



PDP Training Manual

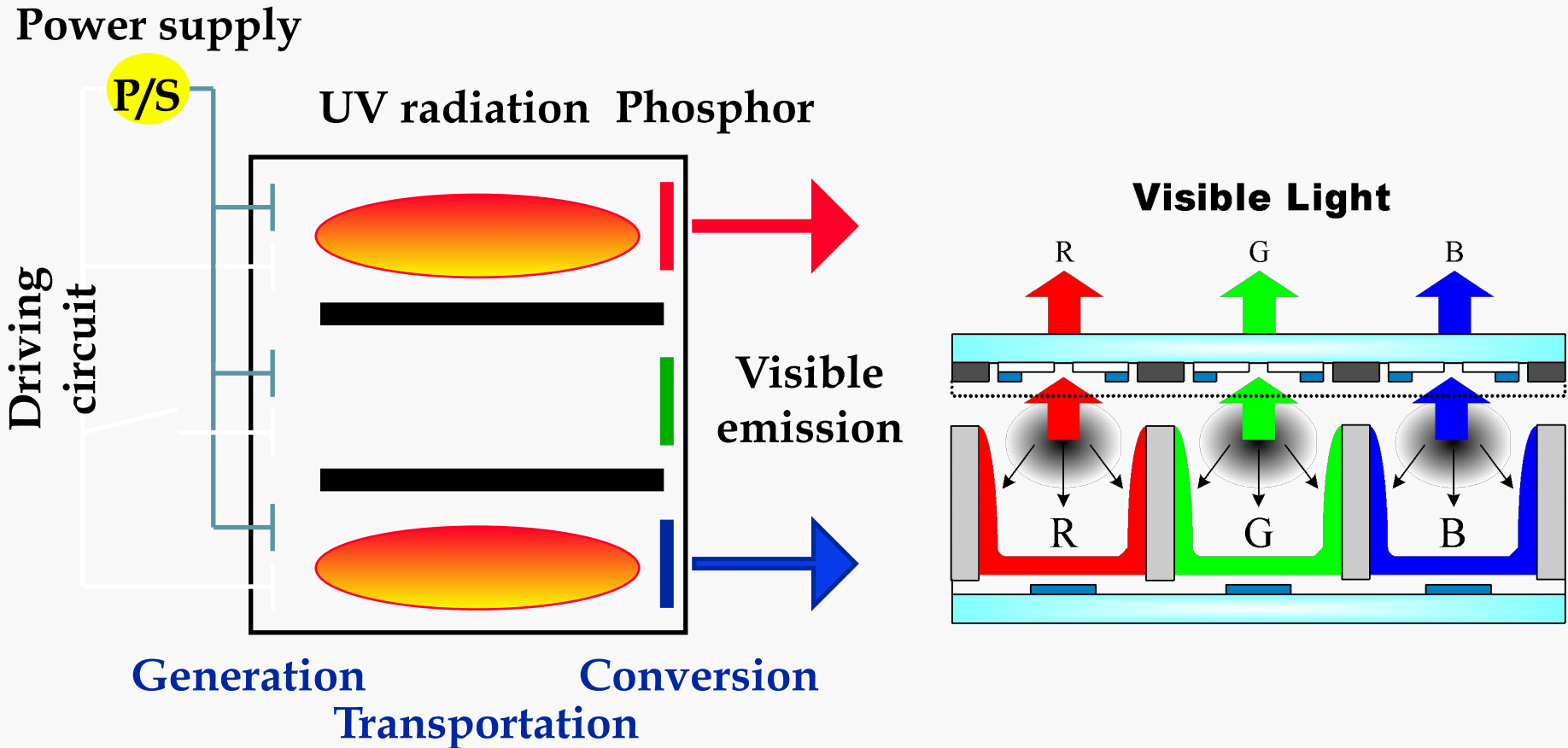
**Carmeliana
P416**

Agenda

- 1. Introduction to PDP**
- 2. Manufacturing & Structure of Panel**
- 3. PDP Driving Characteristics**
- 4. CARNELIAN Training**
- 5. Trouble shooting**
- 6. CIRCUIT DIAGRAM**

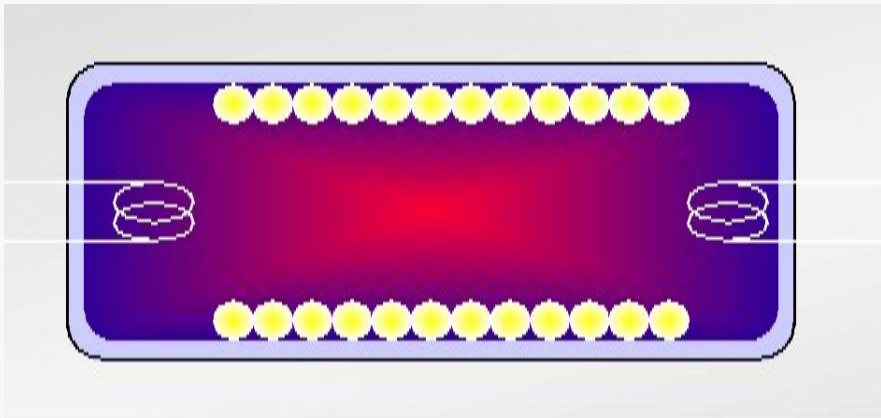
1. Introduction to PDP

- Concepts of PDP

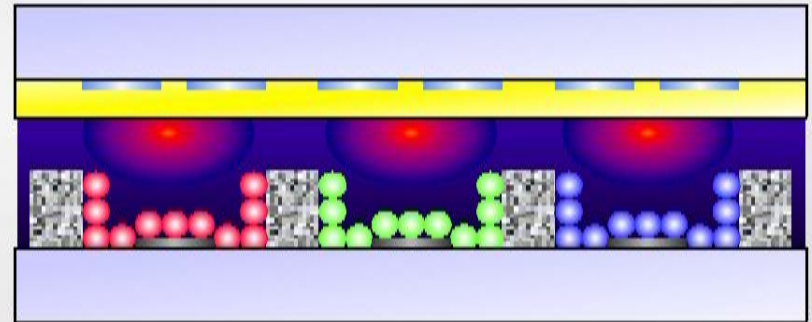


● Fluorescent Lamp and PDP

Principle of PDP light emission is the same as fluorescent lamp. 2 pieces of glass plates are placed with a small gap of 0.1mm, which is filled with discharge gas, and one of the glass plate has a transparent electrode. When 100 and several ten V of voltage is applied to the electrodes, discharge starts and generates UV light. This UV light reaches to the other glass plate on which phosphors (R,G,B) are pasted, and the phosphors convert UV light to visible light.



< Fluorescent lamp >



< PDP >

● History of PDP

3rd Generation

Size : 30-80 inch
 Price : Under \$10/inch
 Definition : CRT Grade
 Efficiency : 2-5 lm/w
 FAN Noise : No Fan
 Use : Public
 New Production Technique

2nd Generation

Size : 30-60 inch
 Price : \$10~\$20/inch
 Definition : CRT Grade
 Efficiency : 1-2 lm/w
 FAN Noise : Under 30db / No Fan
 Use : High-Income bracket Business
 Establishing Mass Production Technique

1st Generation

Size : 20-50 inch
 Price : \$20~\$30/inch
 Definition : PJTV
 Efficiency : 1-1.2 lm/w
 FAN Noise : 35-45 db
 Use : High-Income bracket/ Business
 Upgrading Mass Production Technique

Preceding

Size : 20 inch
 Price : \$30~\$50/inch
 Efficiency : 0.5-1 lm/w
 Use : Business
 Upgrading Basic Technique

1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

● Merits & Demerits of PDP

< Merits >

- Thin Type TV
- Large Scale : 80" possible
- Light Weight (42" Scale)
 - : PDP 30kg / CRT: over 100kg
 - : LCD 40" 32Kg
- Wide Angleview
- High Definition
 - : cell pitch 0.1mm
- Not-Sensitive to Magnetic Field
- Full-color
- Good Non linerity
 - : No need for TFT like LCD

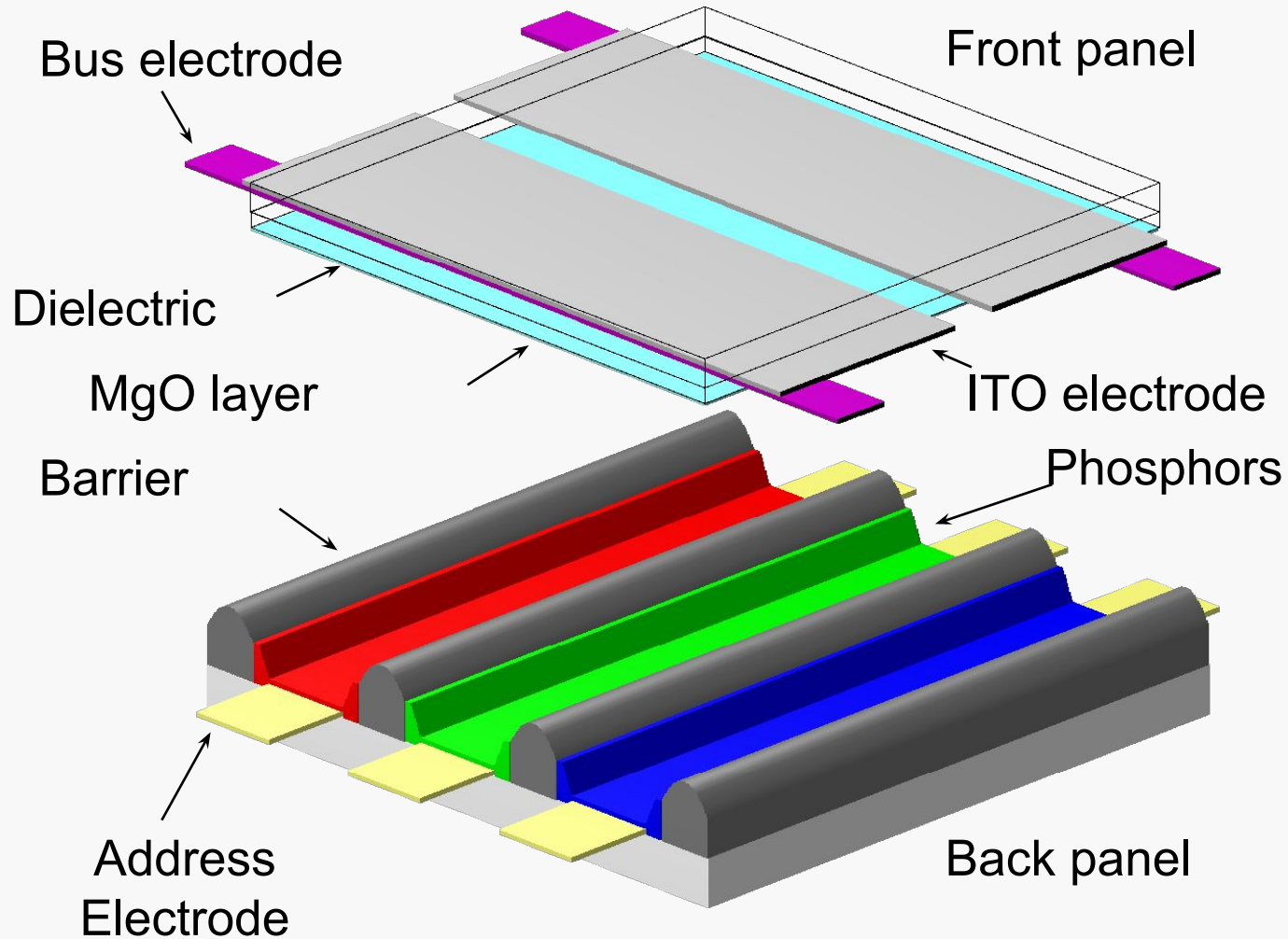
< Demerits >

- High Power Consumption
- Low Brightness
- High Cost
- Low Lighting Efficiency
- Image Retention
- Operation Temperature
- Acoustic Noise of Driving

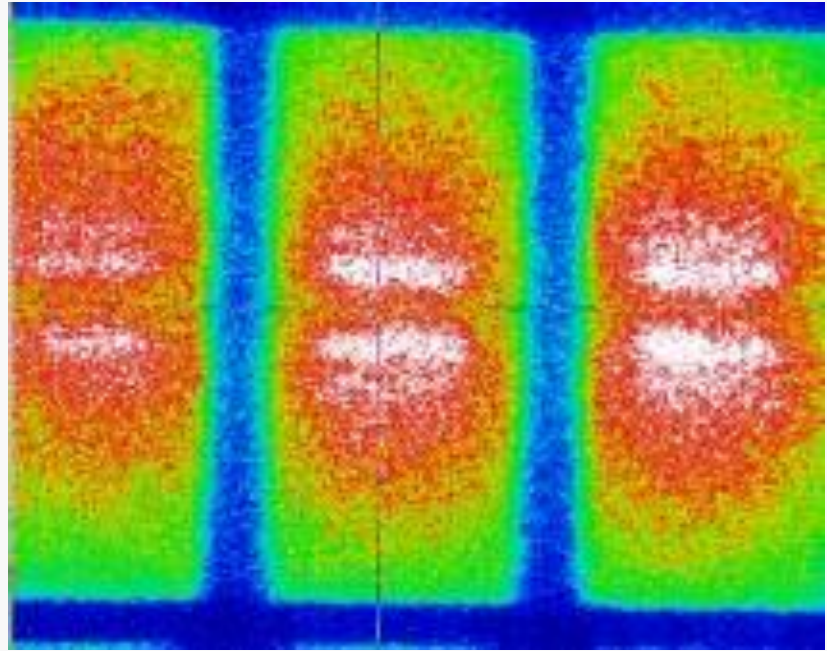
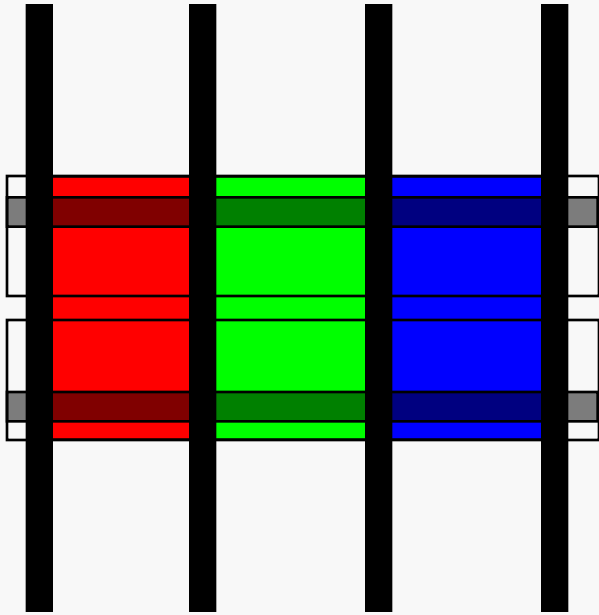
Manufacturing & Structure of Panel

