Great Company Great People

XCUTE 125

Think New

ERRC Eliminate, Reduce, Raise, Create

LCD TV

LG Electronics

Display Division CS Gr

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3. How to Use Monitor Tools Program

4. How to Identify LCD TV Defect

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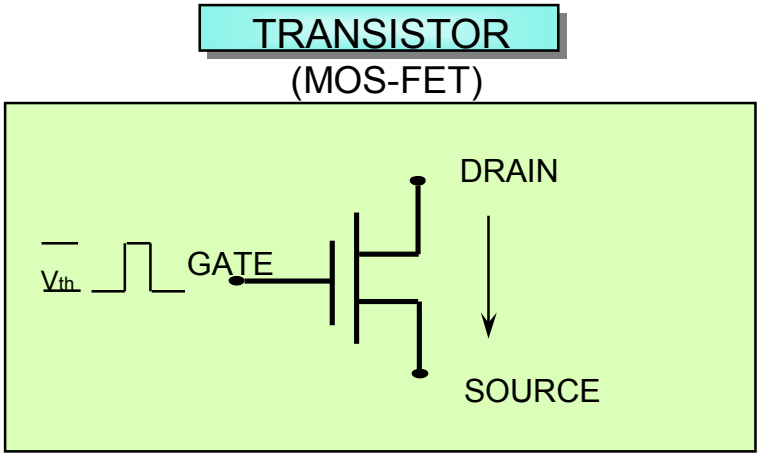
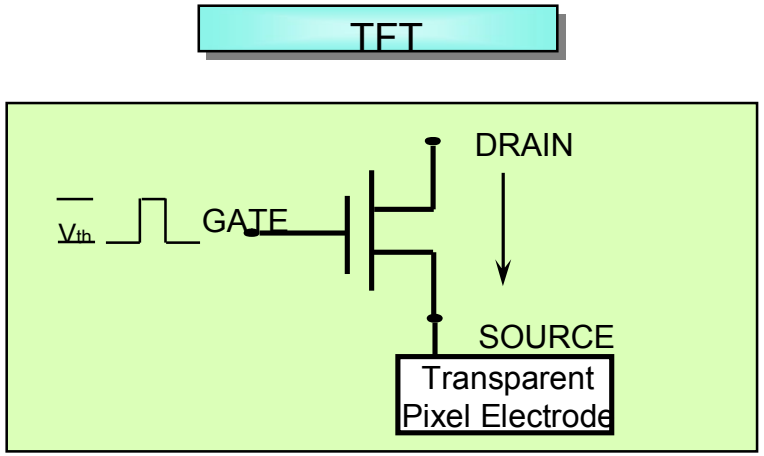
1. What is TFT ?
2. TFT LCD Structure
3. TFT-LCD Operation
4. Principle of Operation
5. LCD Module Structure
6. Structure of Back light
7. Principle of Back light
8. Core Part; Color Filter, Polarizer

What is TFT (Thin Film Transistor)?



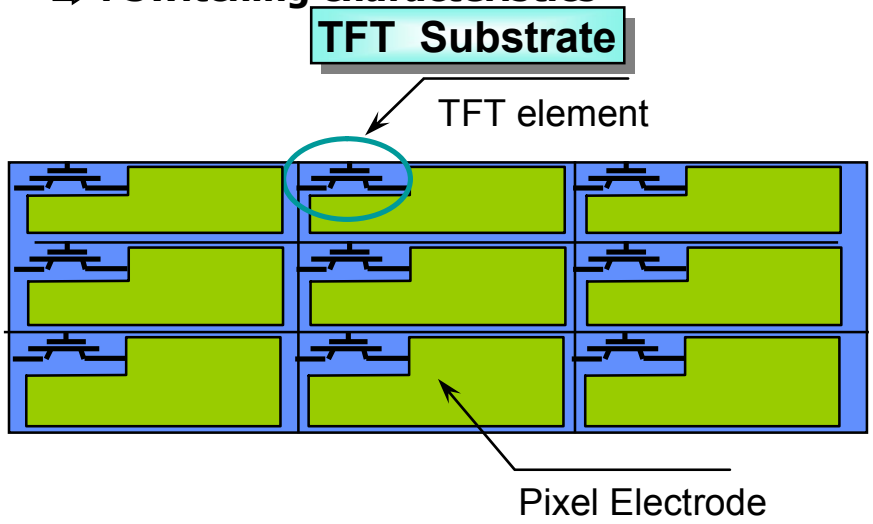


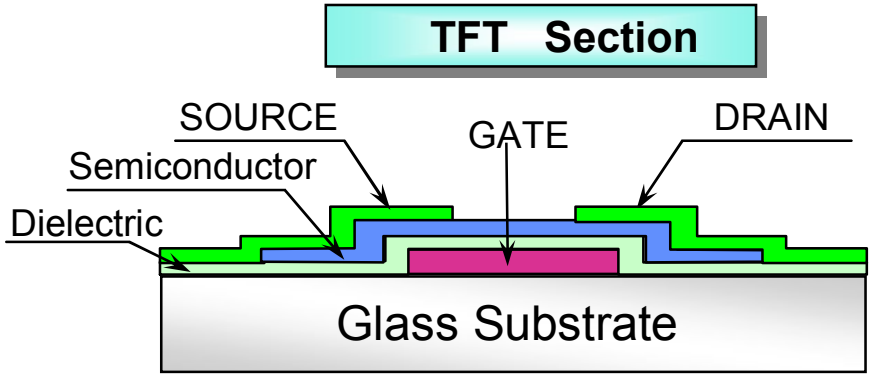
When some voltage (Vth) is applied to the gate, data is delivered from Drain to Source

⇨ : Switching characteristics

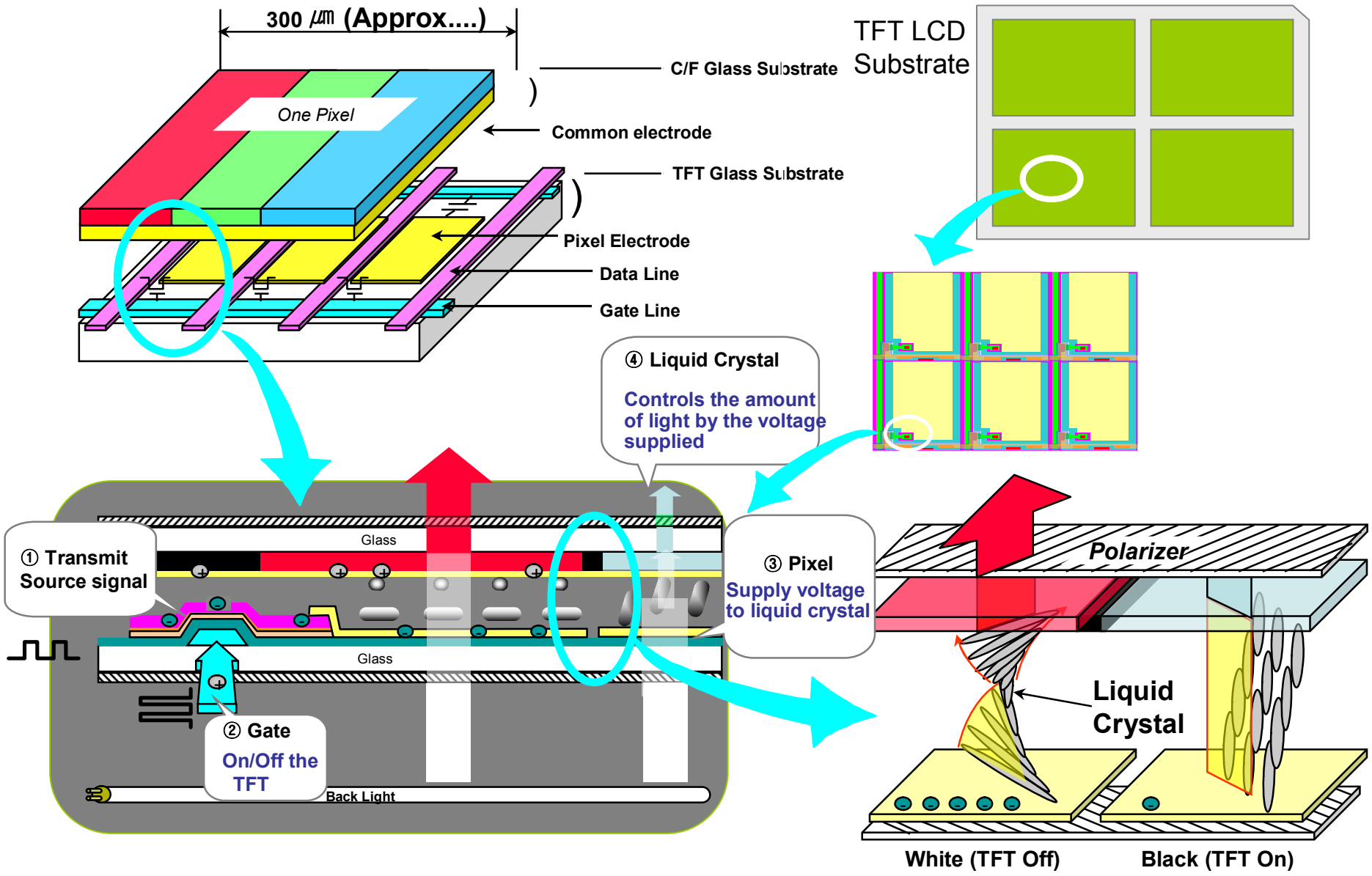
TFT is formed in each pixel

⇨ : Each pixel operates independently



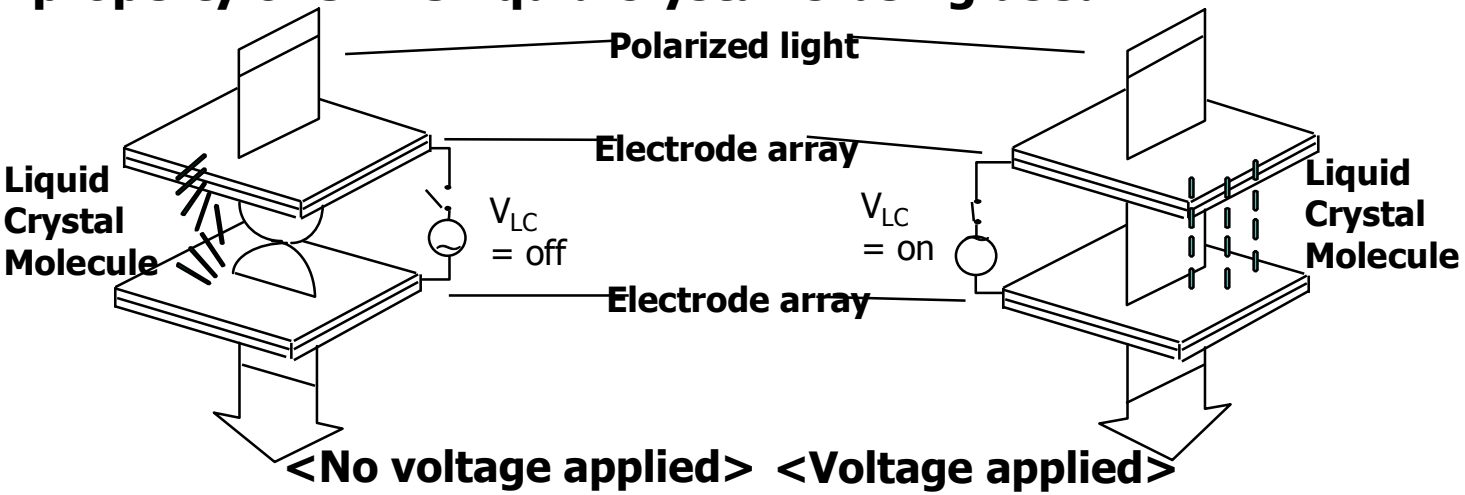


Structure of TFT- LCD



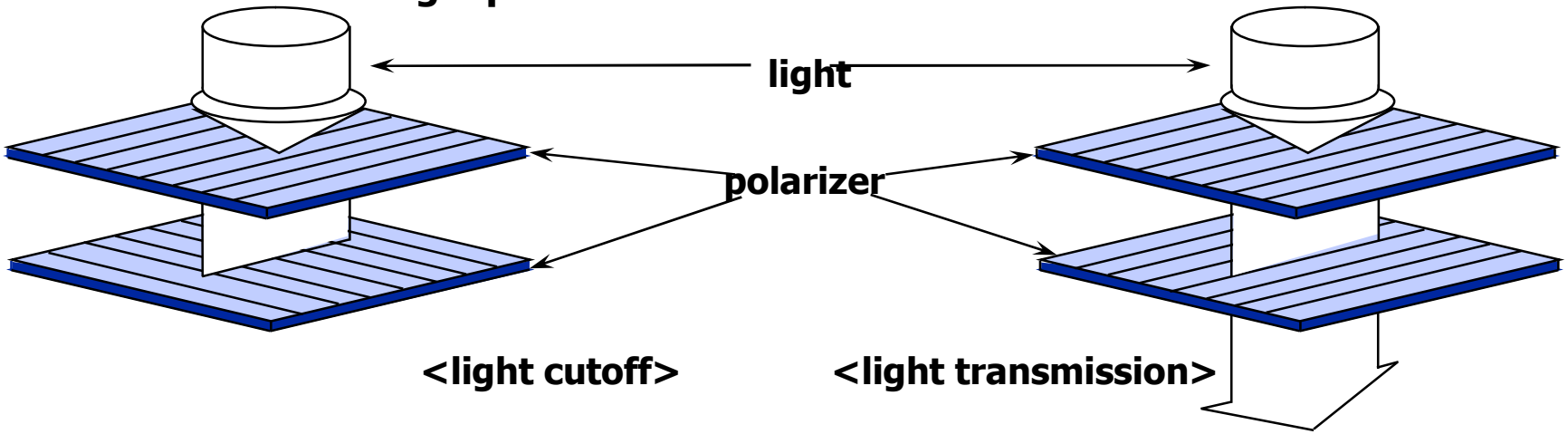
TFT- LCD Operation Mechanism

Which property of S-IPS liquid crystal is being used?



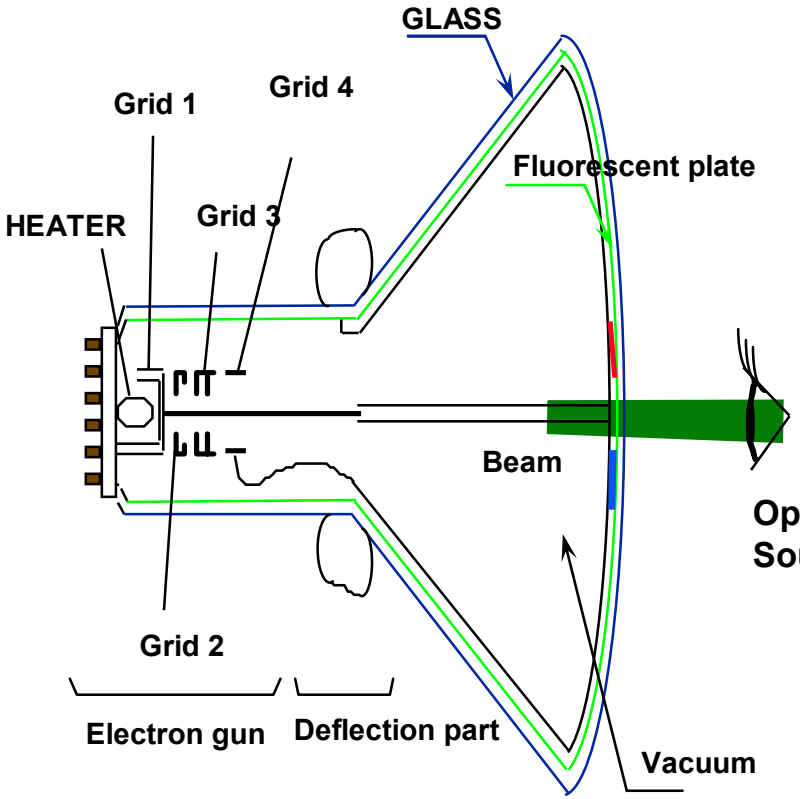
What is polarizer?

Filter which converts an unpolarized beam of electromagnetic waves into a beam with a single polarization state

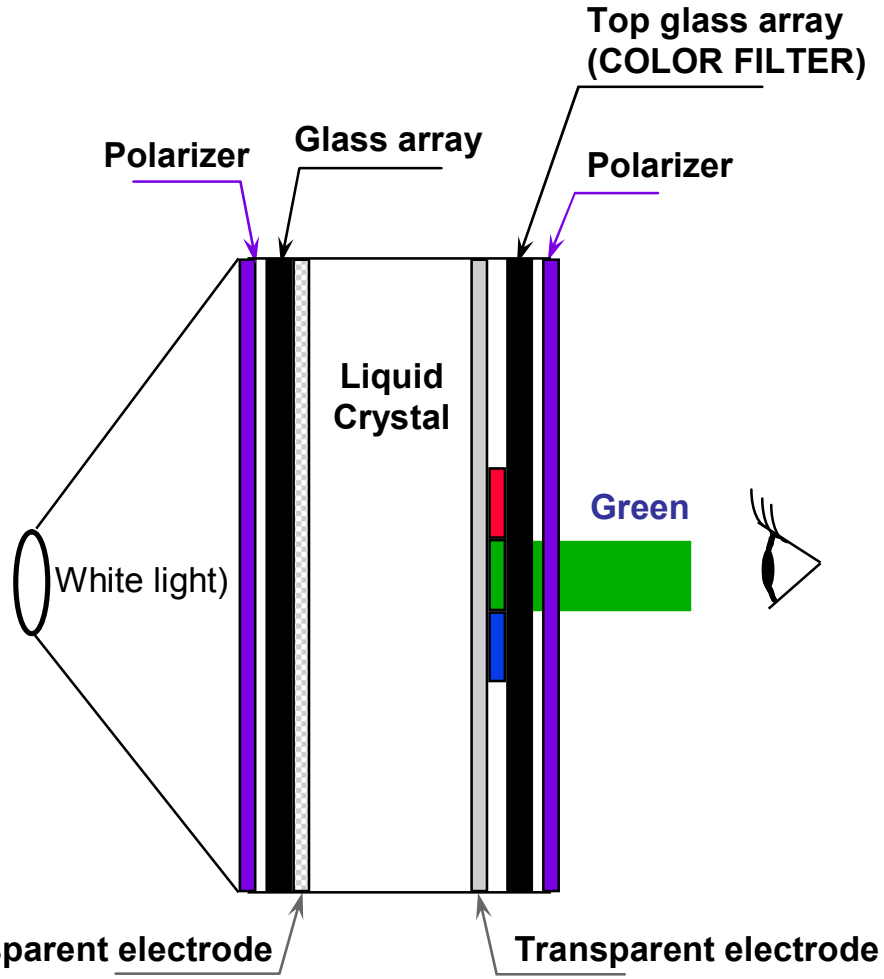


Operation Principle

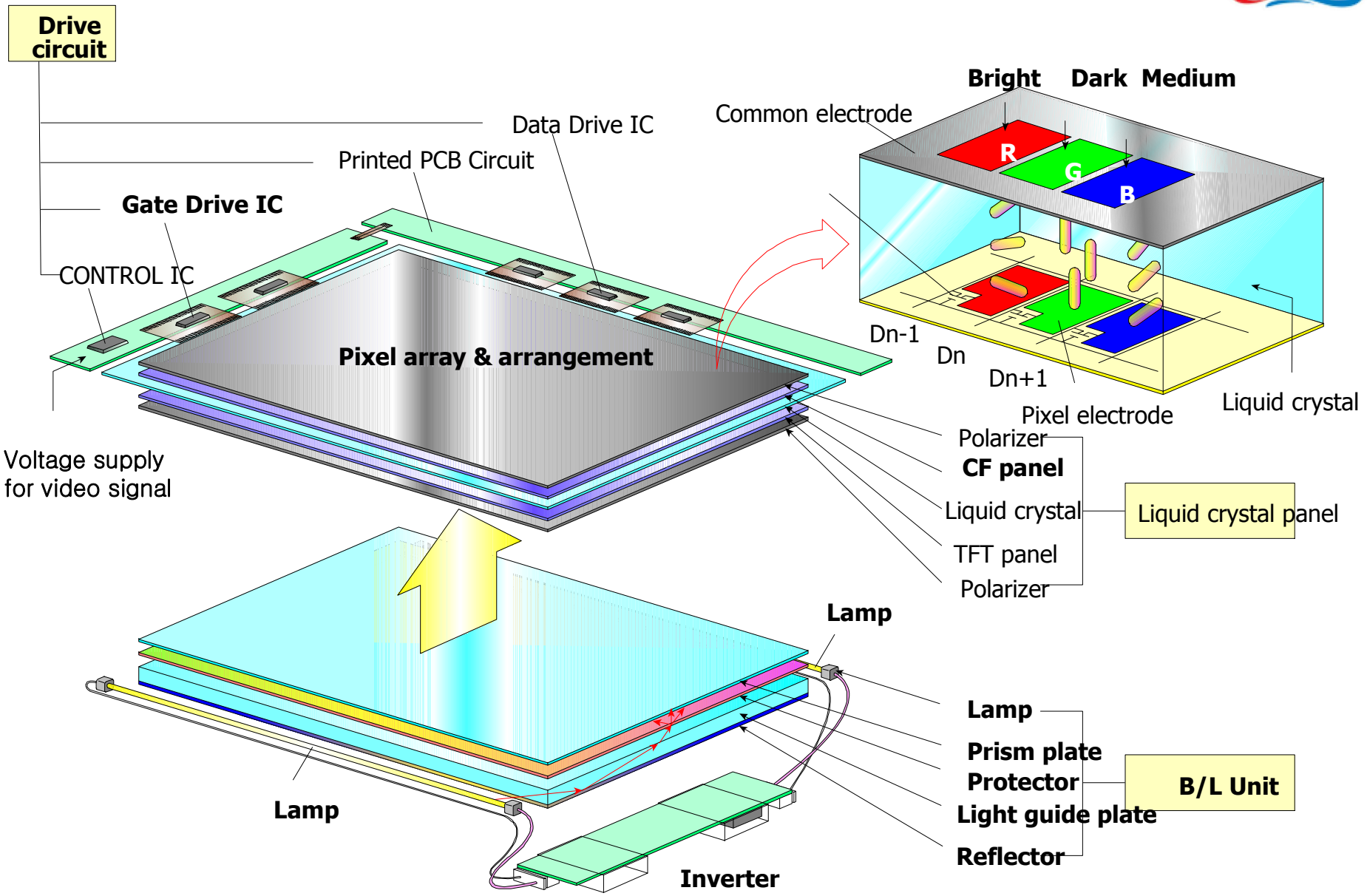
(Braun tube : Luminous element)



