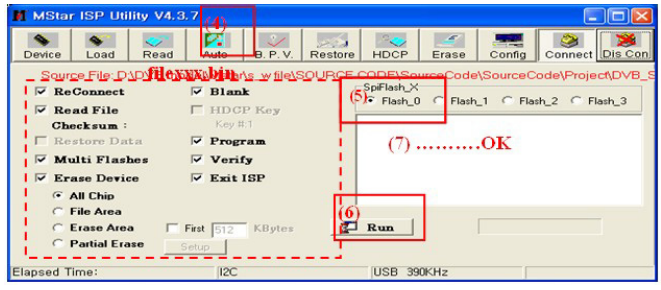
(1) Execute ISP program “Mstar ISP Utility” and then click “Config” tab.
(2) Set as below, and then click “Auto Detect” and check “OK” message
If “Error” is displayed, Check connection between computer, jig, and set.
(3) Click “Read” tab, and then load download file (XXXX.bin) by clicking “Read”



(4) Click “Connect” tab. If “Can’t ” is displayed, Check connection between computer, jig, and set.



(5) Click “Auto” tab and set as below.
(6) Click "Run".
(7) After downloading, check "OK" message.



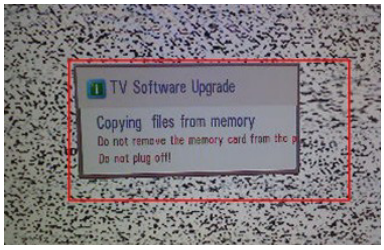
* USB DOWNLOAD(*.epk file download)

(1) Put the USB Stick to the USB socket

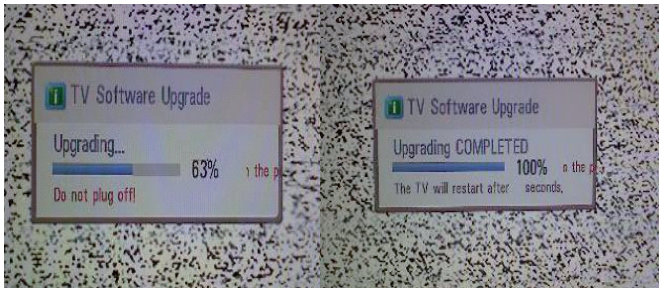
(2) Automatically detecting update file in USB Stick

- If your downloaded program version in USB Stick is Low, it didn't work.
- But your downloaded version is High, USB data is automatically detecting

(3) Show the message "Copying files from memory"



(4) Updating is staring.



(5) Updating Completed, The Multi-vision will restart automatically.

(6) If your Multi-vision is turned on, check your updated version and Tool option. (explain the Tool option, next stage)

* After downloading, have to adjust TOOL OPTION again.

1) Push "IN-START" key in service remote controller.
2) Select "Tool Option 1" and Push "OK" button.
3) Punch in the number. (Each of models has their number.)
4) Completed selecting Tool option.

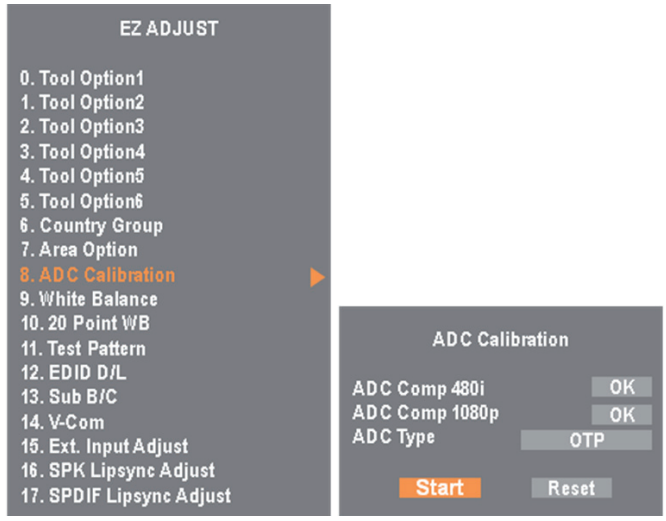
	50PB560B-Z*
HD/FHD	HD
Tool option 1	16393
Tool option 2	2577
Tool option 3	10497
Tool option 4	13136
Tool option 5	51218
Tool option 6	8464

3.1. ADC Process

3.1.1. ADC

■ Enter Service Mode by pushing "ADJ" key,

■ Enter Internal ADC mode by pushing "►" key at "5. ADC Calibration"



* Caution : Using 'power on' button of the Adjustment R/C , power on Multi-vision.

* ADC Calibration Protocol (RS232)

NO	Enter Adjust MODE	ADC adjust
Item	Adjust 'Mode In'	ADC Adjust
CMD 1	A	A
CMD 2	A	D
Data 0	0	1
	0	0
	When transfer the 'Mode In', Carry the command.	Automatically adjustment (The use of a internal pattern)

- Adjust Sequence
  - ▪aa 00 00 [Enter Adjust Mode]
  - ▪xb 00 40 [Component1 Input (480i)]
  - ▪ad 00 10 [Adjust 480i Comp1]
  - ▪aa 00 90 End Adjust mode
    - * Required equipment : Adjustment R/C.

3.2. Function Check

3.2.1. Check display and sound

■ Check Input and Signal items. (cf. work instructions)

1) TV
2) AV (SCART/ CVBS)
3) COMPONENT (480i)
4) HDMI
5) PC Audio In

* Display and Sound check is executed by Remote controller.

* Caution : Not to push the INSTOP KEY after completion if the function inspection.

4. Total Assembly line process

4.1. POWER PCB Assy voltage adjustment

(Vs voltage adjustment)

4.1.1.Test equipment : D.M.M 1EA

4.1.2. Condition for adjustment

- No signal with the snow noise in RF mode

4.1.3. Connection Diagram for Measuring

: refer to below

4.1.4. Adjustment method

4.1.4.1. Vs adjustment

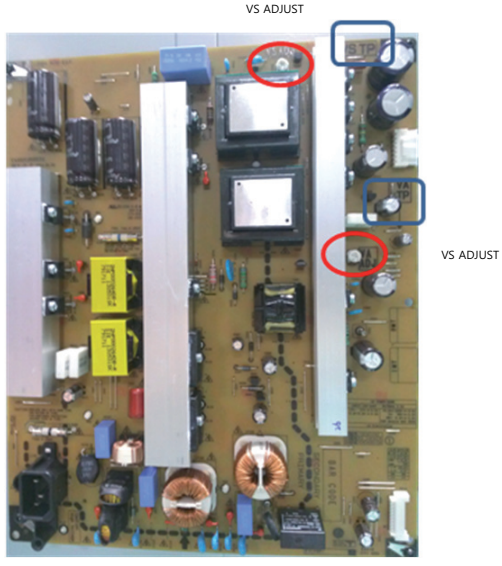
(1) Connect + terminal of D. M..M. to Vs TP, connect -terminal to GND.

(2) After turning VR901, voltage of D.M.M adjustment as same as Vs voltage which on label of panel right/top (deviation ; ±0.5V)

4.1.4.2. Va adjustment

(1) Connect + terminal of D. M..M. to Va TP, connect -terminal to GND.

(2) After turning VR502, voltage of D.M.M adjustment as same as Va voltage which on label of panel right/top (deviation ; ±0.5V)



4.2. Adjustment Preparation

- Required Equipment
  - Remote controller for adjustment
  - Color Analyzer (CS-1000, CA-100,100+,CA-210 or same product : CH 11 (PDP)

* Please adjust CA-210, CA-100+ by CS-1000 before measuring

- Auto W/B adjustment instrument(only for Auto adjustment)
- 9 Pin D-Sub Jack(RS232C) is connected to the AUTO W/B EQUIPMENT.

Before Adjust of White Balance, Please press POWER ONLY key

- Adjust Process will start by execute RS232C Command.
- Color temperature standards according to CSM and Module

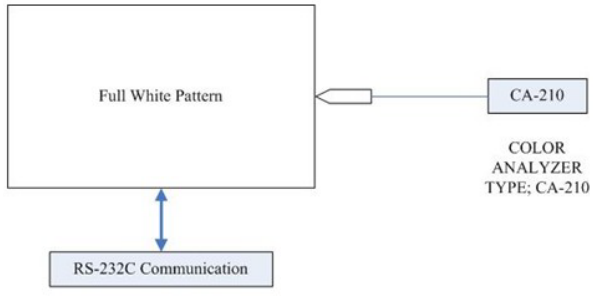
CSM	PLASMA
Cool	11000K
Medium	9300K
Warm	6500K

- CS-1000/CA-100+/CA-210(CH 10) White balance adjustment coordinates and color temperature.

CSM	Color Coordination		Temp	± Color Coordination
	x	y		
COOL	0.276	0.283	11000K	0.002
MEDIUM	0.286	0.289	9300K	0.002
WARM	0.313	0.329	6500K	0.002

* Connecting picture of the measuring instrument
(On Automatic control)

- Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment R/C POWER-ON -> Enter the mode of White-Balance, the pattern will come out.



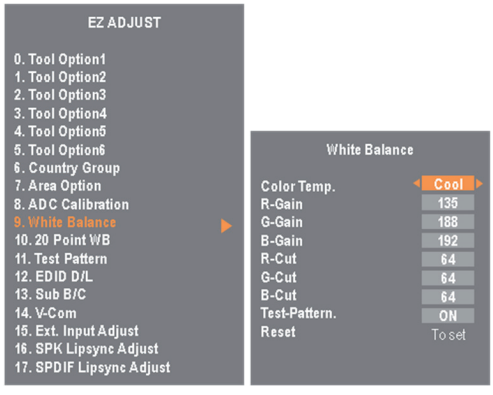
* Auto-control interface and directions
  1) Adjust in the place where the influx of light like floodlight around is blocked. (Illumination is less than 100Lux).
  2) Adhere closely the Color Analyzer (CA210) to the module less than 10cm distance, keep it with the surface of the Module and Color Analyzer's Prove vertically. (80~100°).
  3) Aging time
     - After aging start, keep the power on (no suspension of power supply) and heat-run over 5 minutes.
     - Using 'no signal' or 'full white pattern' or the others, check the back light on.

■ Auto adjustment Map(RS-232C)
RS-232C COMMAND
[CMD ID DATA]
Wb 00 00 White Balance Start
Wb 00 ff White Balance End

	RS-232C COMMAND [CMD ID DATA]			MIN	CENTER (DEFAULT)			MAX
	Cool	Mid	Warm		Cool	Mid	Warm	
R Gain	jg	Ja	jd	00	172	192	192	192
G Gain	jh	Jb	je	00	172	192	192	192
B Gain	ji	Jc	jf	00	192	192	172	192
R Cut					64	64	64	128
G Cut					64	64	64	128
B Cut					64	64	64	128

* Caution
  - Color Temperature : COOL, Medium, Warm.
  - One of R Gain/G Gain/ B Gain should be kept on 0xC0, and adjust other two lower than C0. (when R/G/B Gain are all C0, it is the FULL Dynamic Range of Module)

* Manual W/B process using adjusts Remote control.
  ■ After enter Service Mode by pushing "ADJ" key,
  ■ Enter White Balance by pushing "►" key at "6. White Balance".
  ■ Stick the sensor to the center of the screen and select each items(Red/Green/Blue Gain) using ▲/▼(CH +/-) key on R/C.
  ■ Adjust R/G/B Gain using◄/►(VOL +/-) key on R/C.
  ■ Adjust three modes all(Cool/Medium/Warm) : Fix the one of R/G/B Gain and Change the others.
  ■ When the adjustment is completed, Enter "COPY ALL".
  ■ Exit adjustment mode using EXIT key on R/C.



* After You finish all adjustments, Press "In-start" button and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable.
  If it is not same, then correct it same with BOM and unplug AC cable.
  For correct it to the model's module from factory JIG model.
* Push The "IN STOP KEY" after completing the function inspection. And Mechanical Power Switch must be set "ON"
* To check the coordinates of White Balance, you have to measure at the below conditions.
- Picture mode : Vivid, Energy Saving : Off, Below the Advanced control, Dynamic Contrast : Off, Dynamic Colour : Off Colour Temp.

Cool	30
Medium	0
Warm	30

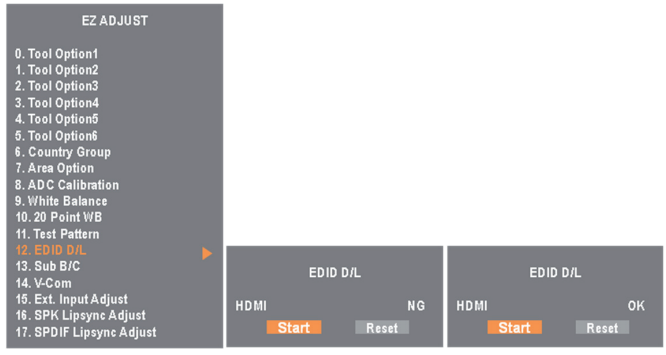
-> Picture Mode change : Vivid -> Vivid(User)

4.3. DDC EDID Write (HDMI 256Byte) -> Not used any more, Use Auto D/L

■ Connect HDMI Signal Cable to HDMI Jack.
■ Write EDID DATA to EEPROM(24C02) by using DDC2B protocol.
■ Check whether written EDID data is correct or not.
* For SVC main Ass'y, EDID have to be downloaded to Insert Process in advance.

4.4. EDID DATA

(1) All Data : HEXA Value
(2) Changeable Data :
  * : Serial No : Controlled / Data:01
  ** : Month : Controlled / Data:00
  *** : Year : Controlled
  **** : Check sum



4.5. EDID DATA Auto Download

(1) Press Adj. key on the Adj. R/C,
(2) Select EDID D/L menu.
(3) By pressing Enter key, EDID download will begin
(4) If Download is successful, OK is display, but If Download is failure, NG is displayed.
(5) If Download is failure, Re-try downloads.

* Caution : Never connect HDMI & D-sub Cable when EDID downloaded.

■ Edid data and Model option download (RS232 Zender)

NO	Enter download MODE	EDID data and Model option download
Item	download 'Mode In'	download
CMD 1	A	A
CMD 2	A	E
Data 0	0	00
	0	10
	When transfer the 'Mode In', Carry the command.	Automatically download (The use of a internal Data)

- Manual Download

* Caution

● Use the proper signal cable for EDID Download
- Digital EDID : Pin3 exists

* Caution
- Never connect HDMI & D-sub Cable at the same time.
- Use the proper cables below for EDID Writing.
- Download HDMI1, HDMI2 separately because HDMI1 is different from HDMI2.

For HDMI EDID
DVI-D to HDMI or HDMI to HDMI


No.	Item	Condition	Hex Data
1	Manufacturer ID	GSM	1E6D
2	Version	Digital : 1	01
3	Revision	Digital : 3	03

* HD EDID data
- HD HDMI1 EDID data

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	01	18	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	31	40	45	40	61	40	01	01	01	01
30	01	01	01	01	01	01	64	19	00	40	41	00	26	30	18	88
40	36	00	B0	84	43	00	00	18	A0	0F	20	00	31	58	1C	20
50	28	80	14	00	B0	84	43	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC
70	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	3D

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	02	03	21	F1	4D	10	1F	04	93	05	14	03	02	12	20	22
10	15	01	26	15	07	50	09	57	07	67	03	0C	00	10	00	80
20	2D	01	1D	00	72	51	D0	1E	20	6E	28	55	00	40	84	63
30	00	00	1E	02	3A	80	18	71	38	2D	40	58	2C	45	00	40
40	84	63	00	00	1E	01	1D	80	18	71	1C	16	20	58	2C	25
50	00	40	84	63	00	00	9E	00	00	00	00	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	24

* Checksum: Changeable by total EDID data.

EDID C/S data		2D-HD
		HDMI
check sum (Hex)	Block 0	0x3D
	Block 1	0x24(HDMI1)

4.5. EDID DATA Auto Download

(1) Press Adj. key on the Adj. R/C,
(2) Select EDID D/L menu.
(3) By pressing Enter key, EDID download will begin
(4) If Download is successful, OK is display, but If Download is failure, NG is displayed.
(5) If Download is failure, Re-try downloads.

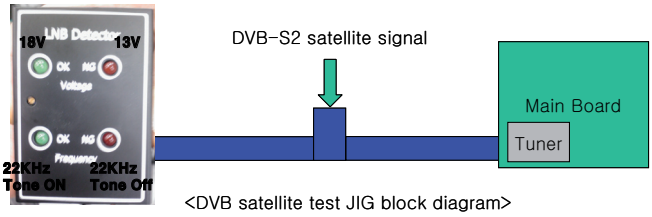
4.6 LNB voltage and 22KHz tone check

(1) Test method
1) Press "Power on" button of a service R/C.(Baud rate : 115200 bps)
2) Connect cable between satellite ANT and test JIG.
3) Connect RS232-C Signal Cable.
4) Write LNB ON control command through RS-232-C.
5) check LED light 'ON' at 18V menu.
6) check LED light 'ON' at 22KHz tone menu.
7) Write LNB OFF control command through RS-232-C.
8) check LED light 'OFF' at 18V menu.
9) check LED light 'OFF' at 22KHz tone menu.

(2) RS-232 command for test LNB

	Command	Set ACK
LNB On	[A][I][ ][Set ID][ ][30][Cr]	[O][K][x] or NG : [N][G][x]
LNB Off	[A][I][ ][Set ID][ ][40][Cr]	[O][K][x] or NG : [N][G][x]

(3) Test result
- After send LNB On command, '18V LED' and '22KHz tone LED' should be ON.
- After send LNB Off command, '18V LED' and '22KHz tone LED' should be OFF.



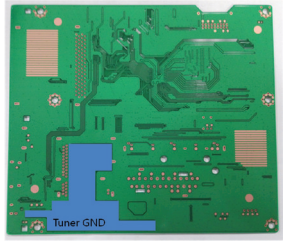
<DVB satellite test JIG block diagram>

<Remark>
After the measurement conditions witnessed in the last state.

4.7. GND & Hi-pot test

■ GND TEST = POWER CORD GND and SIGNAL CABLE GND
■ Hi-pot TEST = POWER CORD GND and LIVE&NUETRAL
■ Test Process
1. Check the POWER CABLE and SIGNAL CABLE insertion condition.
2. Connect the AV JACK Tester
3. Controller(GWS103-4) on
4. GND TEST(Auto)
- If Test is failed, Buzzer operate
- If Test is passed, execute next process(HI-pot test)
- Remove A/V CORD from A/V JACK BOX
5. HI-POT test(Auto)
- If Test is failed, Buzzer operate
- If Test is passed, GOOD Lamp on and move to next process automatically.

■ Checkpoint
(1) Test voltage
1) 3 Poles
- GND: 1.5KV/min at 100mA
- SIGNAL: 3KV/min at 100mA
2) 2 Poles
- SIGNAL: 3KV/min at 100mA
(2) TEST time: 1 second
(3) TEST POINT
1) 3 Poles
- GND Test = POWER CORD GND and SIGNAL CABLE GND.
- Hi-pot Test = POWER CORD GND and LIVE & NEUTRAL.
2) 2 Poles
- Hi-pot Test = Accessible Metal and LIVE & NEUTRAL.
(4) LEAKAGE CURRENT: At 0.5mArms

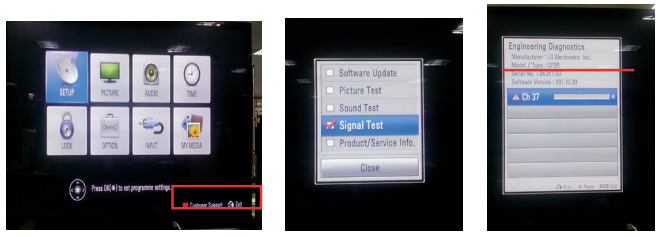


(Tuner GND is separated)

5. Model name & Serial number Download

5.1. Model name & Serial number D/L

■ Press “Power on” key of service remocon.(Baud rate : 115200 bps)
■ Connect RS232 Signal Cable to RS-232 Jack.
■ Write Serial number by use RS-232.
■ Must check the serial number at signal test of customer support. (Refer to below).