2. Manufacturing & Structure of Panel

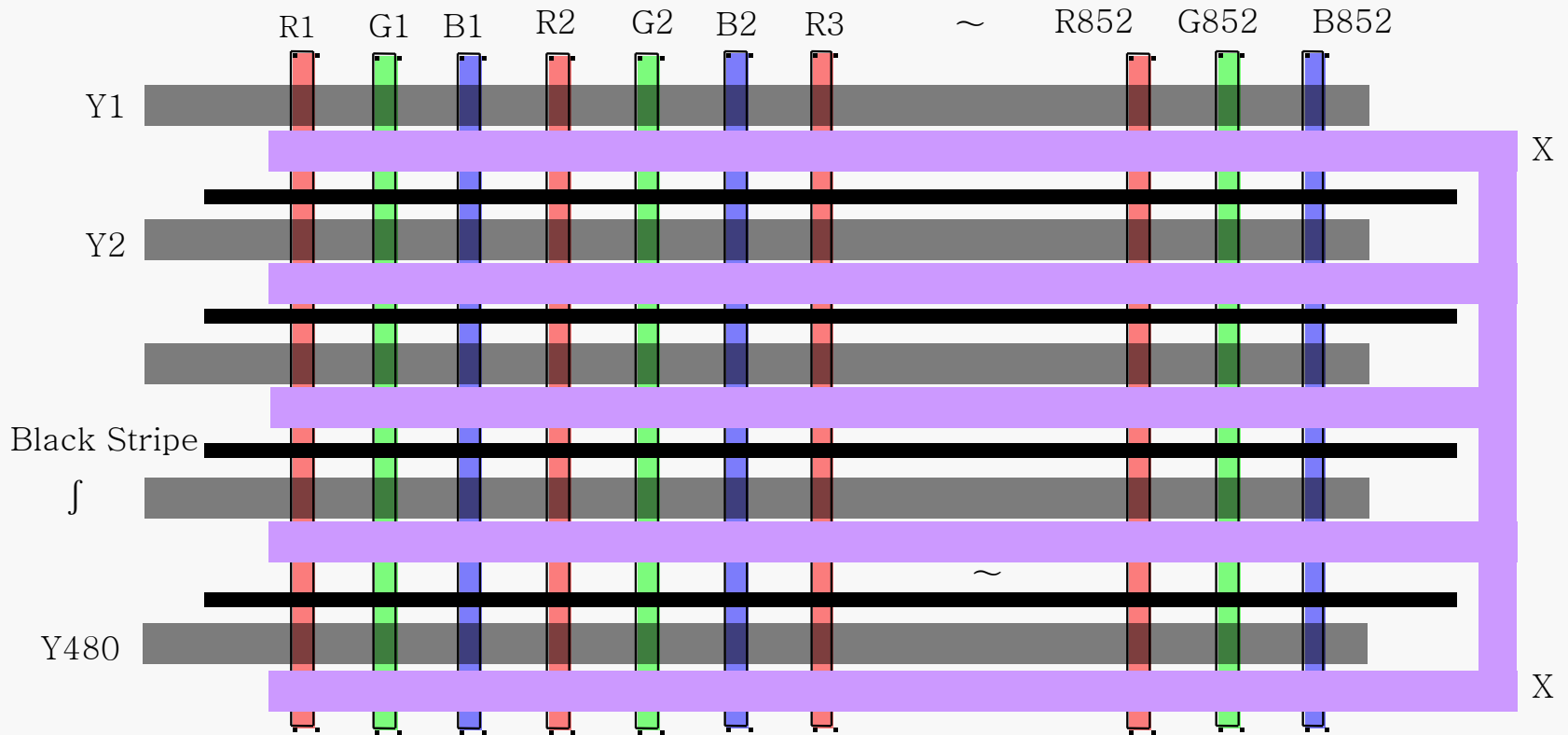
- Cell Structure of Panel



- Cell Structure of Panel



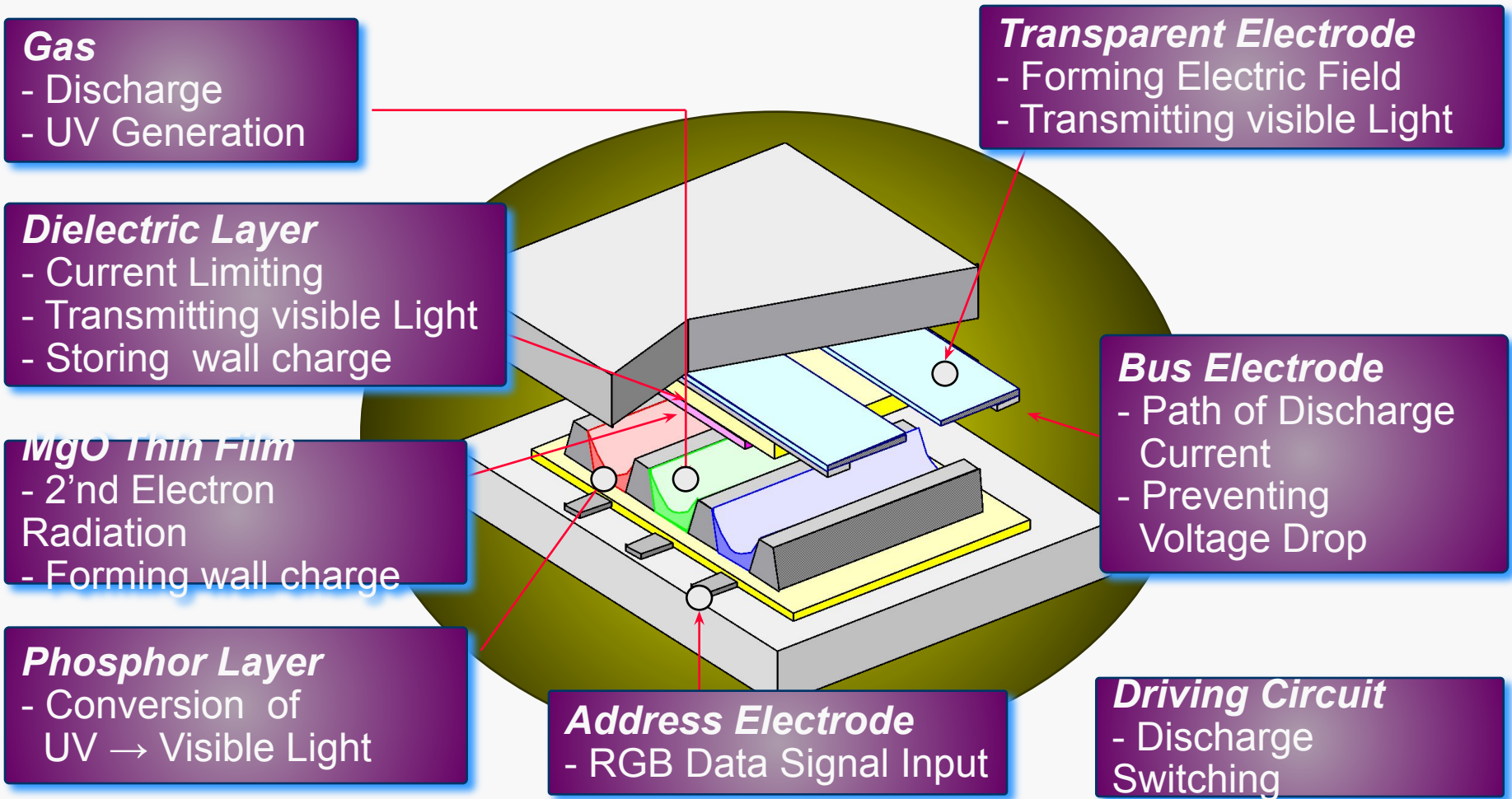
● Electro Arrangement of PDP(SDI Panel - SD)



Reference

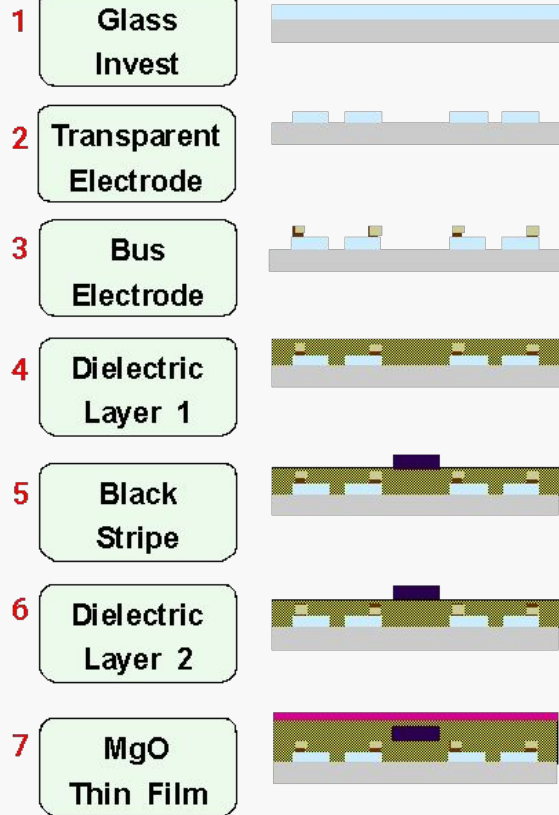
- A1,A2, , , : Address Electrode
- Y1,Y2, , , : Scan & Sustain Electrode
- X : Common & Sustain Electrode

• Function of each PDP Cell Components

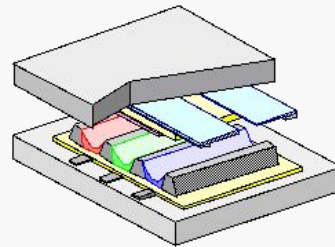
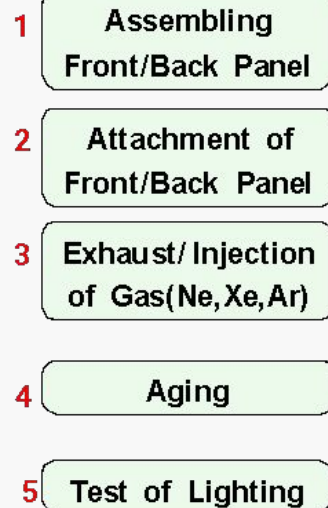


● Process of Panel Manufacturing

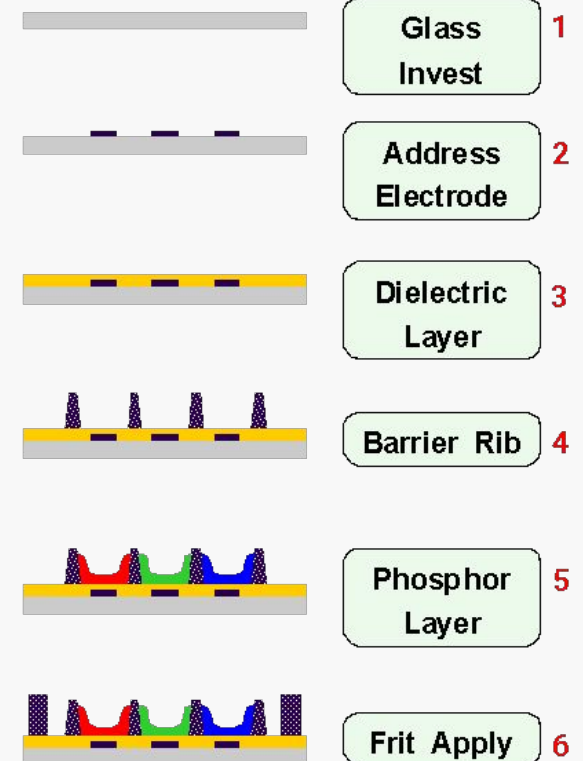
A Front Panel



C Assemble



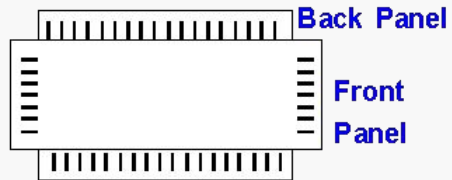
B Back Panel



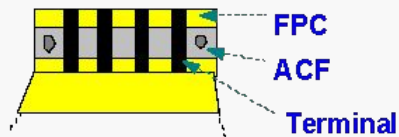
● Process of Panel Manufacturing

D Inter-connection

1 Cleaning Terminal of Panel



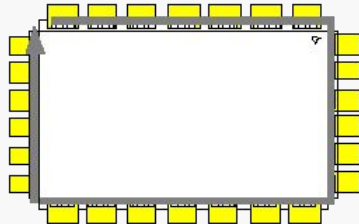
2 Attachment of ACF



3 Attachment of FPC

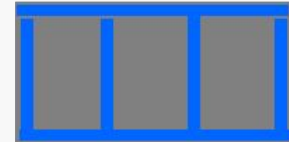


4 Silicon Apply

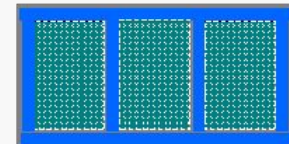


E Chassis Assemble

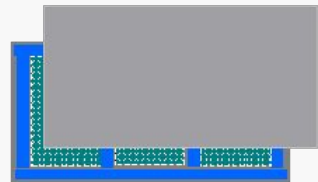
1 Attachment of Tape



2 Attachment of Heat-proof sheet



3 Attachment of Panel



4 Assembling of Circuits



PDP Driving Characteristics

3. General PDP Driving Characteristics

● Function Description by board - 1

■ SMPS(Switching Mode Power Supply)

: It is the supplier to provide voltage and current to work the drive voltage and panel in each board.

■ X-MAIN BOARD

: It makes the drive wave form by switching FETs to Timing Controlle coming from logic-board and supplies X electrode of panel with the drive wave form via connector.

■ Y-MAIN BOARD

: It makes the drive wave form by switching FETs to Timing Controller coming from the logic-board and provides Y electrode of panel with the drive wave form via Scan Driver IC on Y buffer board in order.

■ LOGIC MAIN BOARD

: It process image signal and performs buffering of the logic-main board (to create XY drive signal and output) and the address driver output signal.

Then it supplies the output signal to the address driver IC(COF Module).

● **Function Description by board - 2**

■ **LOGIC BUFFER(E,F)** : It delivers the data signal and control signal to the COF.

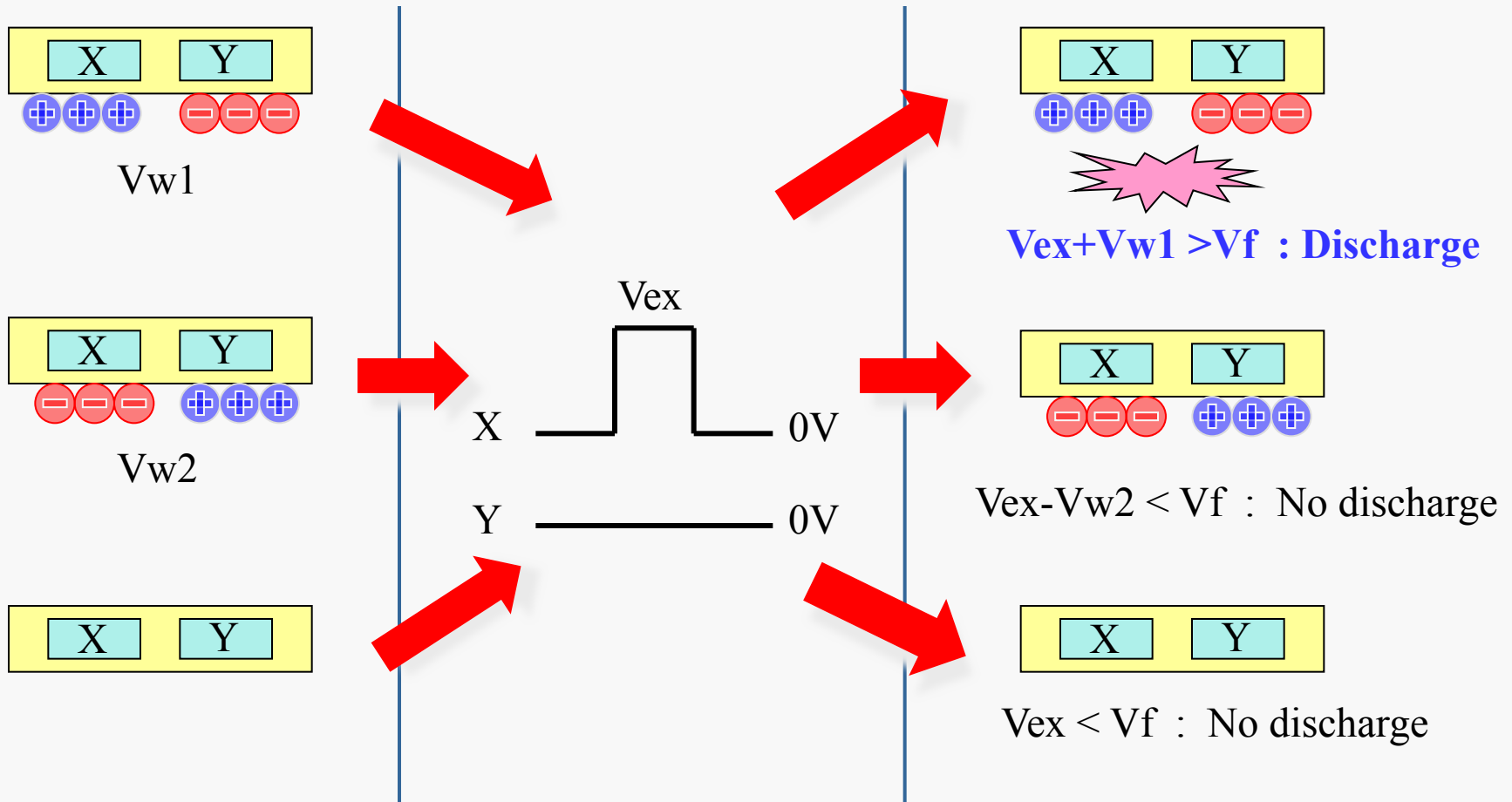
■ **AC Noise Filter**

: It has functions to remove noise(low frequency) coming from AC LINE and prevent surge.
It gives serious effects on the safety regulations (EMC, EMI) according to AC filter.