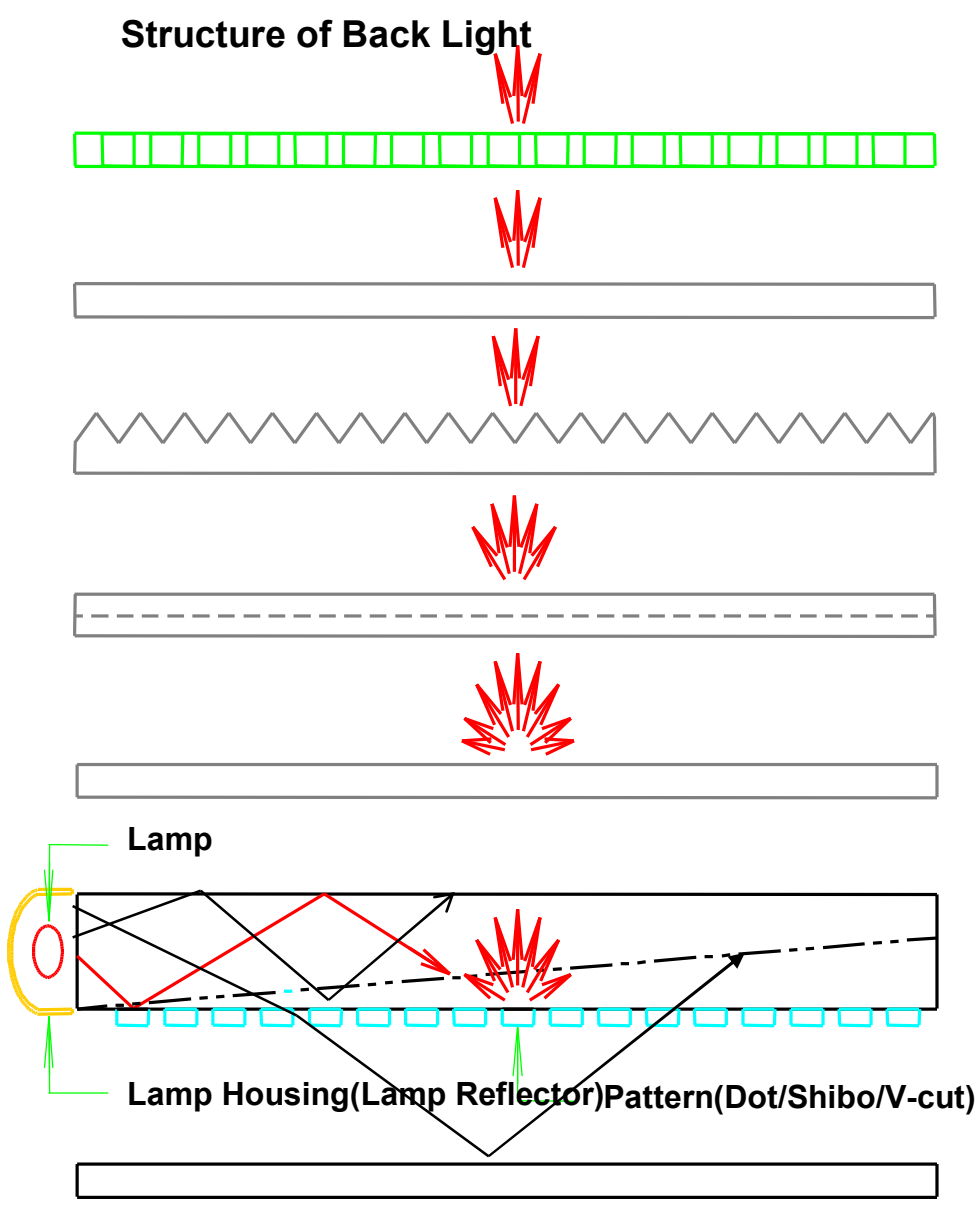
(TFT-LCD : Non-luminous element)



LCD Module Structure



Back Light Structure



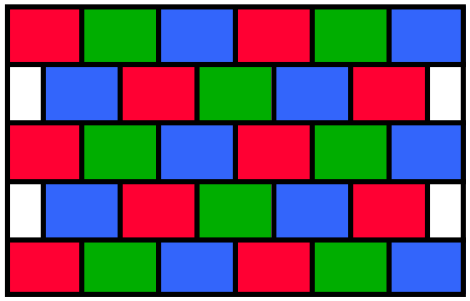
	Function
LCD PANEL	Displays the light adjusted by data signal
Protector	Same function as the bottom prism Protects top prism
Top Prism	Same function as the bottom prism Increases luminance by 1.33 times than the bottom prism
Bottom Prism	Collects light and increases luminance by 1.55 times than light guide plate
Protector	Collects and equalize light from the light guide plate
Light guide plate (Flat/Wedge)	Receives light from lamp and equalize the light on the whole area
Reflector	Transmits the light from guide plate again to maximize efficiency

Color Filter

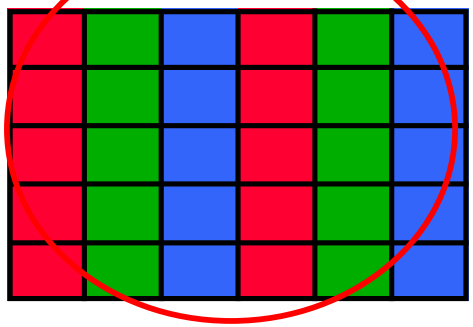
To realize color of the Display, array Red,Green & Blue color paint beneath Upper Glass Panel regularly in accord with Pixel electrode of lower Glass Panel.

- **Types of Pixel Arrangement**

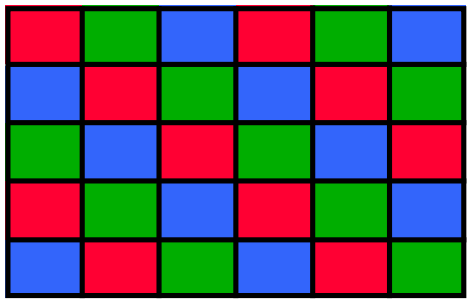
① **Delta Arrangement**



② **Stripe Arrangement**

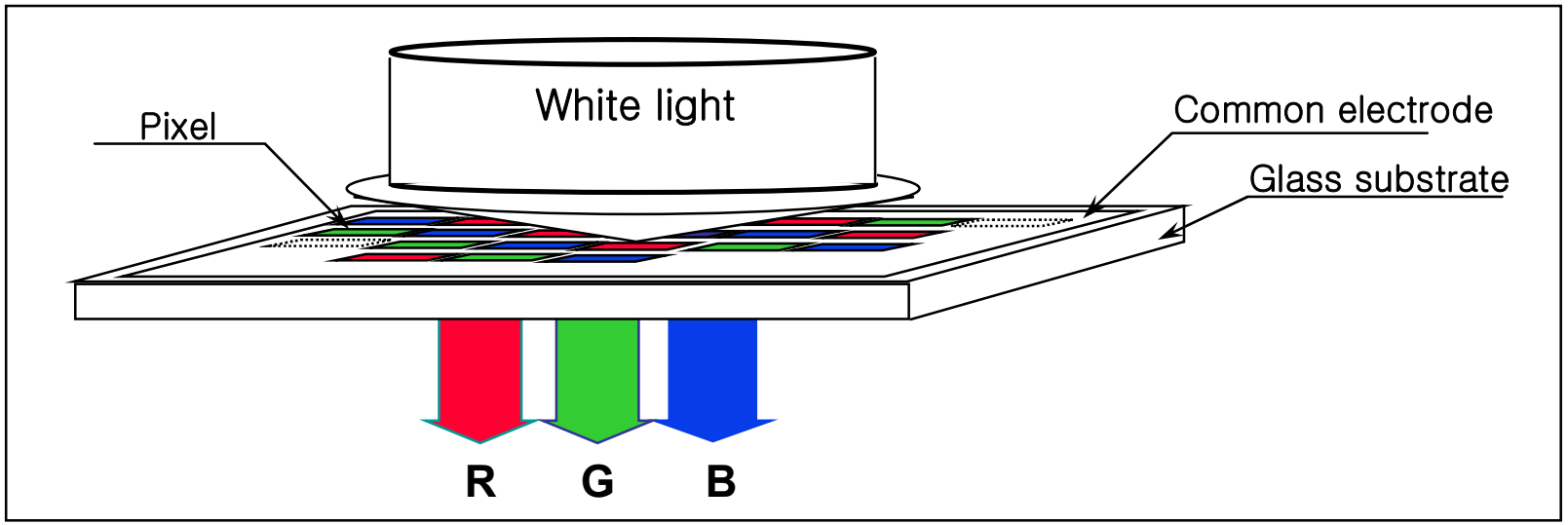


③ **Mosaic Arrangement**



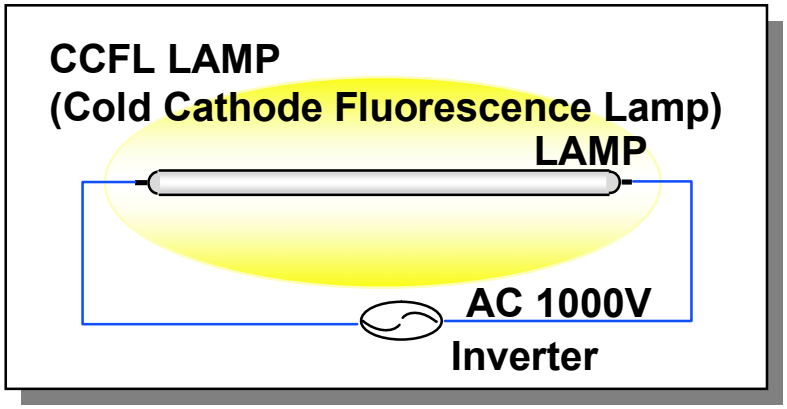
- The Function of Color Filter

Divide the white light from optical source into R,G,B

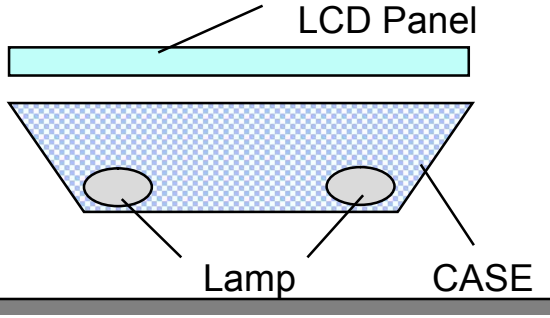
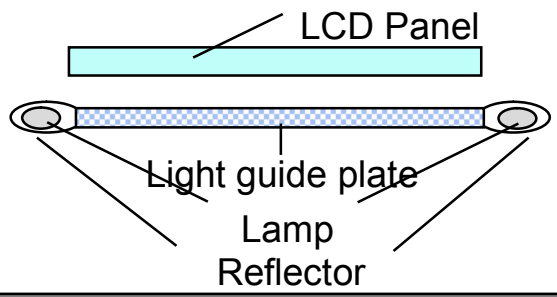


Back Light

Located on the back of bottom glass substrate of TFT-Panel in Back Light Unit, supplies light to the Panel.

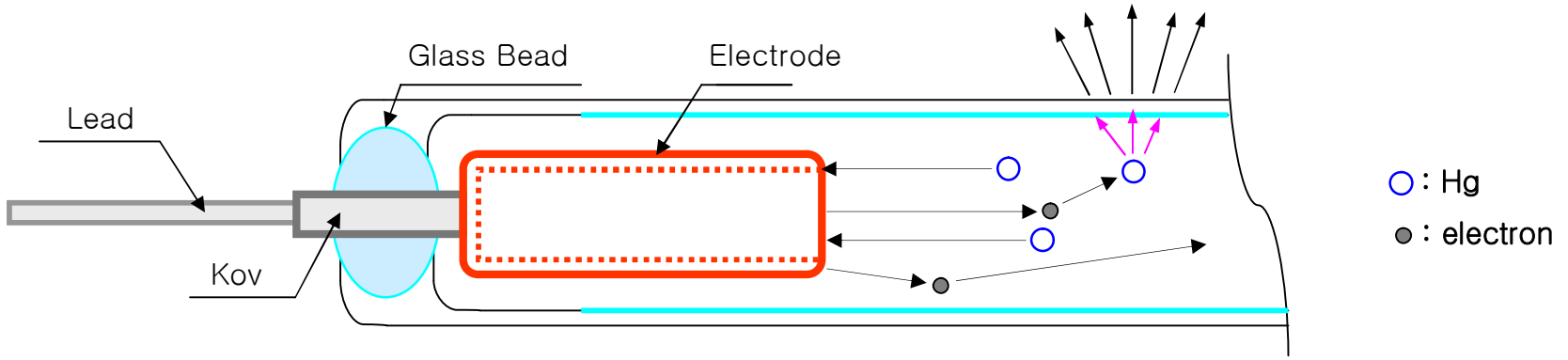


- Long life time (about 25,000 hr.)
- Easy to control brightness
- Small size
- Easy to attach

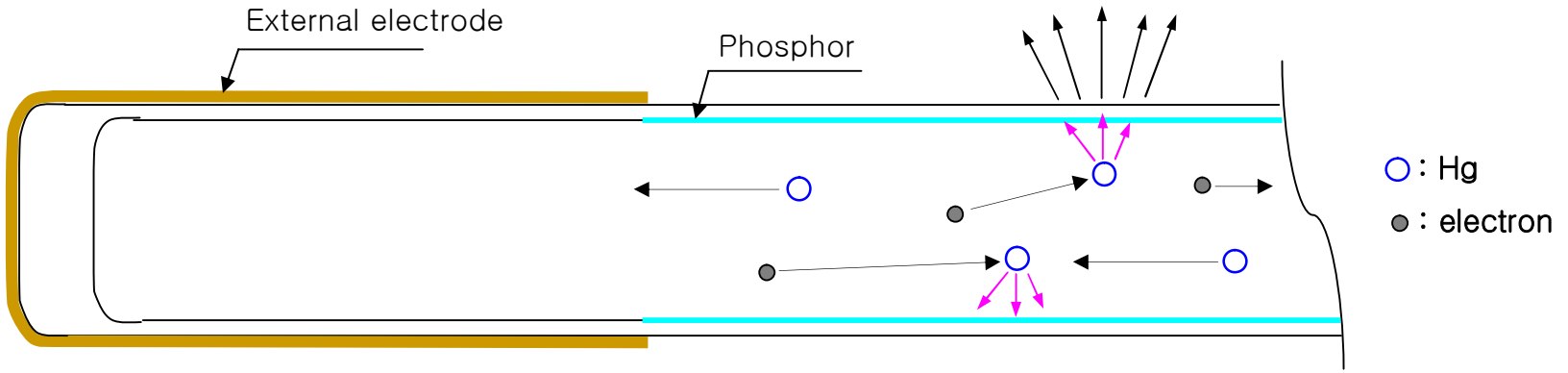
	Direct Type	Side Guided Type
Structure		
Merits	High efficiency of light Simple structure	Thin and small volume
Demerits	Thick	Complicated structure, expensive, and poor efficiency of light

Introducing EEFL

CCFL (Cold Cathode Fluorescent Lamp)



EEFL (External Electrode Fluorescent Lamp)

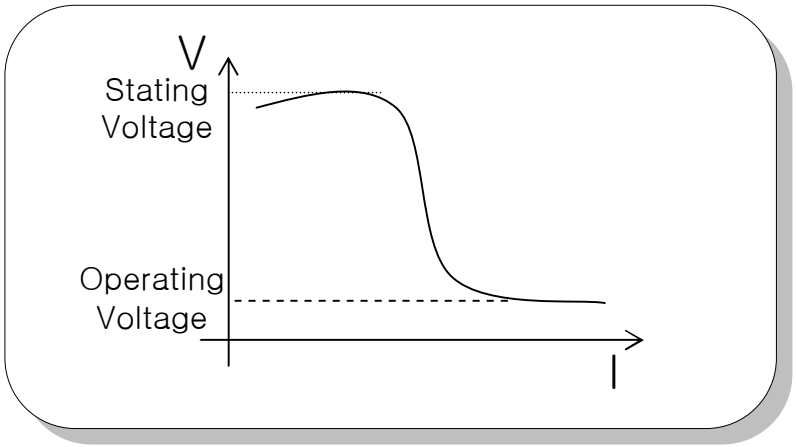


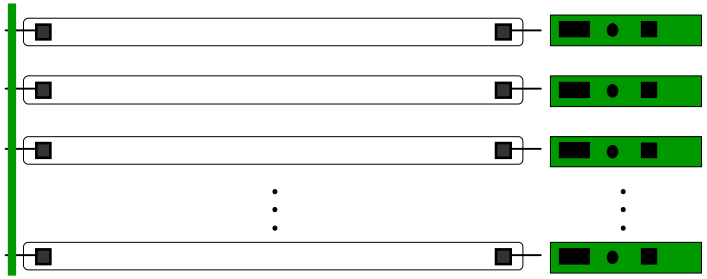
- **For CCFL, Hg gas is consumed mainly near the internal electrode**
- **For EEFL, longer life time is expected because there is no internal electrode consuming Hg gas**

Introducing EEFL

Simple structure, Low price

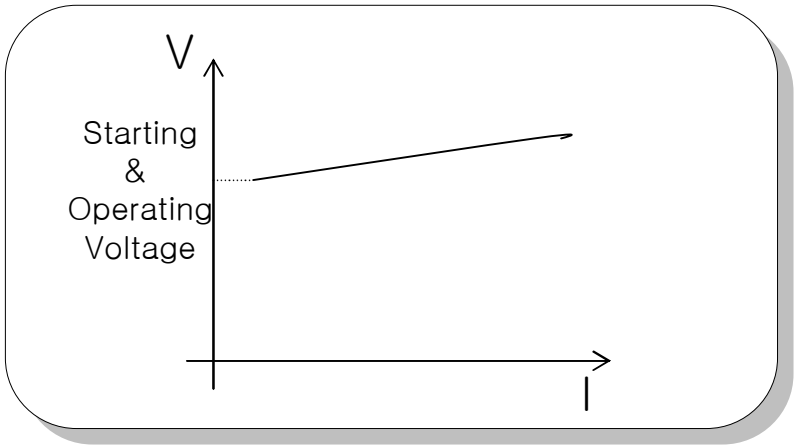
CCFL (Cold Cathode Fluorescent Lamp)