5.2. Signal TABLE

CMD	LENGTH	ADH	ADL	DATA_1	...	Data_n	CS	DELAY

CMD: A0h
LENGTH : 85~94h (1~16 bytes)
ADH : EEPROM Sub Address high (00~1F)
ADL : EEPROM Sub Address low (00~FF)
Data : Write data
CS : CMD + LENGTH + ADH + ADL + Data_1 + … + Data_n
Delay : 20ms

5.3. Command Set

No.	1
Adjust mode	EEPROM WRITE
CMD(hex)	A0h
LENGTH(hex)	84h+n
Description	n-bytes Write (n = 1~16)

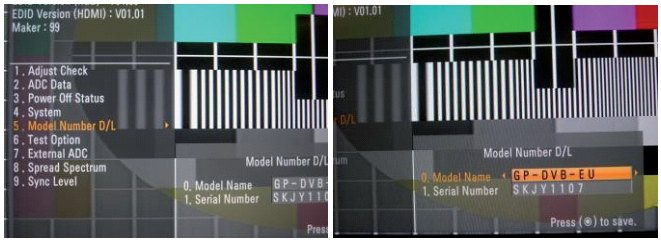
* Description
FOS Default write : <7mode data> write
Vtotal, V_Frequency, Sync_Polarity, Htotal, Hstart, Vstart, 0, Phase
Data write : Model Name and Serial Number write in EEPROM,.

5.4. Method & Notice

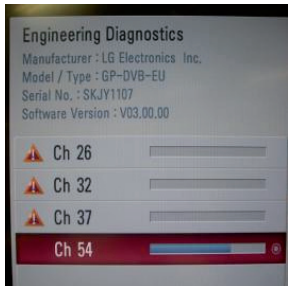
(1) Serial number D/L is using of scan equipment.
(2) Setting of scan equipment operated by Manufacturing Technology Group.
(3) Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0

* Manual Download (Model Name and Serial Number)
- If the TV set is downloaded By OTA or Service man, Sometimes model name or serial number is initialized.(Not always)
- There is impossible to download by bar code scan, so It need Manual download.

1) Press the 'instart' key of ADJ remote controller.
2) Go to the menu '5.Model Number D/L' like below photo.
3) Input the Factory model name or Serial number like photo.

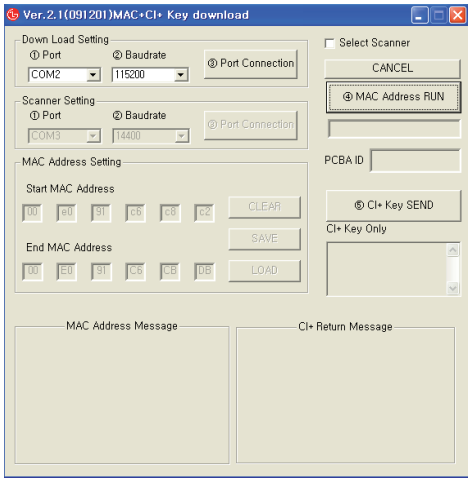


4) Check the model name Instart menu -> Factory name displayed.
5) Check the Diagnostics (DTV country only) -> Buyer model displayed



6. Download CI+ Key (EU model only)

* Connect TV SET and PC which download keys Writing program by RS232C-Cable
(1) Start "CIKeyl.exe"Program and Click (3) Button to connect TV and PC.
(2) Click (5) to download CI+ Key.
(3) When download succeed, you can see "OK" on (6)



■ Check the method of RS232C Command
(1) into the main ass'y mode (RS232 : aa 00 00)

CMD1	CMD2	Data 0	
A	A	0	0

(2) check the key download for transmitted command (RS232 : ci 00 10)

CMD1	CMD2	Data 0	
C	1	1	0

(3) result value
- normally status for download : OKx
- abnormally status for download : NGx

■ Check the method of CI+ Key value (RS232)
(1) into the main ass'y mode (RS232 : aa 00 00)

CMD1	CMD2	Data 0	
A	A	0	0

(2) check the mothed of CI+ key by command (RS232 : ci 00 20)

CMD1	CMD2	Data 0	
C	I	2	0

(3) result value
i 01 OK 1d1852d21c1ed5dcx
└──> CI+ Key Value

7. Download MAC Address, CI+ Key and widevine Key.

- Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).
-> MAC Address need only DVB-T2 Model (ex.50PA650T-ZA).

* Connect TV SET and PC which download keys Writing program by RS232C-Cable
1) Start "MAC+CIKeyl.exe"Program and Click (3) Button to connect TV and PC.
2) Click (4) to download MAC Address.
3) Click (5) to download CI+ Key.
4) When download succeed, you can see "OK" on (6)

* Each Chassis has it's own MAC Address. Please be careful of download.

■ Check the method of RS232C Command
(1) into the main ass'y mode (RS232 : aa 00 00)

CMD1	CMD2	Data 0	
A	A	0	0

(2) check the key download for transmitted command (RS232 : ci 00 10)

CMD1	CMD2	Data 0	
C	I	1	0

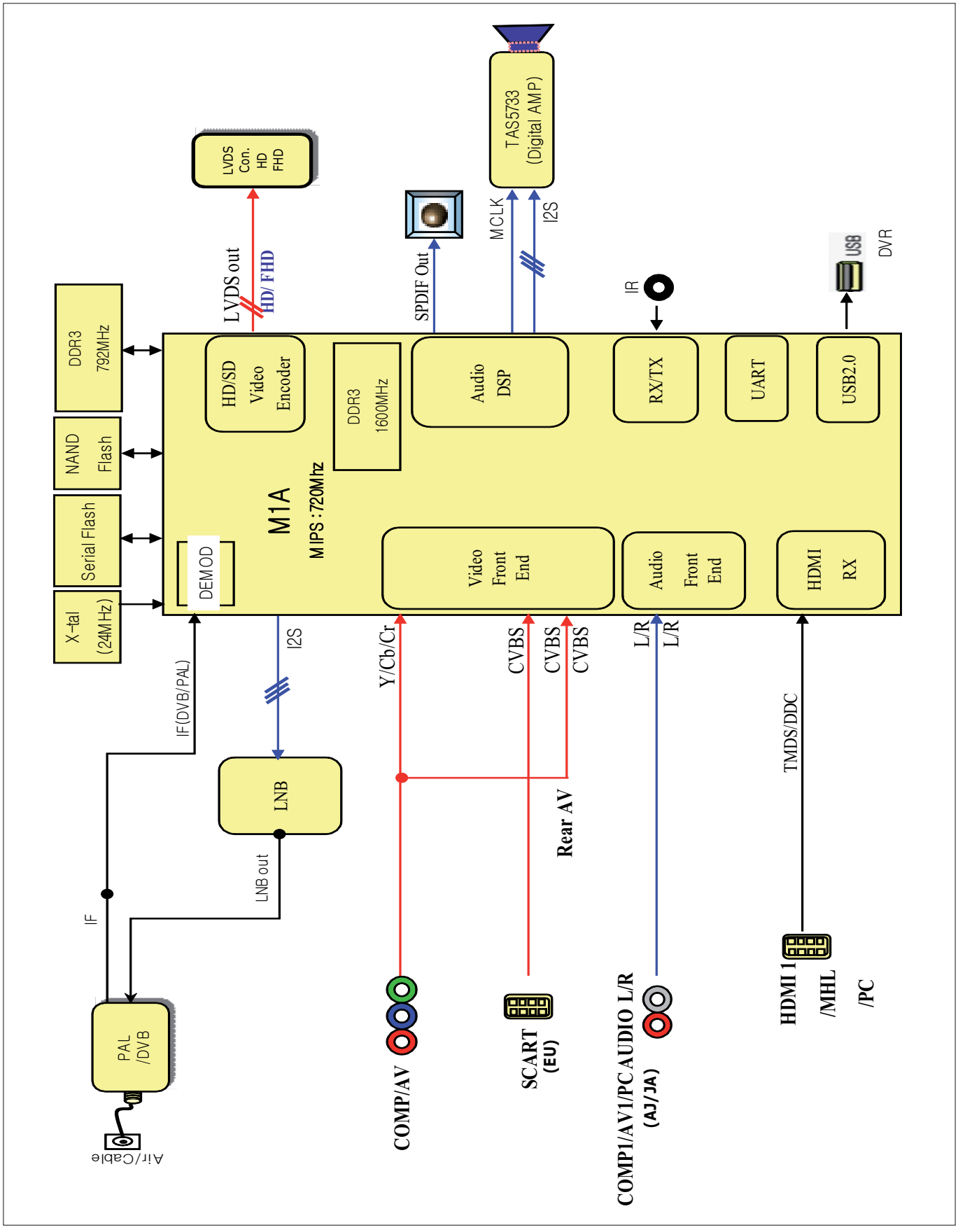
(3) result value
- normally status for download : OKx
- abnormally status for download : NGx

8. SW Download Guide.

* Put a *.bin to USB Stick and Turn on TV

(1) Put the USB Stick to the USB socket
(2) Automatically detecting update file in USB Stick
* If your downloaded program version in USB Stick is Low, it didn't work.
But your downloaded version is High, USB data is automatically detecting.
(3) Show the message "Copying files from memory"
(4) Updating is staring.
(5) Updating Completed, The TV will restart automatically.
After turn on TV, Please press 'IN-STOP' button on ADJ Remote-control.
* IF you don't have ADJ R/C, enter 'Factory Reset' in OPTION MENU.
(6) When TV turn on, check the Updated version on Diagnostics MENU.

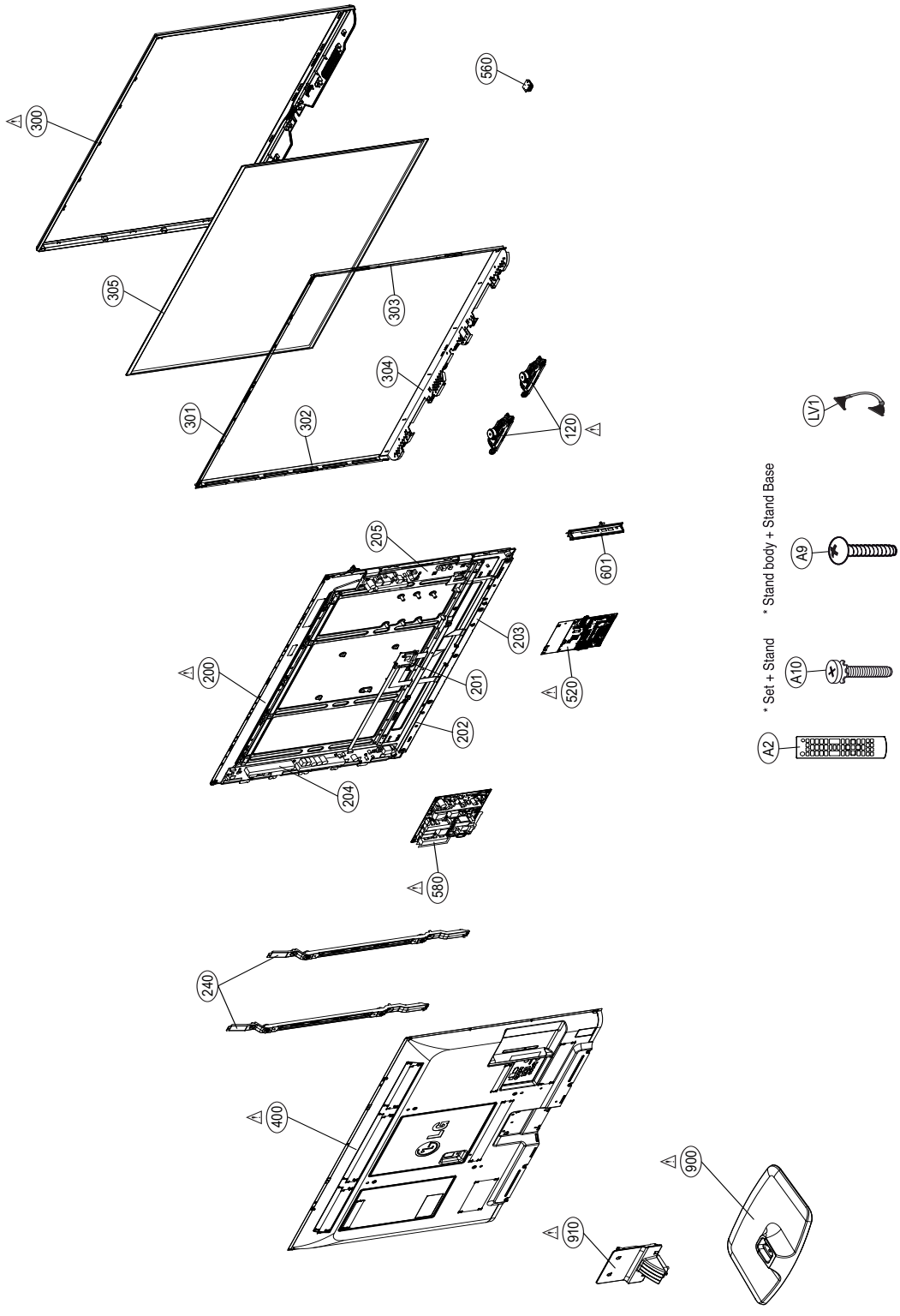
BLOCK DIAGRAM



EXPLODED VIEW

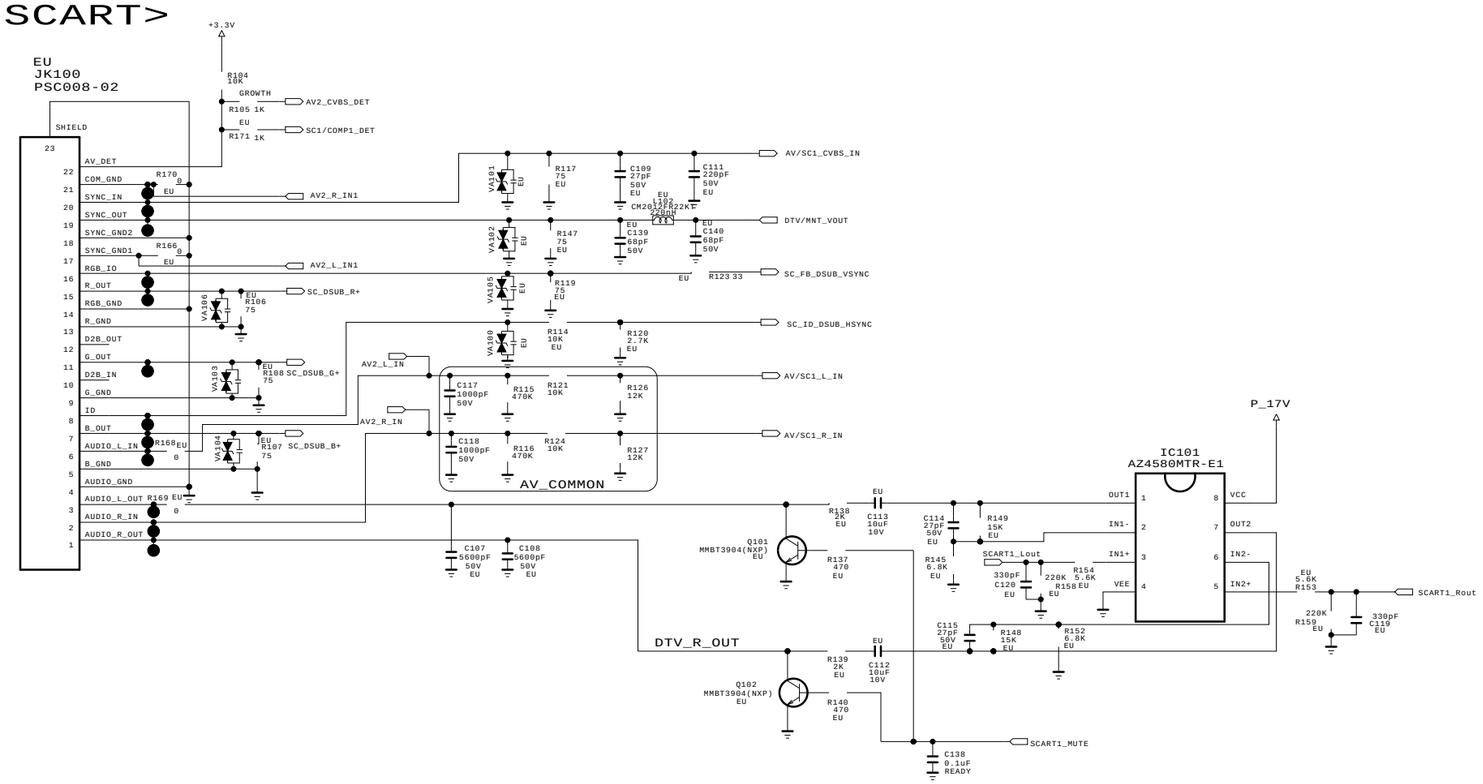
IMPORTANT SAFETY NOTICE

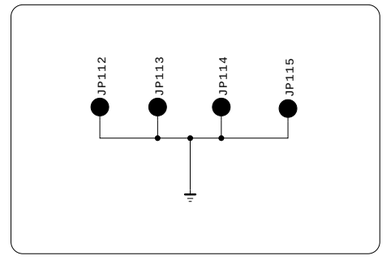
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.



PDP L14
EAX65405603

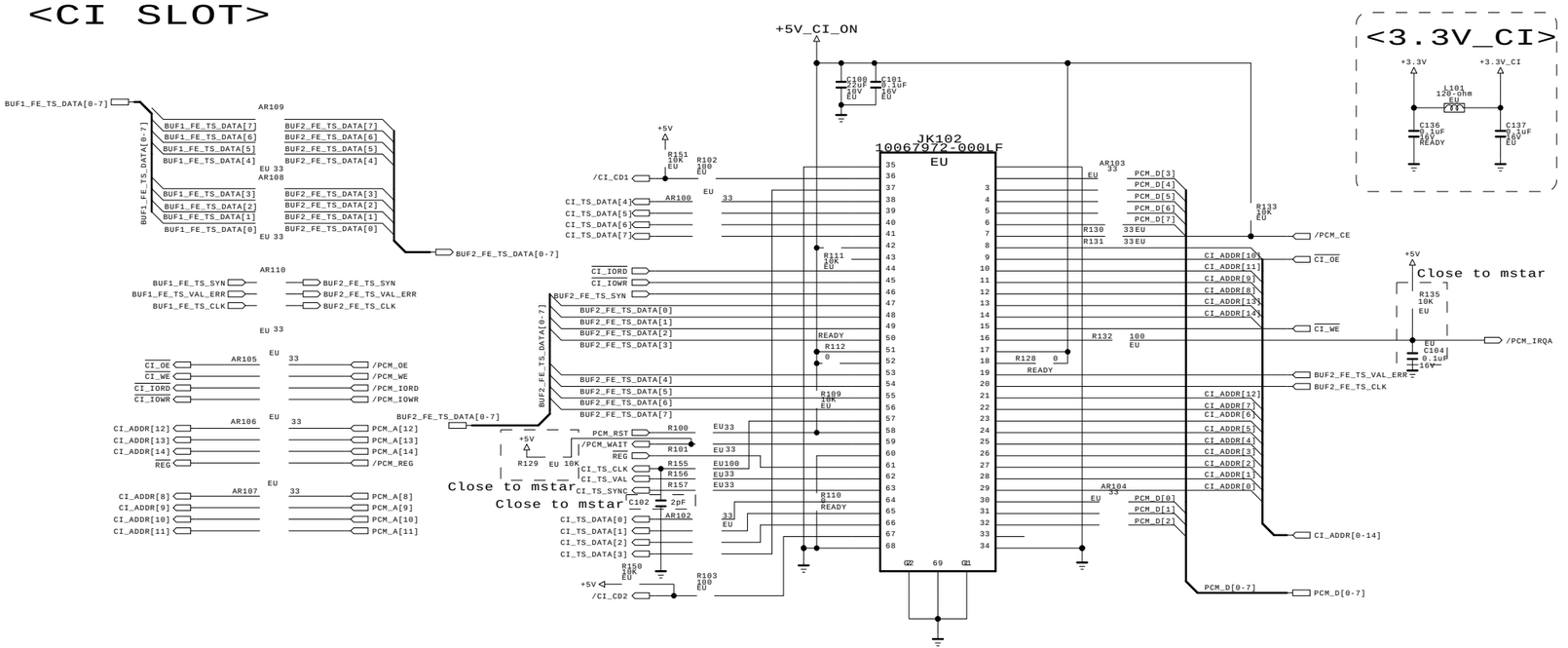
<Full SCART>





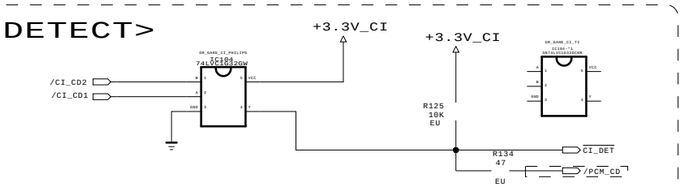
JIG_GND

<CI SLOT>

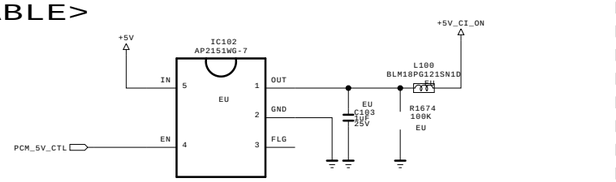


<3.3V_CI>

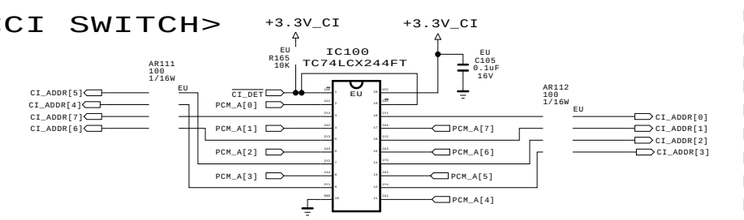
<CI DETECT>



<CI ENABLE>



<CI SWITCH>



THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FIRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