■ **COF (Chip on Flexible)**

: It impress the Va pulse to the address electrode in the address section and forms the address discharge by electric potential difference with scanning pulse to be dismissed by the Y electrode. It is made in the form of COF and one COF consists of 4 Data Drive IC (STV7610A :96 Output), otherwise single scan is made of 7 COF.

• Effect of Wall Charge



Different Result with same input pulse V_{ex} according to Wall Charge state

• 1 Sub-Field Image Process(ADS – Address Data Separate)

Reset

- Function*
- Sustain Erase
 - Wall Charge Set

- Issue*
- Operation margin
 - Contrast
 - Short Time

Address

- Function*
- Select On Cell

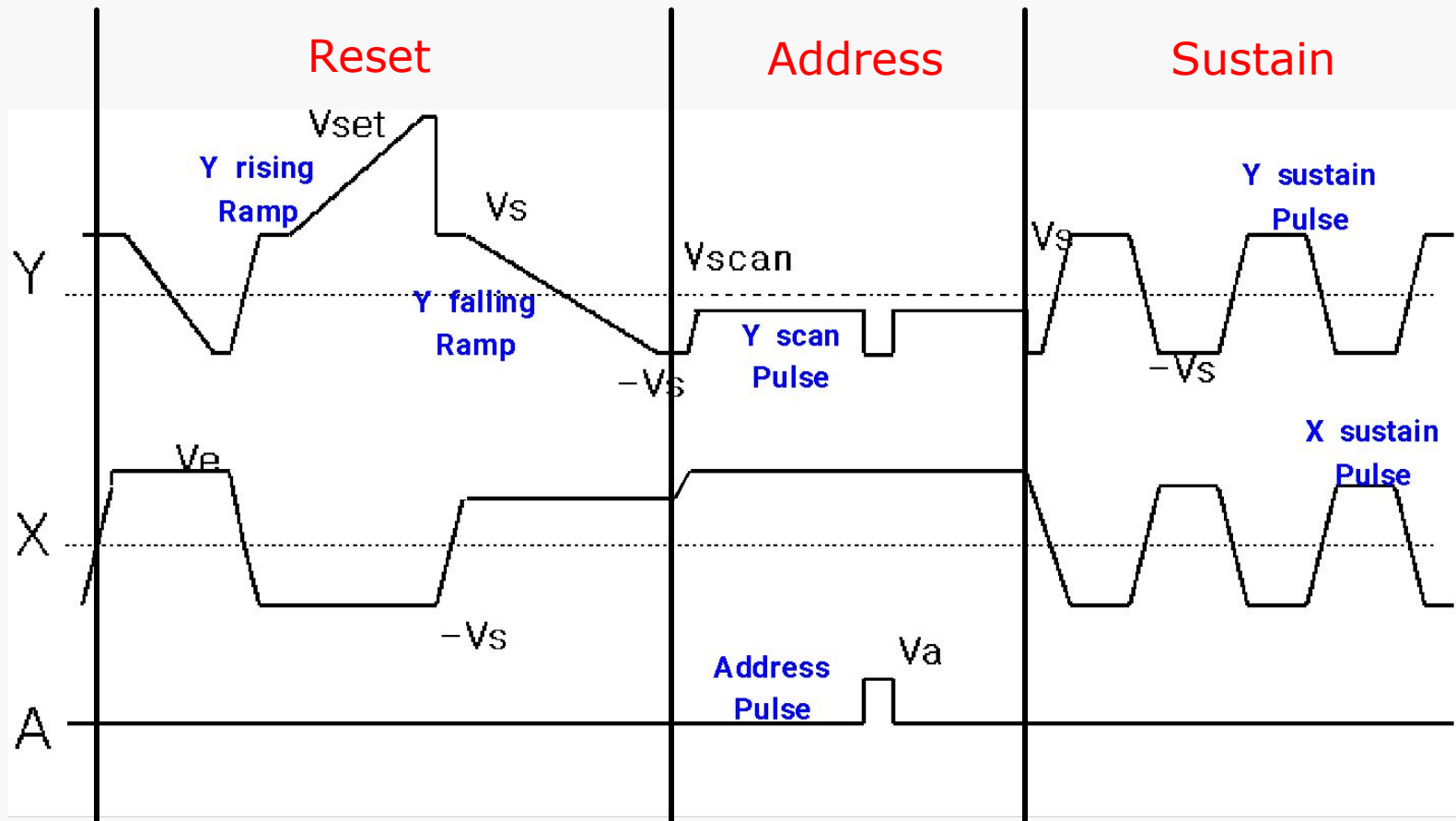
- Issue*
- High Speed
 - Low Voltage
 - Low Failure

Sustain

- Function*
- Discharge On Cell

- Issue*
- High Efficiency
 - Low Voltage
 - ERC Performance

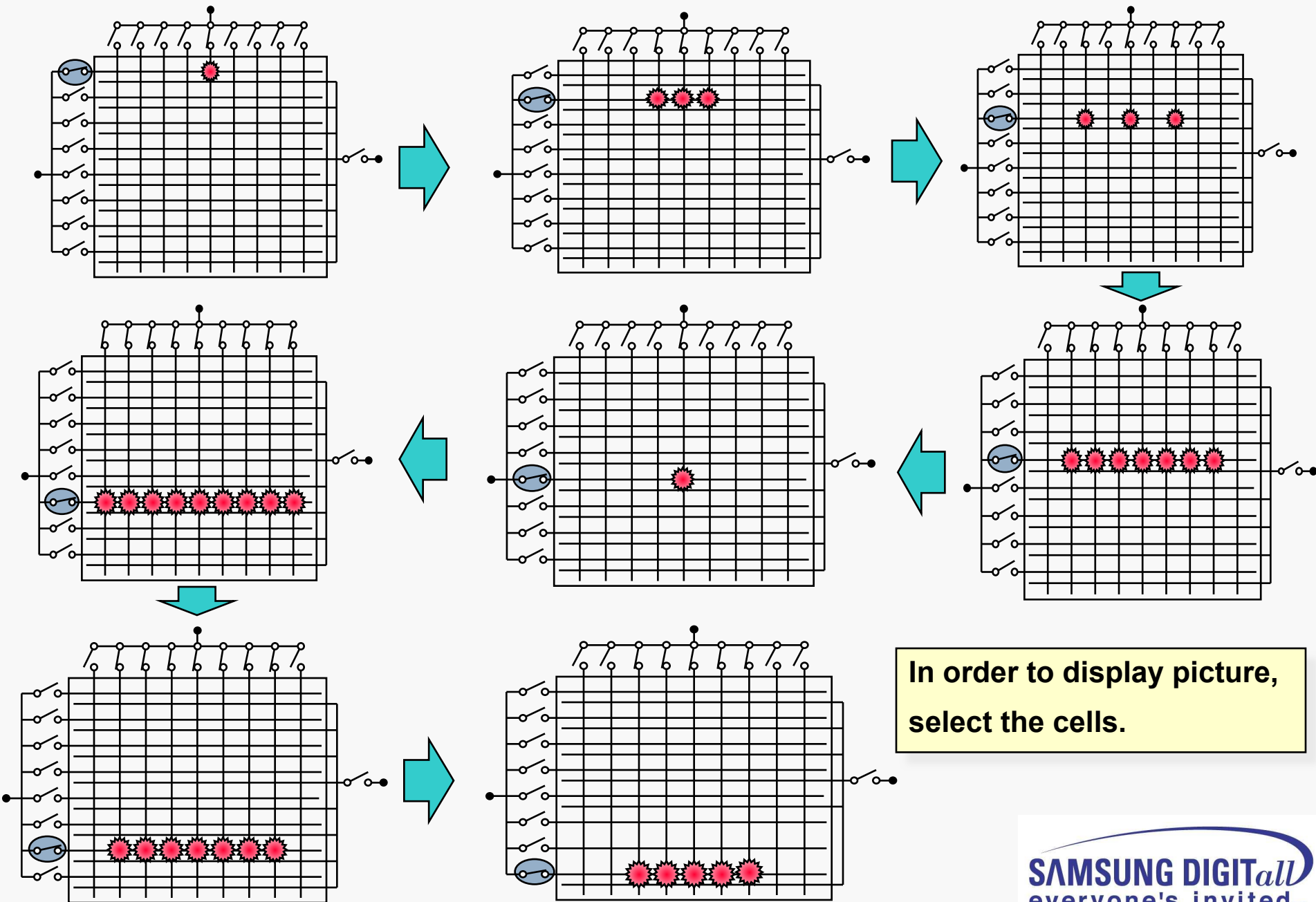
● Driving Waveform Specification (P3 Alexander)



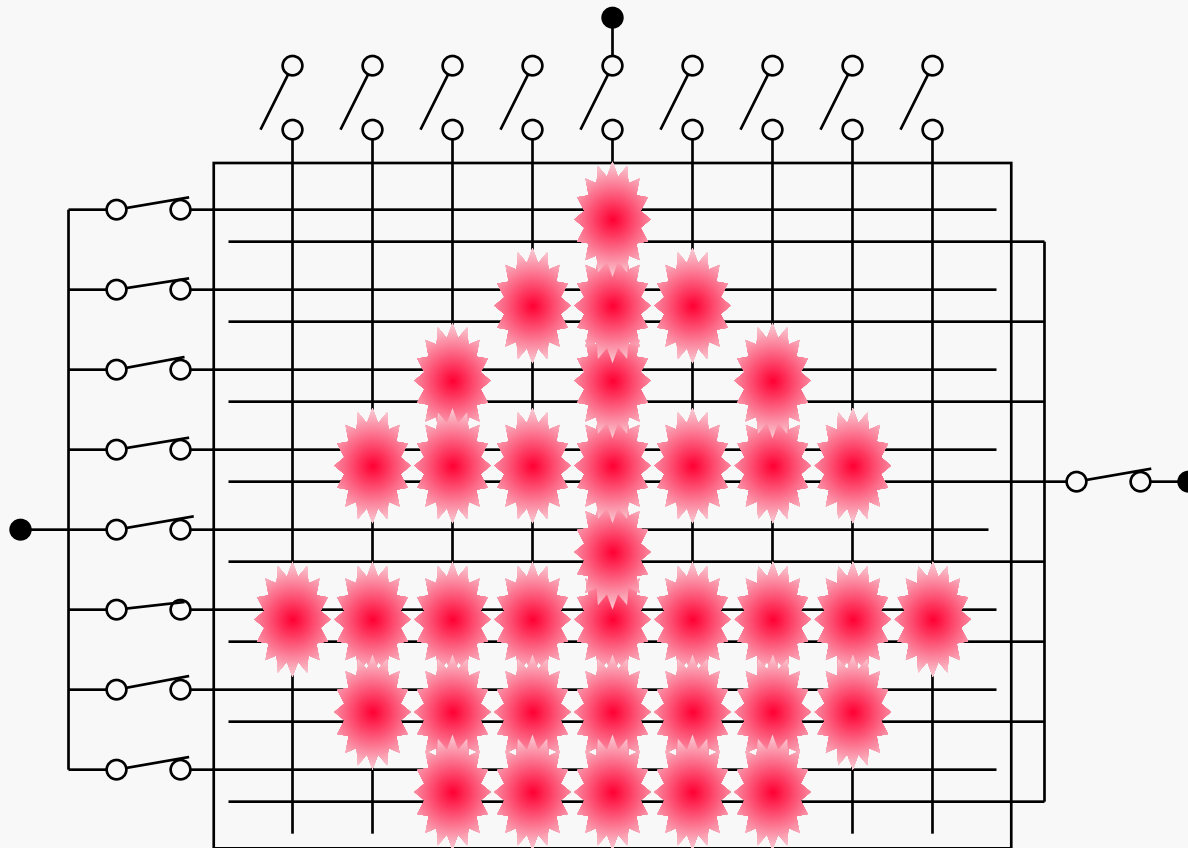
A1, 2,	Address(=Data) Electrode
X	Common & Sustain Electrode
Y1, 2, . . .	Scan & Sustain Electrode