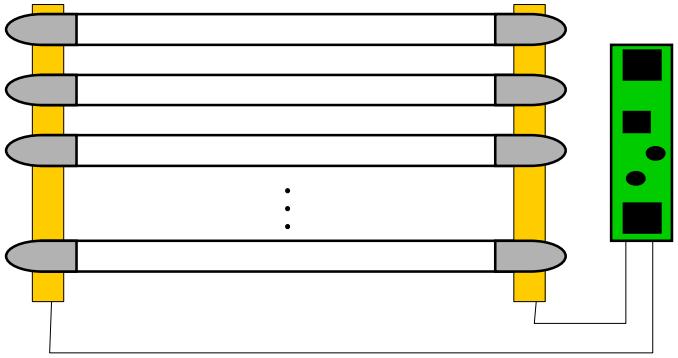




Complicated structure

EEFL (External Electrode Fluorescent Lamp)





Simple structure

Lamp manufacturing process
Lamp assembly structure

Low Cost

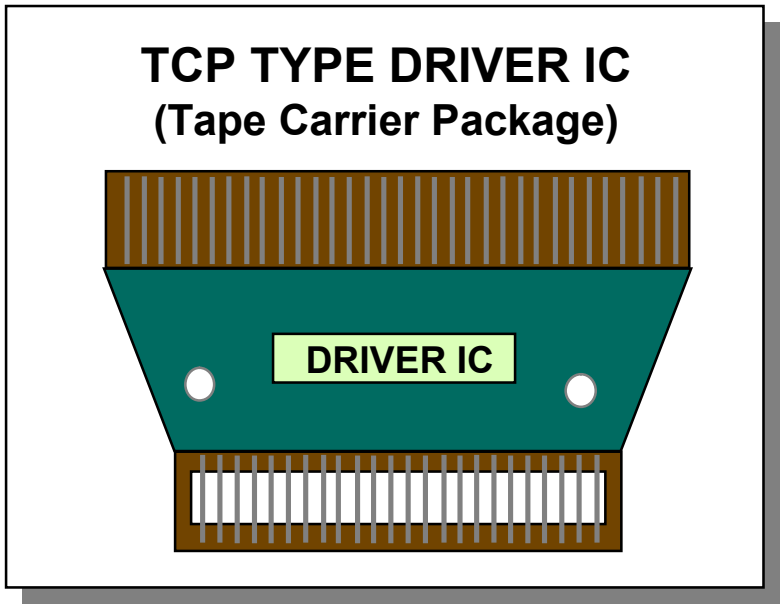
Large number of Lamp
Drive by single inverter

Introducing EEFL

	CCFL	HCFL	EEFL
Discharge Principle	Glow Discharge	Arc Discharge	Glow Discharge
	Remark : Same principle of discharge : Electronic energy → Hg UV → Phosphor visible light, Only difference is the principle of initial electron generation		
	• Metal electrode emits free electron → Cold Cathode • Electron created by the collision energy of internal ion (Ar^+, Ne^+) and cathode	• Thermion emission by filament heating → Hot Cathode • Electron generated by the collision energy of internal ion (Ar^+, Ne^+) and cathode	• Discharge by the initial electron in lamp • Electron generated by the collision energy of internal ion (Ar^+, Ne^+) and cathode (electron emitting material: MgO, TiO2, etc.)
Life span	• Hg consumption due to the combination of electrode material & Hg by the sputtering of electrode	• Determined by the rate of Ba, Ca loss, which is coated on electrode → Separated by high temperature or the collision of internal ion causing blackening of electrode → Great loss when starting (Consumption of 1 starting = consumption of lighting for about 1~2 hrs)	• Ion accelerated by high voltage & sputter of lamp glass by electron/ Phosphor damage • Hg consumption : Compound of glass/phosphor
	Average : about 50,000 hrs	Short life span : about under 10,000 hrs	Long life span : over 70,000 hrs
Efficiency	Relatively low → Power loss by voltage drop of cathode (about over 100V)	High efficiency → Low power loss by relatively small voltage drop of cathode (about 10V)	Not much is known theoretically, but the result shows having high efficiency than CCFL → by small voltage drop of cathode than CCFL
Others	• Narrow diameter by using rod type metal electrode • Φ1.6 is possible as of '03	• Narrow diameter is impossible due to the characteristic of filament electrode • Φ6.5 is possible as of '97	• Most favorable condition for narrow diameter by having no internal electrode

Drive IC

Send signal from PCB to TFT-PANEL



GATE DRIVER IC(8EA) : Horizontal

Send signal from data line to TFT-Panel Gate in series.

Each IC controls 128 lines horizontally.

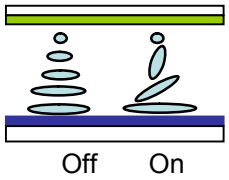
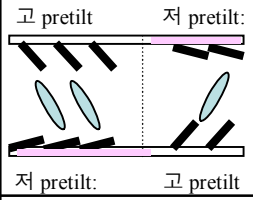
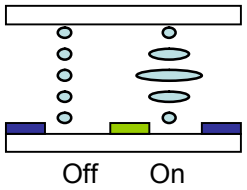
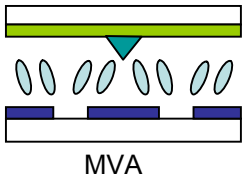
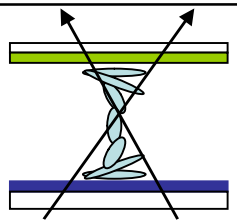
SOURCE DRIVER IC(5EA) : Vertical

As the gate of TFT-Panel is ON, pixel data is being sent from source to each pixel.

Each IC controls 154 lines vertically.

LCD Mechanism

WIDE VIEWING ANGLE TECHNLOLGY

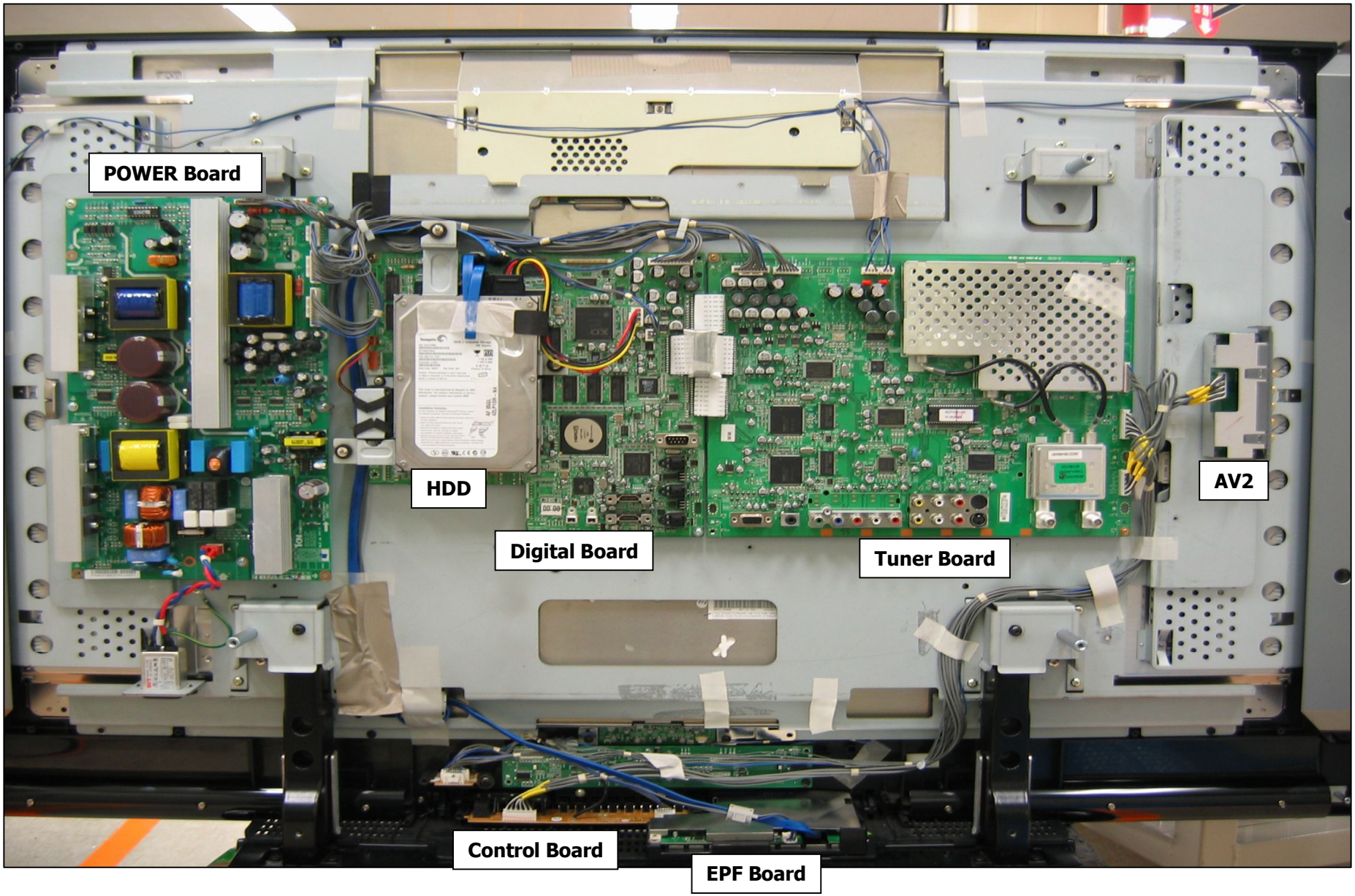
	Maker	Structure	Viewing Angle	Response time(On/Off)	Material Price	Remark
TN	All Maker		△ 120/100	△ 25~40ms	△ WV film	•Mostly Under 15 inch •W V film: Fuji monopoly
ASV	Sharp		○ 170/170(?)	◎ 15ms	○ Normal compensation film (C-plate)	• Sharp's original technology - strongpoint •High brightness
IPS	Hitachi LG NEC IBM etc.		◎ 170/170	○ ~25ms	◎ No compensation film	-strongpoint •Wide viewing angle •Response time of middle gray pattern is good
VA	Fujitsu (MVA) SS(PVA) Para-A (LG)		◎ 170/170	○ ~25ms	○ Normal compensation film (C-plate)	•Fujitsu only produce
OCB	Matsu-shita		○ 160/120 (140/120)	◎ 3~10ms	○ △ C-plate or WV film	•Very fast response time => suitable for moving picture

2. LCD TV Block Diagram

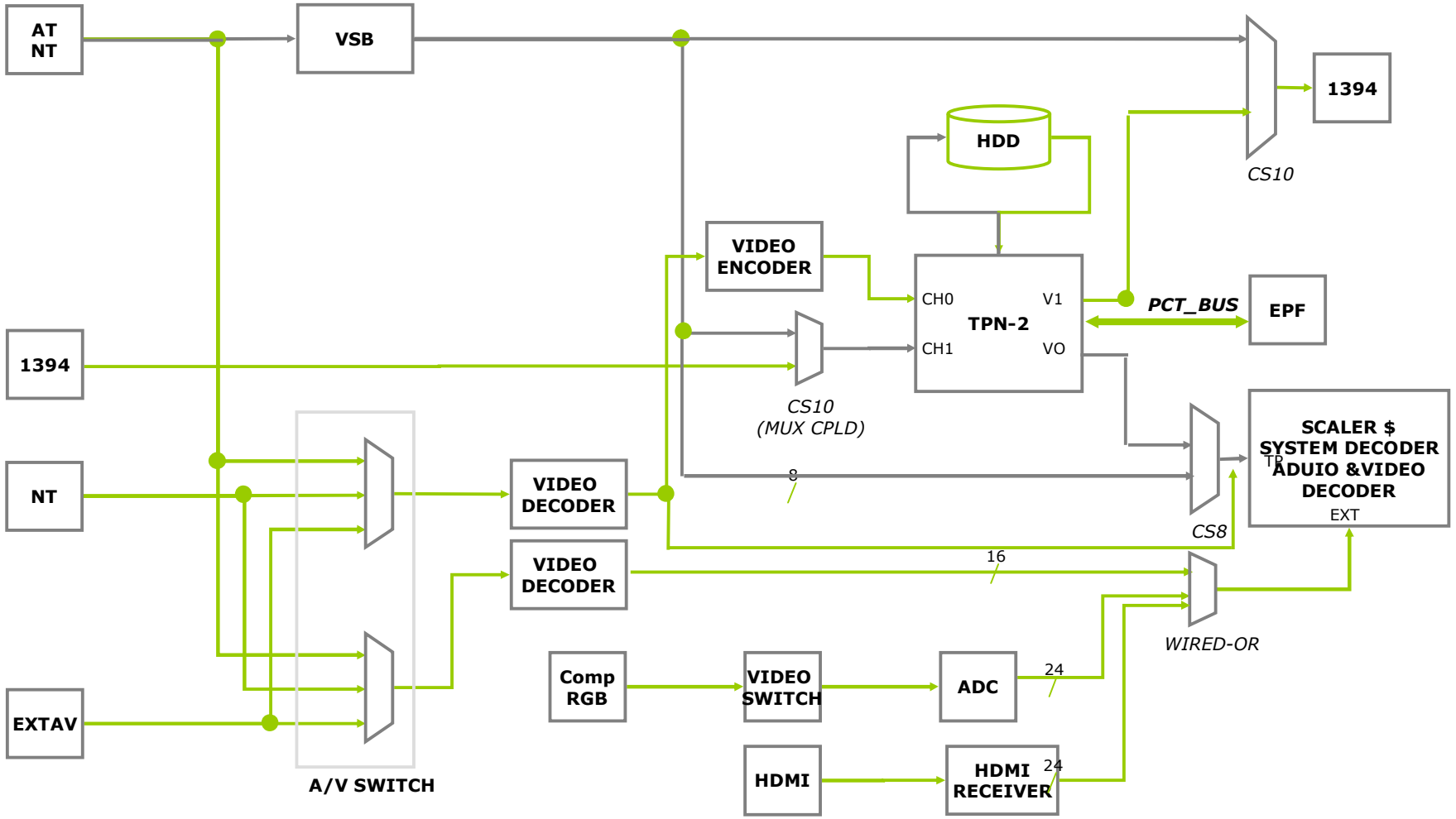
-42LP1DR Block Diagram

-42LB1D Block Diagram

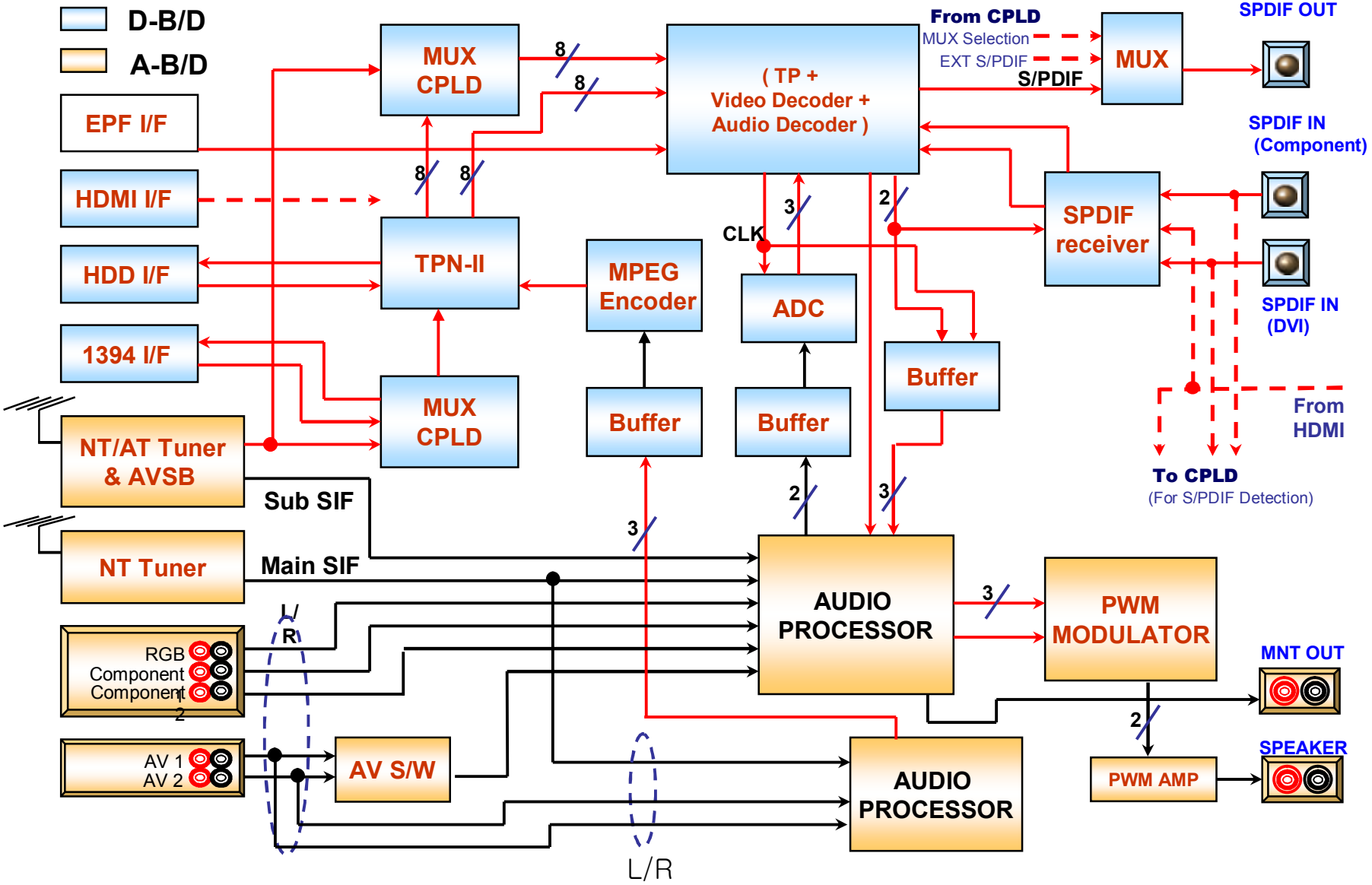
-42LC2D(PACIFIC) Block Diagram


POWER Board
HDD
Digital Board
Tuner Board
AV2
Control Board
EPF Board

1-1. 42LP1DR VIDEO Block Diagram



1-2. 42LP1DR AUDIO Block Diagram



1-3. 42LP1DR AUDIO Block Diagram

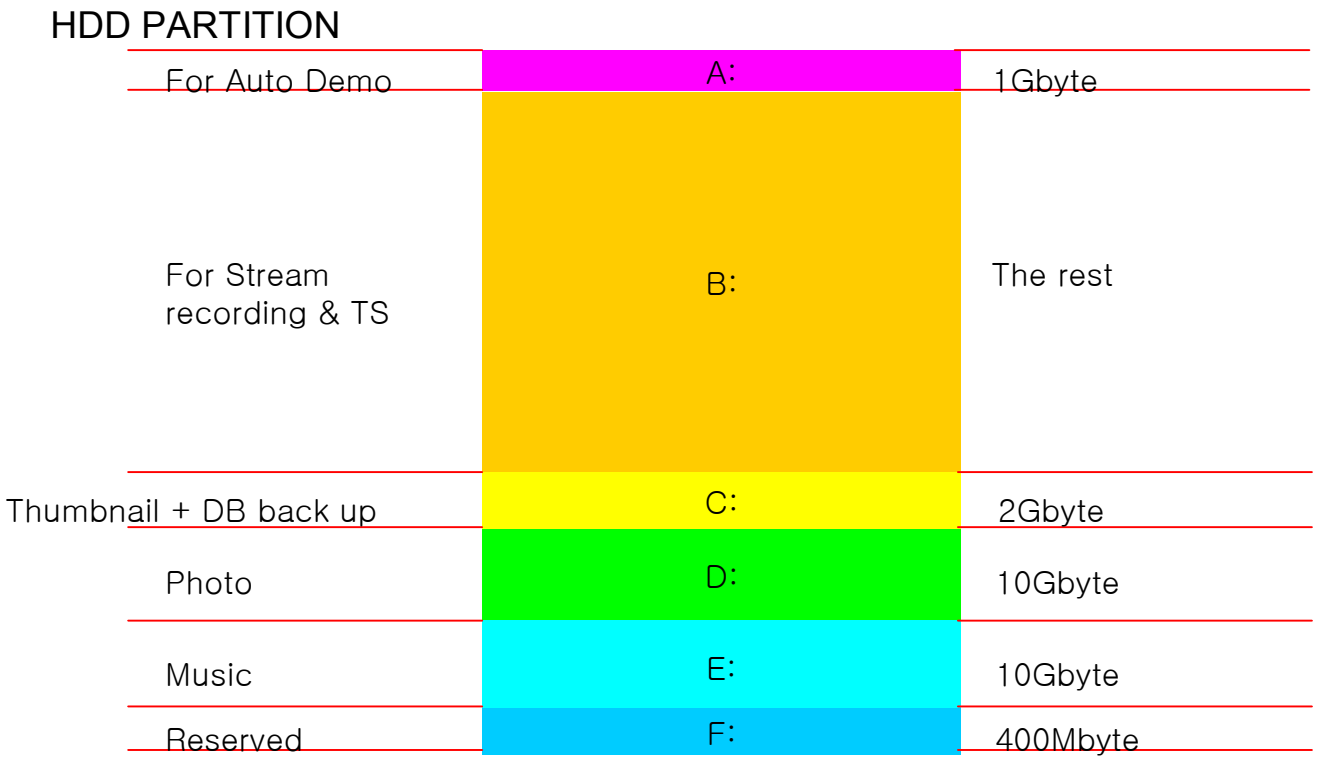
1) EPF interface: Interface CPU with PCI BUS, and send audio signals to CPU and HD2 by PER communication

2) ADC → HD2 CHIP I2S signal : AUDIO_IN_SCLK, AUDIO_IN_DATA_H,AUDIO_IN_LRCLK.