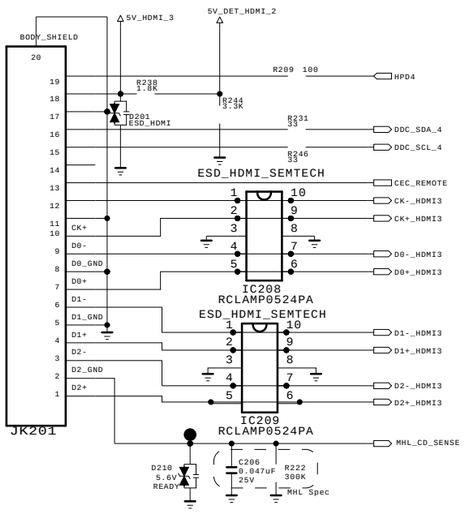
SECRET

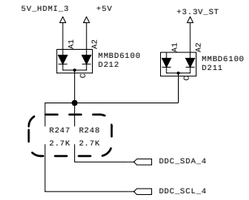
LGElectronics

LG ELECTRONICS

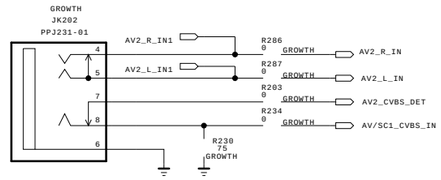
MODEL	L14	DATE	2013-08-06
BLOCK	SCART,CI Slot	SHEET	1 / 10

<HDMI/MHL>

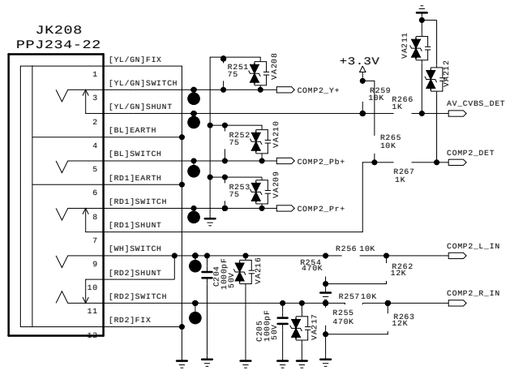




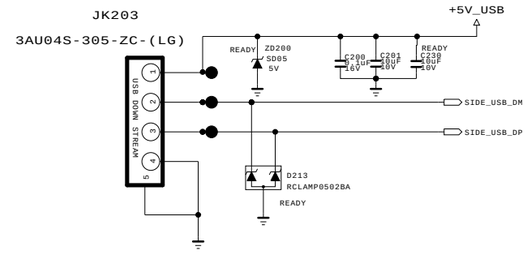
<AV (Growth & SCA)>



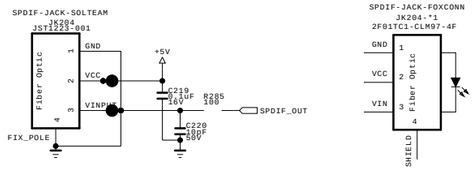
<COMPONENT>



<SIDE USB>



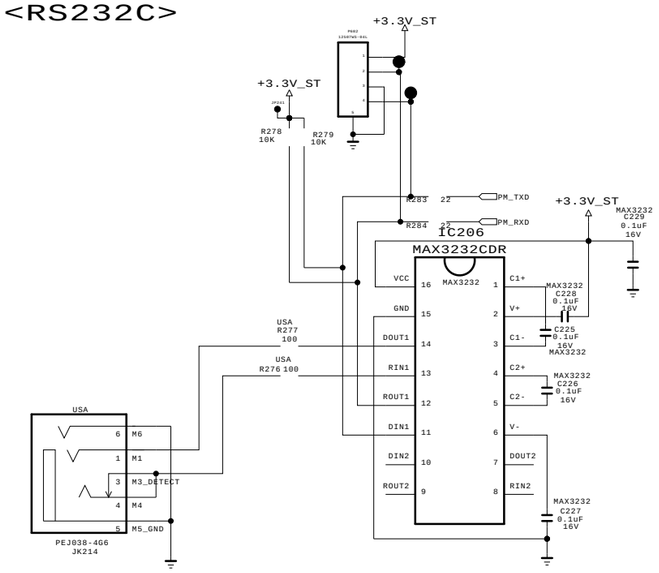
<SPDIF>



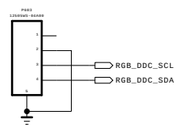
<CEC>

<FOR COMMERCIAL>

<RS232C>



<Mstar Debug 4P>



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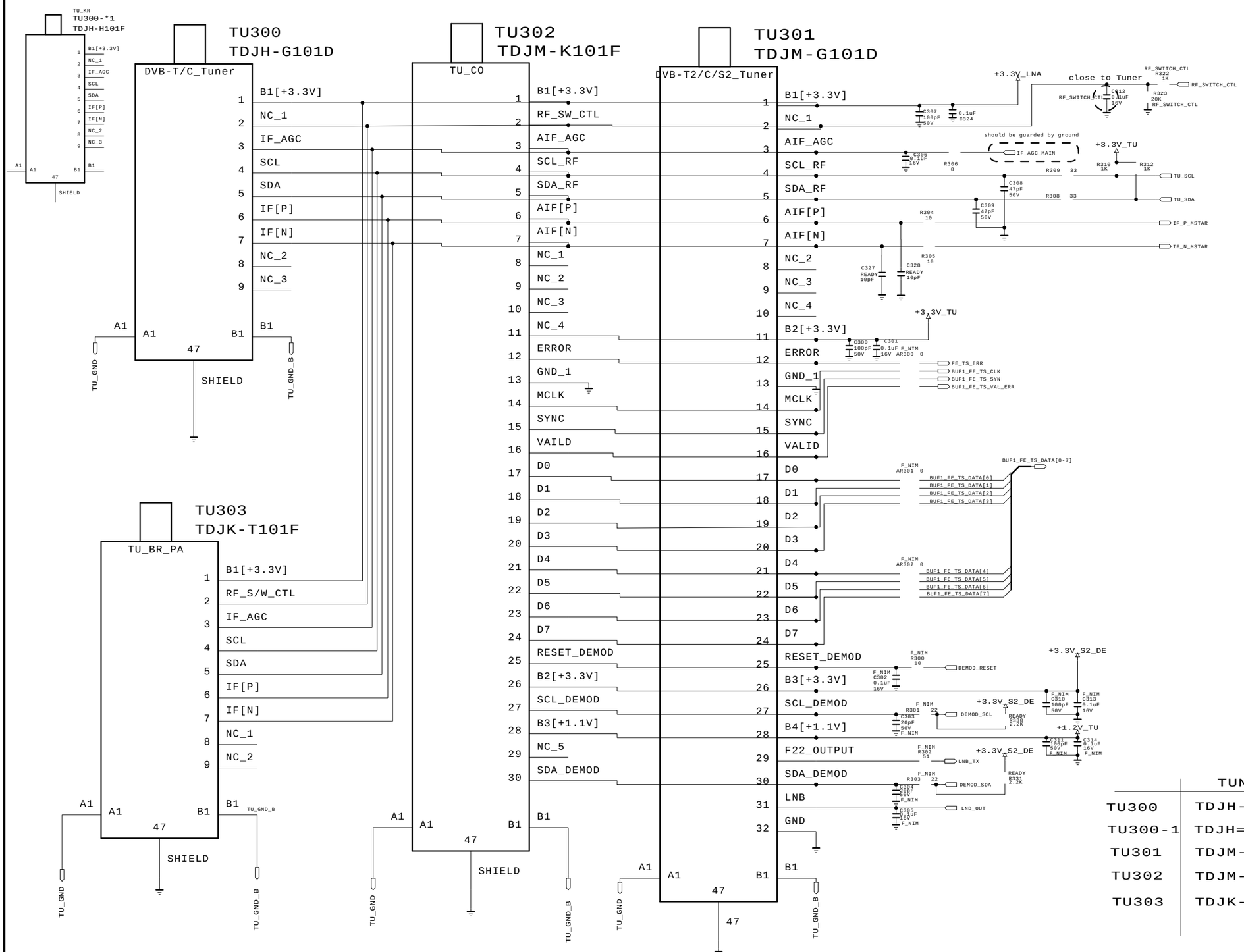
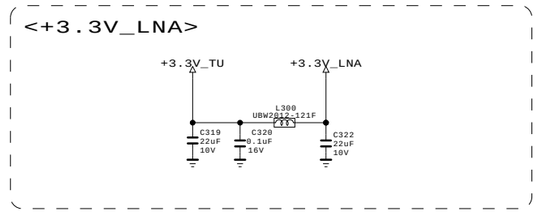
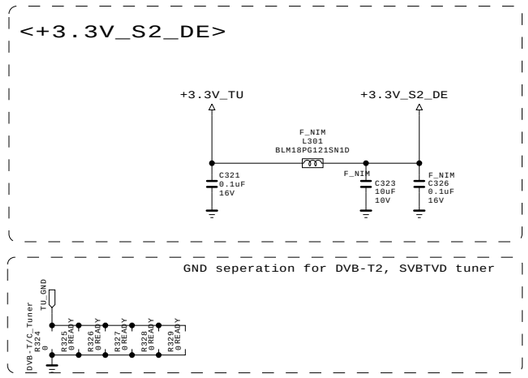
MODEL	L14	DATE	2013-08-06
BLOCK	JACK INTERFACE	SHEET	2 / 10

<L14 TUNER T2/C/S2>







	TUNER	OPT1	OPT2	OPT3	OPT4
TU300	TDJH-G101D	DVB-T/C	HNIM	X	W/O AD
TU300-1	TDJH=H101F	ATSC	HNIM	X	W/O AD
TU301	TDJM-G101D	DVB-S2/T2	HNIM	X	W/O AD
TU302	TDJM-K101F	DVB-T2			
TU303	TDJK-T101F	SBTVD			

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SECRET
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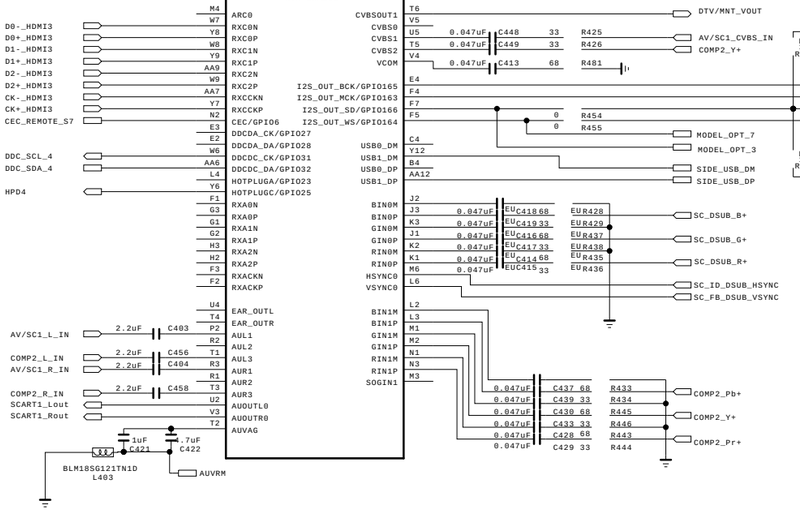
LG ELECTRONICS

MODEL	L14	DATE	2013-08-06
BLOCK	Tuner	SHEET	3 / 10

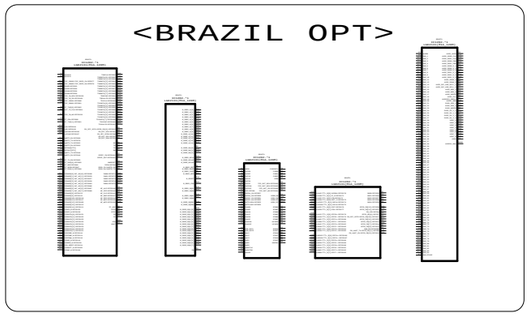
TUNER

<HDMI& AV/COMP >

IC1202
LGE2132(M1A_256M)

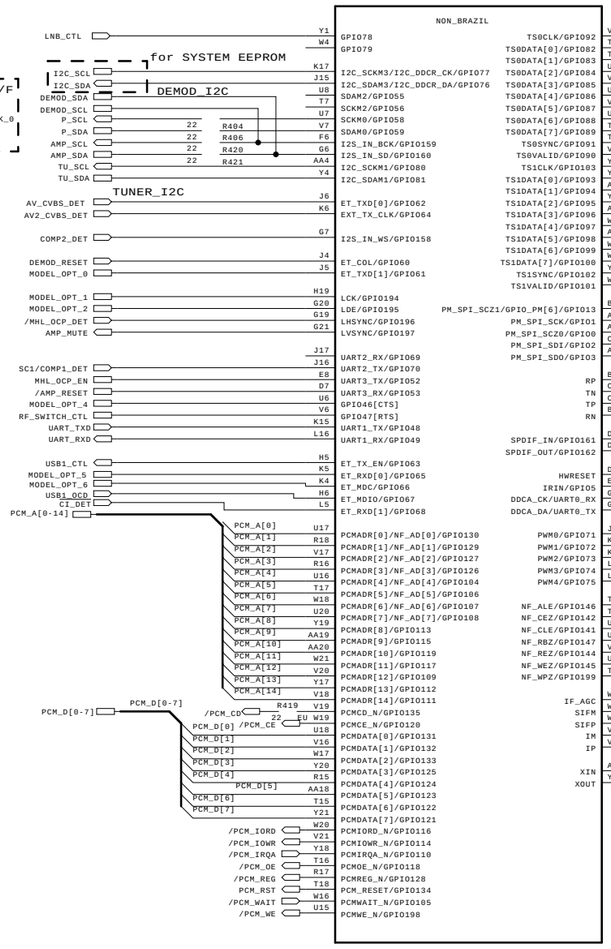


<BRAZIL OPT>



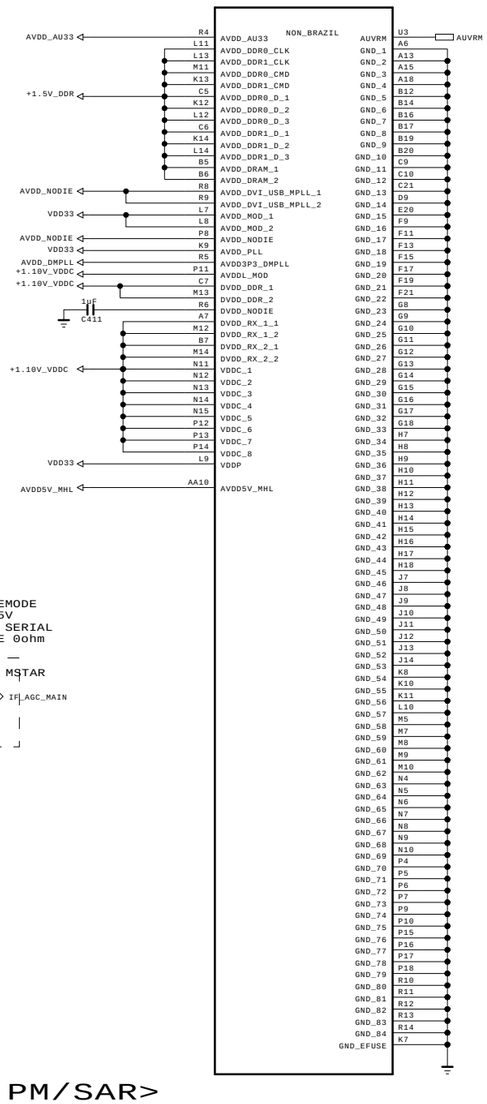
<GPIO & CI>

IC1202
LGE2132(M1A_256M)



<VCC &GND>

IC1202
LGE2132(M1A_256M)



NON_A_DEMODE
AGC 1.25V
100 OHM SERIAL
A_DEMODE 0ohm

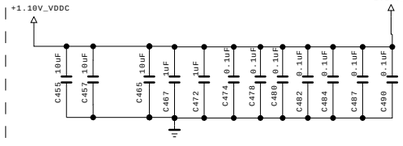
Close to MSTAR

ANALOG SIF
Close to MSTAR

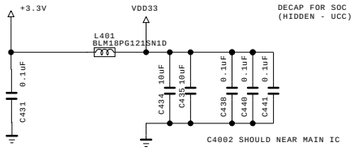
DTV_IF

#POWER FOR MAIN#

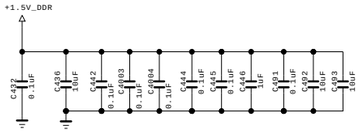
<VDDC 1.05V>

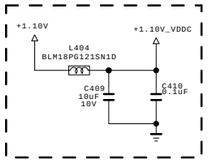


<Normal Power 3.3V>

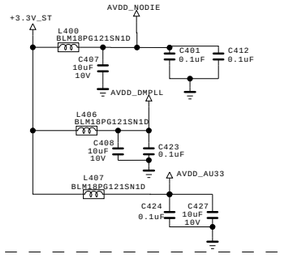


<DDR3 1.5V>

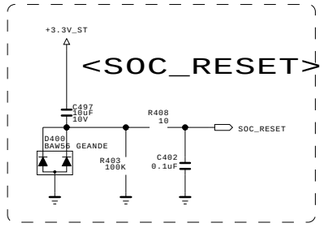


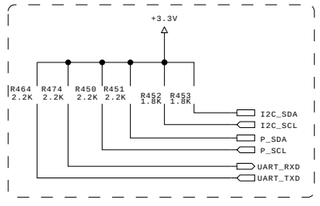


<STby 3.3V>



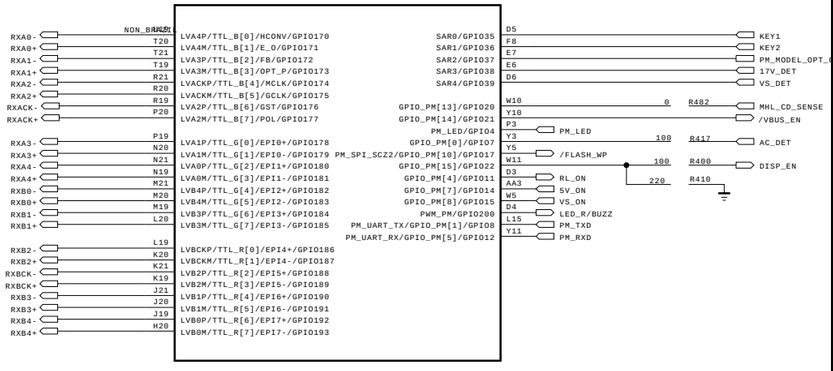
<SOC_RESET>





<LVDS & PM/SAR>

IC1202
LGE2132(M1A_256M)