V_s	85V	V_e	110V
V_{set}	95V	V_a	79V
V_{scan}	85V		

● Address Operation

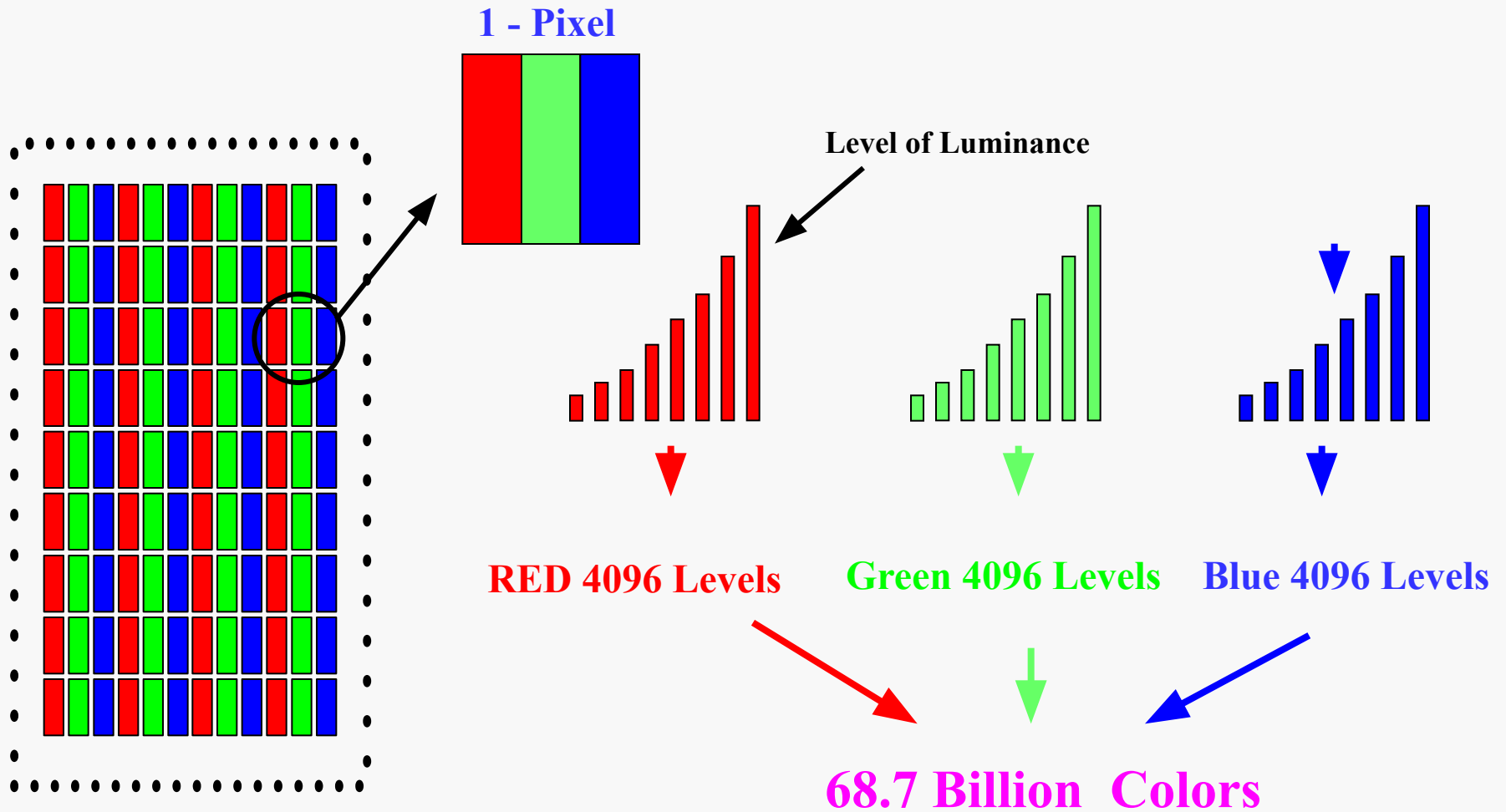


- **Sustain Operation**

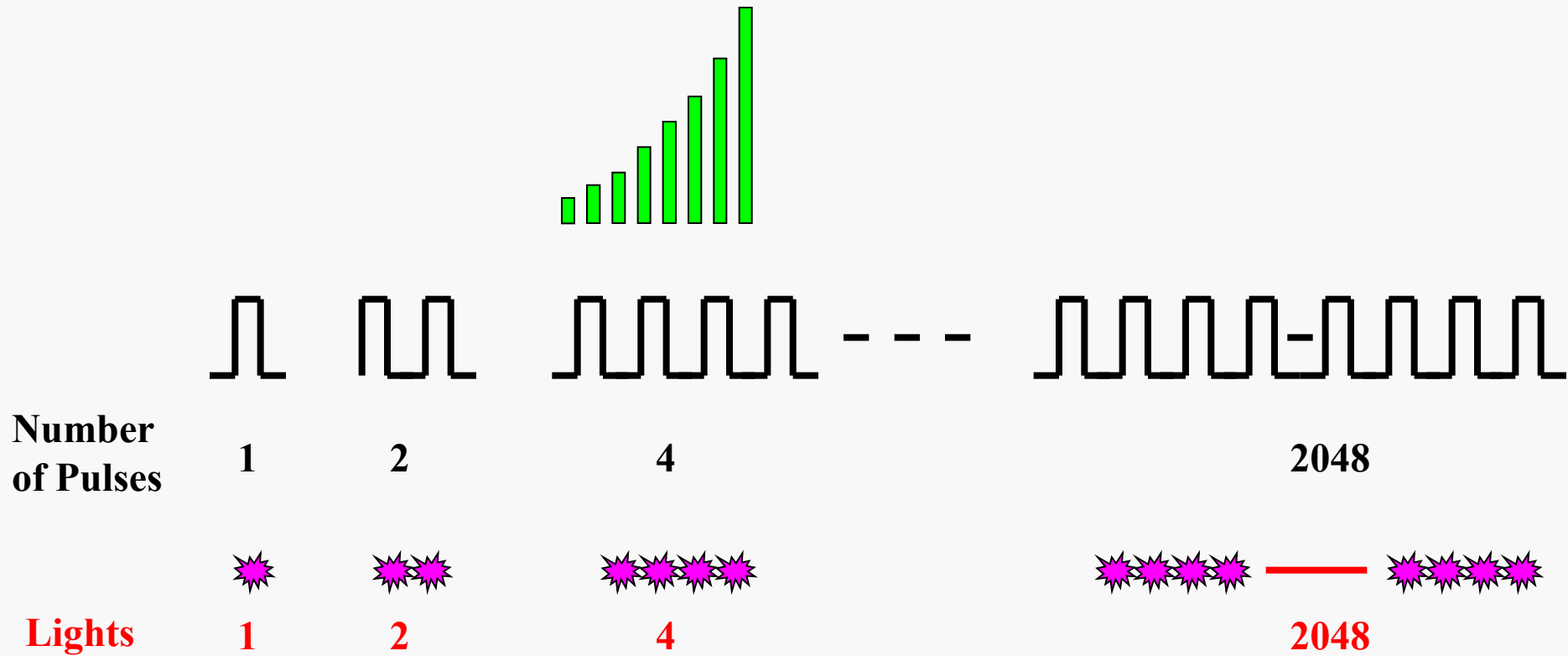


**Display cells through strong
Sustain discharge.**

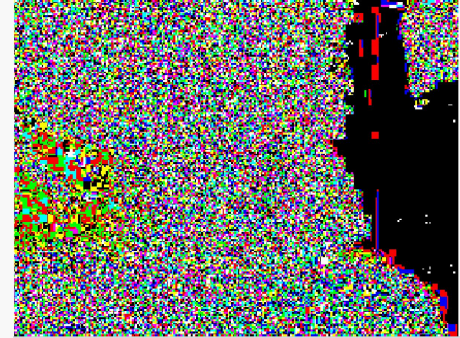
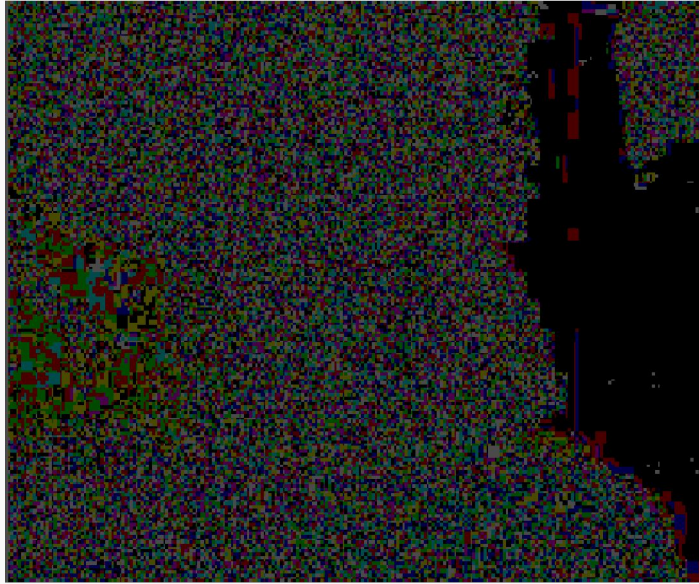
● Combination of R,G,B Light



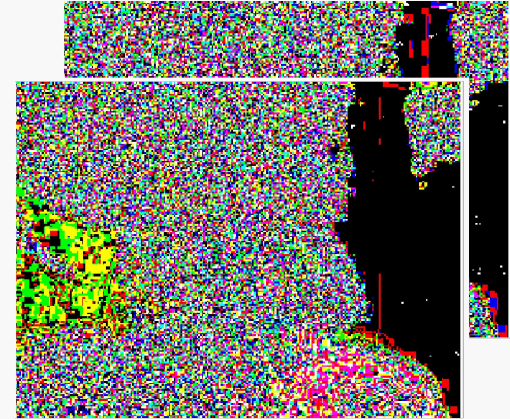
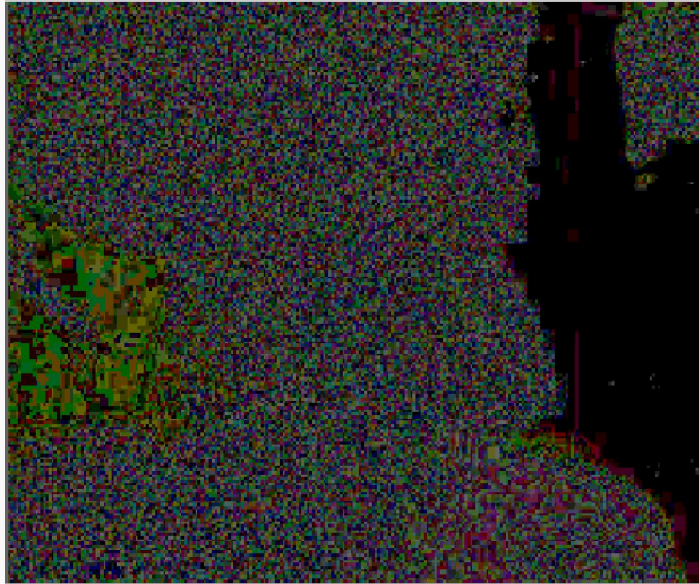
● Luminance Control



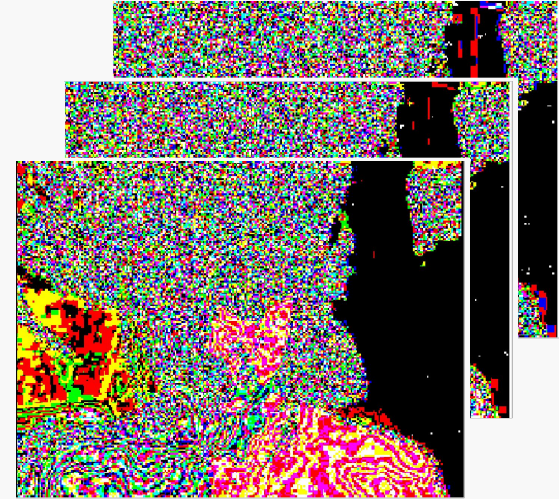
- 1 Picture Structure by 12 Sub-Field - 1



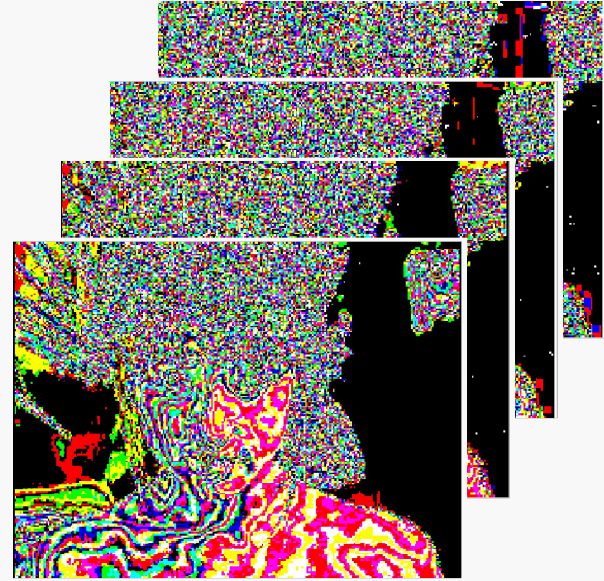
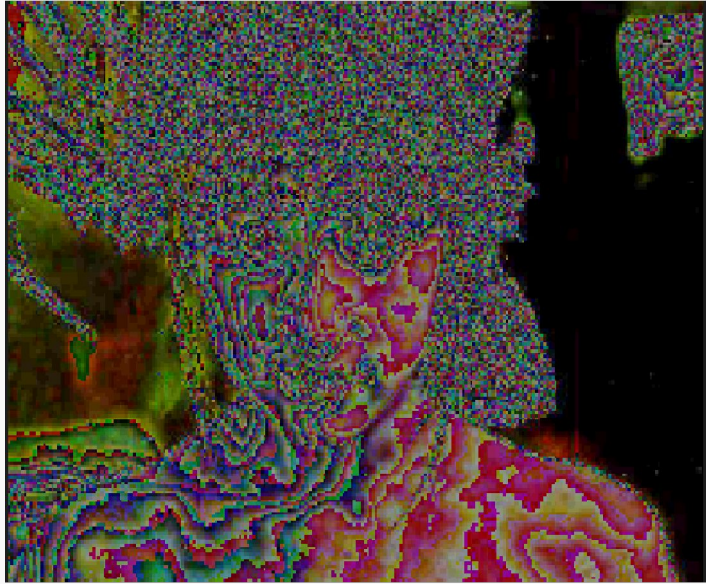
- 1 Picture Structure by 12 Sub-Field - 2



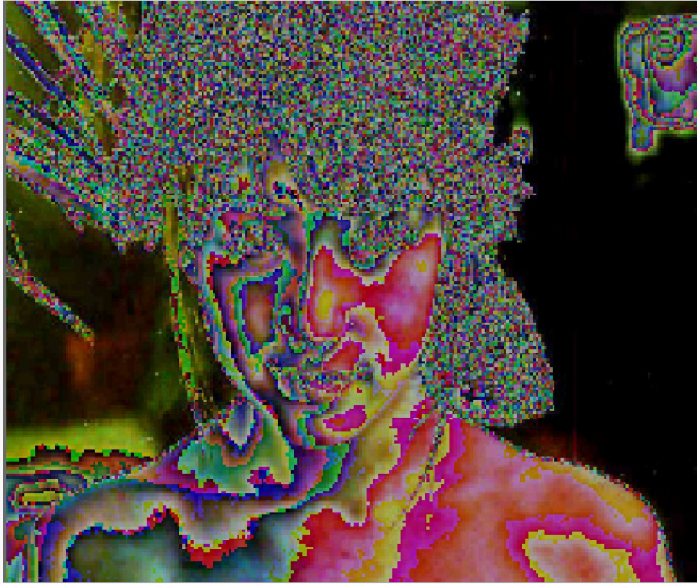
- 1 Picture Structure by 12 Sub-Field - 3



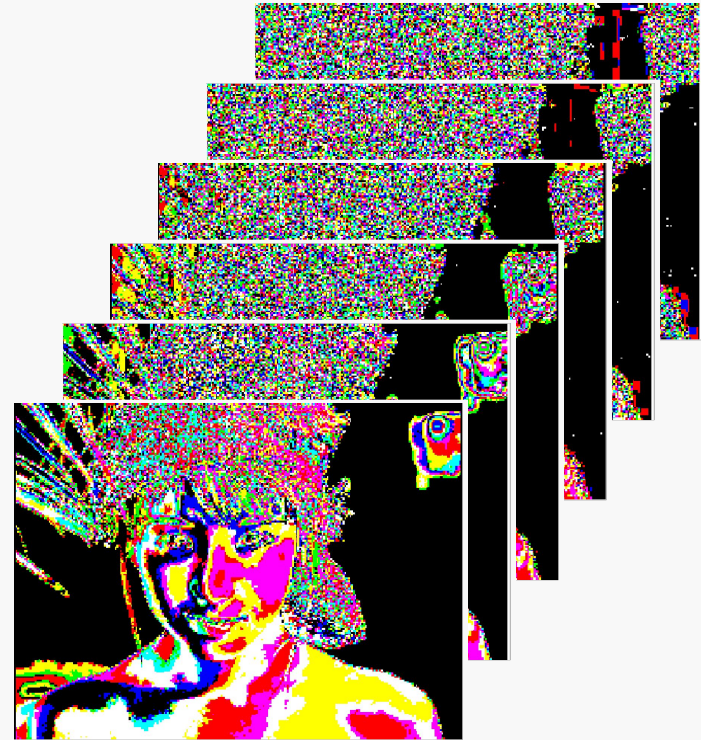
- 1 Picture Structure by 12 Sub-Field - 4



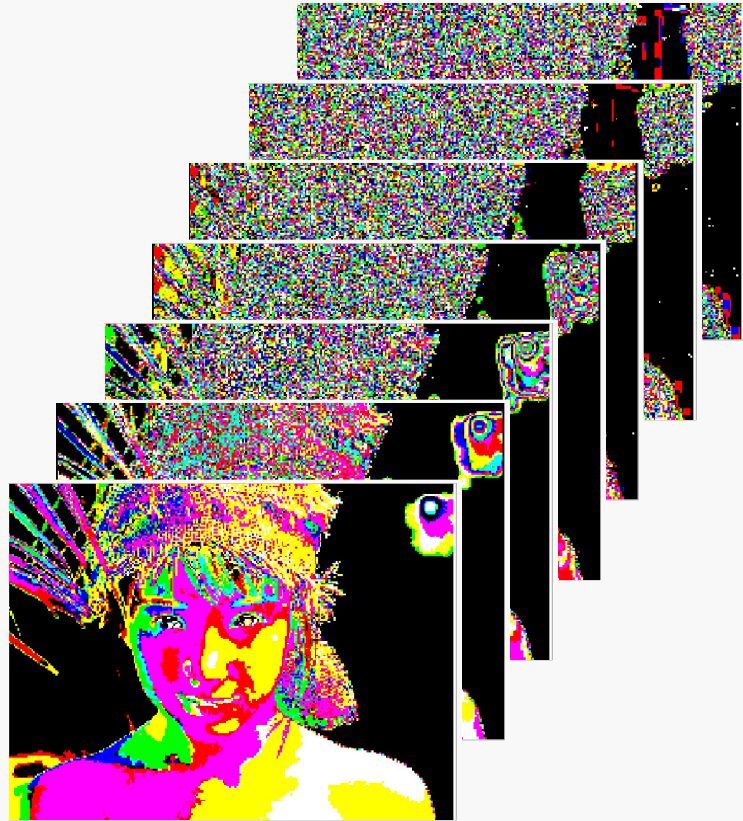
- 1 Picture Structure by 12 Sub-Field - 5