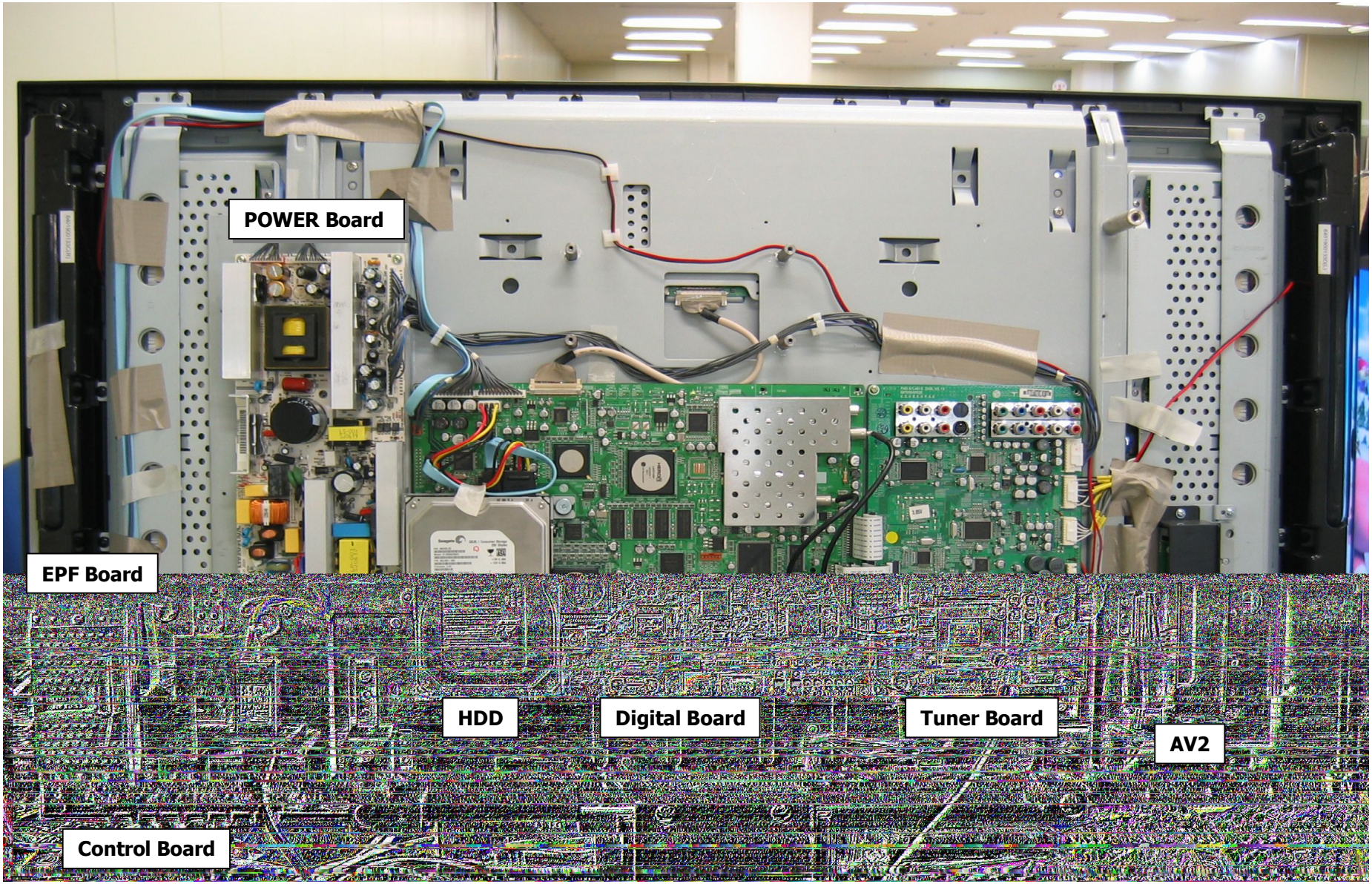
3) HD2 → I2S signal to MSP4440 : HA_DAC_SCK, HA_DAC_LRCK, HA_DAC_LRCH

4) By measuring MNT_OUT of AUDIO Test, the problem can be found whether it's the front or back of MSP_4440.

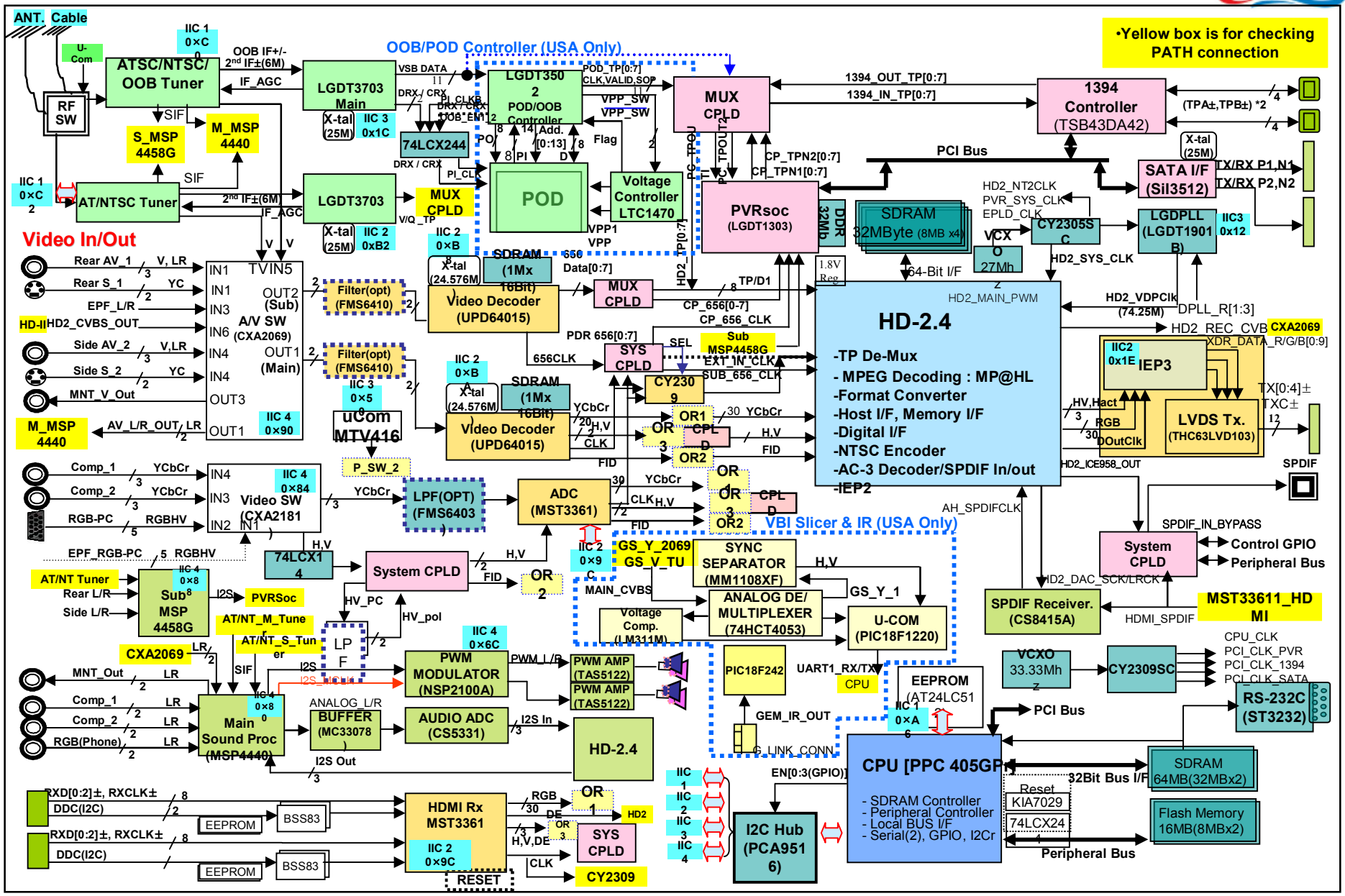
5) The signal related to recording is controlled by SUB_MSP.



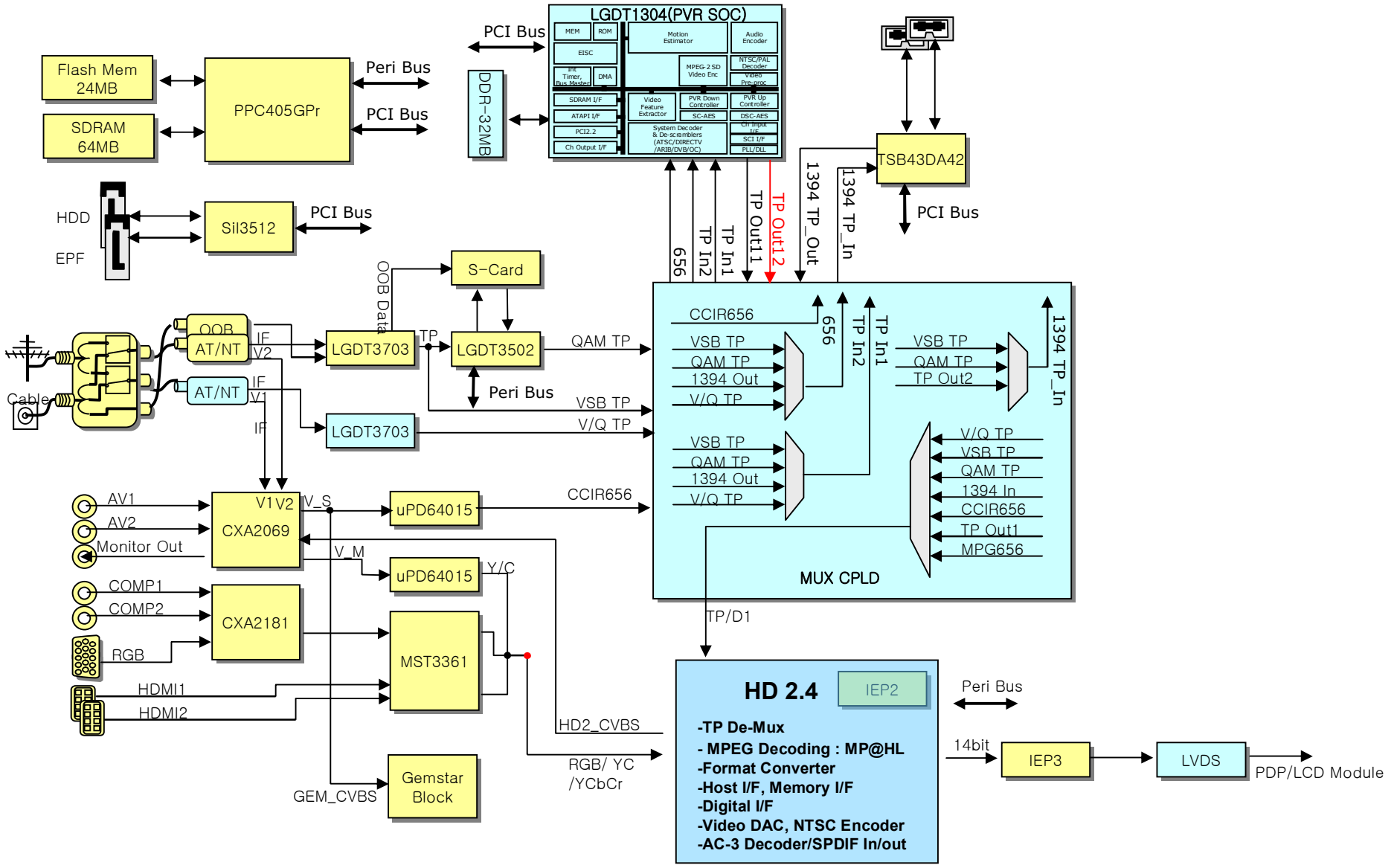
Configuration



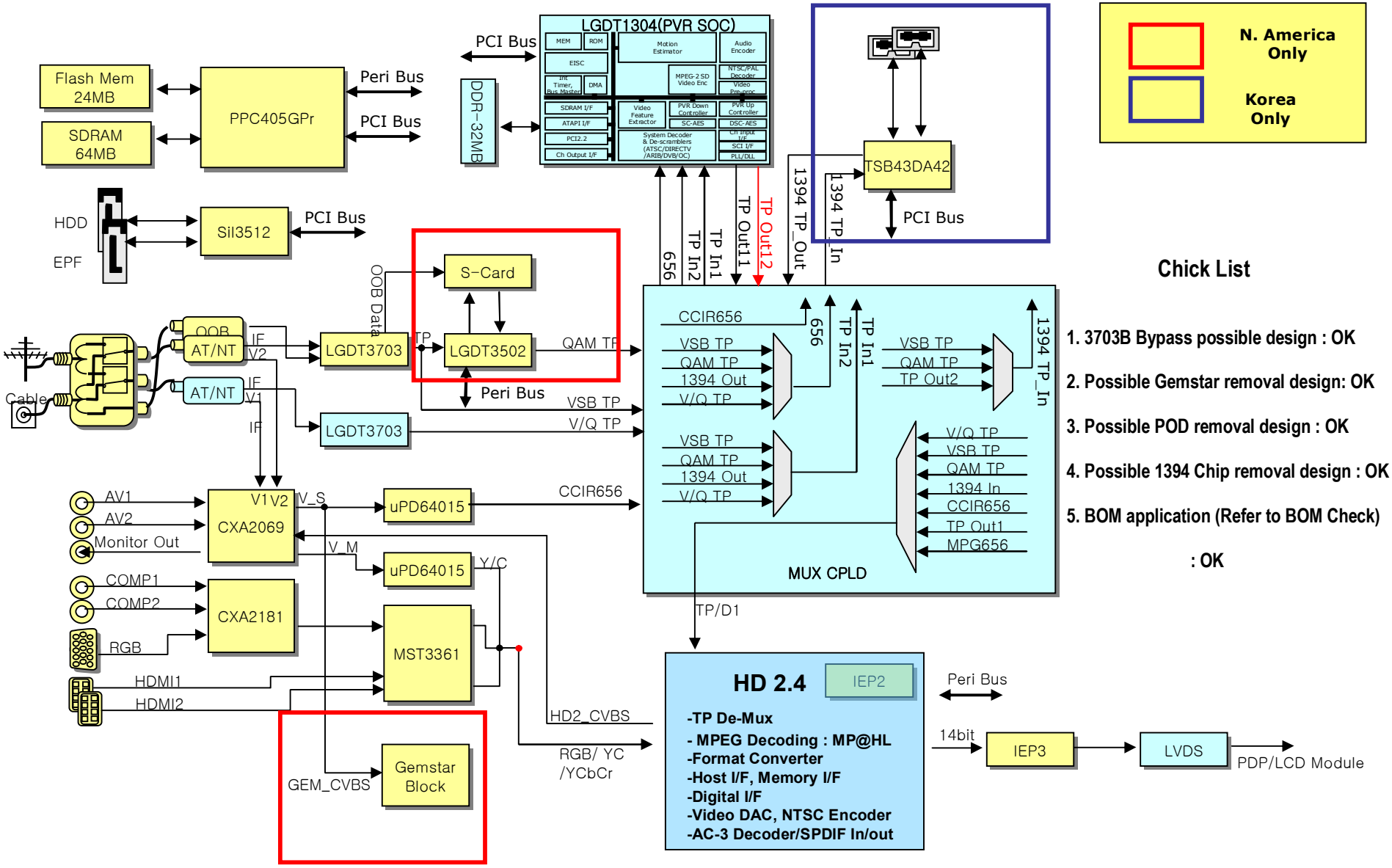
2-1. 42LB1D Block Diagram



2-2. 42LB1D Video Path Block Diagram



2-3. 42LB1D Option Design Block Diagram

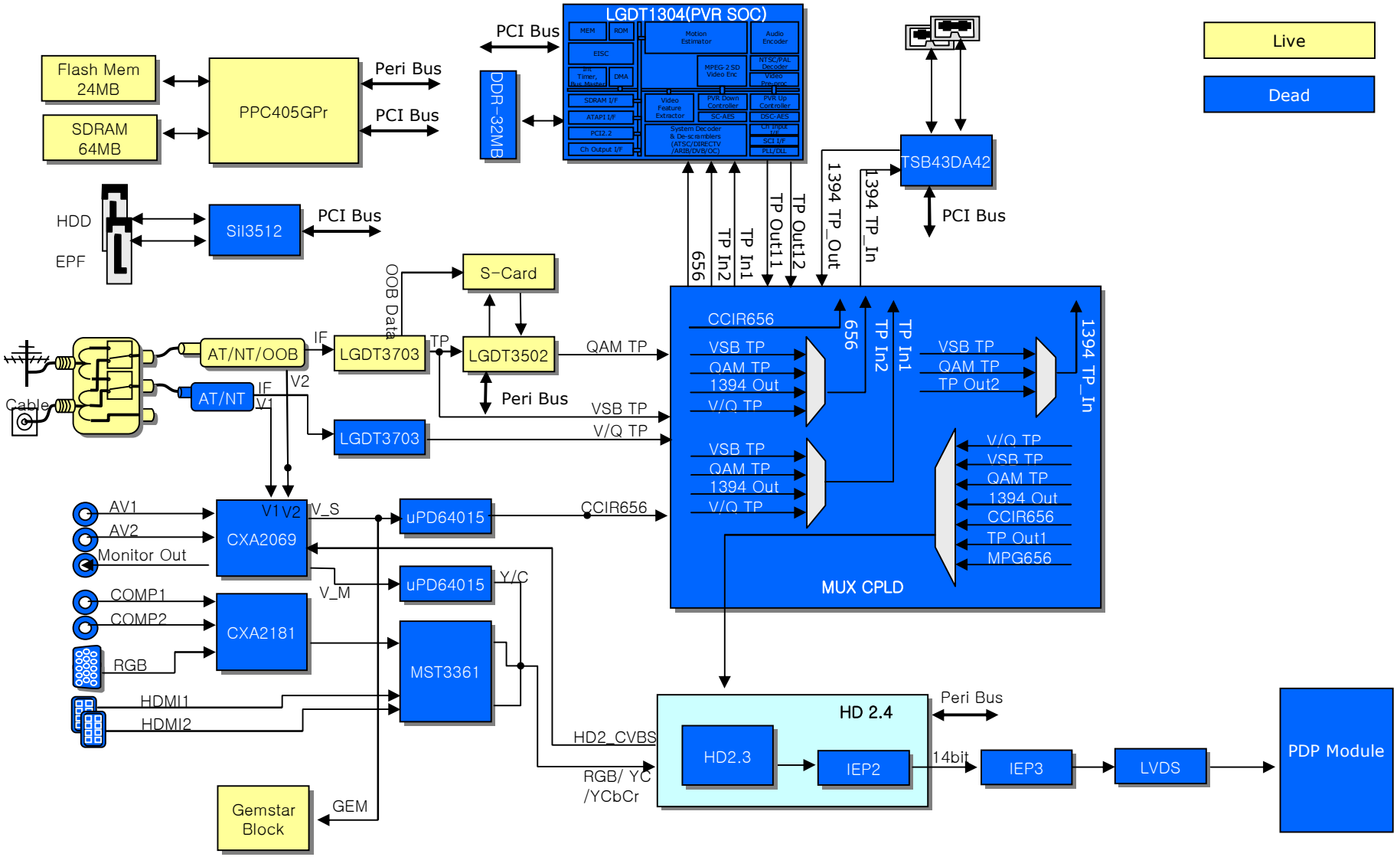


Chick List

1. 3703B Bypass possible design : OK
2. Possible Gemstar removal design: OK
3. Possible POD removal design : OK
4. Possible 1394 Chip removal design : OK
5. BOM application (Refer to BOM Check)