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SECRET
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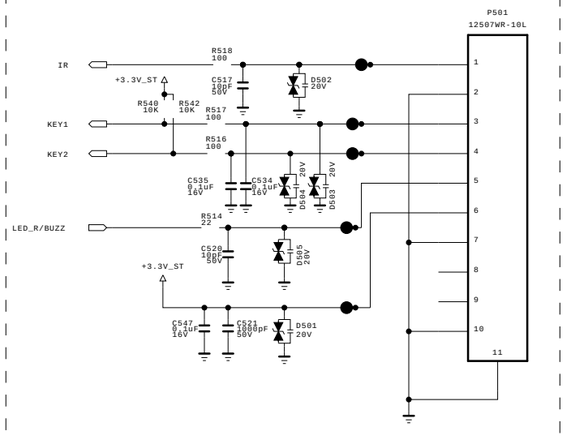
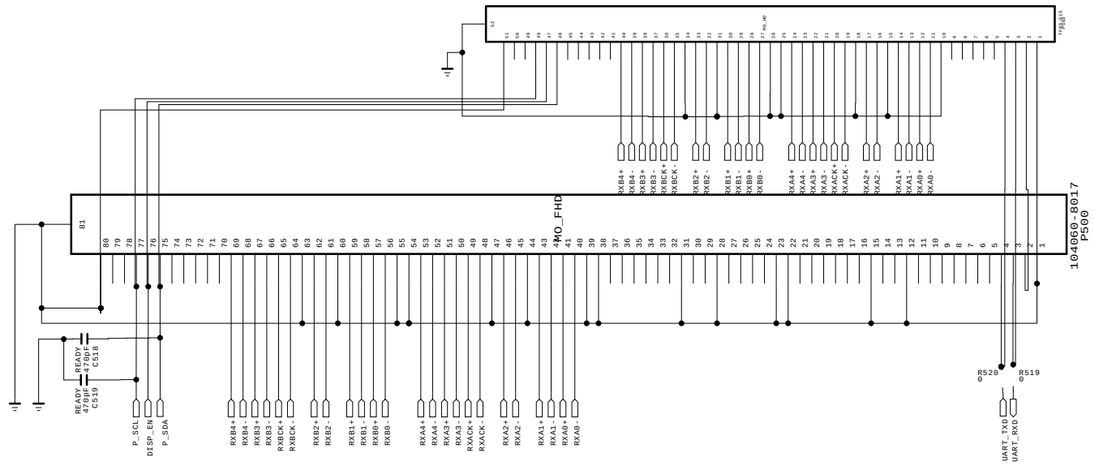
LG ELECTRONICS

MODEL	L14	DATE	2013-08-06
BLOCK	MAIN	SHEET	4 / 10

<KEY/IR>

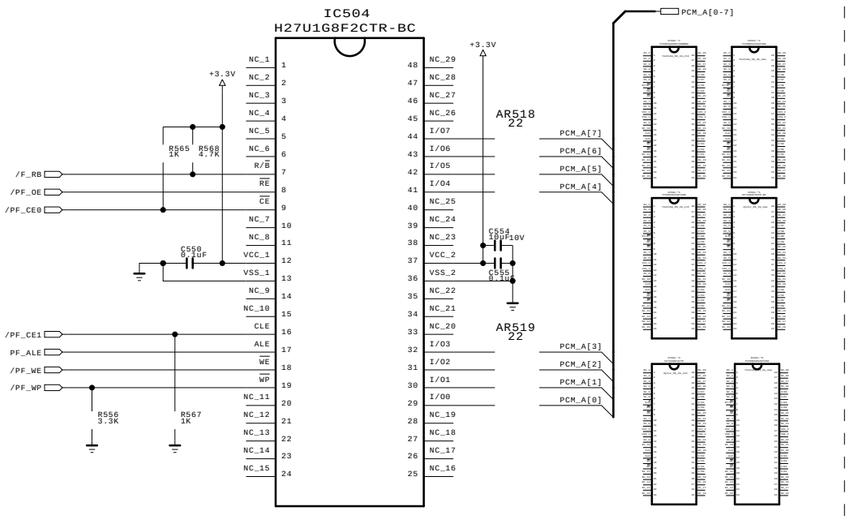


<LVDS>



* LCI: LVDS Connection Indicator

<NAND Flash>
1GBit



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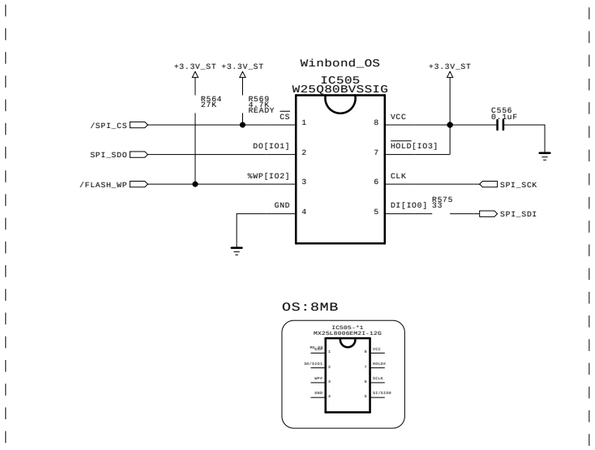

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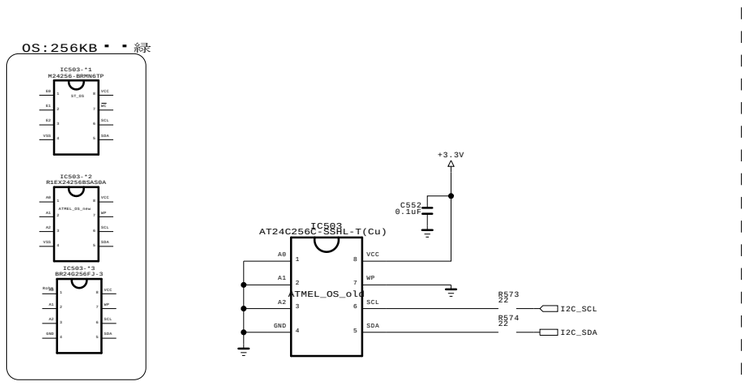

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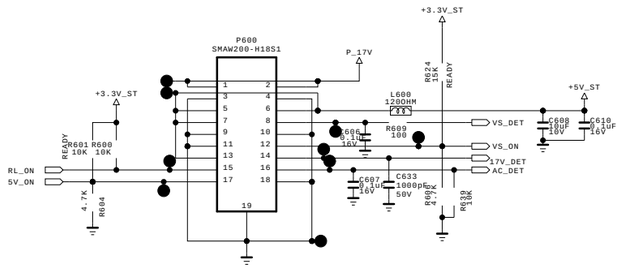
SECRET
LGElectronics

LG ELECTRONICS

MODEL	L14	DATE	2013-08-06
BLOCK	Memory.LVDS,IR	SHEET	5 / 10

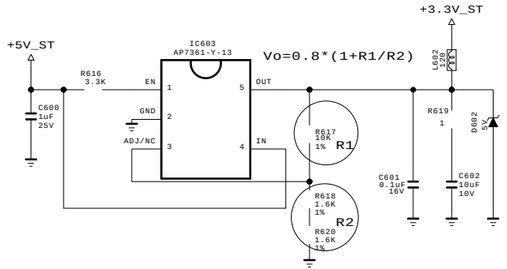
POWER

<Power Wafer>

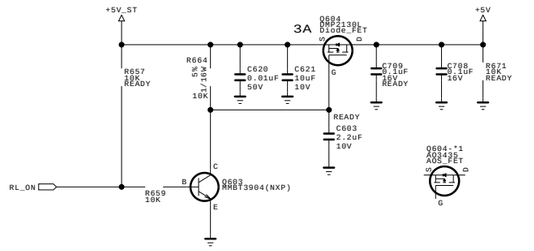


<ST-BY>

+5V_ST --> 3.3Vst

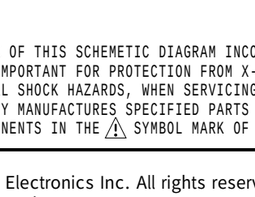


5V_ST --> MULTI 5V

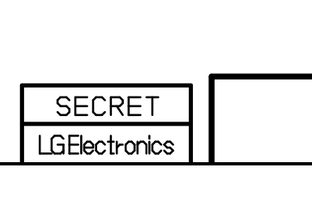


<MUTI>

+5V->+3.3V_DDR

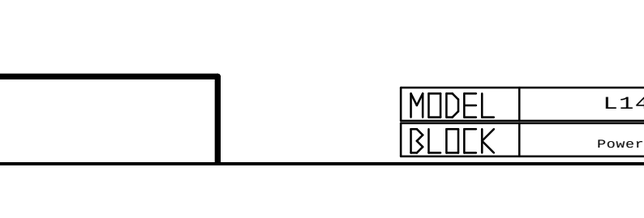


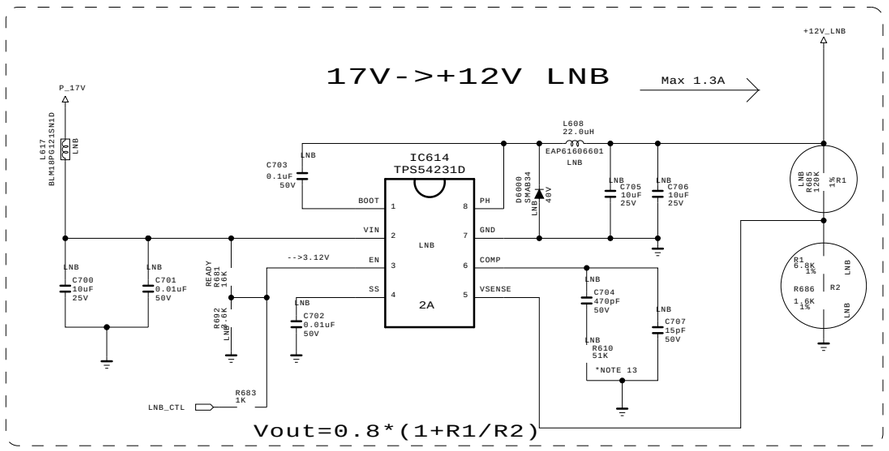
--> +1.5V_DDR



+5V->+3.3V ->+3.3V_TU

--> +1.2V_TU





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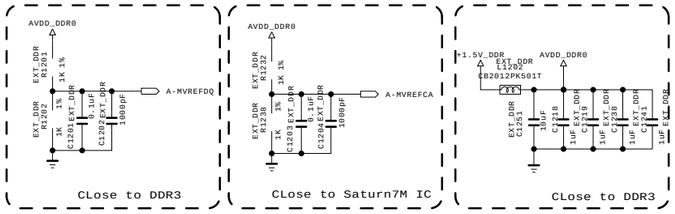
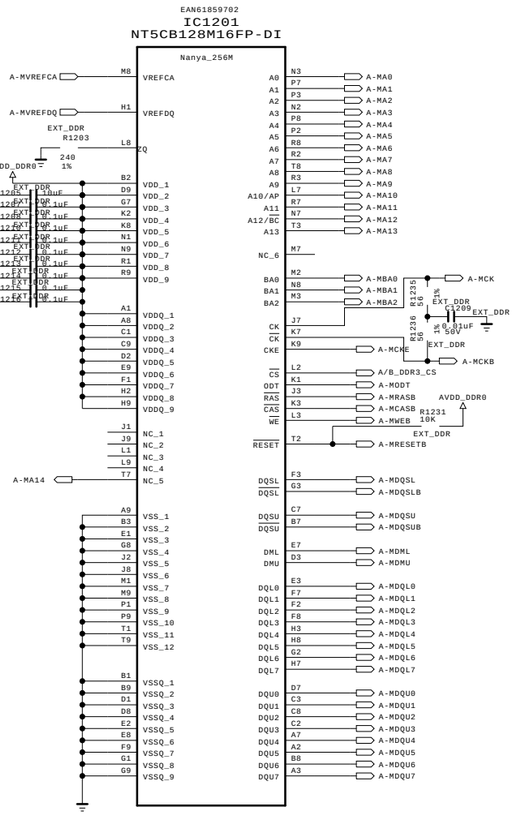
SECRET

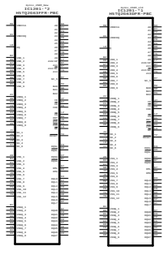
LGElectronics

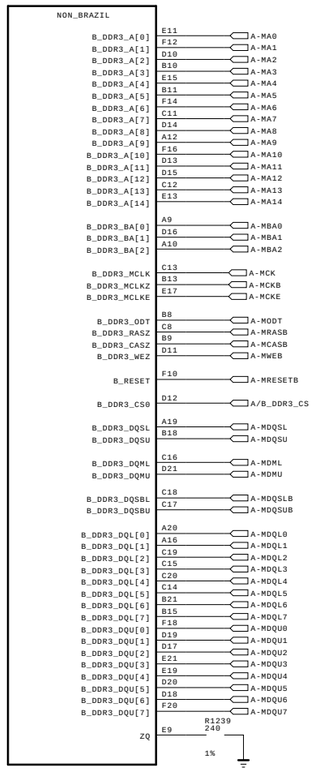
LG ELECTRONICS

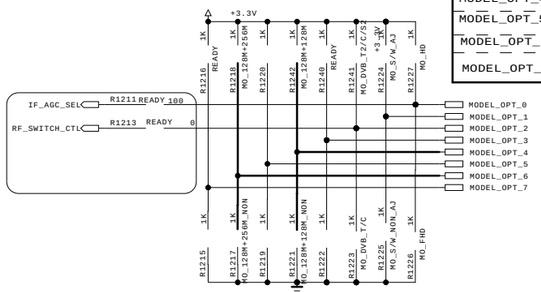
MODEL	L14	DATE	2013-08-06
BLOCK	Power	SHEET	6 / 10











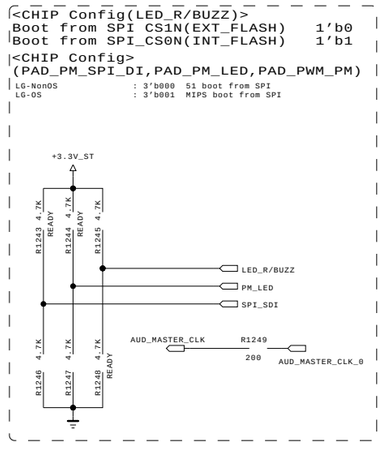
MODEL OPTION

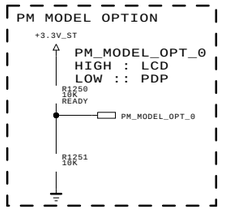
PIN NAME	PIN NO.	LOW	HIGH
MODEL_OPT_0	J5	MO_FHD	MO_HD
MODEL_OPT_1	H19	MO_S/W_NON_AJ	MO_S/W_AJ
MODEL_OPT_2	G20	MO_DVB_T/C	MO_DVB_T2/C/S2
MODEL_OPT_3	G19	MO_M120_NON(Default)	MO_M120
MODEL_OPT_4	U6	MO_128M+128M_NON	MO_128M+128M
MODEL_OPT_5	K5	MO_S/W_TW	MO_S/W_EU/AJ
MODEL_OPT_6	K4	MO_128M+256M_NON	MO_128M+256M
MODEL_OPT_7	L5	MO_DUALSTREAM_NON(Default)	MO_DUALSTREAM

* Dual Stream is only Korea 3D spec

Memory OPTION

Memory INT+EXT	Auto Det	MODEL_OPT_4	MODEL_OPT_6
128M Only	0	0	0
256M Only	1	0	0
128M+128M	0	1	0
128M+256M	0	0	1





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LG ELECTRONICS

MODEL	L14	DATE	2013-08-06
BLOCK	External_DDR	SHEET	7 / 10

DVB-S2 LNB Part Allegro

(Option:LNB)

Input trace widths should be sized to conduct at least 3A

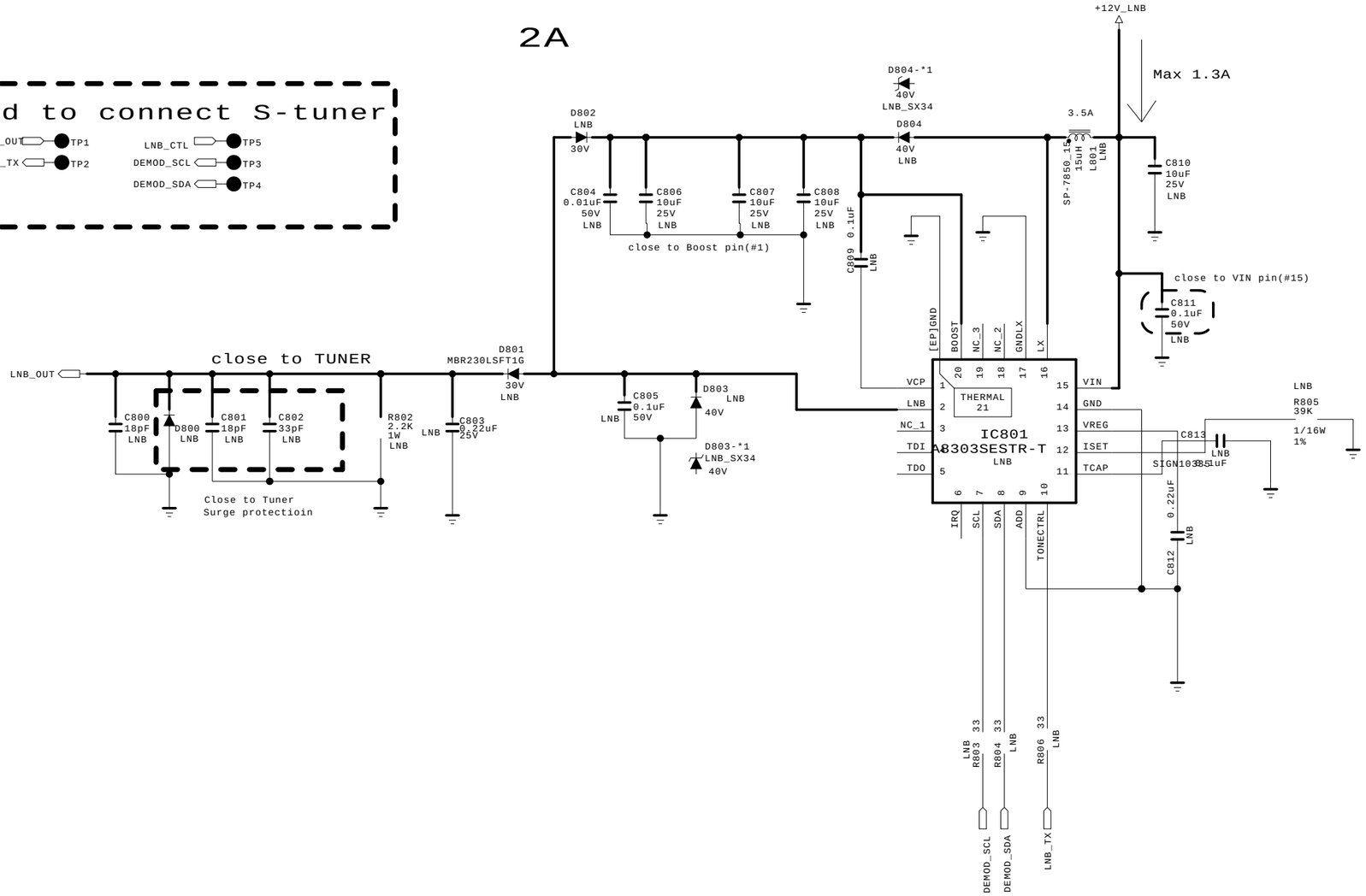
Ouput trace widths should be sized to conduct at least 2A