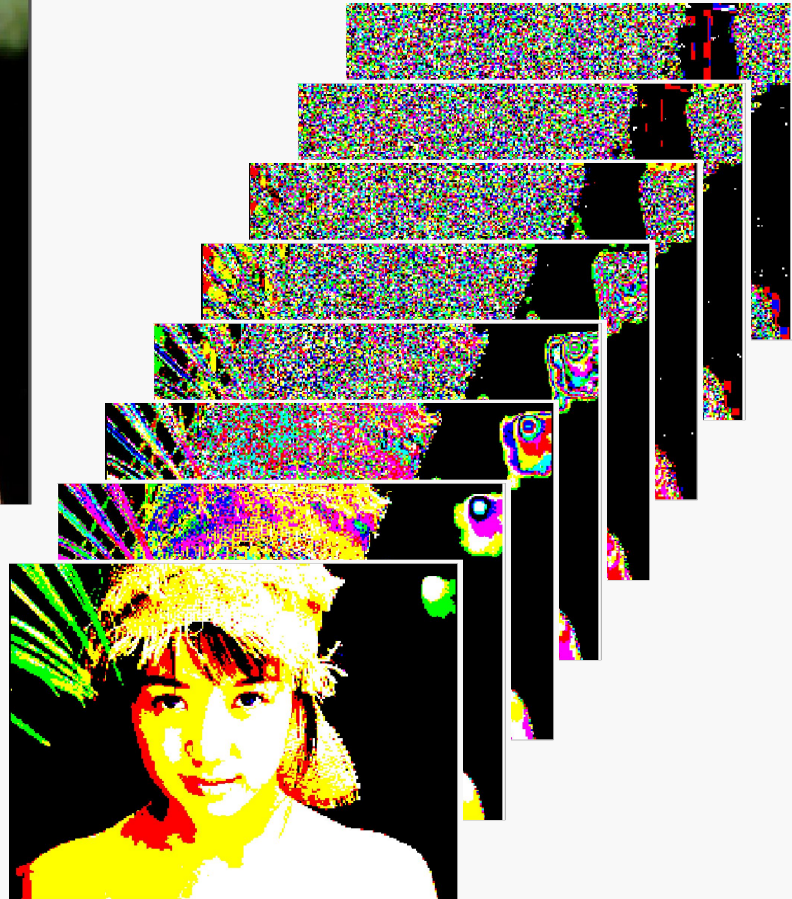
- 1 Picture Structure by 12 Sub-Field -



- 1 Picture Structure by 12 Sub-Field - 11





- 1 Picture Structure by 12 Sub-Field - 12













3. CARNELIAN Training

● Comparison with other Models

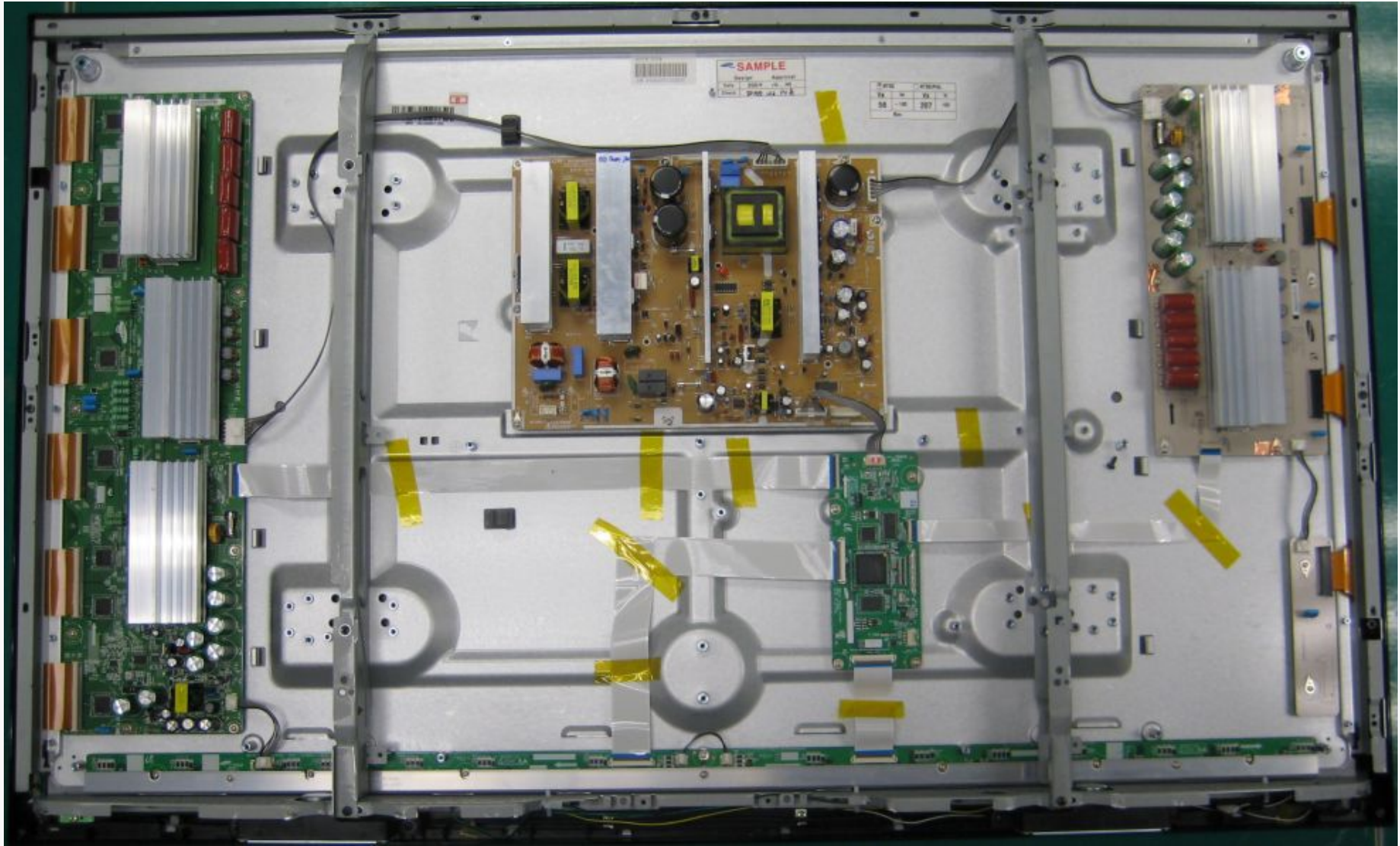
Project	LILY2 (W2A)	CARNELIAN (W3)
Design		
Brightness	1500cd/m ²	1500cd/m ²
Contrast ratio	10000:1	15000:1
Tuner	1 Nim Tuner	1 Nim Tuner (Slim)
Audio out	10W x 2	10W x 2
Sound	SRS Tru Surround XT	SRS Tru Surround XT
Speaker	Included	Included
Video input	-	1Side
S-Video input	-	1Side
Component Input	1Rear	1Rear
Side Input	-	CVBS,S-Video, Headphone
HDMI	1Rear	2Rear
Power Consumption	42" : 350W 50" : 450W	42" : 380W 50" : 480W
Etc.	-	-

- Picture of PS50A416P1DX Set [Back view]

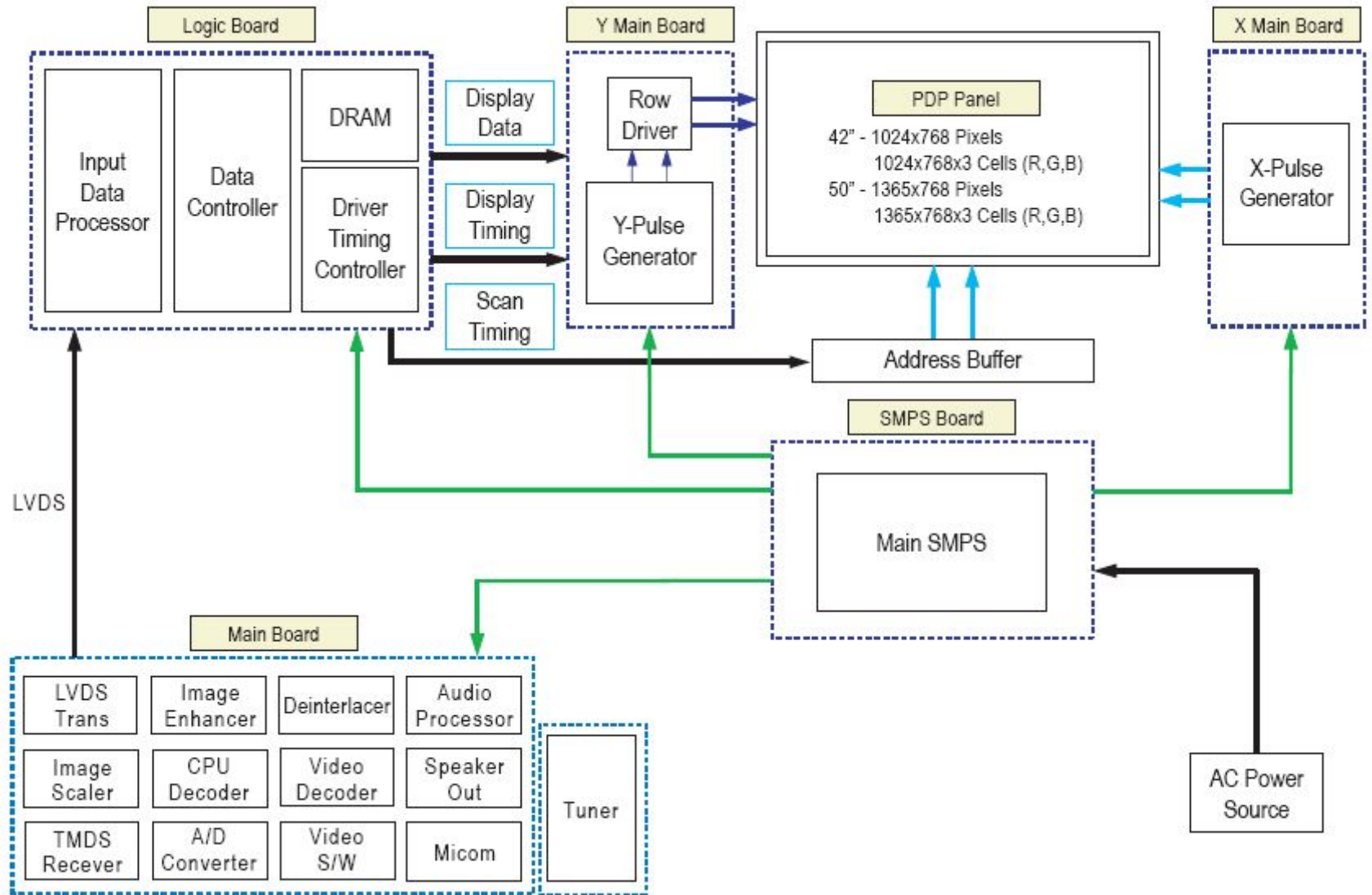


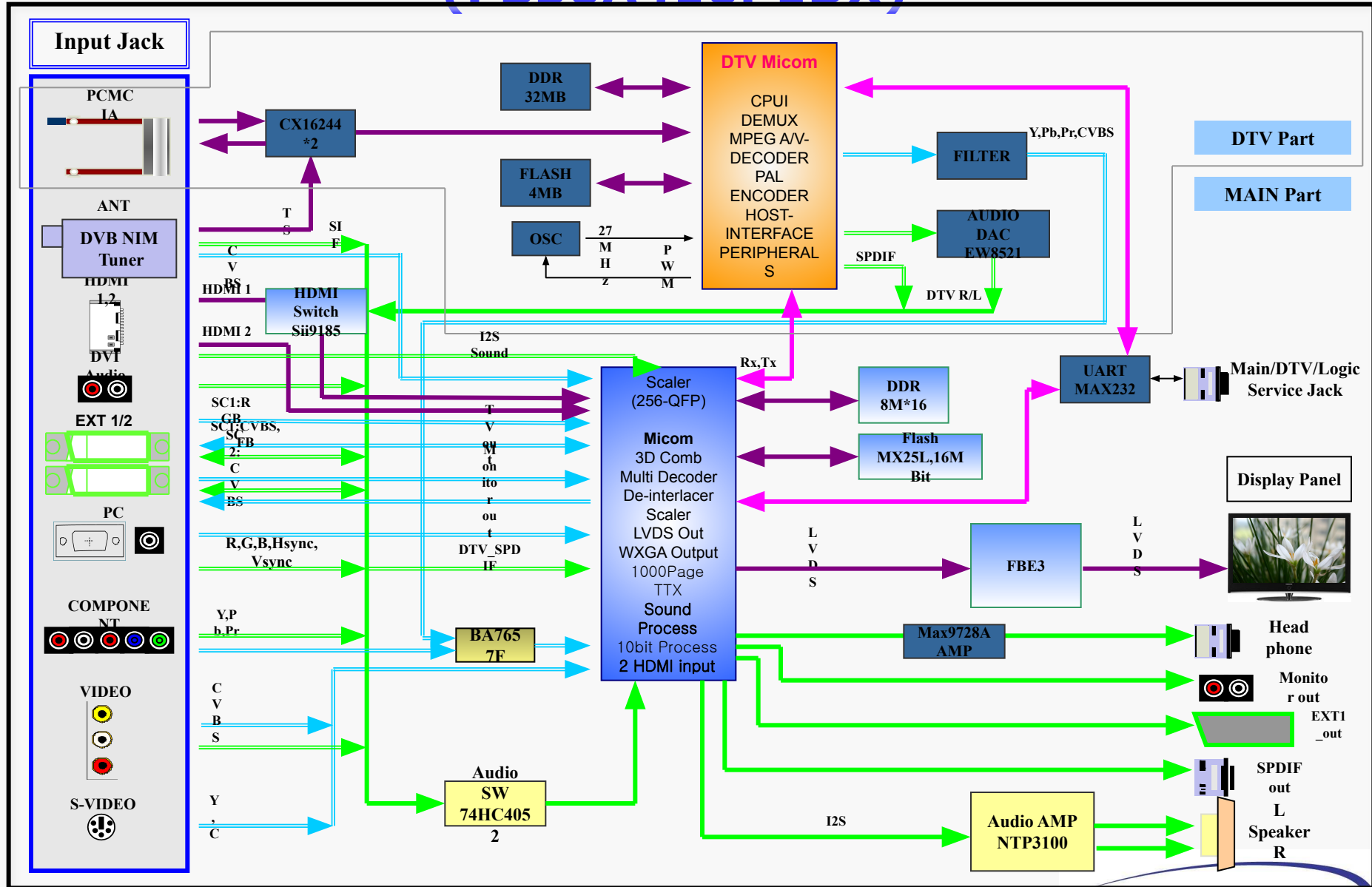
- Picture of CARNELIAN 50" W3 PDP Module [Back view]



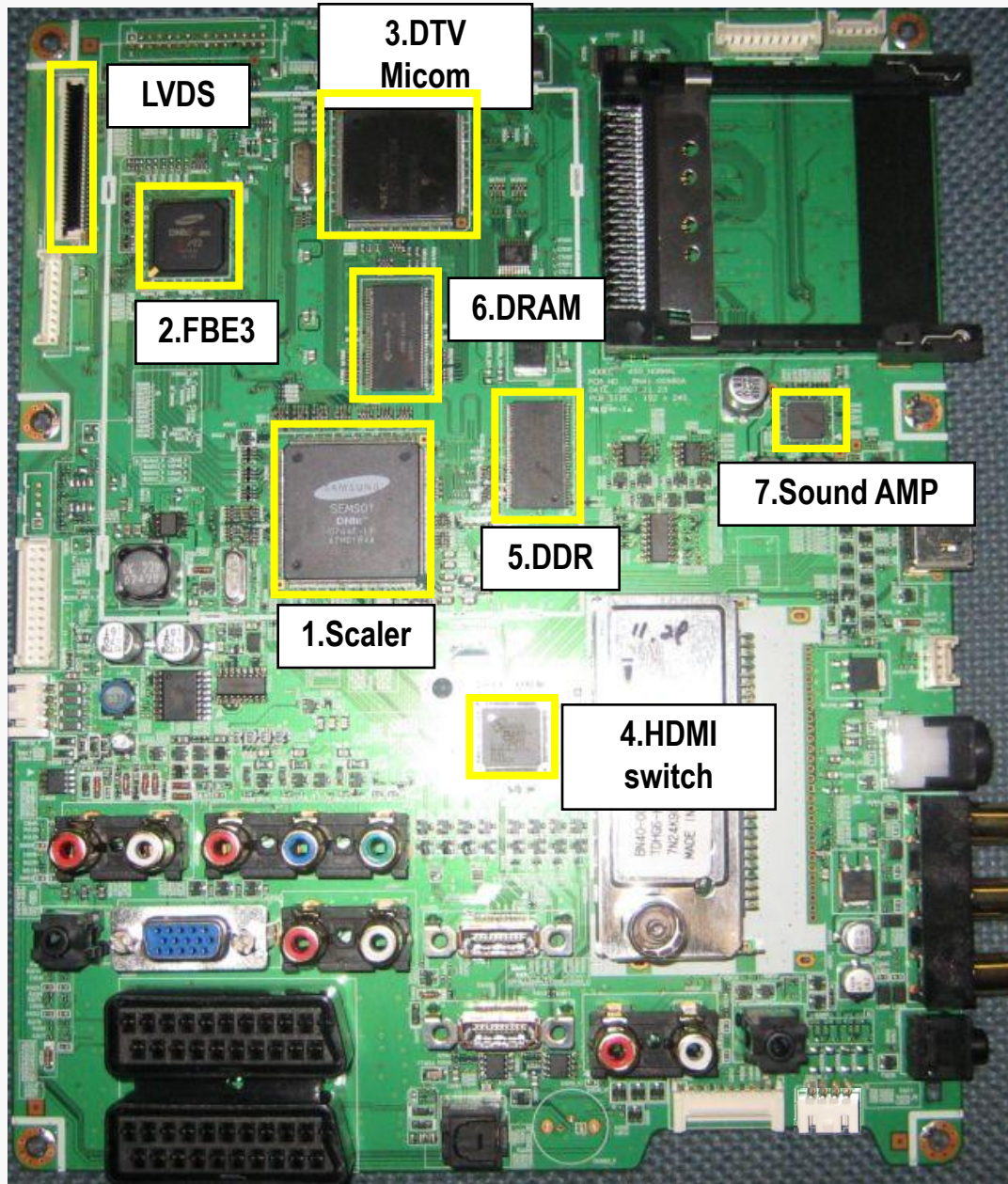
● General PDP SET Block Diagram



Carnelian Block Diagram (PS50A416P1DX)