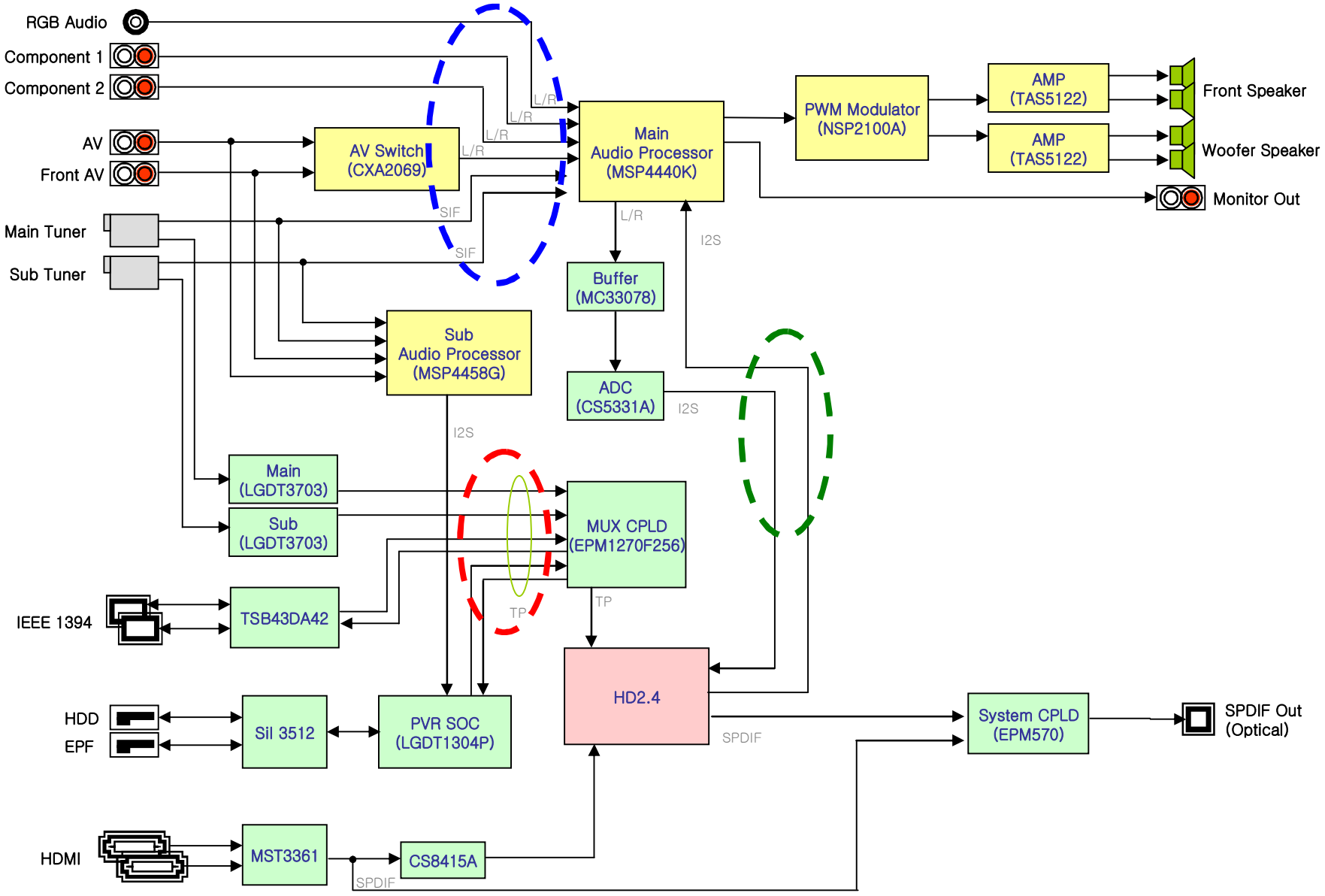
: OK

2-4. 42LB1D Power Saving Mode block diagram

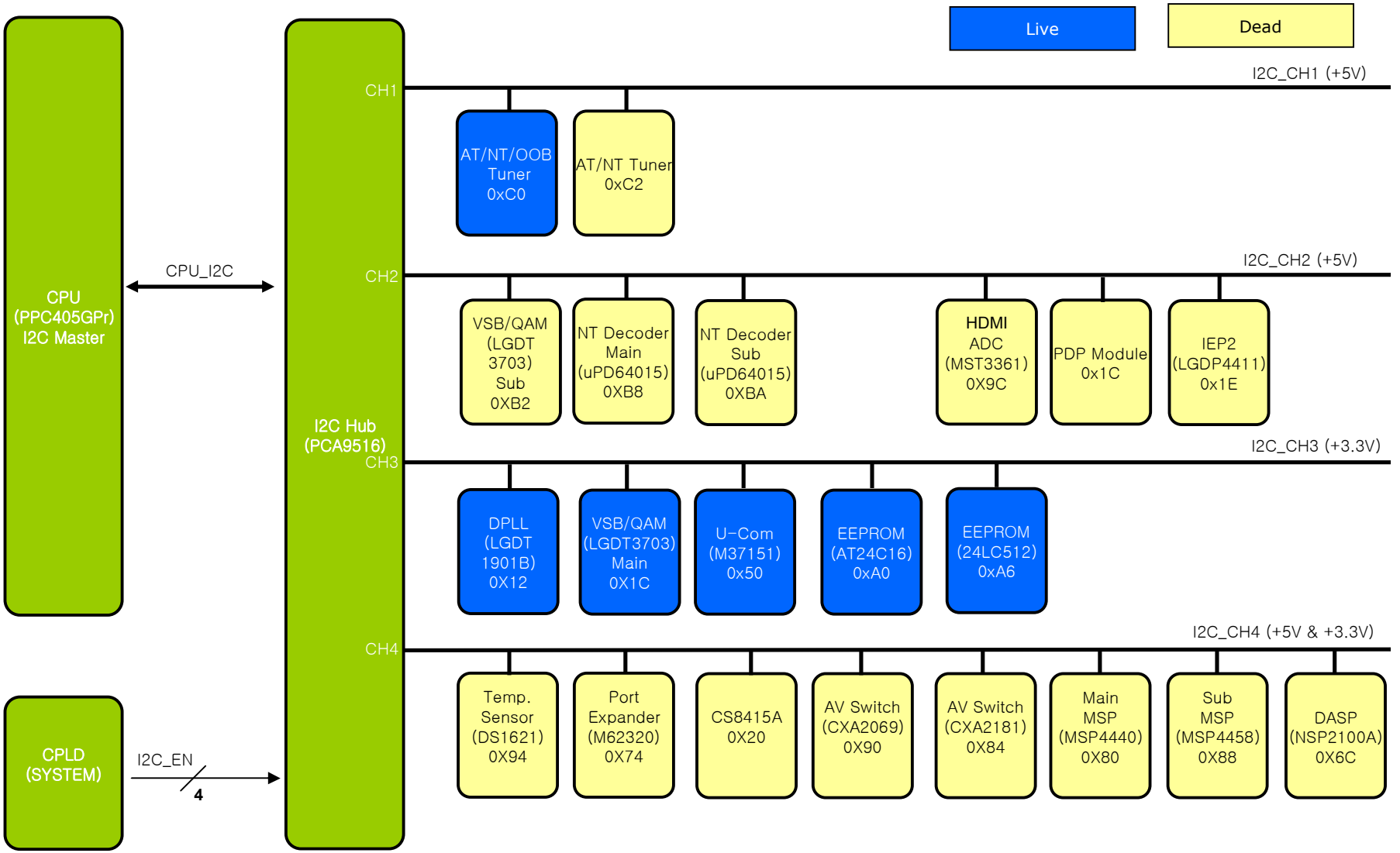


HD2.4 has no power cutoff of H/W because of peri-bus, and switches to its own Power saving mode after killing S/W task.