3A

2A

need to connect S-tuner

LNB_OUT TP1
LNB_TX TP2
LNB_CTL TP5
DEMOD_SCL TP3
DEMOD_SDA TP4



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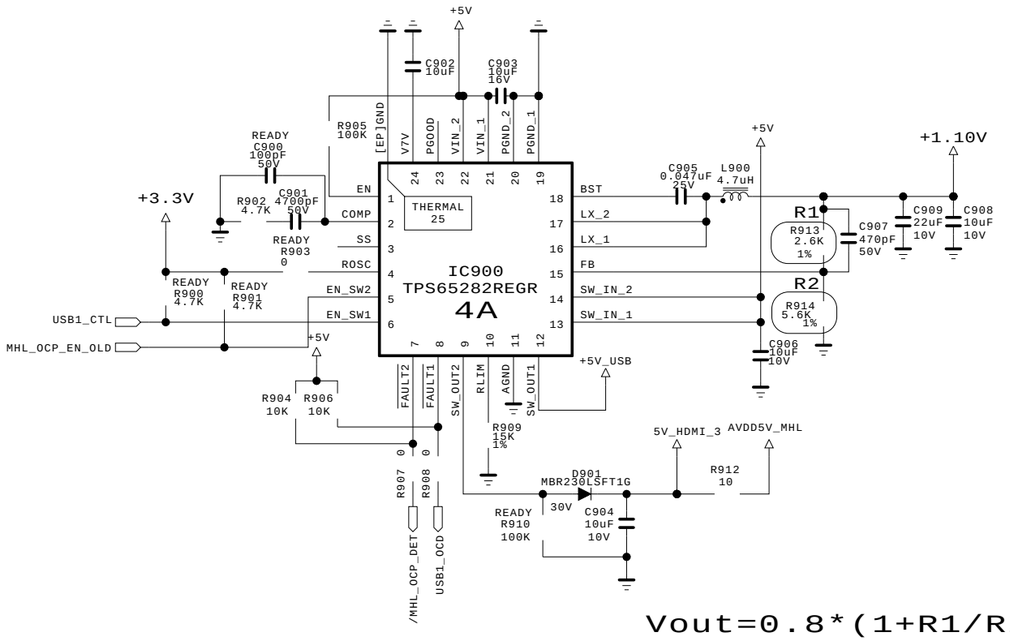
SECRET

LGElectronics

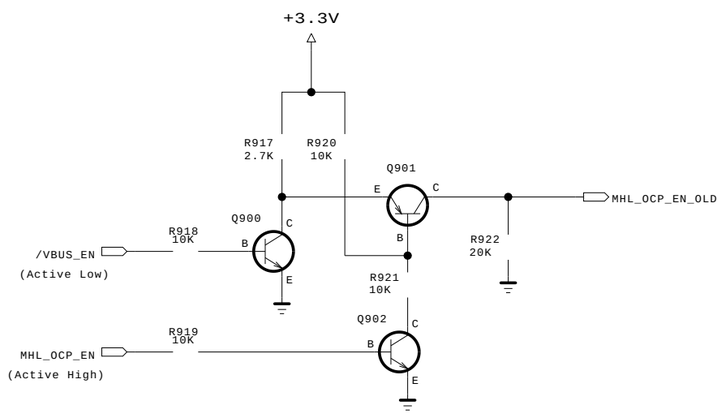
LG ELECTRONICS

MODEL	L14	DATE	2013-08-06
BLOCK	Satellite LNB	SHEET	8 / 10

+1.15V_Normal & +5V_USB with OCP



Vout=0.8*(1+R1/R2)



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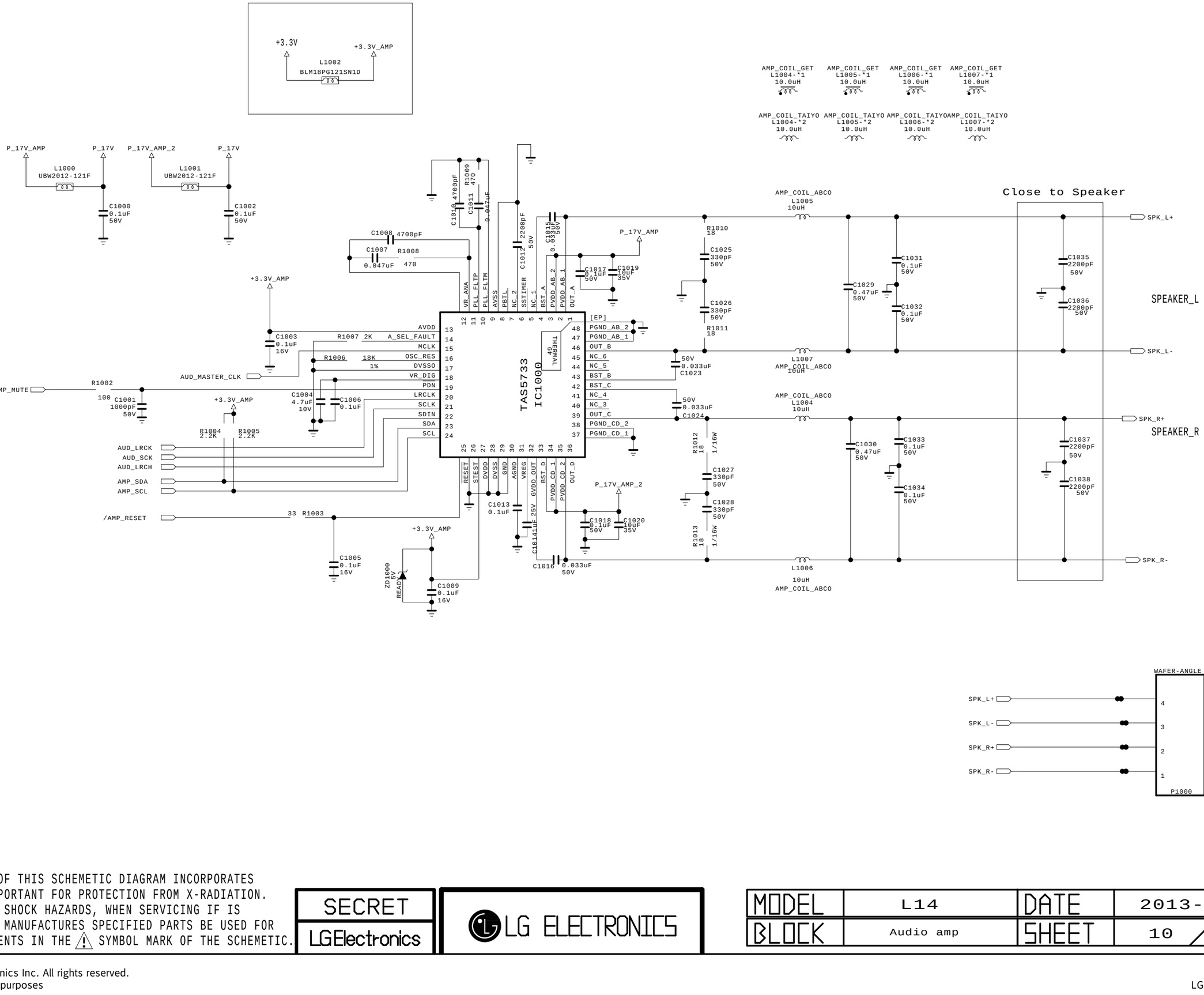
SECRET

LGElectronics

LG ELECTRONICS

MODEL	L14	DATE	2013-08-06
BLOCK	Dual DC DC	SHEET	9 / 10

<AUDIO AMP>



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SECRET

LGElectronics

LG ELECTRONICS

MODEL	L14	DATE	2013-08-06
BLOCK	Audio amp	SHEET	10 / 10


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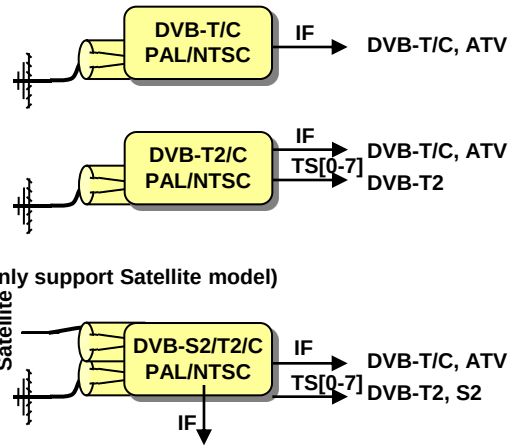
L14 Trouble shooting guide

Please check system, after power Off/On one time

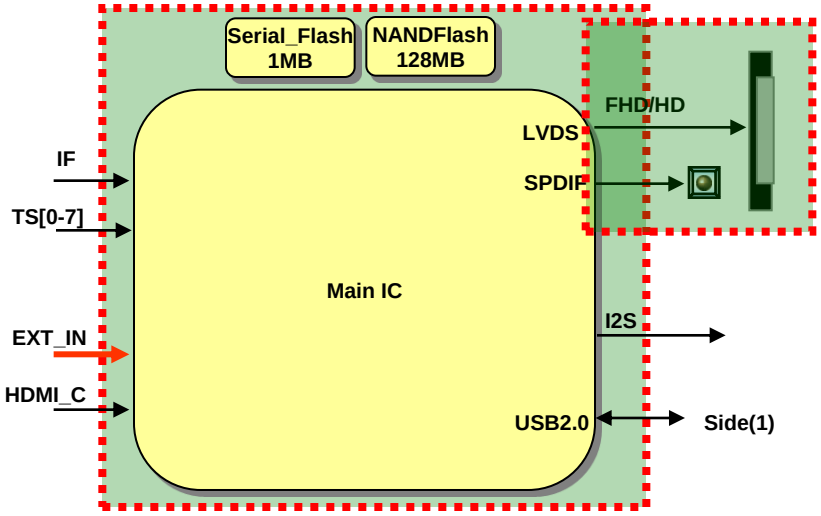
1. Power-Up Boot Fail Trouble Shooting
2. No OSD Trouble Shooting
3. Digital TV Video Trouble Shooting
4. Analog TV Video Trouble Shooting
5. Component Video Trouble Shooting
6. RGB Video : N/A
7. AV Video Trouble Shooting
8. HDMI Video Trouble Shooting
9. All Source Audio Trouble Shooting
10. Digital TV Audio Trouble Shooting
11. Analog TV Audio Trouble Shooting
12. Component / RGB / AV Audio Trouble Shooting
13. HDMI Audio Trouble Shooting
14. USB Trouble Shooting

1. Power-Up Boot Fail Trouble Shooting

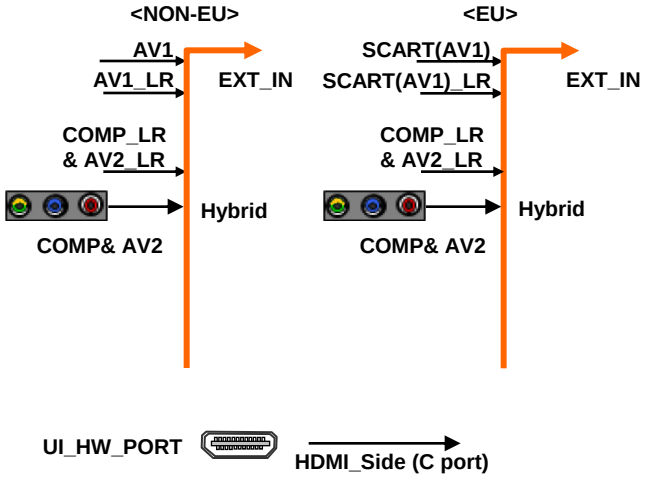
(Front-end)



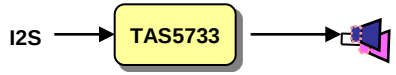
(System + Scalar)



(External Input)

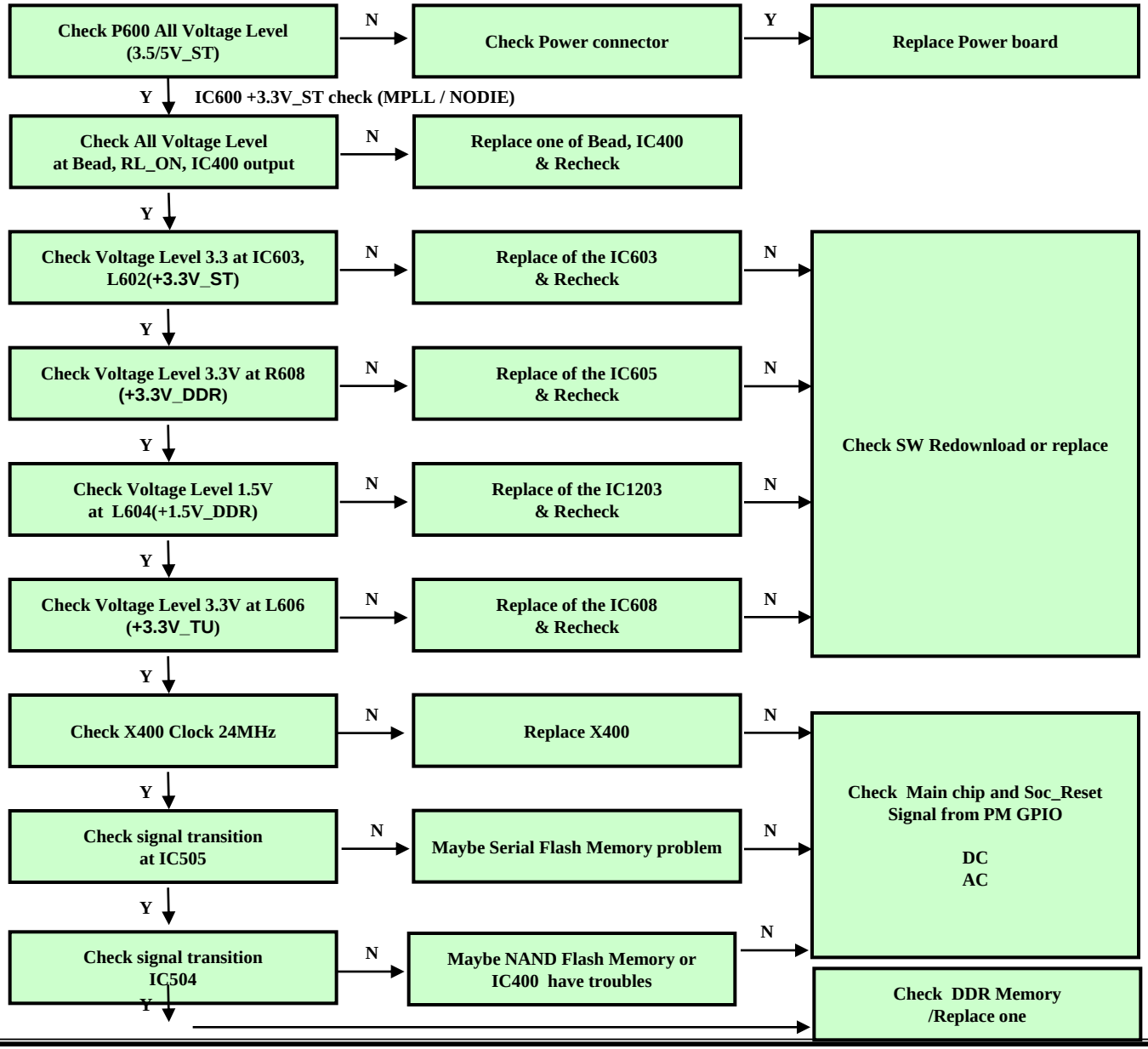


(Audio Out)



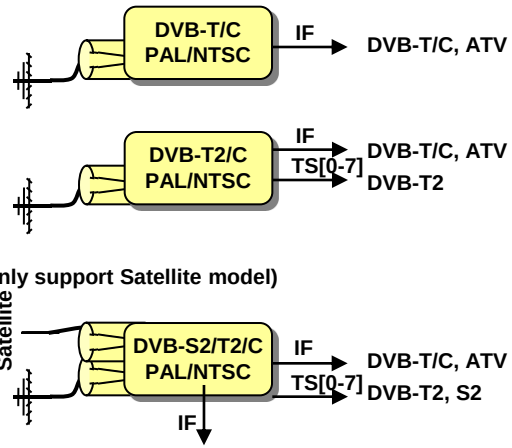
(USB)

1. Power-Up Boot Fail Trouble Shooting

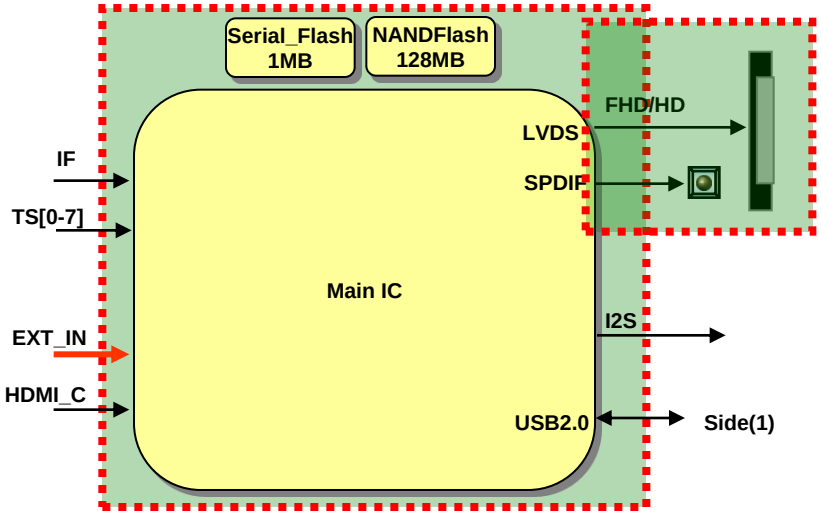


2. No OSD Trouble Shooting

(Front-end)



(System + Scalar)



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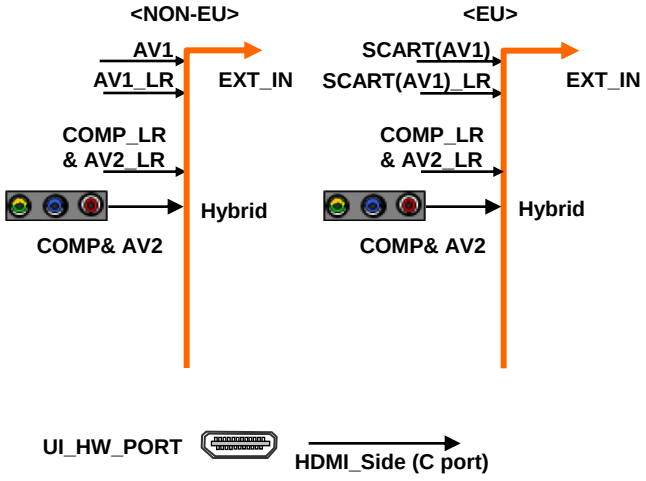
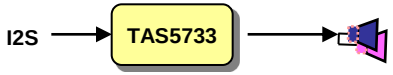
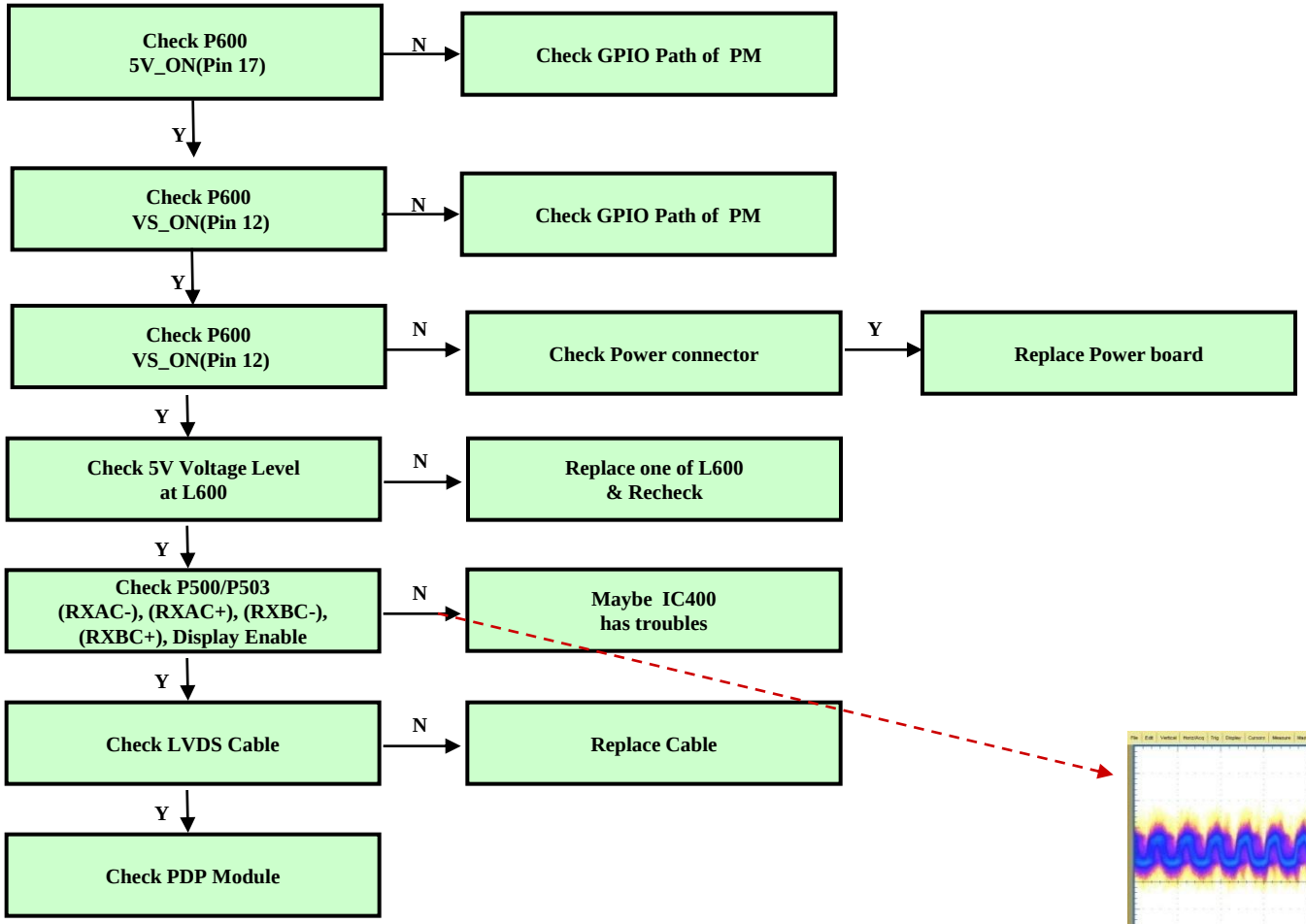