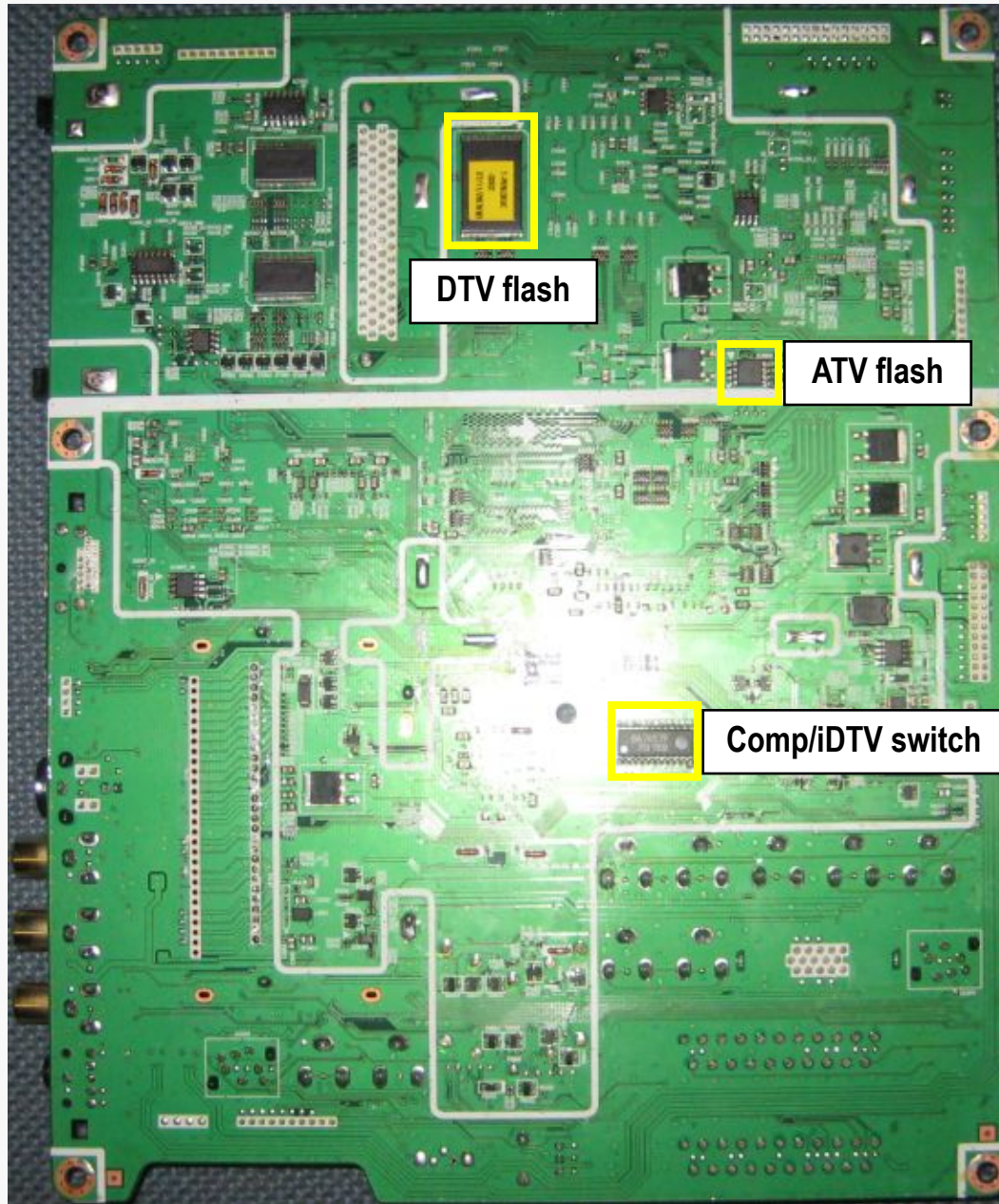


● Picture of PS50A416P1DX Chassis - Top



1	IC5001	IC-LCD CONTROLLER	SEMS01,LQFP,256P,30x30mm,PLASTIC,3.3V,2.2W,0to+70C,TR
2	IC6001	IC-VIDEO PROCESS	S4LF119X01,PBGA,208P,17x17mm,PLASTIC,3.6V,0to+70C,TR,FBEx
3	IC7001	IC-DECODER	UPD61211GM-104-GAA-A,QFP,216P,24x24mm,PLASTIC,3.3V,700mA,0to+70C,TR
4	IC3001	IC-VIDEO SWITCH	Sil9185CTU,QFP,80P,3.3V,0 to +70C,PLASTIC,TR
5	IC5201	IC-DDR SDRAM	EM6A9160TS0A-5G,DDR SDRAM,128Mbit,8Mx16,TSOP2,66P,22.22x10.16mm,5nS,2.375/2.625V,0to+70C,90m A TR
6	IC7002	IC-DRAM	HYB25D256163CE,DDR,256Mbit,16Mx16Bit,TSOP,66P,22.22x10.16mm,4ns,2.5/2.7V, -,0to+7
7	IC2001	IC-POWE AMP	NTP3100,QFN56,56P,8x8mm,DUAL,PLASTIC,24V,40W,-10to+85C

- Picture of PS50A416P1DX Chassis - Bottom



● PS50A416P1DX SW update method (ATV software)

1. Connect the PC and PDP using D-SUB Cable and D/L jig

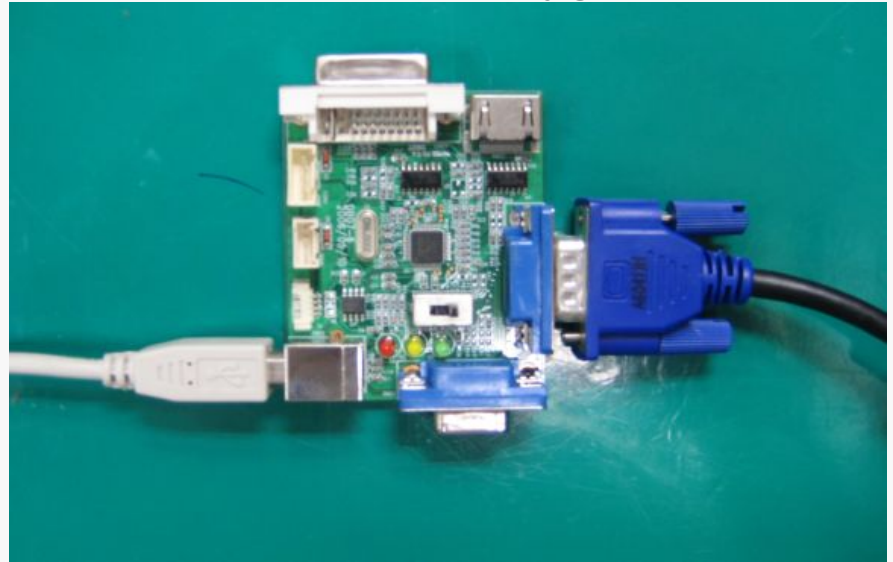
Step by Step



2. Run the Flash download program ISP_Tool v4.3.0



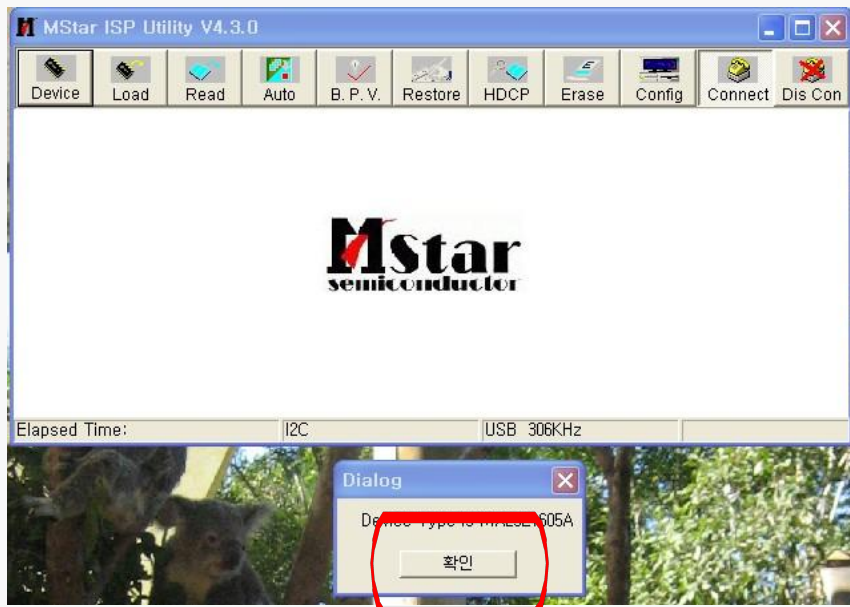
Picture of D/L jig



3. Click “Connect” button



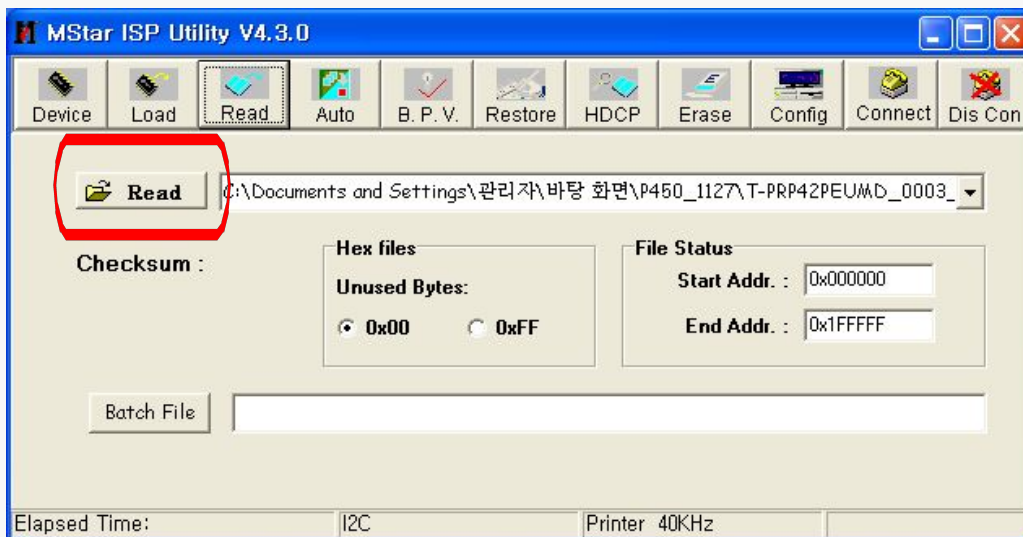
4. Now the connection with the SET is established. Click the “확인”



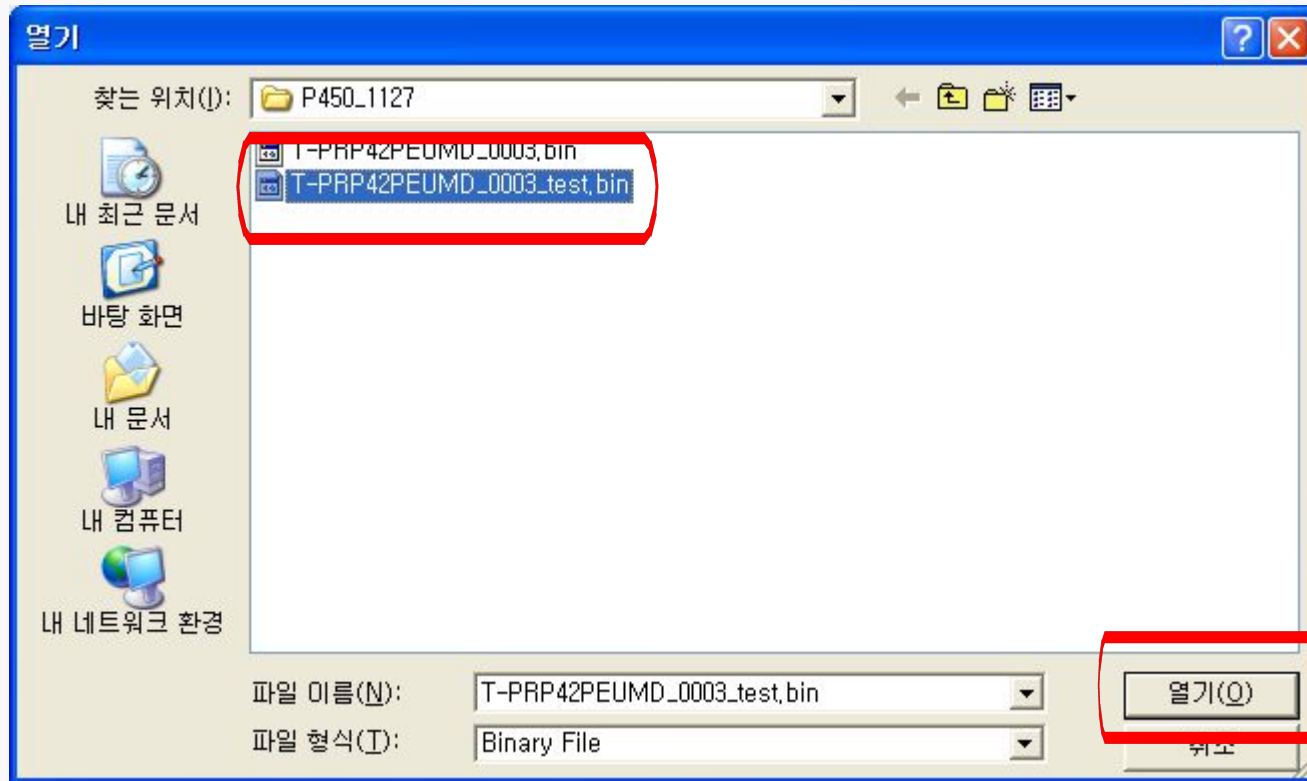
5. Connect the Power cord and click “Read”



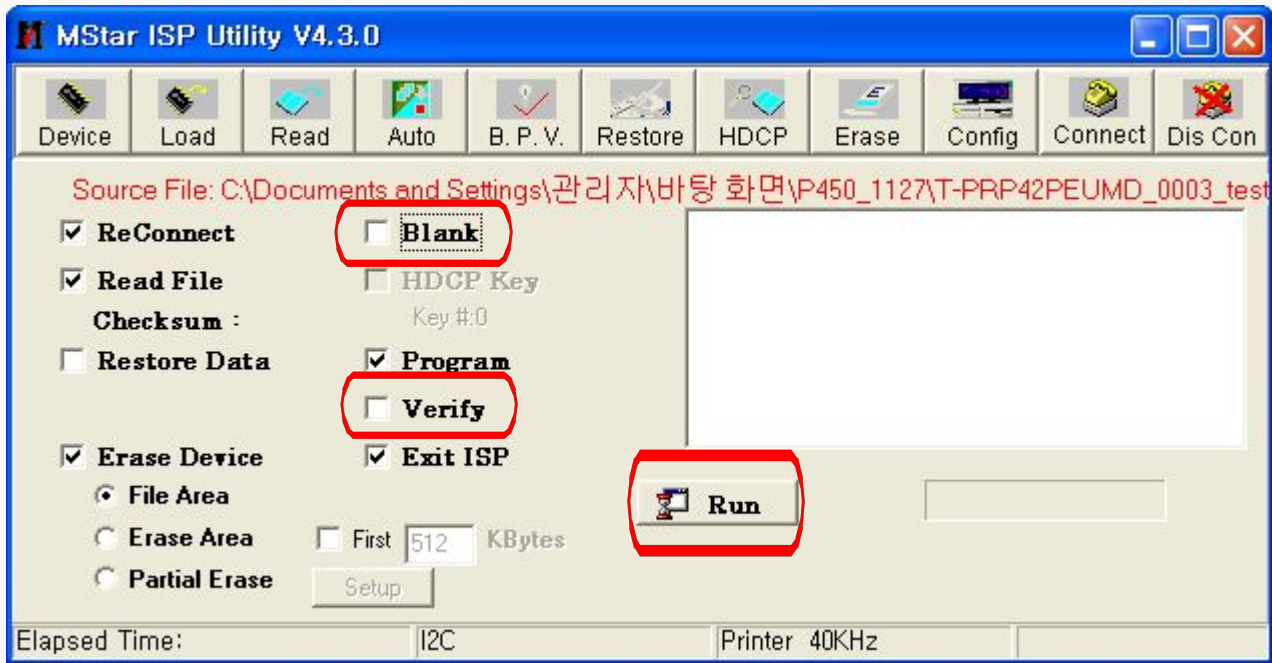
6. Click the new “Read” button



7. Select the upgrade file



8. Click “Auto” button, uncheck the Blank and Verify options and click “Run”



9. The download progress bar appears and D/L information is shown in the info window



PS50A416P1DX SW update method (DTV software)

Step by Step

1. Connect the serial D/L cable to the SET and execute the D/L program

2. Click the “Browse...” button to select the upgrade file and click “Next >”



3. Select the appropriate COM port and click “Next >”



4. After a short port scan the communication should be established

Click “Next >” to continue



5. Click “Next >” to continue



PS50A416P1DX SW update method (DTV software)

6. The upgrade file is transferring to the SET

You can check the transfer progress bar and the remaining time



7. After the file was transferred the upgrade process will start automatically



8. Wait the upgrade process to finish

You can check the upgrade progress bar



9. After a successful upgrade the following window appears

Click "OK" to close the program



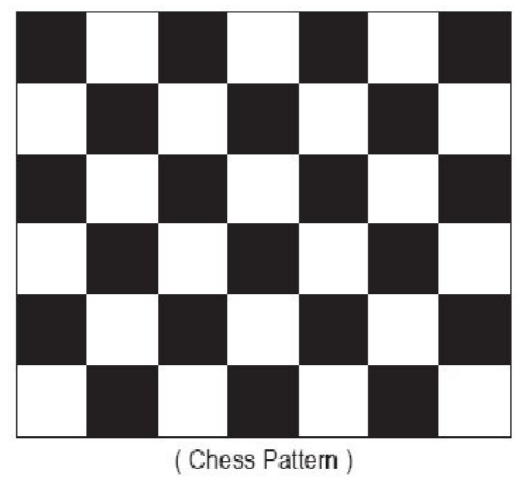
● Calibration (Component/HDMI/AV/PC)

■ White Balance – Calibration

If picture color is wrong, do calibration first.