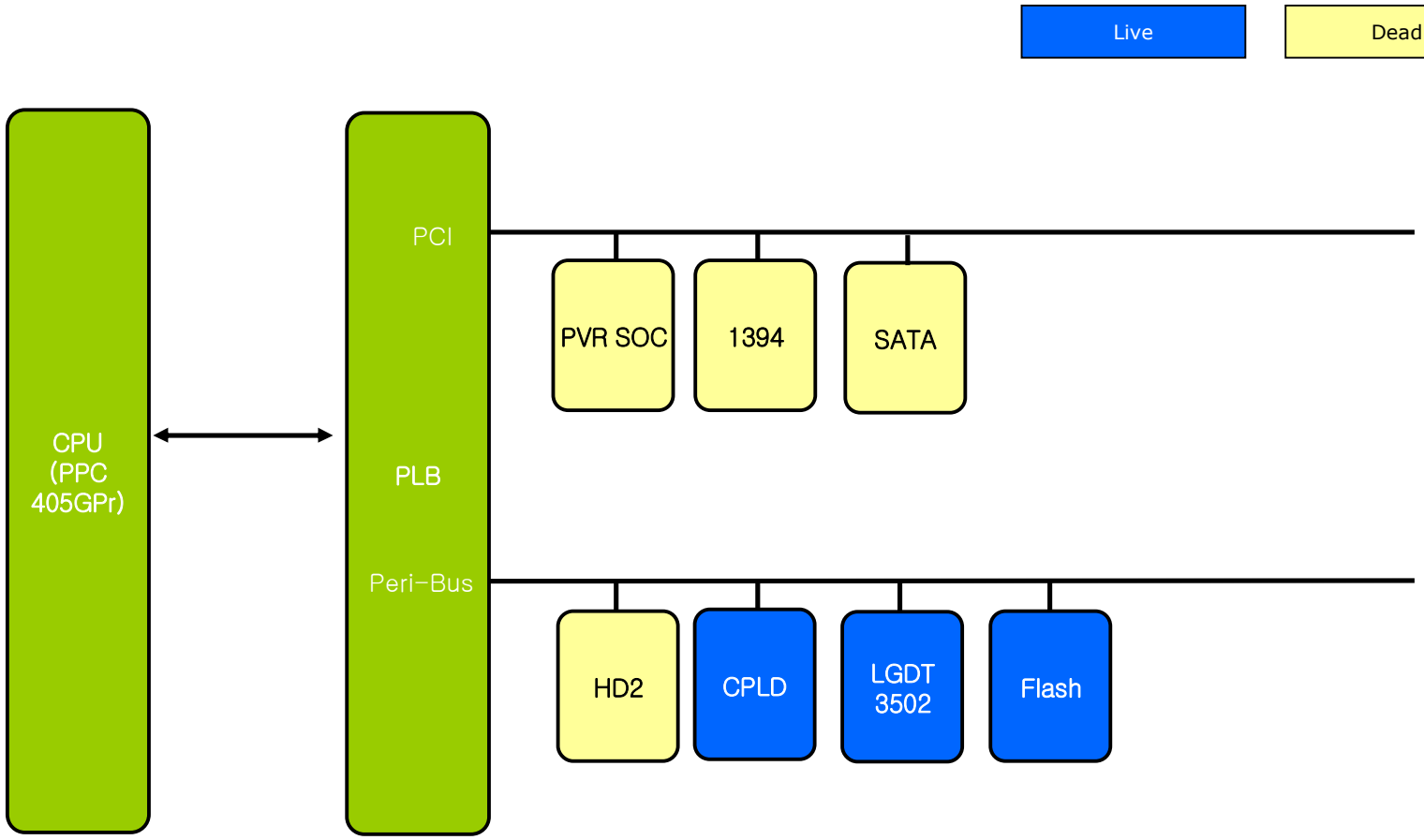
2-5. 42LB1D Audio Path Block Diagram



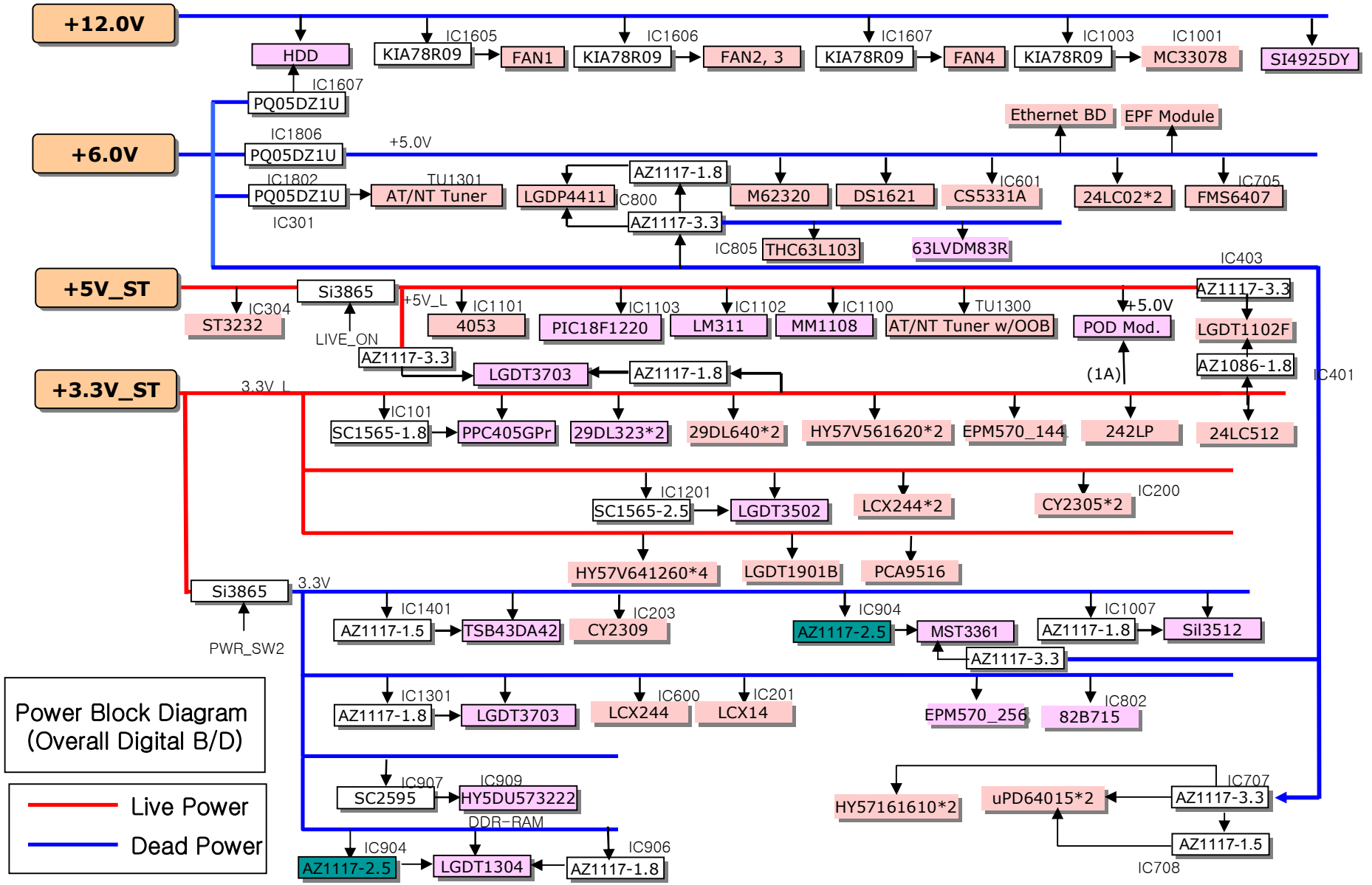
2-6. 42LB1D I2C Channel map



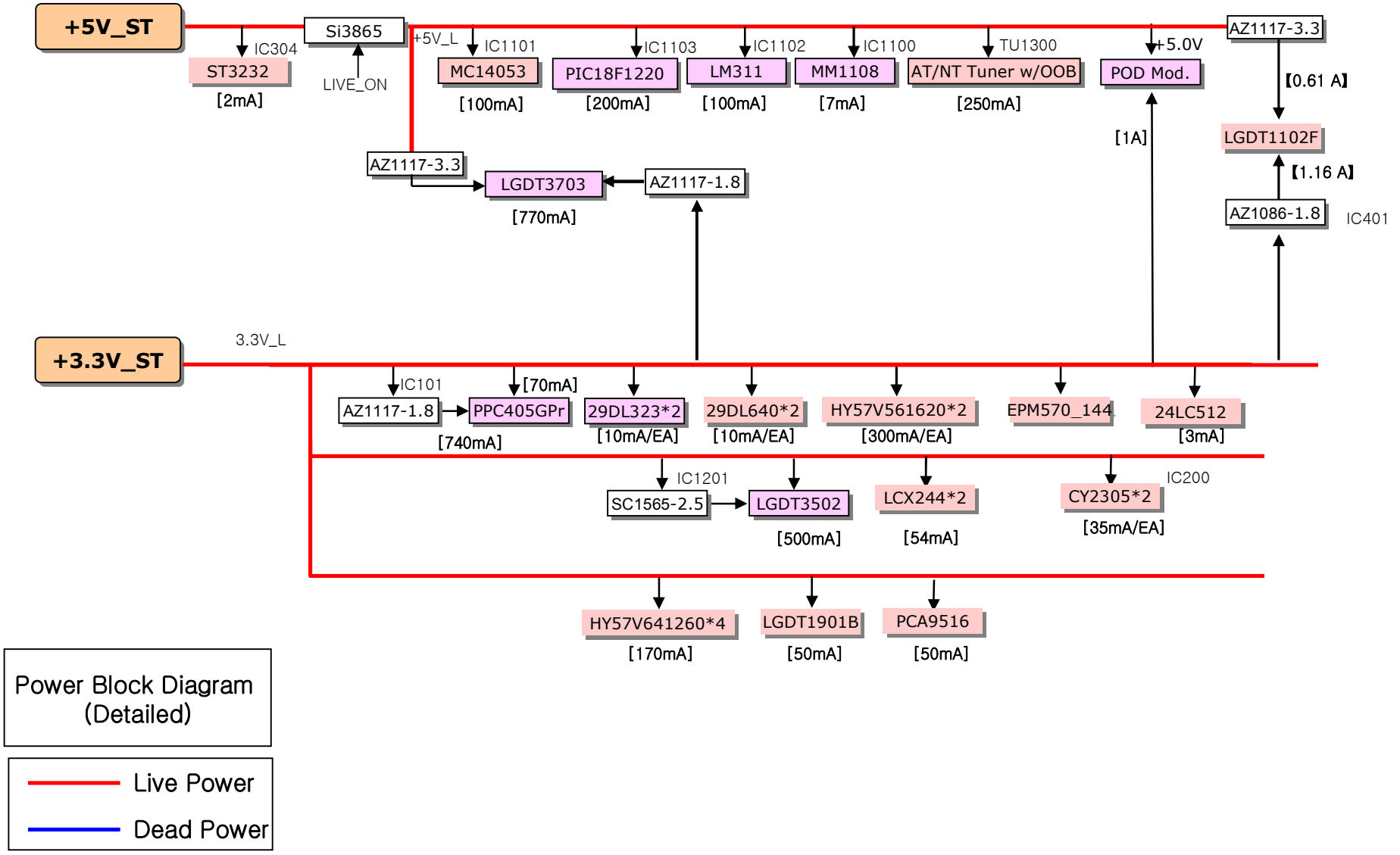
2-7. 42LB1D Local Bus



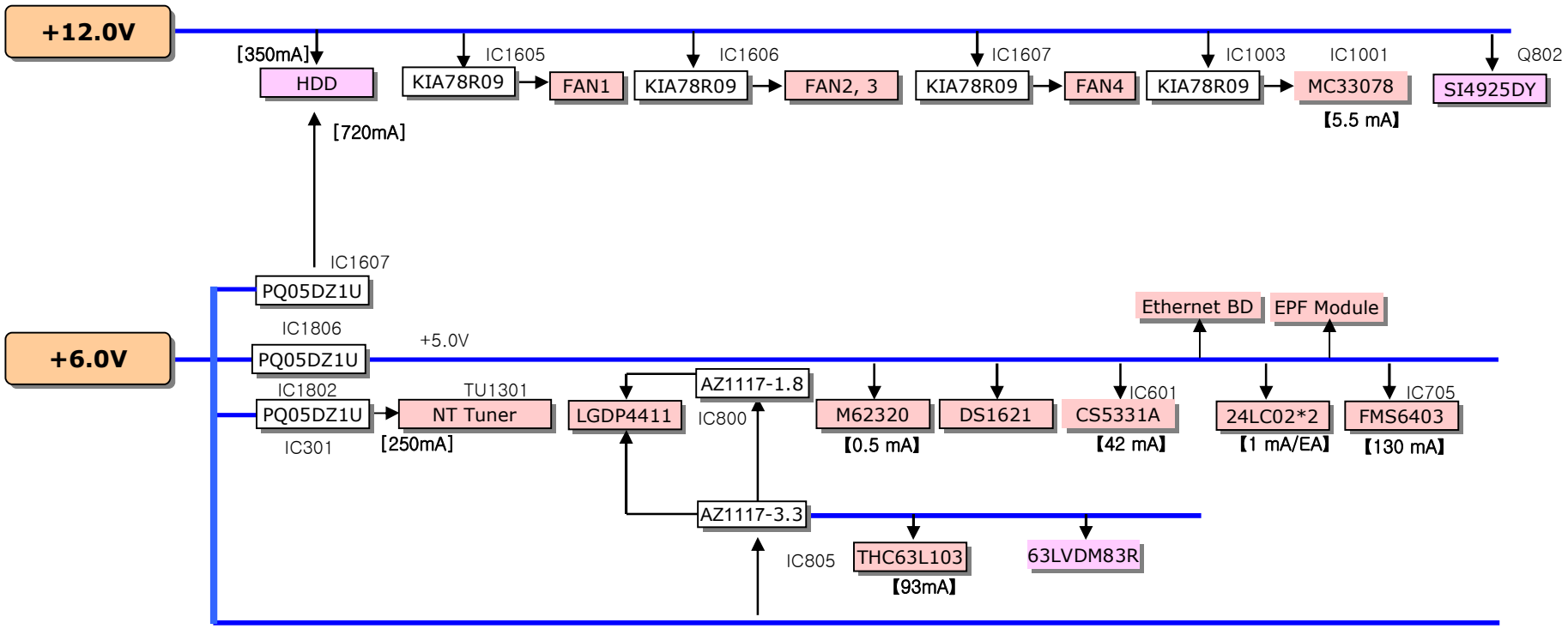
2-8. 42LB1D Option Design Block Diagram



2-9. 42LB1D Digital Board Power Block Diagram



2-10. 42LB1D Digital Board Power Block Diagram

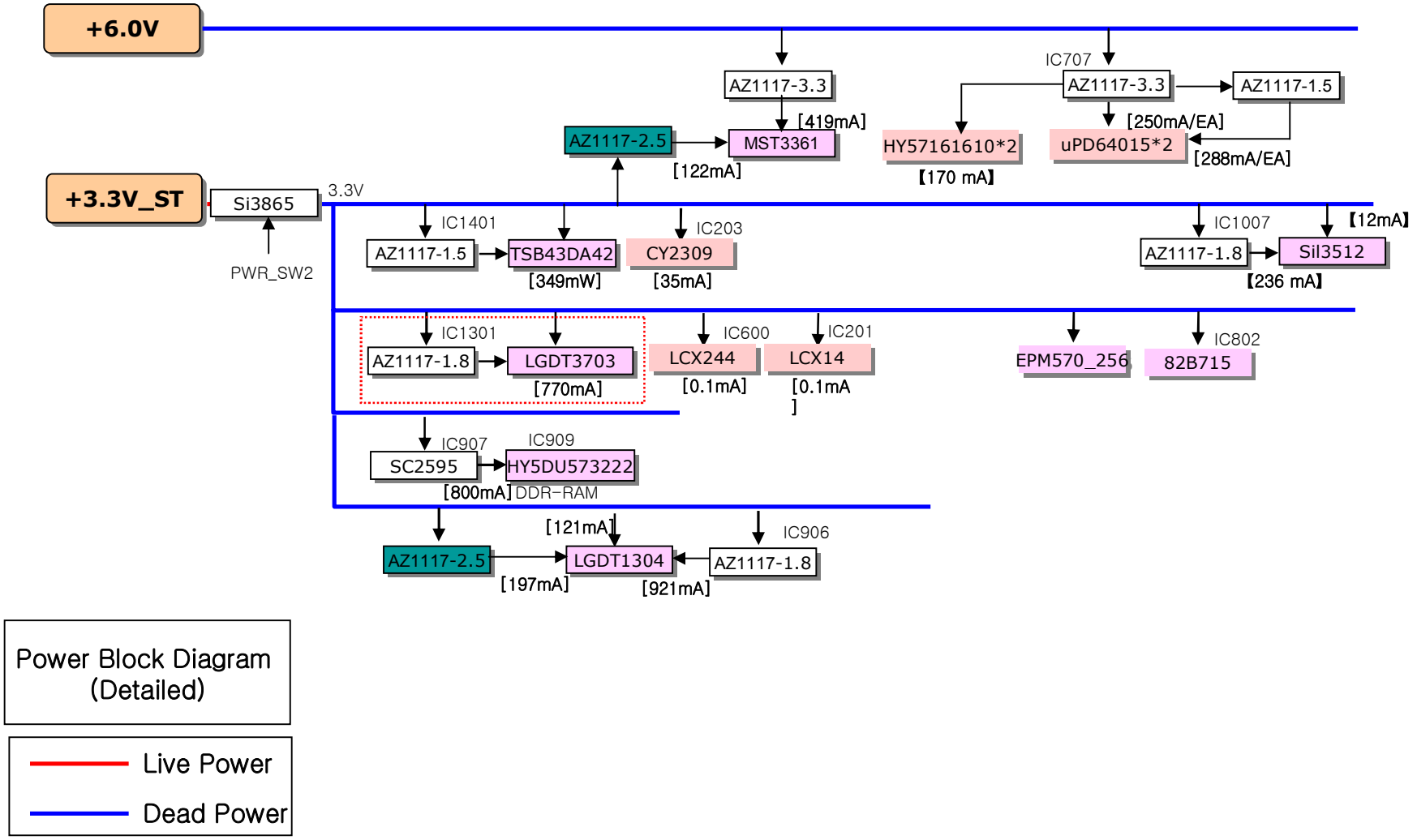


Power Block Diagram
(Detailed)

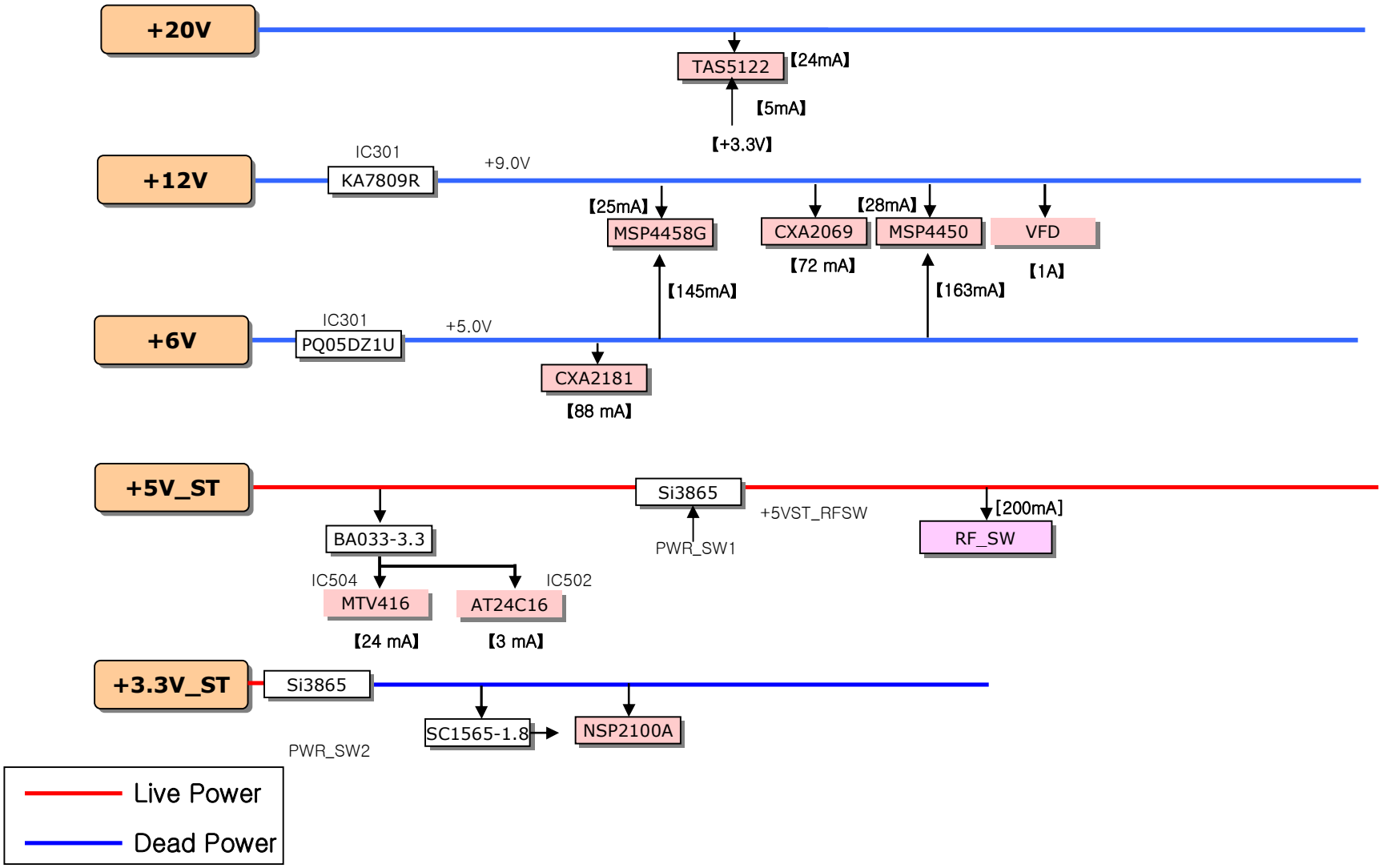
Live Power

Dead Power

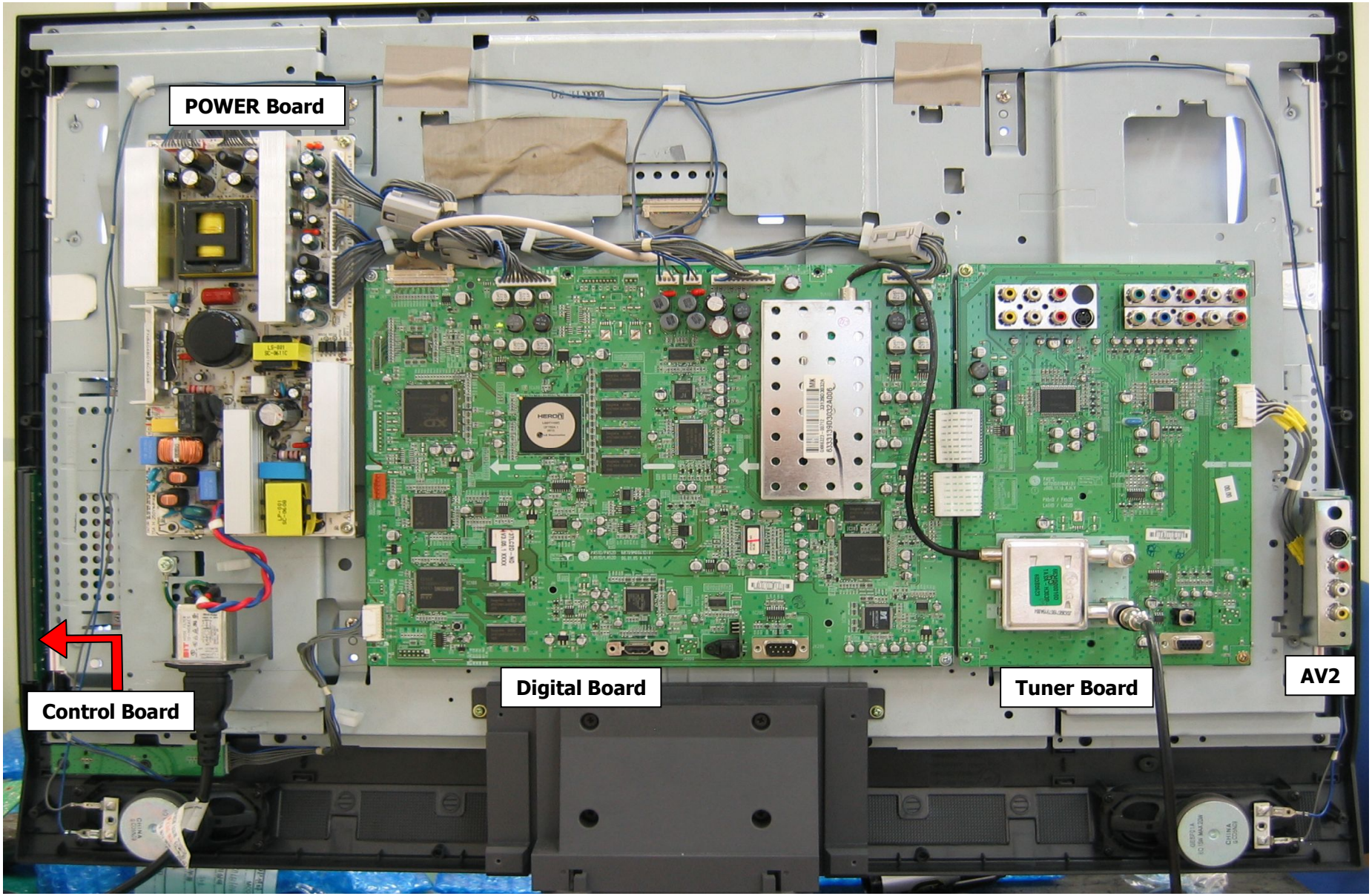
2-11. 42LB1D Digital Board Power Block Diagram



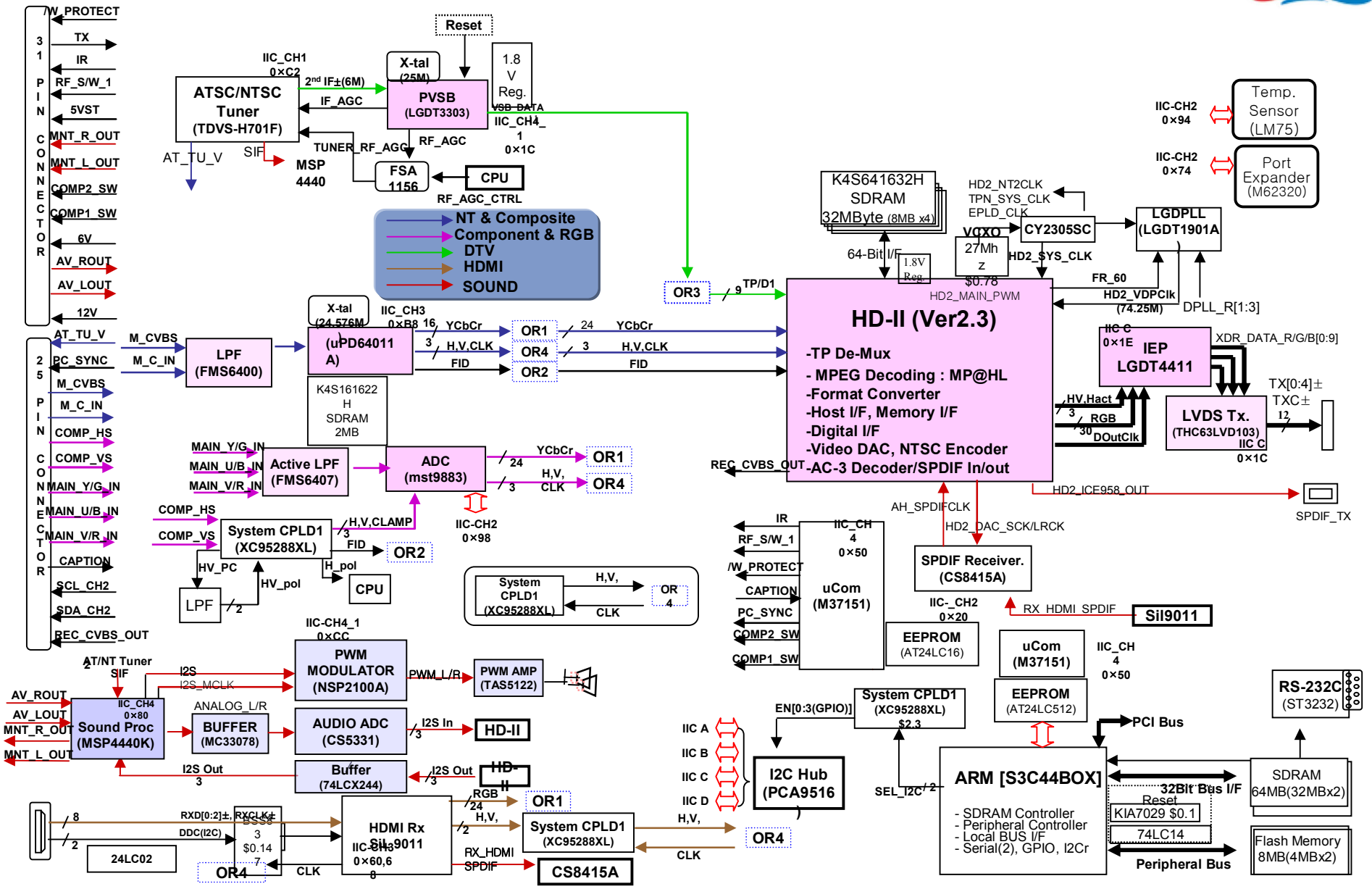
2-12. 42LB1D A/V Board Power Block Diagram