(Audio Out)

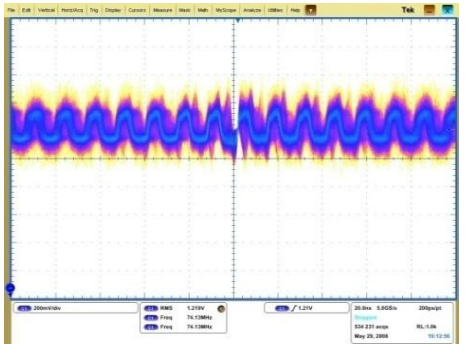


(USB)

2. No OSD Trouble Shooting



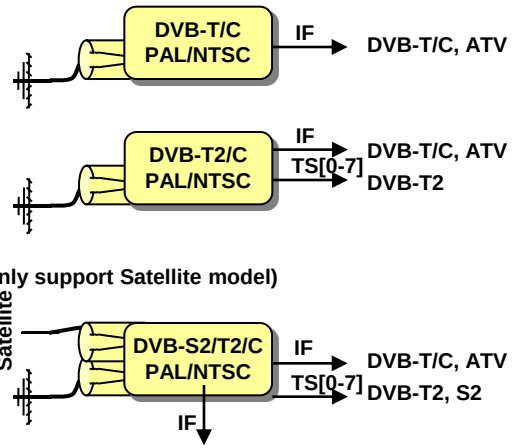
Check CAS
- Electrical Specifications
- Power Supply Sequence
- Input Signal Timing Specification
- Control Signal Register



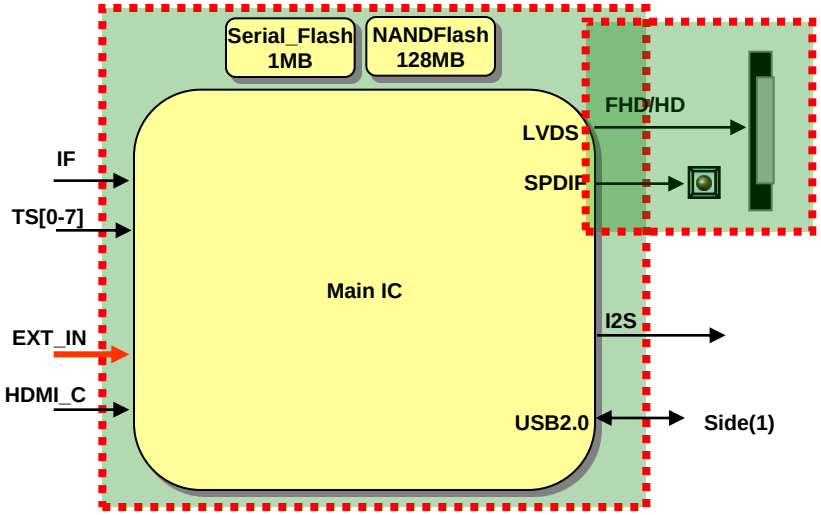
It should satisfy the Pixel Clock on CAS.

3. Digital TV Video Trouble Shooting

(Front-end)



(System + Scalar)



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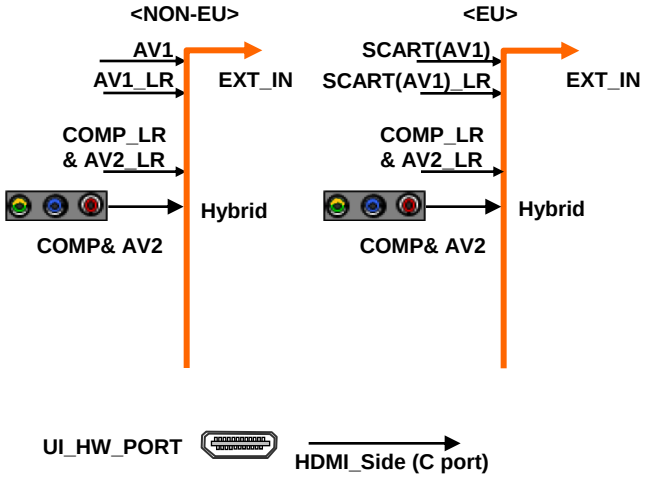
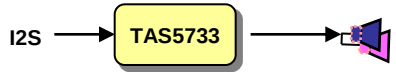
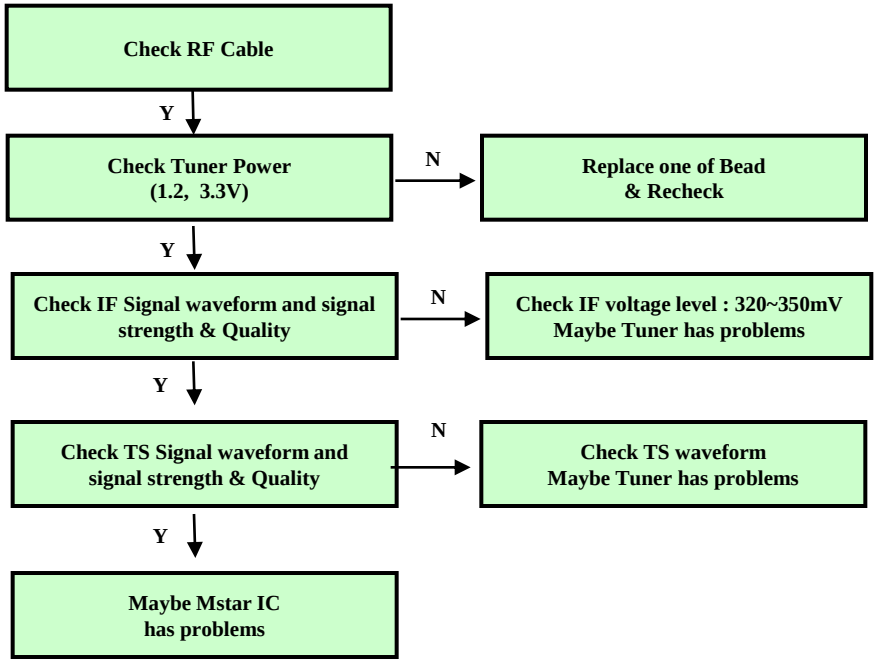


(Audio Out)



(USB)

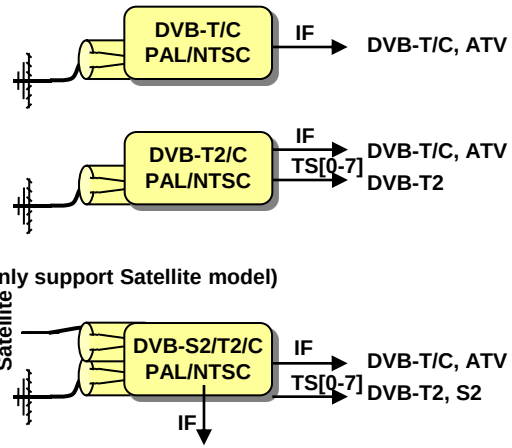
3. Digital TV Video Trouble Shooting



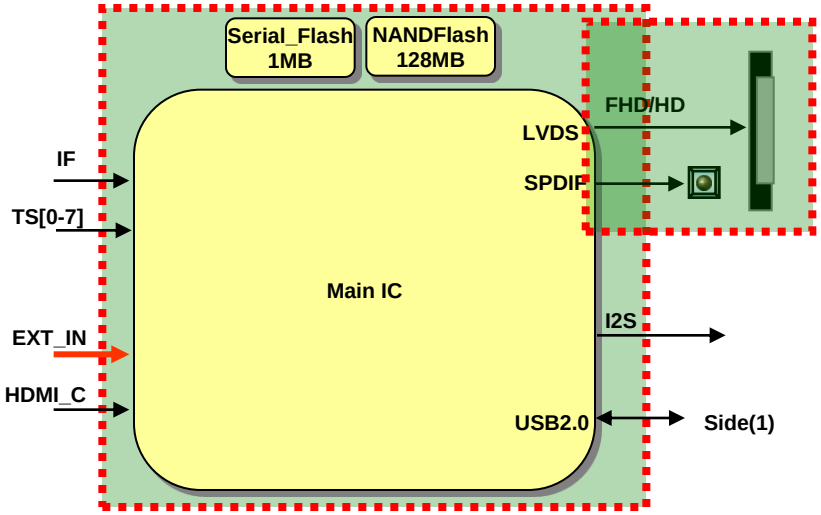
*** Tuner I2C check**
*** ChangeTuner type at adjust menu**

4. Analog TV Video Trouble Shooting

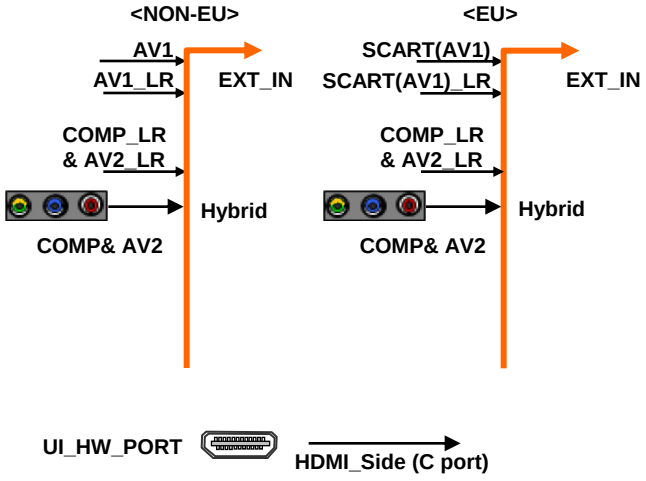
(Front-end)



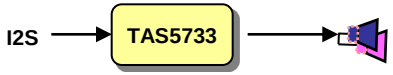
(System + Scalar)



(External Input)

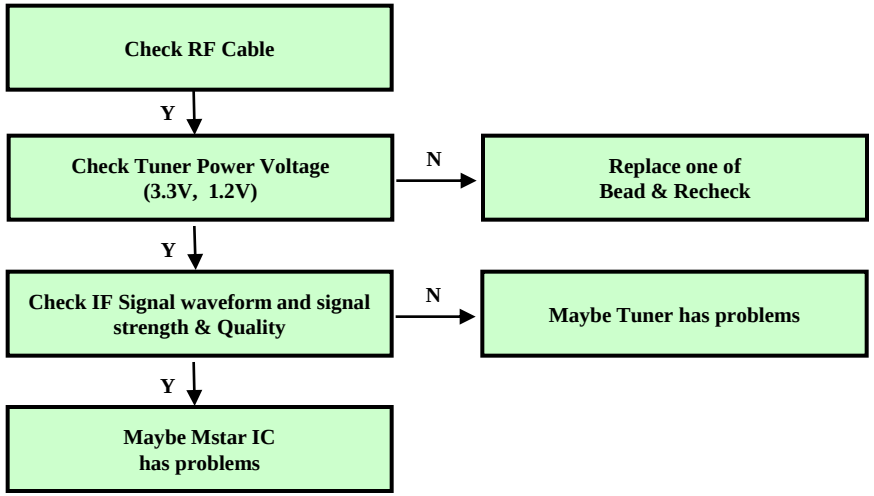


(Audio Out)



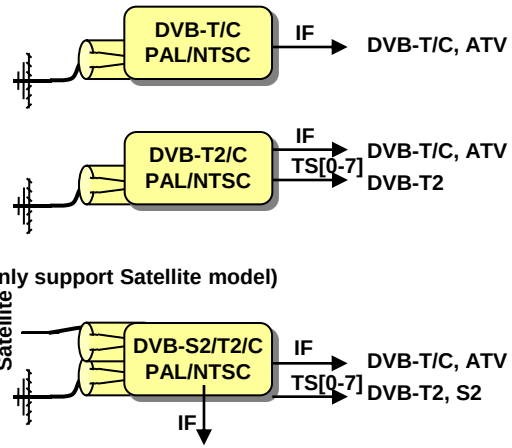
(USB)

4. Analog TV Video Trouble Shooting

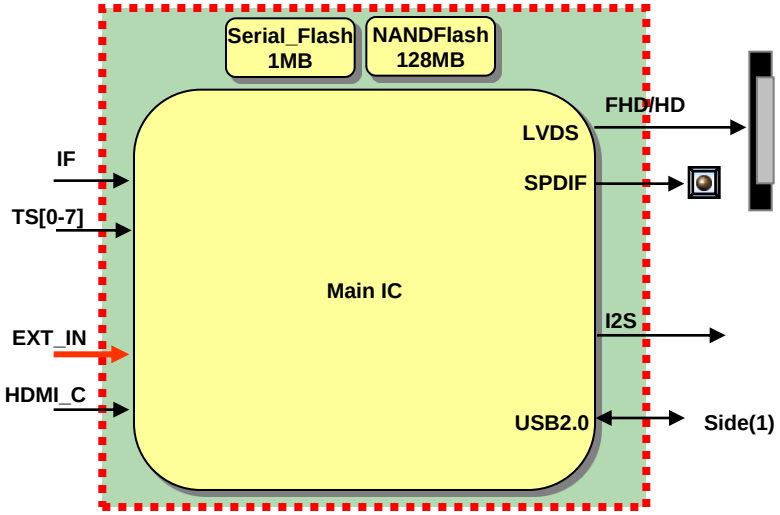


5. Component Video Trouble Shooting

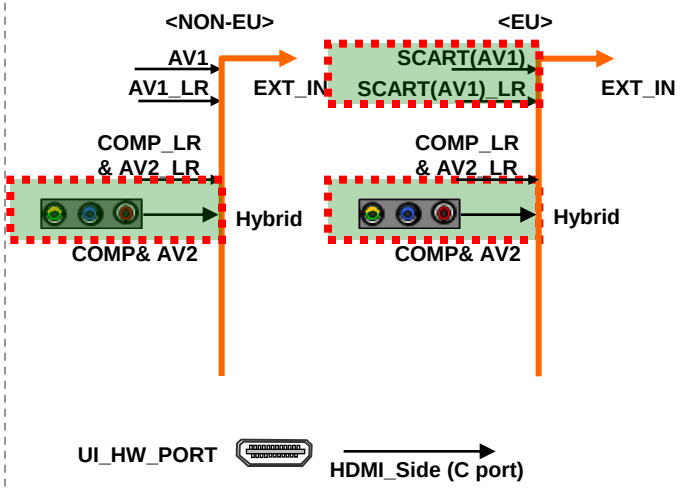
(Front-end)



(System + Scalar)



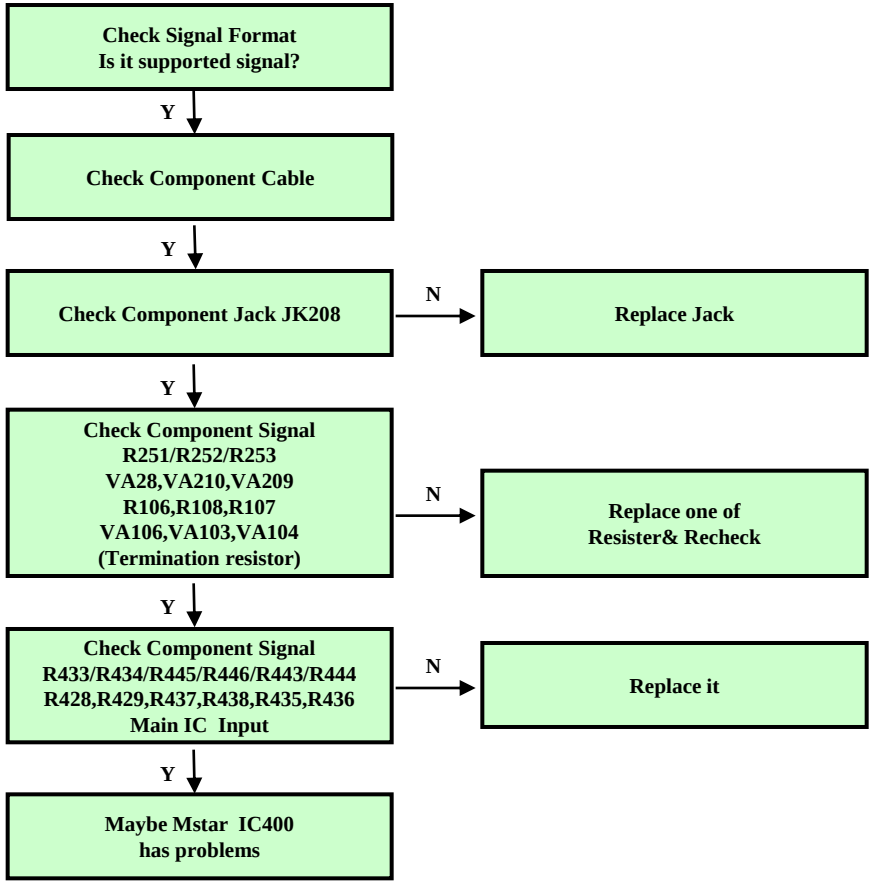
(External Input)



(Audio Out)

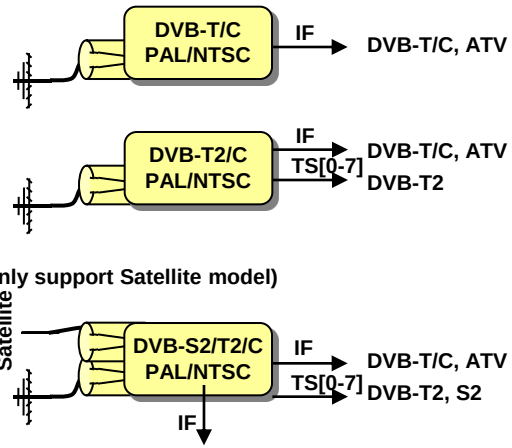
(USB)

5. Component &SCART Video Trouble Shooting

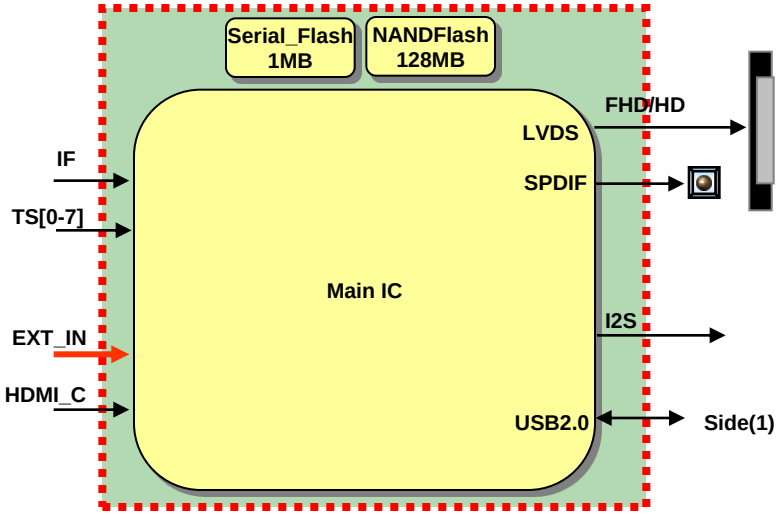


7. AV Video Trouble Shooting

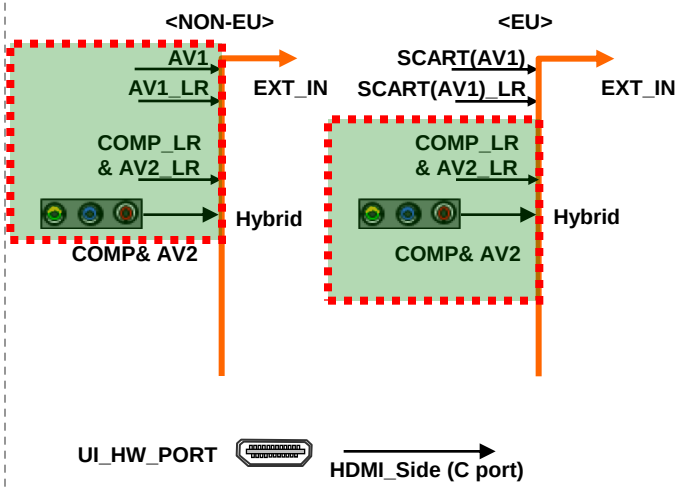
(Front-end)