Execute calibration in Factory Mode (AV mode example):

1. Source : VIDEO (AV mode)
2. Setting Video Mode (Timing) : PAL Video (MODE : #2)
3. Setting pattern : Pattern #24 (Chess Pattern)
4. Use Equipment : K-7256 or Equipment of equality level
5. Work order:
 - 1) Enter Factory Mode and select "2. WB Adjust" -> "Calibration"
 - 2) Select "AV CALIBRATION" and press the right button on the remote ()
 - 3) After completing calibration, the "Success..." message will be displayed next by "AV CALIBRATION"



For Component/HDMI mode use resolution of 1280x720/60Hz (MODE: #6)

For PC mode use resolution of 1024x768/60Hz (MODE: #21)

● White Balance Adjustment

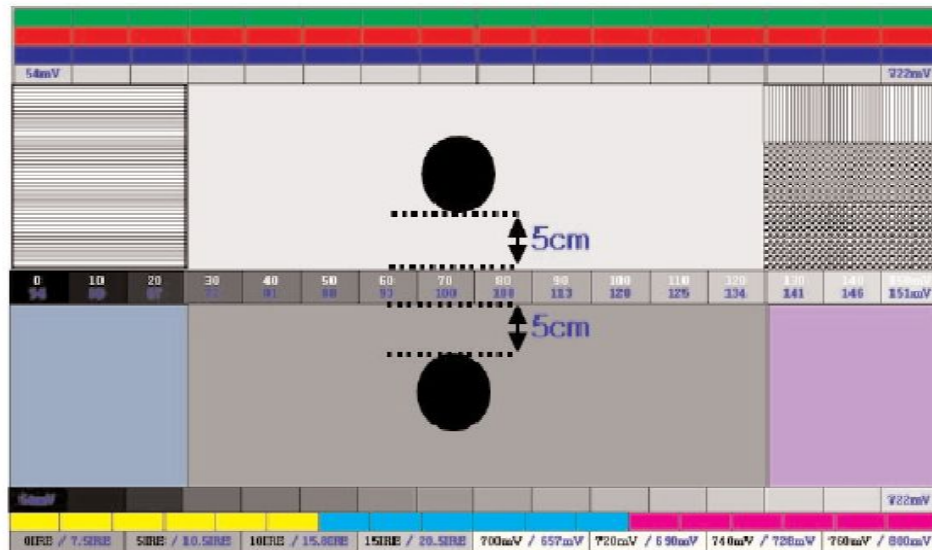
■ White Balance - Adjustment

If picture color is wrong, check White Balance condition.

Equipment : CA210, Patten : Toshiba
Adjust W/B in Factory Mode

Sub brightness and R/G/B Offset controls low light region
Sub contrast and R/G/B Gain controls high light region

Source AV : PAL composite, Component : 1280*720/60Hz,
HDMI[DVI] : 1280*720/60Hz



- **Picture condition in Factory mode / during WB adjust**

No	Item	Status	Remark
1	Mode	Dynamic	
2	Colour Tone	Cool1	
3	Size	Auto Wide	Comp/PC/HDMI : Wide
4	Digital NR	Off	
5	DNle	Off	
6	Energy Saving	Off	
7	PIP	Off	

- **Factory mode OSD**

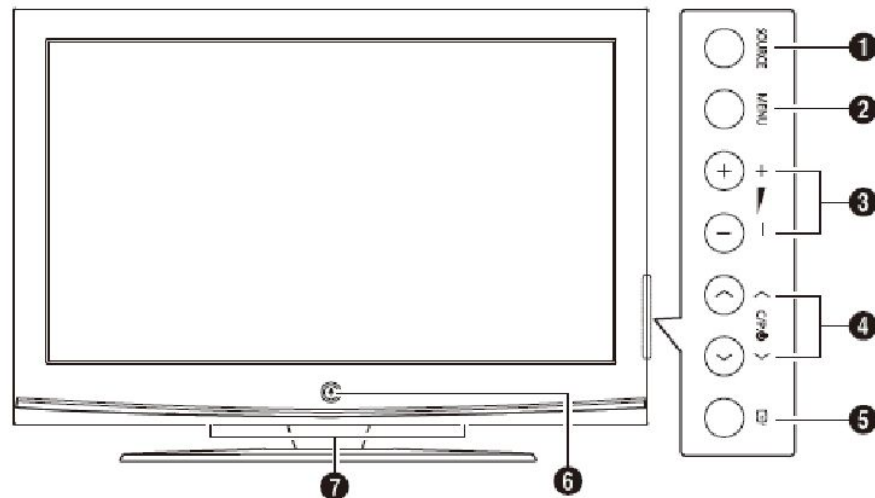
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Panel On Time(Hour) 00003      L24E_DS      TV  P 1