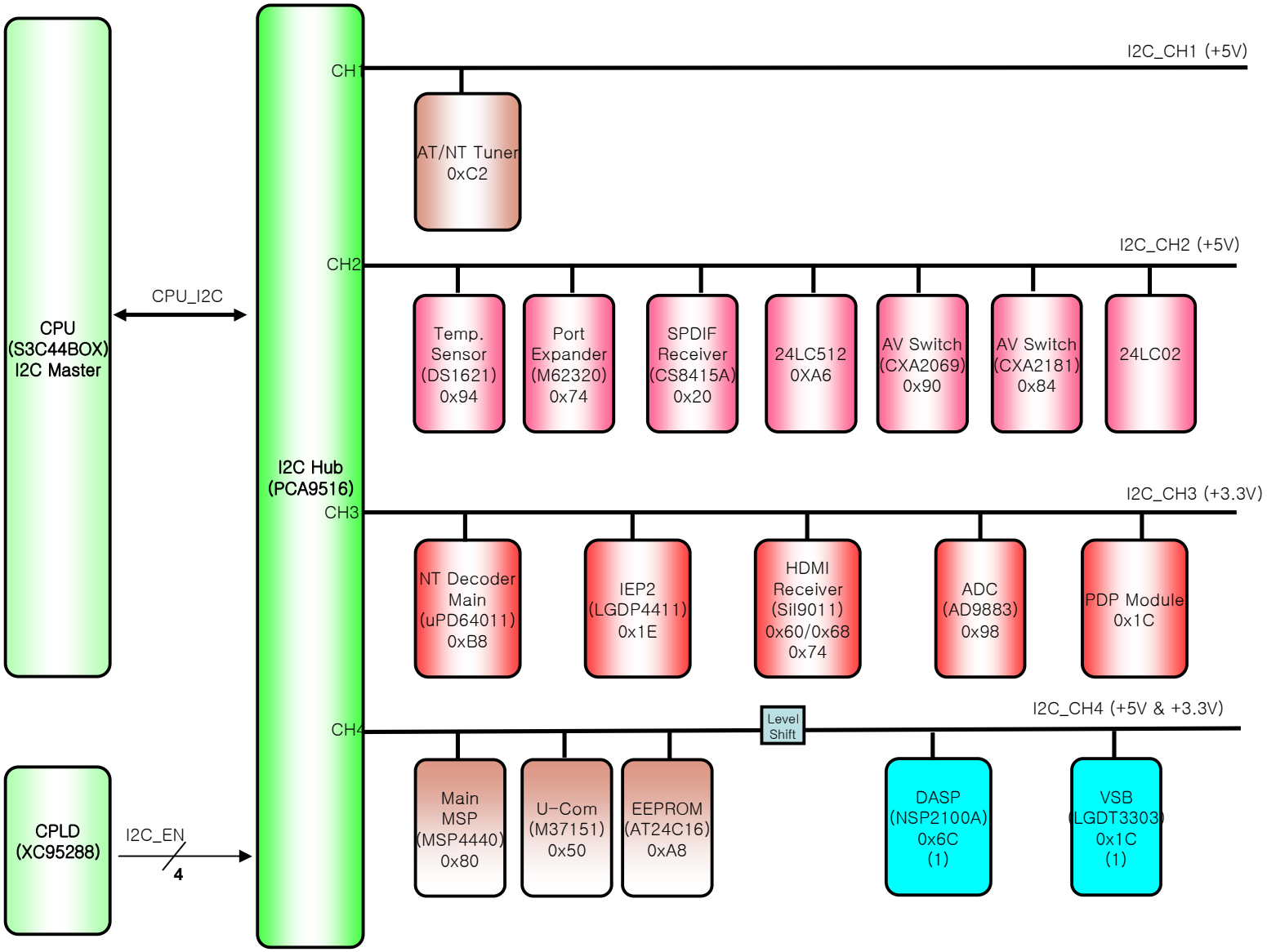
Configuration



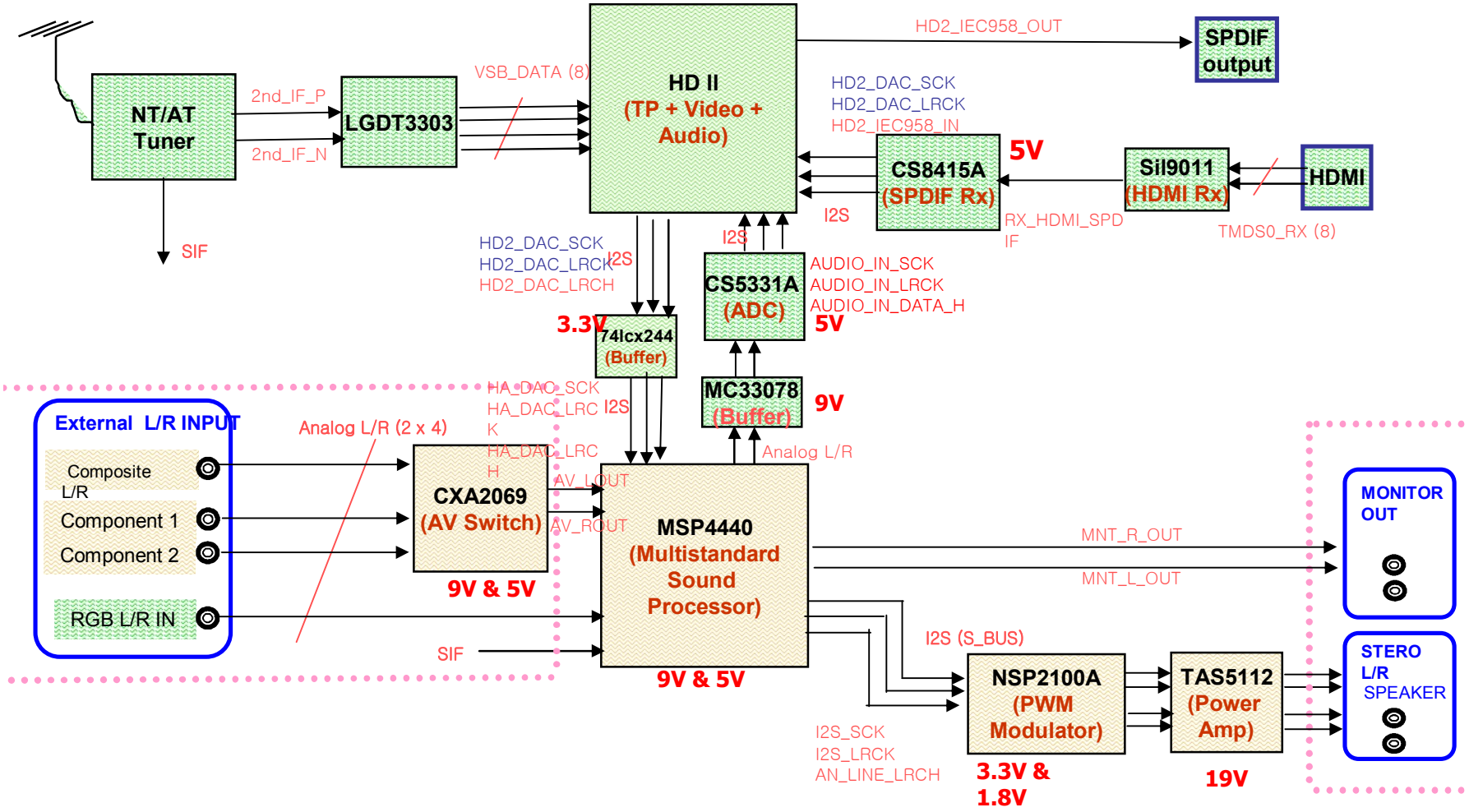
3-1. 42LC2D Digital Board Block Diagram



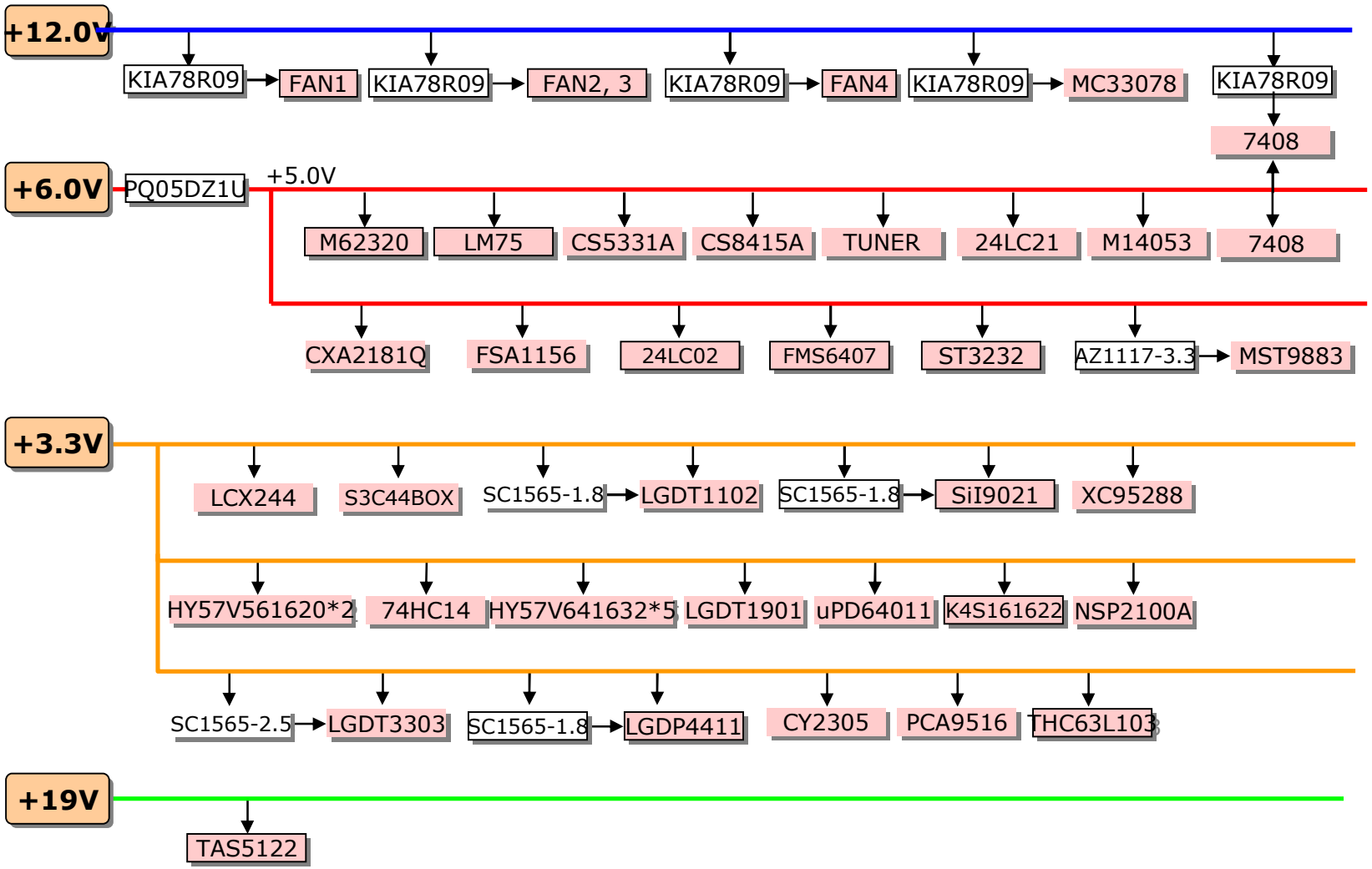
3-2. 42LC2D I2C Configuration



3-3. 42LC2D Audio Block Diagram



3-4. 42LC2D POWER Configuration



3. Monitor Tools Program

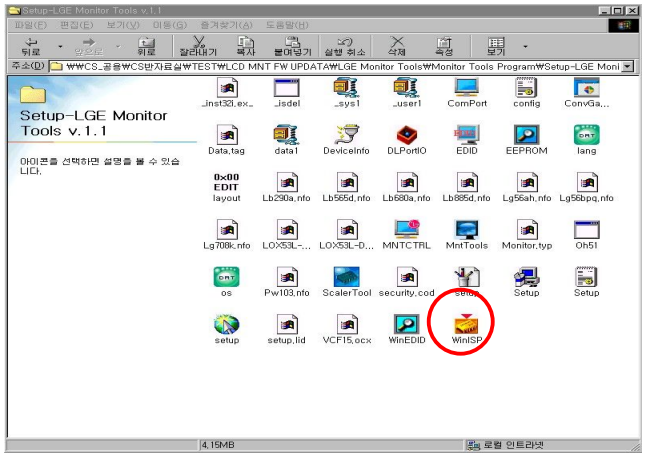
- 1.Setup

- 2.MNT Micom Update

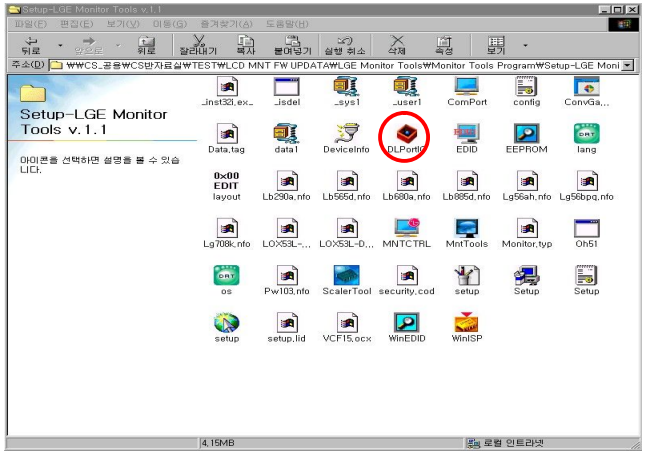
- 3.EDID Editor Setting
  (TV Application)

1.Setup

1. Run Setup file

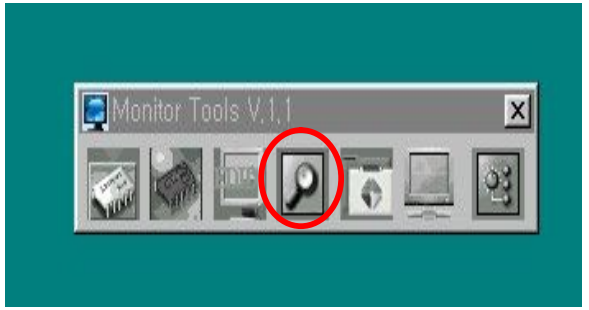


2. Install DLPort IO



3. Run LGE Monitor Tools.

4. Run



2.EDID Editor Setting (Apply to TV)

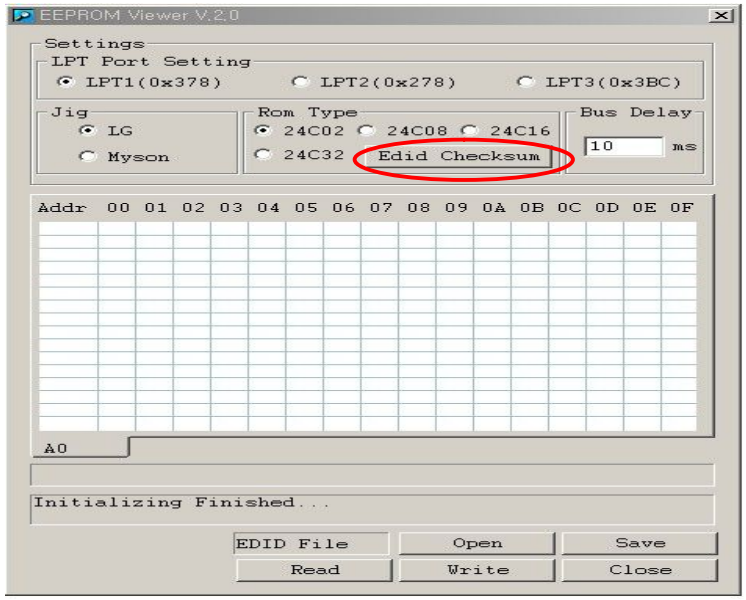
1. Copy the Ecprom.exe file in 256bit folder and paste it in

   C:₩Program Files₩LGE₩MNT Tools before running the program.

2. Run the Monitor Tool.exe and click on EEPROM Viewer.

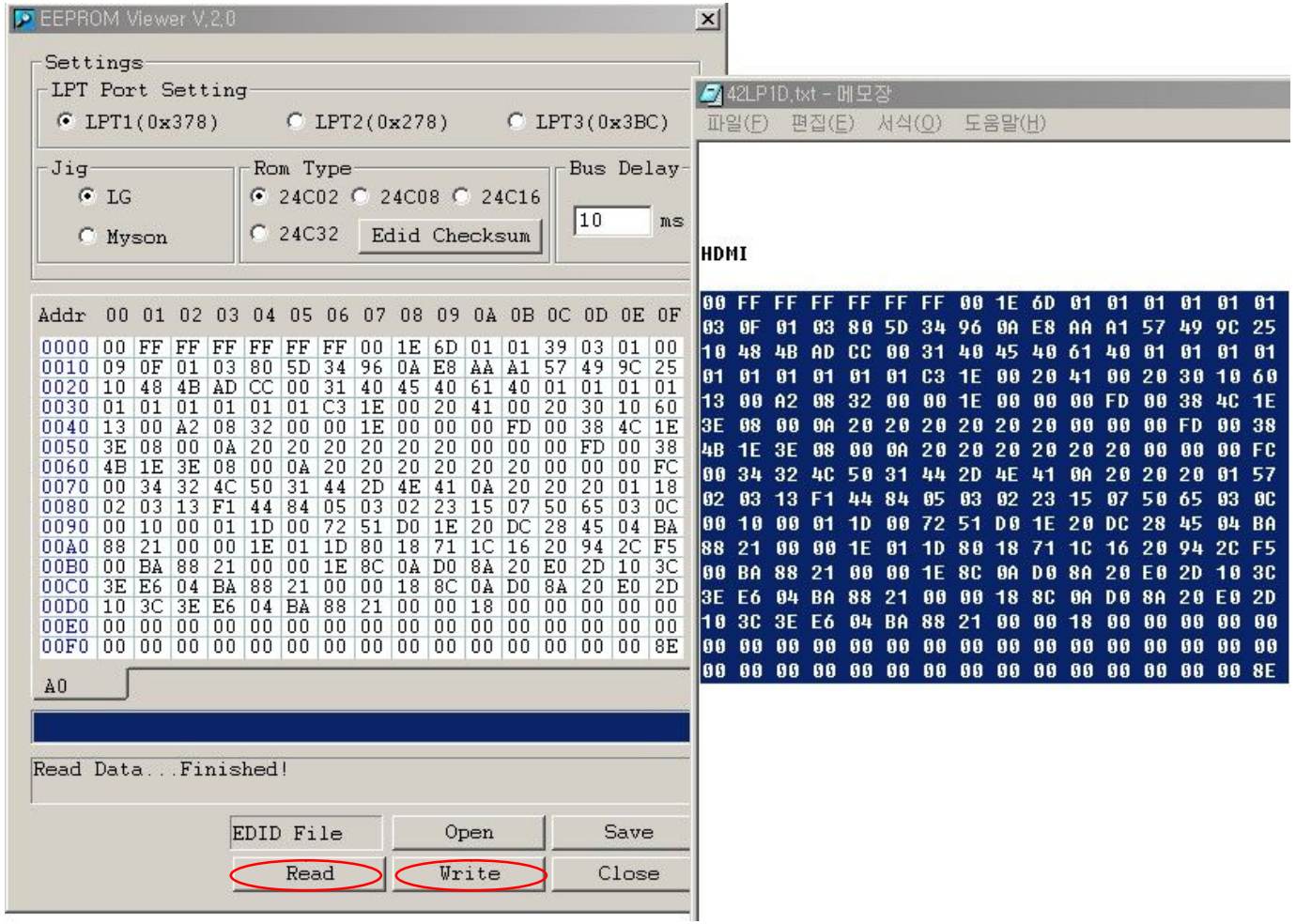
3. The following screen will appear if the program runs normally.

4. To enter 256bit EDID, Edid Checksum should be created.



3. EDID Editor Setting (Apply to TV)

5. Copy EDID and paste in EEPROM Viewer by right clicking on the mouse and Write.
6. Click on Read to check if EDID is entered as it should.