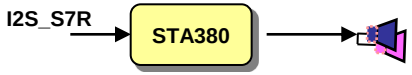
(System + Scalar)



(External Input)

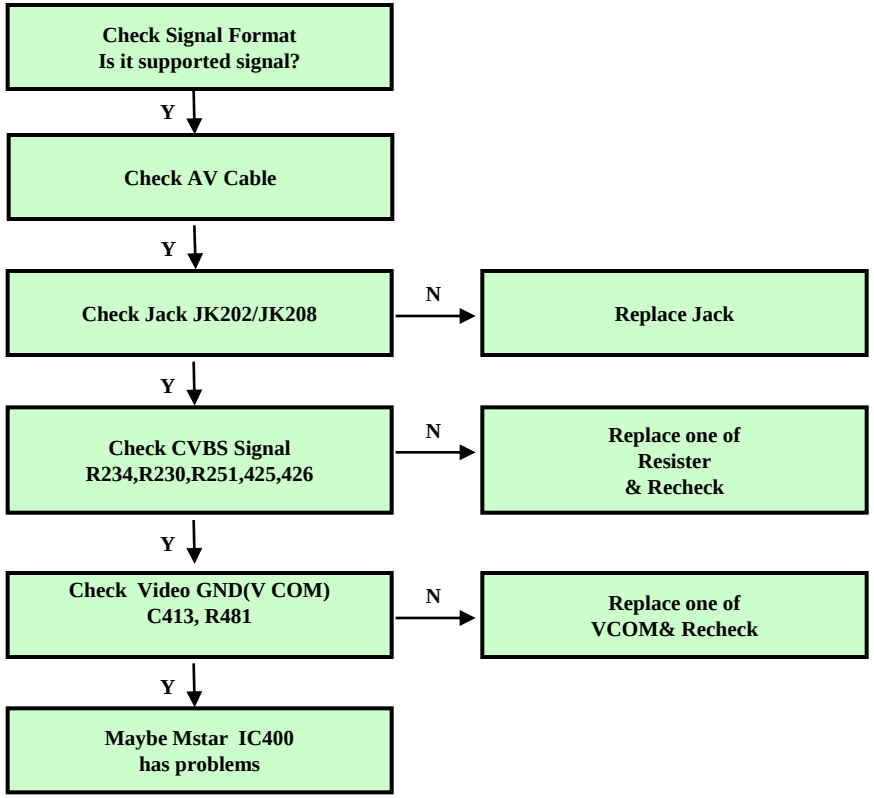


(Audio Out)



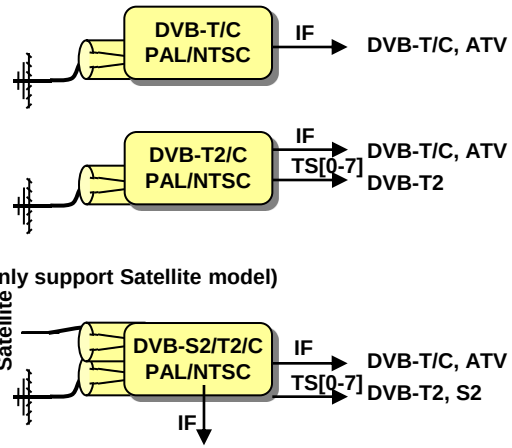
(USB)

7. AV Video Trouble Shooting

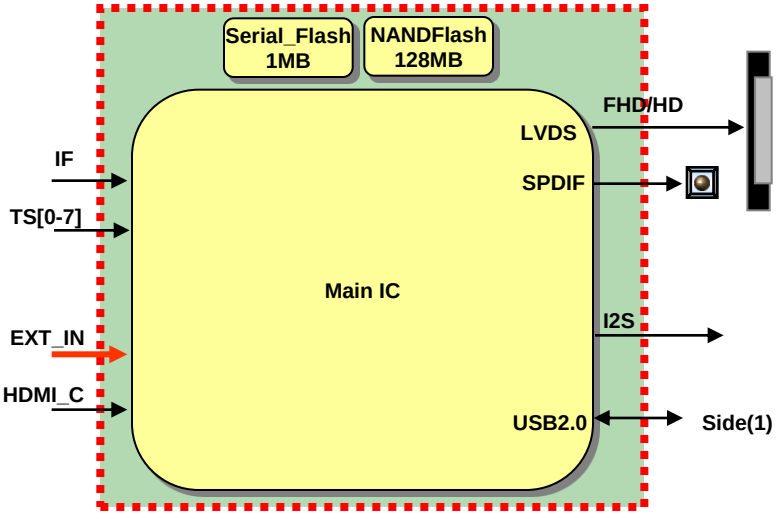


8. HDMI Video Trouble Shooting

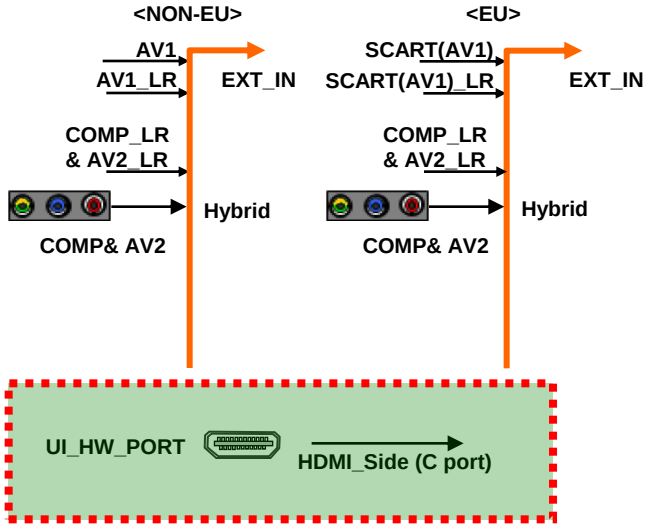
(Front-end)



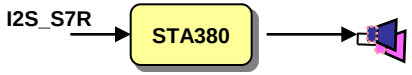
(System + Scalar)



(External Input)

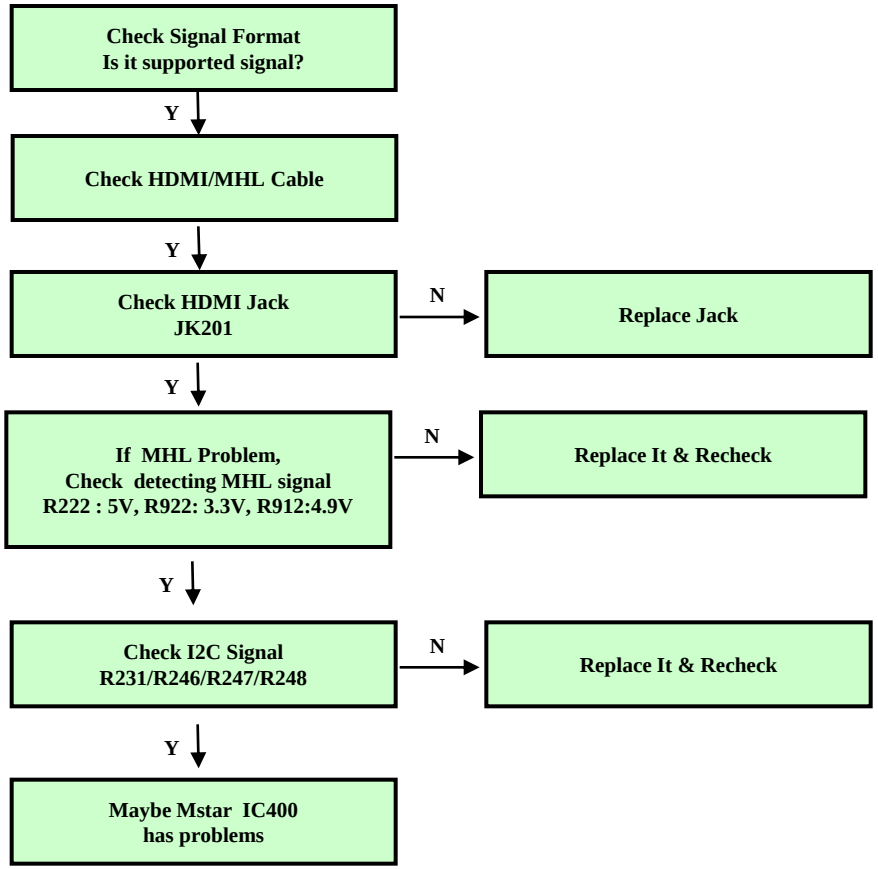


(Audio Out)

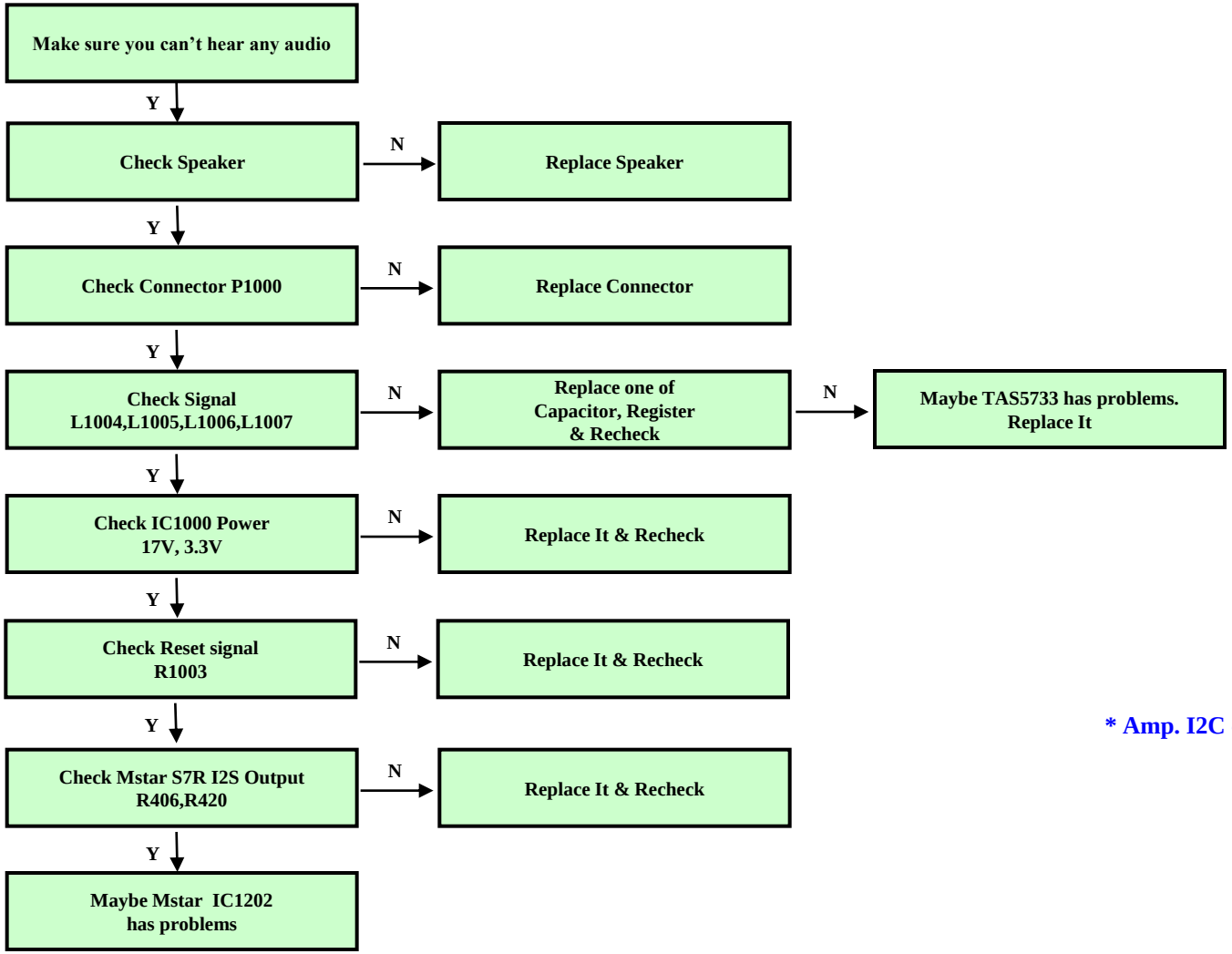


(USB)

8. HDMI (MHL) Video Trouble Shooting



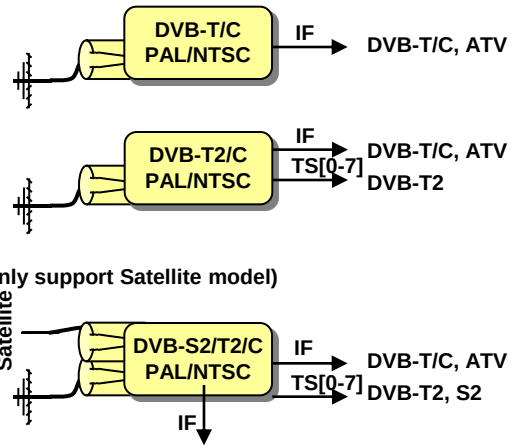
9. All Source Audio Trouble Shooting



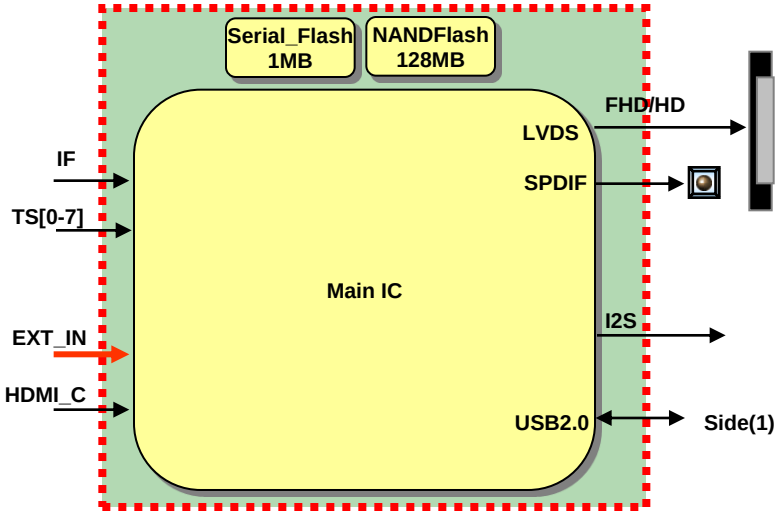
*** Amp. I2C check**

9. All Source Audio Trouble Shooting

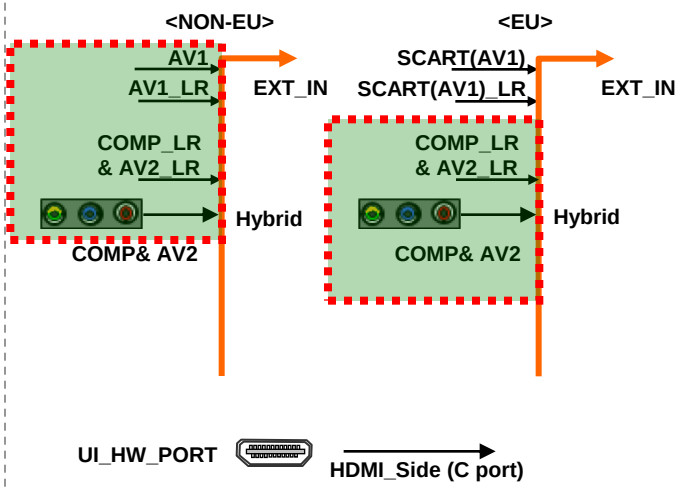
(Front-end)



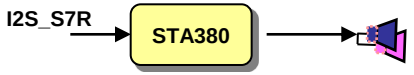
(System + Scalar)



(External Input)



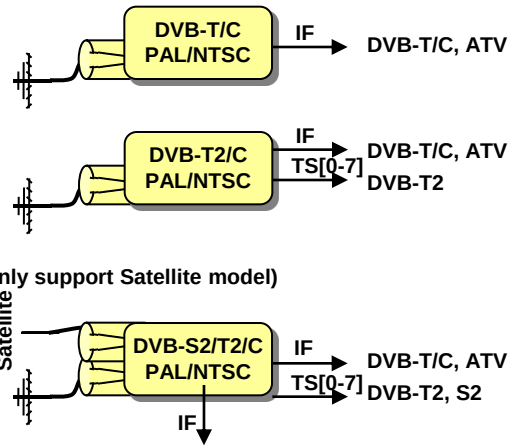
(Audio Out)



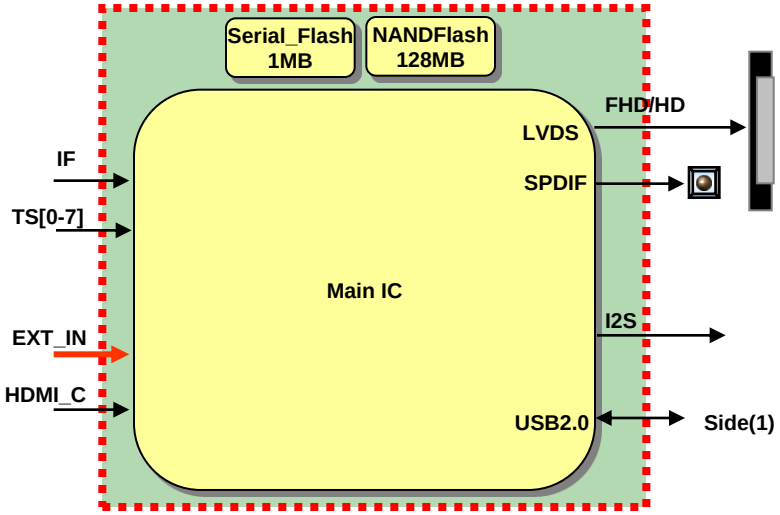
(USB)

10. Digital TV Audio Trouble Shooting

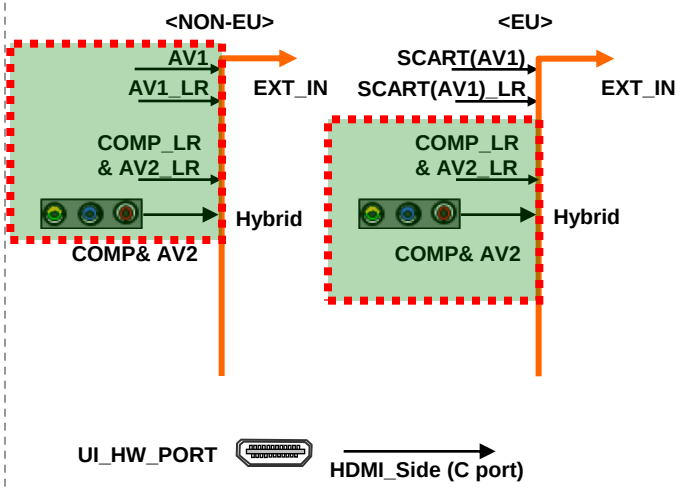
(Front-end)



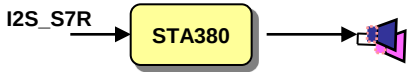
(System + Scalar)



(External Input)