4. How to Identify LCD TV Defect

1. How to Deal with LCD TV Field Defect
2. MODULE Defect Types & Checking
3. MAIN PCB Defect Types & Checking
4. POWER Defect Types & Checking

1-1. How to deal with defect

Model	Defect Type	Details & Management	How to Manage & Defect Range
32LP1D(K) **ALKRLL**	**No POWER** **Power Flicker**	**1.Details** **ⓐ NO POWER** **▶ F101,BD101 Dead** **▶ IC102((F9222L) Dead** **▶ IC103(VIPER22A) Dead** **ⓑ Power Flickering** **▶ Q102(D12NF06L)Dead**	**1.How to manage** **→ Replace POWER Boad (6871TPT303B/D)** **2.Defect range** **→503KG~509KG**
32LP1D(K) **ALKRLL**	**NO Video(Latch up)**	**1.Details** ①Inverter On ②OSD & Video off ③Index window (Full Screen window) OFF **2.Cause** ⓐ Flsh ROM Defect(IC101,102) ⓑ HD2 IC Defect (IC100) ⓒ CPU Defect	**1.How to manage** **→ Digital Board Replacement(3313TD3026A)** **2.Defect range** **→ 503KG~**
32LP1D **ALKRLL**	**Having slow motion during watching analog TV (the same condition for component)**	**1.Details** **Temporary slow motion while watching analog TV** **(the same for component)**	**1.How to manage** **→ S/W update using Tera Term program (Update to 3.15.2)** **→ Digital Board Replacement(3313TD3026A)** **2.Defect range & How to identify** **→ 503KG ~ 506KG**

1-2.How to deal with defect

Model	Defect Type	Details & Management	How to Manage & Defect Range
32LP1D(K) ALKRLL	**Sound OK/No Picture, Abnormal Display**	**1.Details** ①Inverter OFF ②Sound OK ③Index window (Full Screen window) ON → Module inverter defect. ④ Half of the screen is normal & the other half doesn't have picture or abnormal condition	**1.How to manage** **→ Module Replacement(6304FLP290A –A6K6)** **2.Defect range** **→503KG~509KG**
32LP1D(K) ALKRLL	**Unable to receive Analog TV**	**1.Details** ① Automatic channel setting is not working	**1.How to manage** **→ Replace Analog Boad Board (3313TD3027A)** **→ with 6700NF0019B or C** **2.Defect range** **→ 503KG~ 509KG**
32LP1D(K) ALKRLL	**Unable to mount on the wall (Stand is OK)**	**1.Details** **ⓐ Unable to screw because the right tab of rear metal is too small** **2.Cause** **ⓐ Working error by vendor**	**1.How to manage** **→ Rear Metal Replacement(4951TKK238G)** **2.Defect range** **→ 507KG ~ 508KG** **3.Additional details** **→ 503KG ~ 504KG : 4951TKK238A** **→ 505KG ~ : 4951TKK238G**

1-3. How to deal with defect

Model	Defect Type	Details & Management	How to Manage & Defect Range
37LP1D ALKRLL	**No POWER**	**1.Details** **ⓐ NO POWER** **▶ F101,D162 Dead**	**1.How to manage** **→ Replace Power Boad Board (6871TPT315A)** **2.Defect range** **→506KG~510KG**
37LP1D ALKRLL	**NO Video(Latch up)**	**1.Details** ①Inverter On ②OSD & Video off ③Index window (Full Screen window) OFF **2.Cause** ⓐ Flsh ROM Defect (IC101,102) ⓑ HD2 IC Defect (IC100) ⓒ CPU Defect	**1.How to manage** **→ Replace Digital Boad Board (3313TD3038A)** **2.Defect range** **→ 506KG~**
37LP1D ALKRLL	**Unable to receive Analog TV**	**1.Details** ⓐ Automatic channel setting is not working **2.Cause** Oscillation defect by the particle in X-TAL, Tuner	**1.How to manage** **→ Replace Analog Boad Board (3313TD3037A)** **→ Replace tuner with 6700NF0019B or C** **2.Defect range** **→ 506KG~**

1-4. How to deal with defect

Model	Defect Type	Details & Management	How to Manage & Defect Range
42LP1D(K) **ALKRLL**	**No POWER**	**1.Details** **ⓐ NO POWER** **▶ F101,D162 Dead**	**1.How to manage** **→ Replace Power Boad Board (6871TPT315A)** **2.Defect range** **→506KG~510KG**
42LP1D(K) **ALKRLL**	**NO Video(Latch up)**	**1.Details** ①Inverter On ②OSD & Video off ③Index window (Full Screen Window) OFF **2.Cause** ⓐ Flsh ROM Defect(IC101,102) ⓑ HD2 IC Defect (IC100) ⓒ CPU Defect	**1.How to manage** **→ Replace Digital Boad Board (3313TD4010A)** **2.Defect range** **→ 506KG~ 509KG**
42LP1D(K) **ALKRLL**	**Unable to receive Analog TV**	**1.Details** ⓐ Automatic channel setting is not working	**1.How to manage** **→ Replace Analog Boad Board (3313TD4009A)** **→ Tuner can be replaced with 6700NF0019B or C** **2.Defect range** **→ 506KG~ 509KG**

1-5. How to deal with defect

Model	Defect Type	Details & Management	How to Manage & Defect Range
42LP1D ALKRLL	No picture/ Sound OK	**1.Details** **ⓐ NO Video** ①Inverter On ②OSD & Video off ③Index window (Full Screen window) ON **→ Module T-CON Boar Fuse opened (LC420W02-B4K4)**	**1.How to manage** **→ Module Replacement (6304FLP353A(295A) LC420W02- B6K2(1))** **→ Only T-CON Board can be replaced** **2.Defect range** **→ 506KG~507KG**
42LP1D(K) APKRLL	**NO Video(Latch up)**	**1.Details** ①Inverter On ②OSD & Video off ③Index window (Full Screen Window) OFF **2.Cause** ⓐ Flsh ROM Defect(IC101,102) ⓑ HD2 IC Defect (IC100) ⓒ CPU Defect	**1.How to manage** **→ Replace Digital Boad Board (3313TD4010A)** **2.Defect range** **→ 506KG~**
42LP1D(K) APKRLL	**Unable to receive Analog TV**	**1.Details** ⓐ Automatic channel setting is not working	**1.How to manage** **→ Replace Analog Boad Board (3313TD4009A)** **→ Replace Tuner with 6700NF0019B** **2.Defect range** **→ 506KG~**

1-6. How to deal with defect

Model	Defect Type	Details & Management	How to Manage & Defect Range
55LP10D **AQPLKL**	**No Power** **Power Flickering** **Half of the screen is dark**	**1.Details** **ⓐ NO POWER** **Ⓑ Power flickering** **Ⓒ Half of Display screen is dark**	**1.How to manage** **→ Replace Power Board (6871TPT296A)** **→ Part-no 6871TPT320D** **2. Defect range** ① 55LP10D :409KG ~ 509KG
55LP1D **ALKRLV**	**No Power** **Power Flicker**	**1.Details** **ⓐ NO POWER** **→ BD101 SHORT** **ⒷPower Flickering** **→ Q110 SHORT**	**1.How to manage** **→ Replace Power Board (6871TPT320D)** **2. Defect range** ① 55LP1D :510KG
55LP1D **ALKRLV**	**Latch up** **(No sound/No picture)**	**1.Details** ① Inverter on ② No Channel Operation/ No Sound ③ OSD & Video off ④ Index Window (Full Screen Window) off ⑤ Unable to change input ⑥ Only Power on remote control is working, unable to operate other keys **2. Cancellation condition: Unable to cancel**	**1.How to manage** **→ Replace Digital Board (3313TD500031)** **2. Defect range** ① 55LP10D :507KG ~ 510KG

1-7. How to deal with defect

Model	Defect Type	Details & Management	How to Manage & Defect Range
55LP10D AQPLKL 55LP1D ALKRLL	Latch up (No Sound/ No Picture)	1.Details ① Inverter on ② No channel operation/No Sound ③ OSD & Video off ④ Index window (Full Screen Window) off ⑤ Unable to change input ⑥ Only Power is working on remote control, unable to operate other keys 2. Cancellation condition: Unable to cancel	1.How to manage → Replace MODULE (6304FLP119A) Standard: LC550W01-A5 1.How to manage → Replace MODULE (6304FLP296A) Standard: LC550W01-A5K2 → Replace MODULE (6304FLP205A) Standard: LC550W01-A5K1
55LP10D AQPLKL	Rear cover falls apart while Tilt Swivel is assembled (No problem for wall-mount type)	1.Details Ⓐ Rear Cover falls apart in standing condition Ⓑ Cause → Deformed Back Cover	1.How to manage → Back Cover Replacement(3809TKE023A) → Rear Cover Replacement (3550TKK630A) Caution: B/C, R/C should be replaced at the same time for assembly. 2.Defect range → 409KG ~ 504KG
55LP1D ALKRLL	Rear cover falls apart while Tilt Swivel is assembled (No problem for wall-mount type)	1.Details Ⓐ Rear Cover falls apart in standing condition Ⓑ Cause → Deformed Back Cover	1.How to manage → Back Cover Replacement(3809TKE023A) → Rear Cover Replacement (3550TKK630A) Caution: B/C, R/C should be replaced at the same time for assembly. 2.Defect range → 409KG ~ 504KG

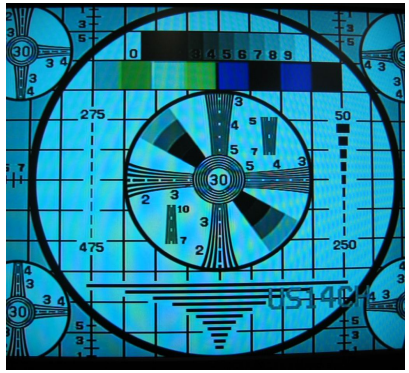
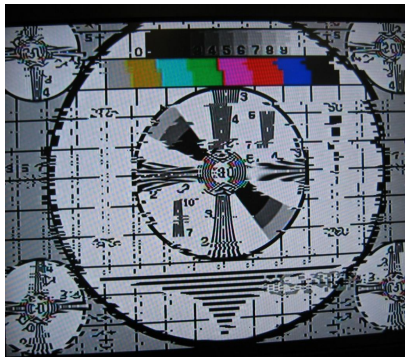
2-1.MODULE Defect Types & Checking

NO	Defect Name	Defect Type	Details	How to Test	Module Defect	Main PCB Defect
1	**No Picture Sound OK**		**No picture while sound is heard**	**1.Is Panel Link cable B+ 12V input?** **2.Is the signal data of output being transmitted to Module?** **3.Does INVERTER have output voltage?**	1. & 2. is done normally, but having no INVERTER output voltage	Check the Inverter Version -8.1Ver R60 delete & change IC810 V2.01 to V3.01 - Change to Inverter 8.1 for 6.0Ver Module
2	**Broken Picture**		**Broken picture horizontally & vertically, no image appears on the screen**	**1.Is Panel Link cable B+ 12V input?** **2.Is the signal data of output being transmitted to Module?**	1. & 2. is done as it should	B+ 12V input & unstable transmission of signal data
3	**V-Tab Defect**		**No picture on the vertical tab of LCD-Module regularly**	**1.Module Defect due to Drive –IC not displaying the picture** **2. Replace Module.**	Input of B+ & data signal is normal. Defect by Drive –IC	No Main PCB Defect

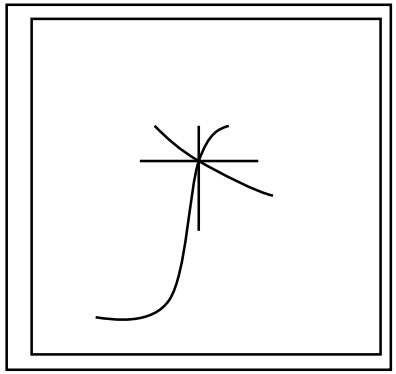
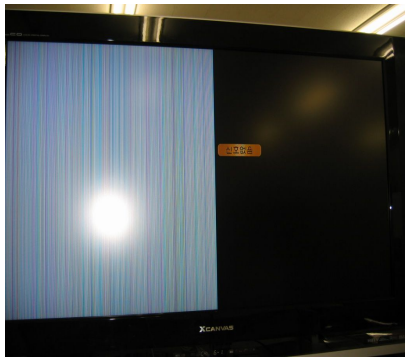
2-2.MODULE Defect Types & Checking

NO	Defect Name	Defect Type	Details	How to Test	Module Defect	Main PCB Defect
4	**Color Saturation**		**Picture appears with a certain color while sound is normal**	**1.Is Panel Link cable being operated normally?** **2.Is the output signal data being transmitted to Module?**	Normal Input of 1. & 2.	Only G color is input when signal data is transmitted, Abnormal data input
5	**V-Line Defect**		**Vertical line appears on the screen**	**1. Do lines appear on White/ Bark screen only?** **2. Do lines appear on certain color of R,G,B screen only?** **3.Do lines move?** **4.Do lines appear when there's no signal?**	Module Defect that may caused by particle in Drive –IC joint part	Check main PCB Scalar IC, LVDS data, & Cold soldering
6	**H-Line Defect**		**Horizontal line appears on the screen**	**1. Do lines appear on White/ Bark screen only?** **2. Do lines appear on certain color of R,G,B screen only?** **3.Do lines move when AUTO SELECT?** **4.Do lines appear when there's no signal?**	Module Defect that may caused by particle in Drive –IC joint part	Check main PCB Scalar IC, LVDS data, & Cold soldering

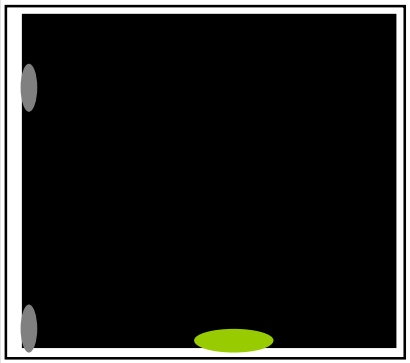
2-3.MODULE Defect Types & Checking

NO	Defect Name	Defect Type	Details	How to Test	Module Defect	Main PCB Defect
7	Picture Blur		Defect appears On Full White or specific Pattern, undefined spots in round shape	1.Clearly appears on Full White or certain pattern 2. Any pressure on Module regularly? 3. TN,IPS Mode : Liquid crystal pillar collapses by applying pressure	Liquid crystal pillar collapses by pressure **(by customer's fault)**	No Main PCB Defect
8	No R(G,B) color		Defect appears in dark color on the top & bottom of screen in Full white & Gray pattern	1.Is there a voltage output from the top & bottom of Inverter? 2. Does LCD-Lamp radiate? 3.Picture appears instantaneously and disappears	Voltage output from the top & bottom of Inverter, or lamp doesn't emit light	Inverter or LIPS Defect if no voltage output from the top & bottom of inverter
9	Screen Noise		Picture curled up as if V-synchronization failed	1.Is Panel Link cable B+ 5V being input? 2.Is output signal data being transmitted to Module without data vibration?	Module Defect by the property of Scaler IC inside of Module	Output signal data vibration

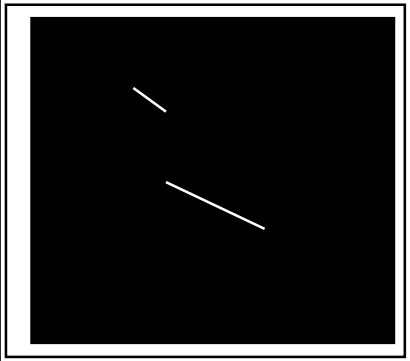
2-4.MODULE Defect Types & Checking

NO	Defect Name	Defect Type	Details	How to Test	Module Defect	Main PCB Defect
10	MODULE Damage		Screen cannot display picture due to damaged glass inside of polarizer and liquid crystal running into phosphor by external Shock	1.The condition appears clearly in Full White or certain patter 2. Any regular pressure on Module? 3. TN,IPS Mode : Liquid crystal pillar collapses by applying certain pressure	Caused by a broken glass inside of polarizer by external shock(by Customer's fault)	No Main PCB Defect
11	Half of the picture is broken		Liquid crystal runs down as if water flows in the screen	1. Liquid crystal runs down as if water flows in the screen	Liquid Crystal runs down as if water flows in the screen	No Main PCB Defect
12	DTV Picture is broken		Irregular noise in the screen	1.Any voltage vibration of each terminal on MAIN PCB? 2.Is output signal data being transmitted to Module without data vibration?	Normal Input of 1. & 2.	Voltage vibration of each terminal Unable to transmit due to the signal data vibration

2-5.MODULE Defect Types & Checking

NO	Defect Name	Defect Type	Details	How to Test	Module Defect	Main PCB Defect
13	**Broken Picture By Memory Operation**		**Irregular flickering occurs on certain image or picture file**	**1.Does the condition occur at lower resolution?** **2.Does the same condition still occur when VGA card is changed? (different VGA)**	▶Check at lower resolution ▶Change VGA card to check	Caused by the compatibility of Main PCB & VGA card
14	**Defect by 32 Comb Filter Changes From 1→0**		**Dark band appears on the top & bottom of screen**	**1.Dark band appears on the top and bottom** **2.The band moves for longer use**	Dark band appears on the top and bottom	No Main PCB Defect
15	**Light Leakage**		**Light leakage at Back Pattern**	**▶Light leakage at Back Pattern**	Light leakage	No Main PCB Defect

2-6.MODULE Defect Types & Checking

NO	Defect Name	Defect Type	Details	How to Test	Module Defect	Main PCB Defect
16	**MODULE Scratch**		**Irregular, long scratch on Polarizer**	**1. Does polarizer have irregular, long scratches?** **2.Does the condition still appear when wiping with a soft cloth?**	Scratch on Polarizer Caused by External shock **(by customer's fault)**	No Main PCB Defect
17	**Unable to Recognize DVD**		**Unable to Recognize DVD, Bark screen**	**1.Is the set unable to recognize DVD and having only Bark screen?** **2.Is output signal data being transmitted to Module?**	**▶Same Condition when DVD CD is changed** (generally DVD Defect By shock during transportatio	No Main PCB Defect
18						

3-1.MAIN PCB Defect Types & Checking

NO	Defect Name	Defect Type	How to Test	PCB Check
1	AC NO POWER	LED Lamp is OFF POWER S/W doesn't operate	▶ POWER or LIPS 33V,12V,5V output ▶ Scalar IC B + Unable to input ▶ U-com B + Unable to input ▶ Unable to oscillate crystal	MAIN PCB Replacement
2	NO RASTER (No picture)	LED Lamp is ON Dark screen, unable to see pictures	▶ Scalar IC B+ Unable to input ▶ No Scalar IC signal output ▶ U-com DATA Error	MAIN PCB Replacement
3	Picture Noise (Color Noise)	Having serious noise while the screen is shaking	▶ Scalar IC & U-com IC B+Voltage shaking ▶ Abnormal signal from Scalar IC & U-com IC	MAIN PCB Replacement
4	White Screen	LED Lamp is ON White screen	▶ Abnormal signal from Scalar IC & U-com IC	MAIN PCB Replacement
5	Screen Flickering	Screen flickers by signal input	▶ Check Panel Link cable connection ▶ Abnormal signal from U-com IC	MAIN PCB Replacement
6	Power Flickering	LED Lamp flickering	▶ Abnormal signal from U-com IC	MAIN PCB Replacement

3-2. MAIN PCB Defect Types & Checking

NO	Defect Name	Defect Type	How to Test	PCB Check
7	No Control S/W operation	LED Lamp is ON CONTROL S/W doesn't work	▶ CONTROL S/W Output Voltage ▶ U-com KEY Input Signal Motion Check	MAIN PCB Replacement
8	DPM (Power-saving Mode)	LED Lamp is Yellow No picture on screen CONTROL S/W doesn't work	▶ CONTROL S/W Output Voltage ▶ U-com KEY Input Signal Motion Check	MAIN PCB Replacement
9	Power Flickering by Applying Signal	Power LED & Picture flickering when applying signal	▶ Abnormal signal from U-com IC	MAIN PCB Replacement
10	Excessive Frequency Message	Excessive frequency message pops up by applying power when no signal	▶ Abnormal signal from U-com IC	MAIN PCB Replacement
11	Color Flickering (Specific color)	Color flickering by signal input	▶ Check Panel link cable connection ▶ Abnormal signal from U-com IC	MAIN PCB Replacement
12	Broken Picture	Picture overlaps or breaks by signal input	▶ Check Panel link cable connection ▶ LVDS IC output signal check ▶ Abnormal signal from U-com IC	MAIN PCB Replacement

4-1. POWER Defect Types & Checking

LIPS stands for L(LCD) I(INVERTER) P(POWER) S(SUPPLY)

NO	Defect Name	Defect Type	How to Test	PCB Check
1	AC NO POWER	LED Lamp is OFF POWER S/W doesn't work	▶ No output when 12V,5V Connector OPEN Check	LIPS Replacement POWER PCB Replacement
2	Power Flickering	LED Lamp flickers	▶ Output for 12V,5V Connector OPEN Check is flickering regularly or irregularly	LIPS Replacement POWER PCB Replacement
3	NO RASTER (Screen is ON and OFF immediately)	LED Lamp is ON without picture Screen is ON and OFF immediately	▶ Inverter Connector OPEN Check ▶ Lamp voltage output from top & bottom of Inverter, then the voltage drops	LIPS Replacement INVERTER Replacement
4	Dark Top or Bottom	Normal picture but the top or Bottom of picture is very dark	▶ Inverter Connector OPEN Check ▶ No lamp voltage output from top & bottom of Inverter	LIPS Replacement INVERTER Replacement
5	Picture Shaking	Serious noise while picture is shaking	▶ 12V, 5V power is shaking when Connector open check	LIPS Replacement POWER PCB Replacement