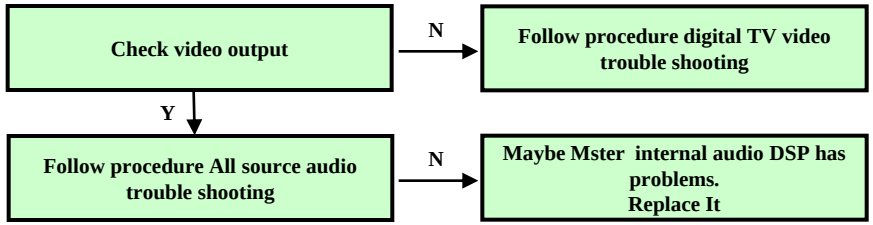


(Audio Out)



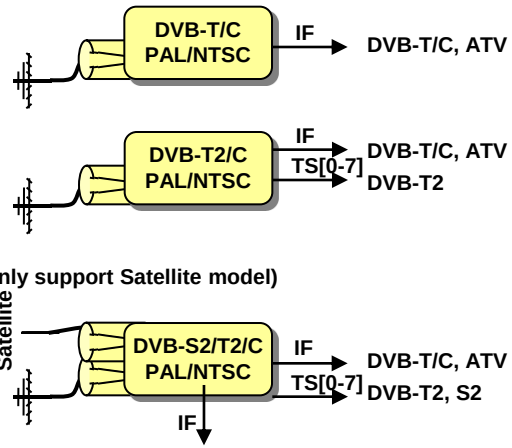
(USB)

10. Digital TV Audio Trouble Shooting

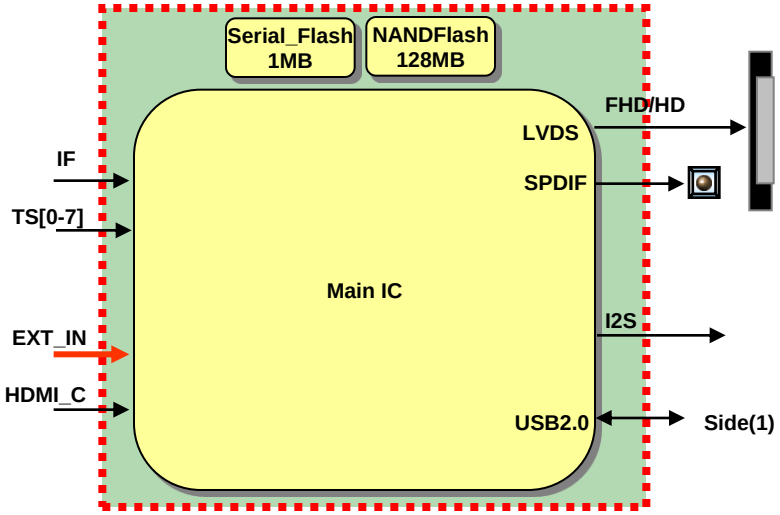


11. Analog TV Audio Trouble Shooting

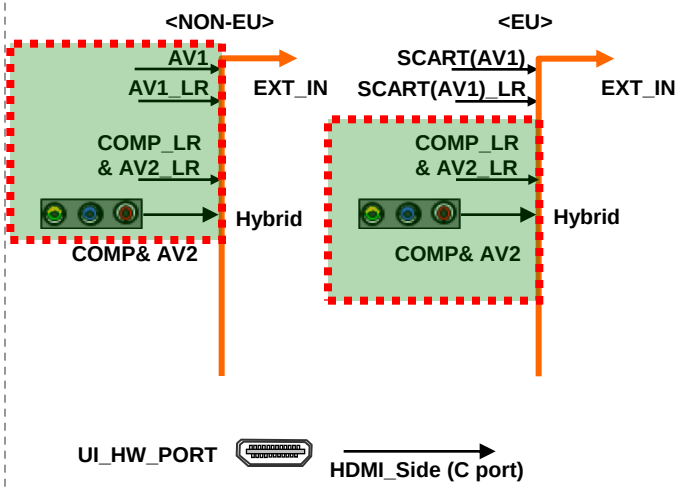
(Front-end)



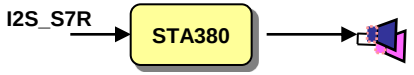
(System + Scalar)



(External Input)

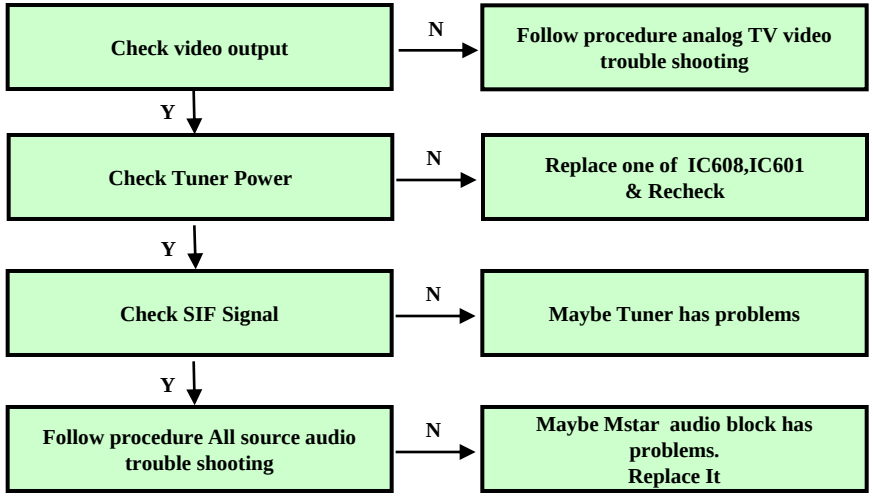


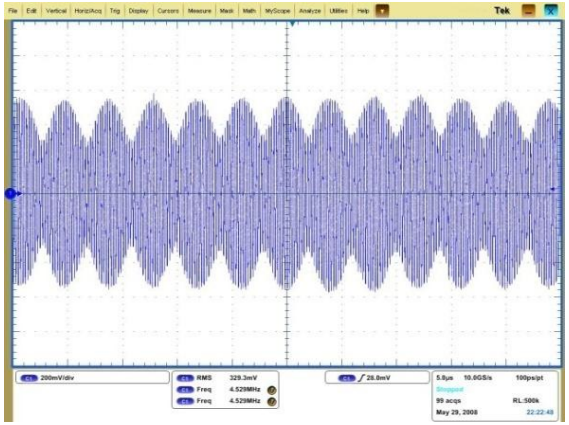
(Audio Out)



(USB)

11. Analog TV Audio Trouble Shooting

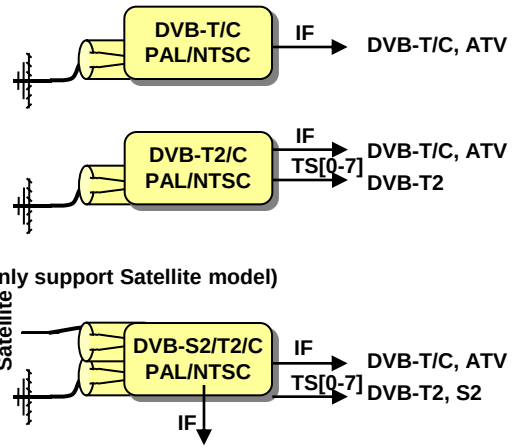




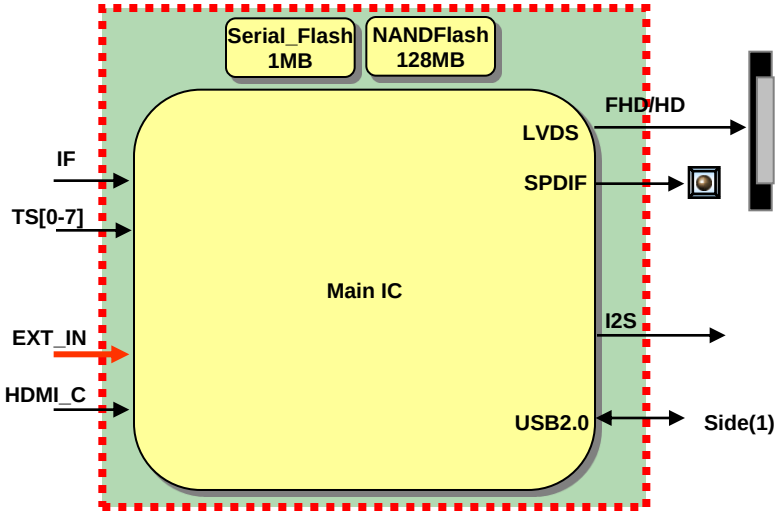
< SIF waveform – sample >
- Defend on the input signal.

12. Component / RGB / AV Audio Trouble Shooting

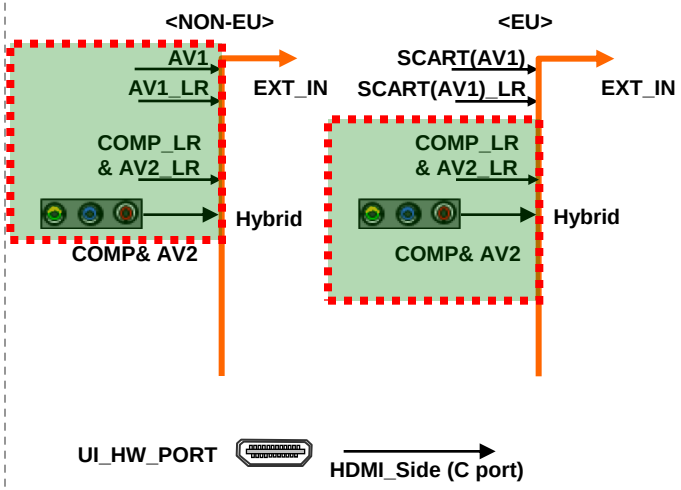
(Front-end)



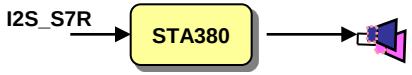
(System + Scalar)



(External Input)

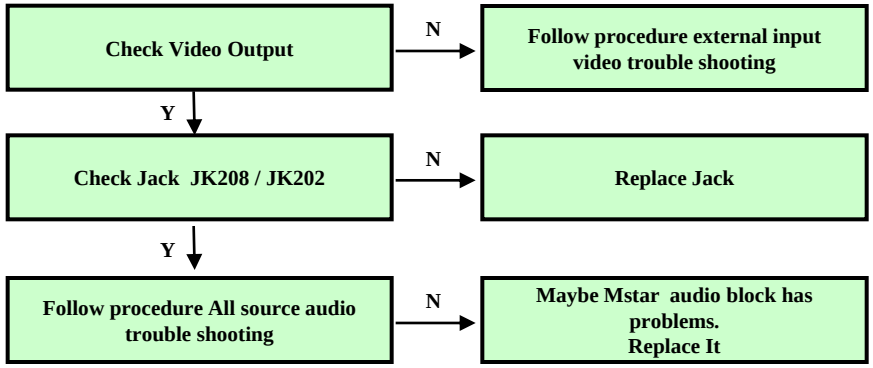


(Audio Out)



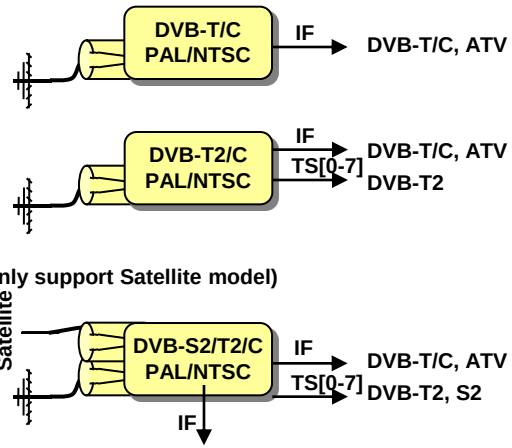
(USB)

12. Component / AV Audio Trouble Shooting

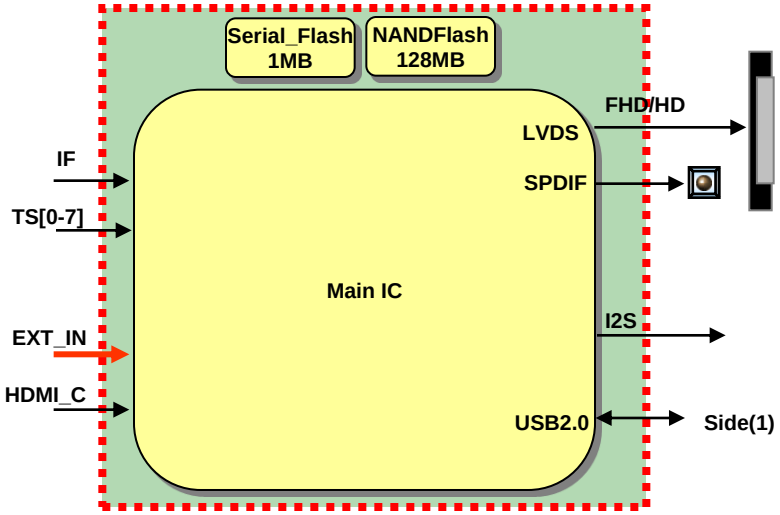


13. HDMI Audio Trouble Shooting

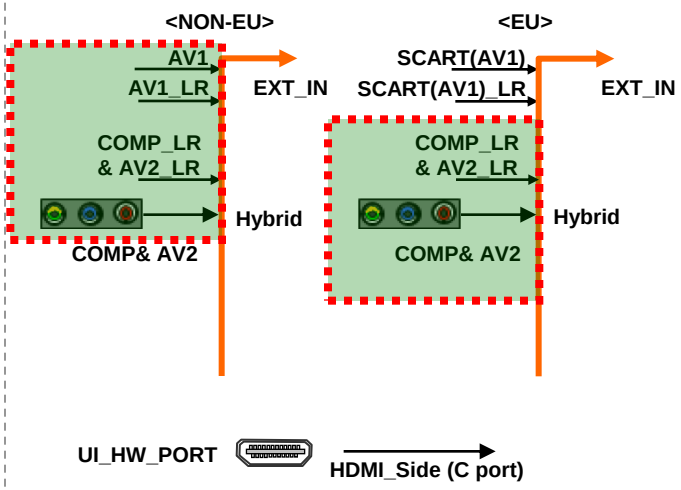
(Front-end)



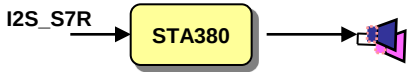
(System + Scalar)



(External Input)

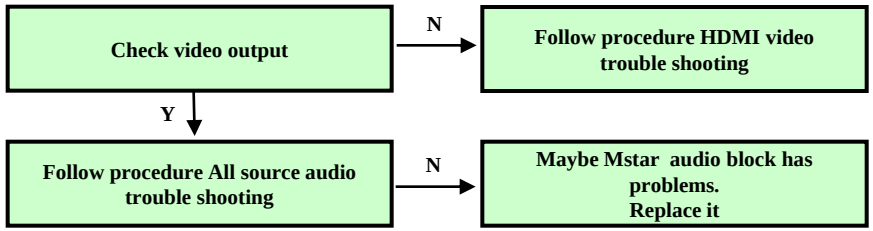


(Audio Out)



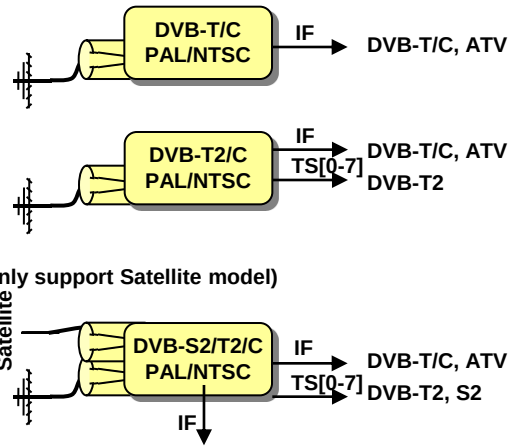
(USB)

13. HDMI Audio Trouble Shooting

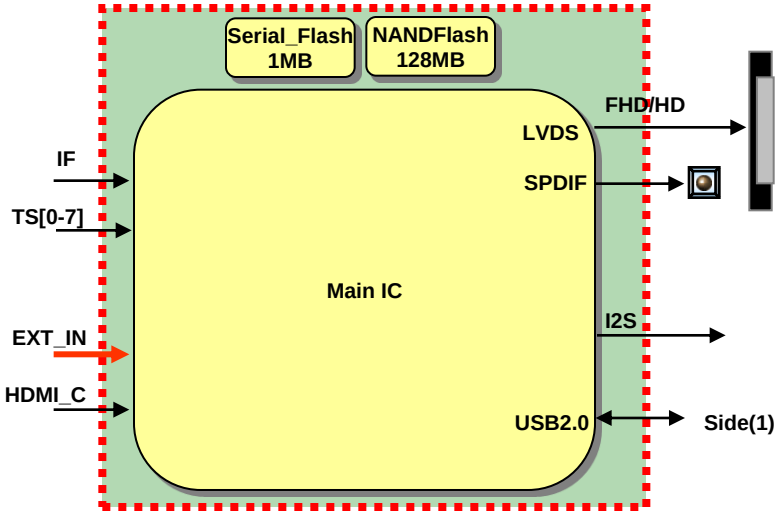


14. USB Trouble Shooting

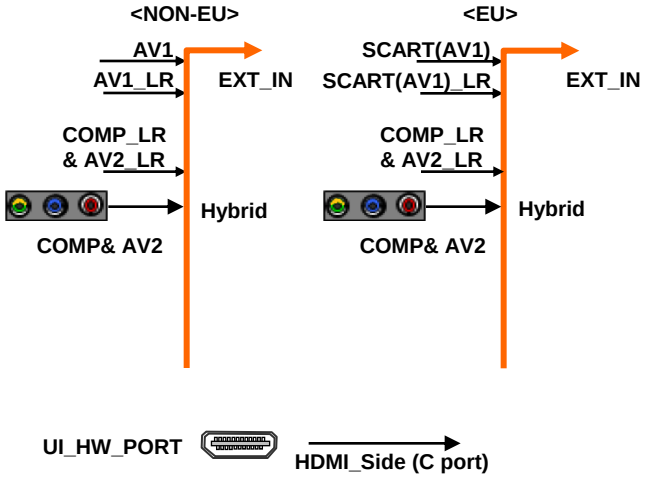
(Front-end)



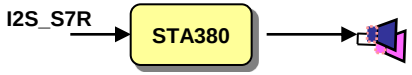
(System + Scalar)



(External Input)

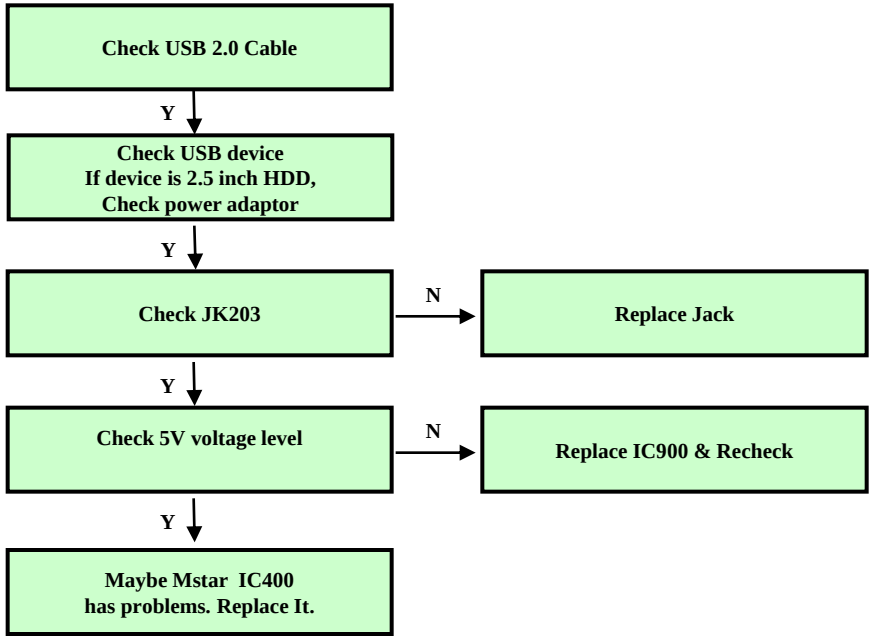


(Audio Out)



(USB)

14. USB Trouble Shooting



- **Exception**
  - **USB power could be disabled by inrushing current**
  - **In this case, remove the device and try to reboot the TV (AC power off/on)**