1. Option Table(Service) 023A 7805 0401 3309 0801 0401
2. WB Adjust
3. Information           4. Advanced Menu
  Checksum
  T-PRP42PEUMD-0000.0
  Nov 19 2007
  12:51:42
  
```

Control Panel

Front (or Side) Panel



➤ The product colour and shape may vary depending on the model.

1 SOURCE

Toggles between all the available input sources (TV, Ext.1, Ext.2, AV, S-Video, Component, PC, HDMI1, HDMI2 and DTV).

2 MENU

Press to see an on-screen menu of your TV's features.

3 - +

Press to increase or decrease the volume. In the on-screen menu, use the - + buttons as you would use the ◀ and ▶ buttons on the remote control.

4 ^ C/P v

Press to change channels. In the on-screen menu, use the ^ C/P v buttons as you would use the ▲ and ▼ buttons on the remote control.

5 ENTER

In the on-screen menu, use this button as you would use the ENTER button on the remote control.

6 POWER

Press to turn the TV on and off.

Power Indicator

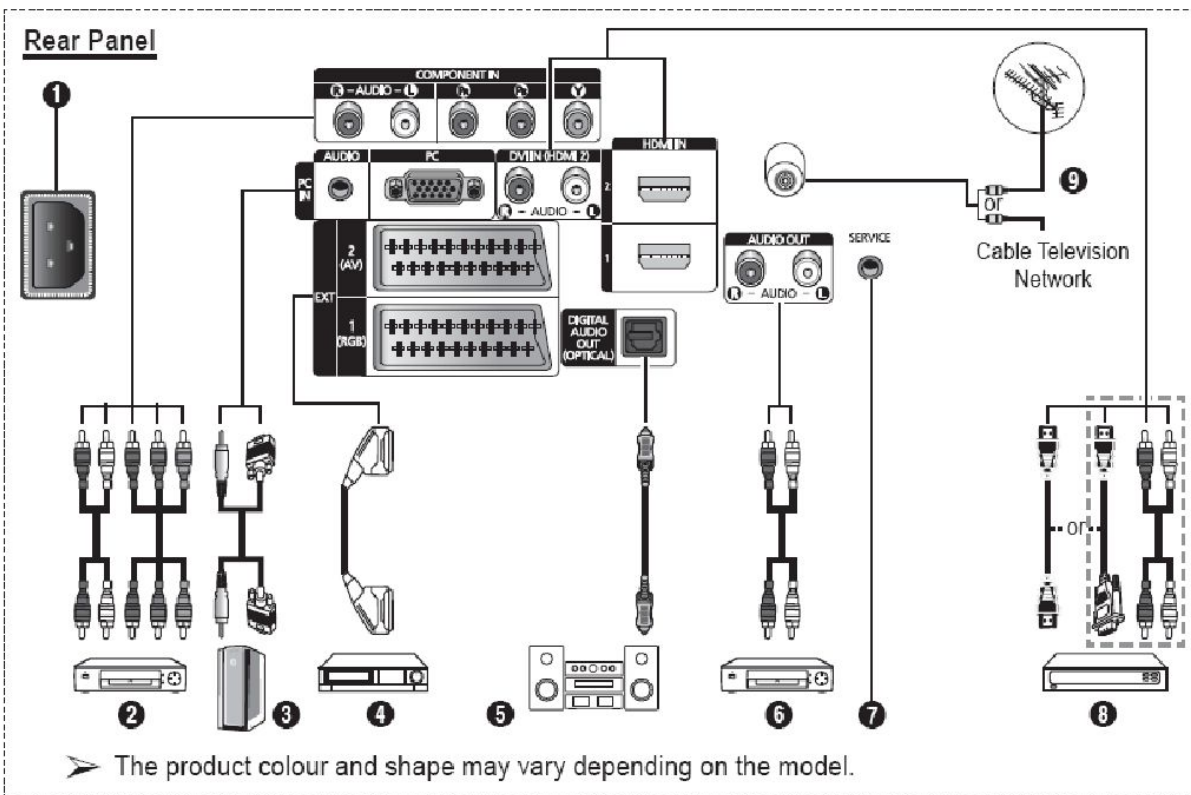
Blinks and turns off when the power is on and lights up in stand-by mode.

Remote Control Sensor

Aim the remote control towards this spot on the TV.

7 Speakers

Connection Panel



- ◆ Whenever you connect an audio or video system to your set, ensure that all elements are switched off.
- ◆ When connecting an external device, match the colour of the connection terminal to the cable.

- 1 POWER IN**
Connect the supplied power cord.
- 2 COMPONENT IN**
Audio (AUDIO L/R) and video (Y/PB/PR) inputs for Component.
- 3 PC IN / AUDIO**
Connect to the video and audio output jack on your PC.
- 4 EXT 1, EXT 2**
Inputs or outputs for external devices, such as VCR, DVD, video game device or video disc players.
- 5 DIGITAL AUDIO OUT (OPTICAL)**
Connect to a Digital Audio Component.
- 6 Connecting external Audio Devices**
Connect RCA audio signals from the TV to an external source, such as Audio equipment.
- 7 SERVICE**
 - Connector for service.
 - Connect the serial jack between the electro-motion wall mount bracket and your TV when you want to adjust the TV viewing angle using your remote control.

Input/Output Specification

Connector	Input			Output
	Video	Audio(L/R)	RGB	Video + Audio(L/R)
EXT 1	✓	✓	✓	Only TV or DTV output is available.
EXT 2	✓	✓		Output you can choose.

- 8 HDMI IN(DVI IN)**
 - Connect to the HDMI jack of a device with HDMI output. These inputs can also be used as a DVI connection with separate analog audio inputs. An optional HDMI/DVI cable will be necessary to make this connection. When using the optional HDMI/DVI adapter, the DVI analog audio inputs on your TV allow you to receive left and right audio from your DVI device. (Not compatible with PC)
 - When connecting this product via HDMI or DVI to a Set Top Box, DVD Player or Games Console etc, make sure that it has been set to a compatible video output mode as shown in the table below. Failure to observe this may result in picture distortion, image breakup or no picture.
- Do not attempt to connect the HDMI/DVI connector to a PC or Laptop Graphics Card. (This will result in a blank screen being displayed)

DVI IN AUDIO L/R

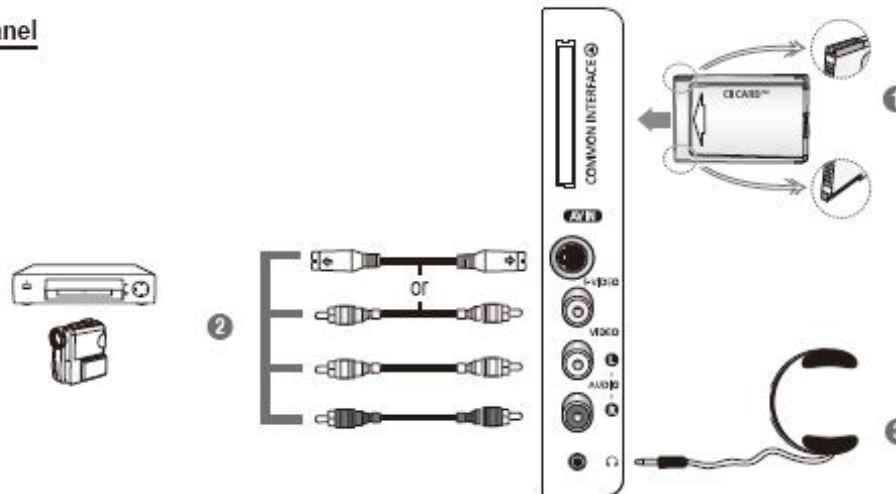
DVI audio outputs for external devices.

- 9 ANT IN**
75Ω Coaxial connector for Aerial/Cable Network.

Supported modes for HDMI and Component

	480i	480p	576i	576p	720p	1080i
HDMI/DVI 50Hz	X	X	X	O	O	O
HDMI/DVI 60Hz	X	O	X	X	O	O
Component	O	O	O	O	O	O

Side Panel



➤ The product colour and shape may vary depending on the model.

1 COMMON INTERFACE Slot

Insert CI (Common Interface) card into the slot. (refer to page 40)

- When not inserting "CI CARD" in some channels, "Scramble Signal" is displayed on the screen.

- The pairing information containing a telephone number, CI CARD ID, Host ID, and other information will be displayed in about 2~3 minutes. If an error message is displayed, please contact your service provider.

- When the channel information configuration has finished, the message "Updating Completed" is displayed, indicating that the channel list is now updated.

➤ Insert the CI-Card in the direction marked on it.

2 S-VIDEO or VIDEO / AUDIO L/R

Video (S-Video or Video) and audio inputs for external devices, such as a camcorder or VCR.







3 Headphones jack

You can connect a set of headphones if you wish to watch a television programme without disturbing the other people in the room.

➤ Prolonged use of headphones at a high volume may damage your hearing.

Accessories

2-3 Accessories

Accessories	Item	Item code	Remark
Supplied Accessories		Remote Control Batteries	BN59-00676A 4301-000103
		Power Cord	3903-000145
		Owner's Instructions	BN68-01416A
		Warranty Card Registration Card Safety Guide Manual	BN68-00514E AA68-03575D AA68-03242K
		Ferrite Core for Earphone/Power Cord	3301-001110
		Ferrite Core for S-VIDEO/Power Cord	3301-001305
Samsung Service center			

5. Trouble shooting

● Check List in advance

■. Each cable connection condition check

- Cable is connected correctly ?

■. Check Voltage

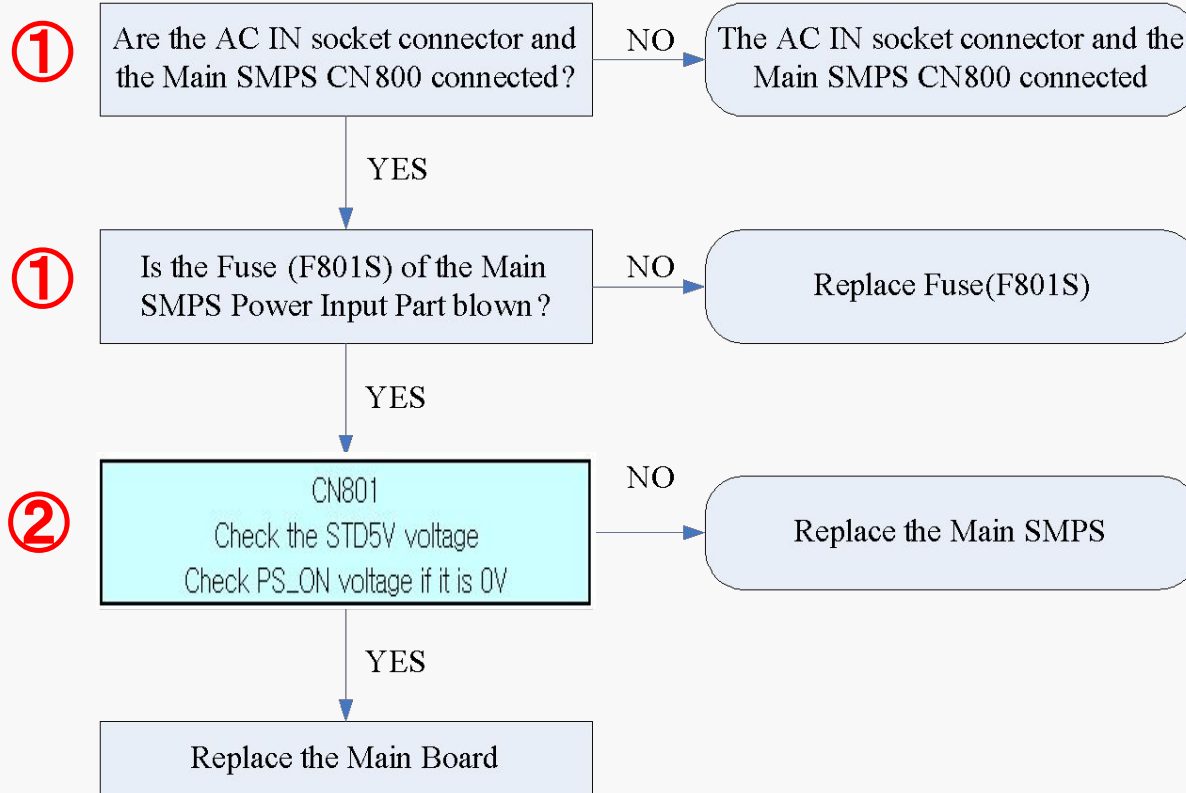
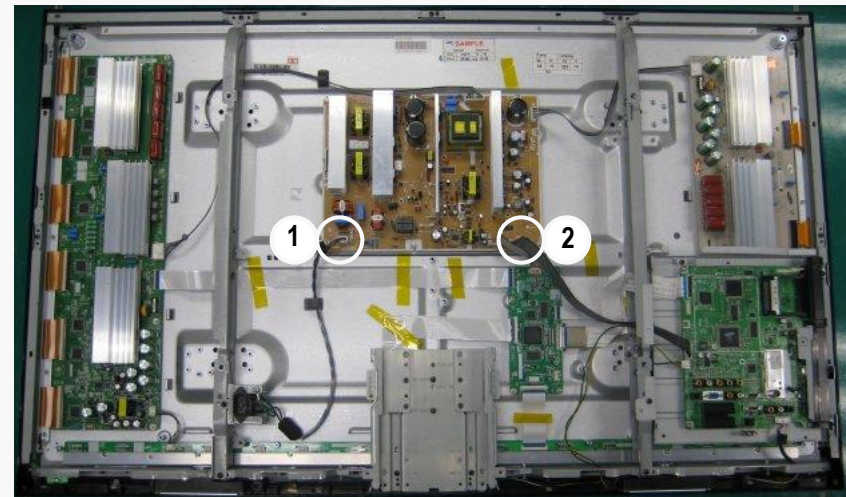
- SMPS □ □ Video main Board, SMPS □ □ X,Y Drive board, SMPS □ □ Logic board

■. The chart below shows abnormal condition

Condition Name	Description	Related Board
No Voltage Output	Operating Voltages don't exist.	SMPS
No Display	Operating Voltages exist, but an Image doesn't exist on screen	Y-MAIN, X-MAIN, Logic Main, Cables, Main
Abnormal Display	Abnormal Image(not open or short) is on screen.	Y-MAIN, X-MAIN, Logic Main
Sustain Open	some horizontal lines don't exist on screen	Scan Buffer, FPC of X / Y
Sustain Short	some horizontal lines appear to be linked on screen	Scan Buffer, FPC of X / Y
Address Open	some vertical lines don't exist on screen	Logic Main, Logic Buffer, FFC, TCP
Address Short	some vertical lines appear to be linked on screen	Logic Main, Logic Buffer, FFC, TCP

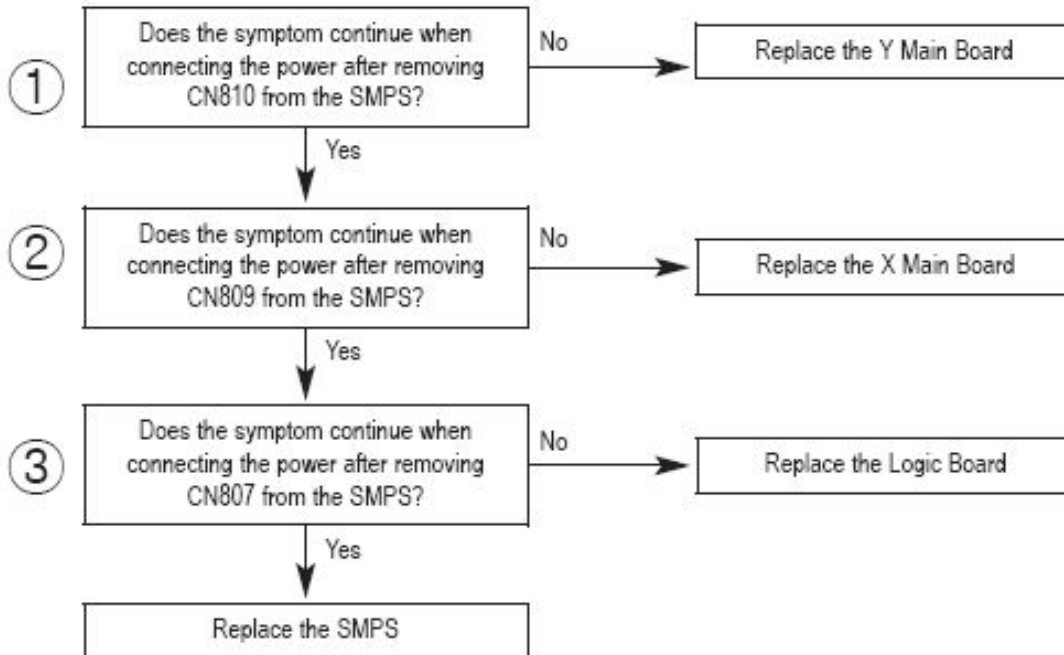
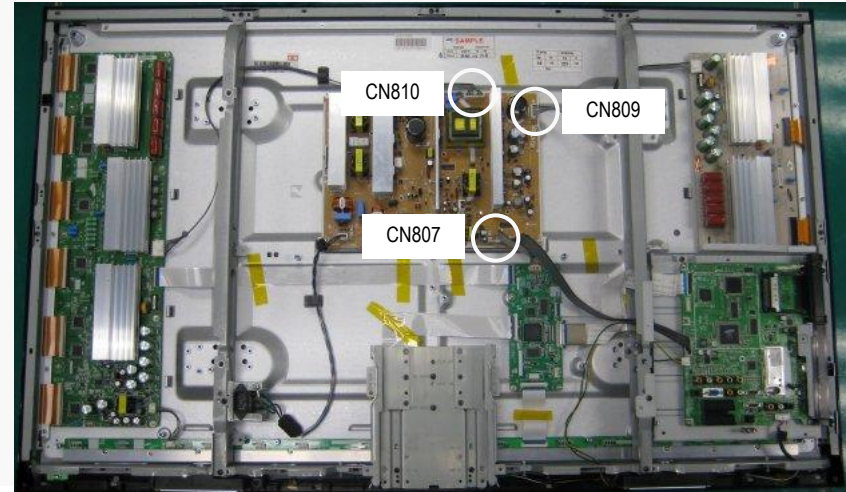
● No Power

- Not operate front LED
- Not operate SMPS relay



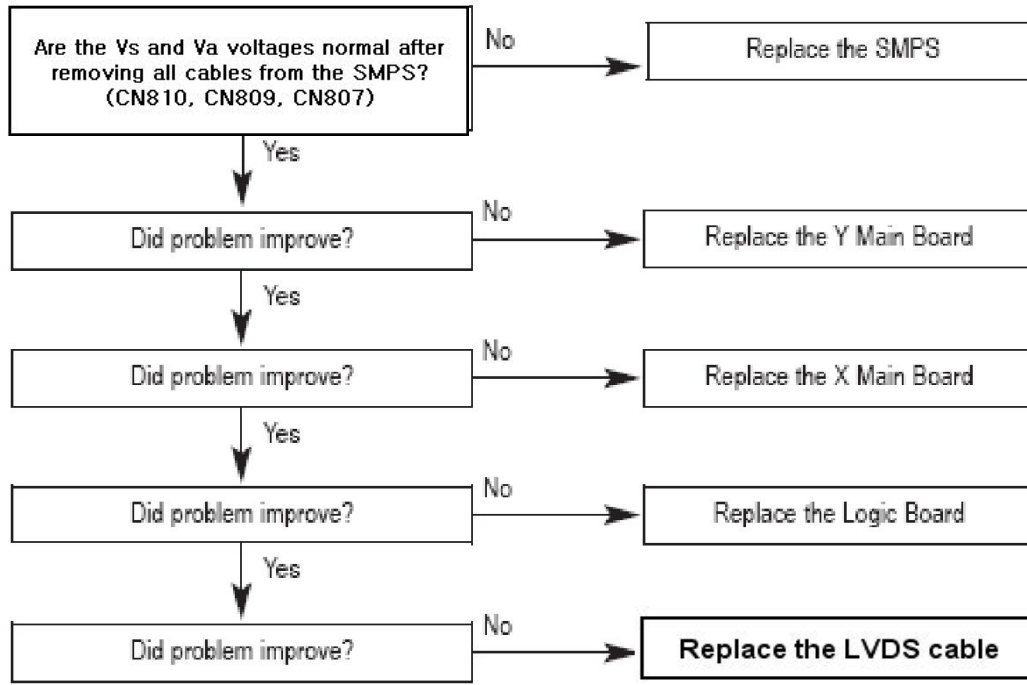
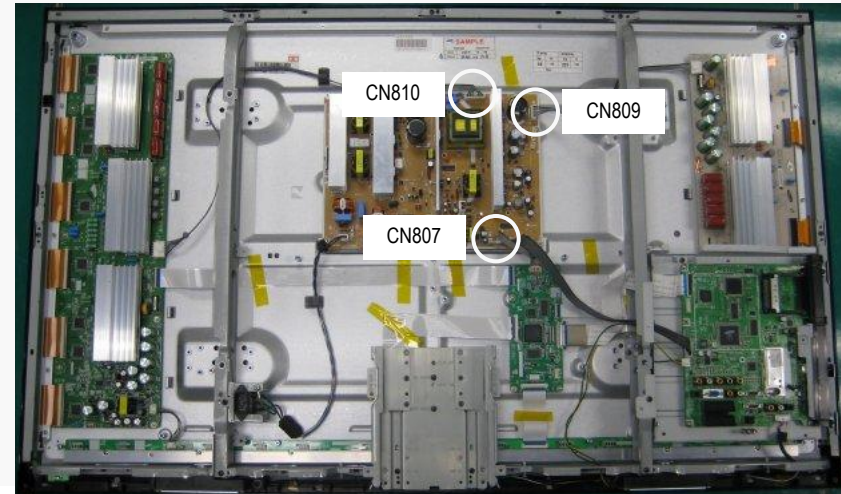
● SMPS relay on <-> off continually

- Operate Protection circuit because of some Ass'y problem



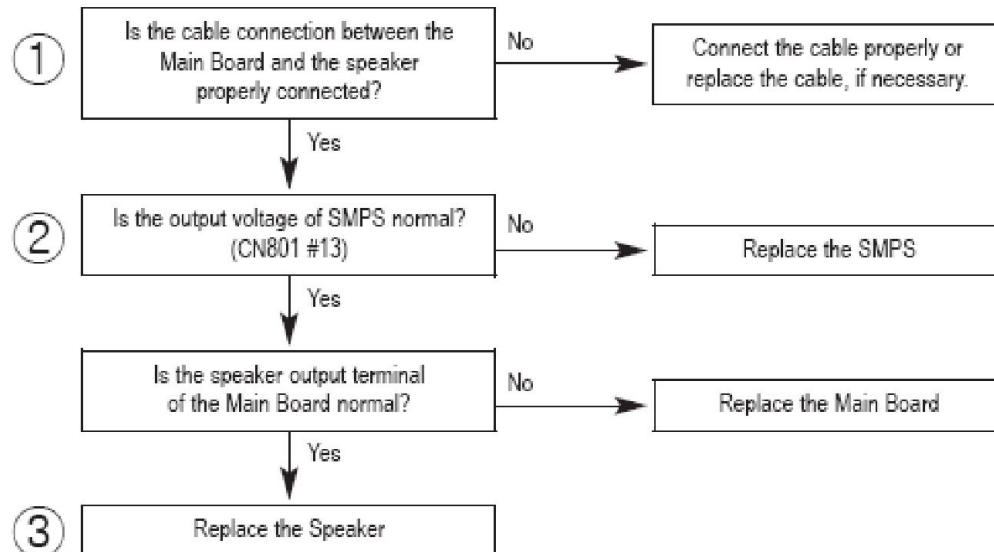
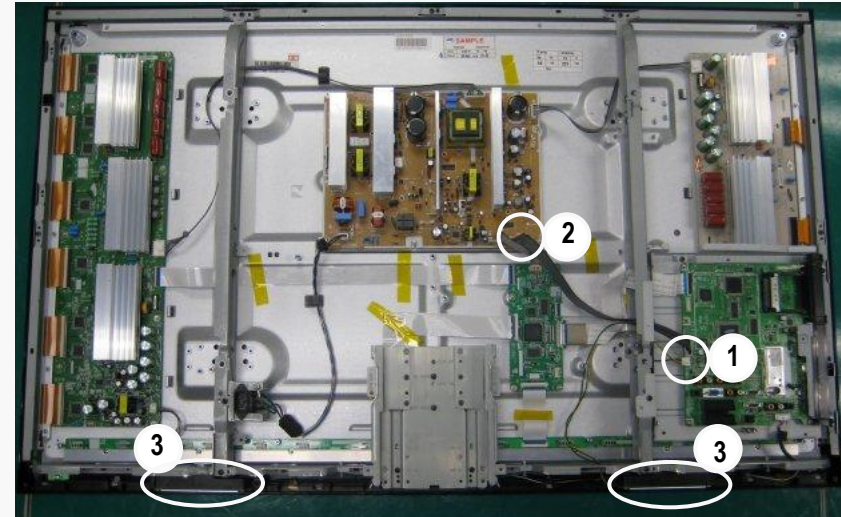
● No display but sound is normal

- X or Y or Logic or Y Buffer board is abnormal
- SMPS output Voltage is abnormal



● No sound but display is normal

- Speaker wire is not connect
- Video main board sound part defect
- Speaker part defect
- Volume level is "0"(Non-sense)



● PDP Dot Module SPEC – SDI module

Item		A Zone	B Zone	Remark
Product	Type			
42" (SD)	Dar k	1	6	
	Br i ght	0	1	
	Fl i cker i ng	0	1	
	TOTAL	7		
42" (HD)	Dar k	3	8	
	Br i ght	0	1	
	Fl i cker i ng	1	2	
	TOTAL	10		
50"	Dar k	3	8	
	Br i ght	0	1	
	Fl i cker i ng	1	2	
	TOTAL	10		
63"	Dar k	3	8	
	Br i ght	0	1	
	Fl i cker i ng	1	2	
	TOTAL	10		

※ Special Management Items

1) It is Cell-Defect if there are dark, bright, flickering cells over **2 points** within **1.5cm** in the boundary section.

2) Before vibration/dropping test, it should be decided whether the module is good / badness first.

And after vibration/dropping test, if Cell-Defect happens more than preceding descriptions on Specification, it is Cell-Defect module.

- A-Zone / B-Zone Size

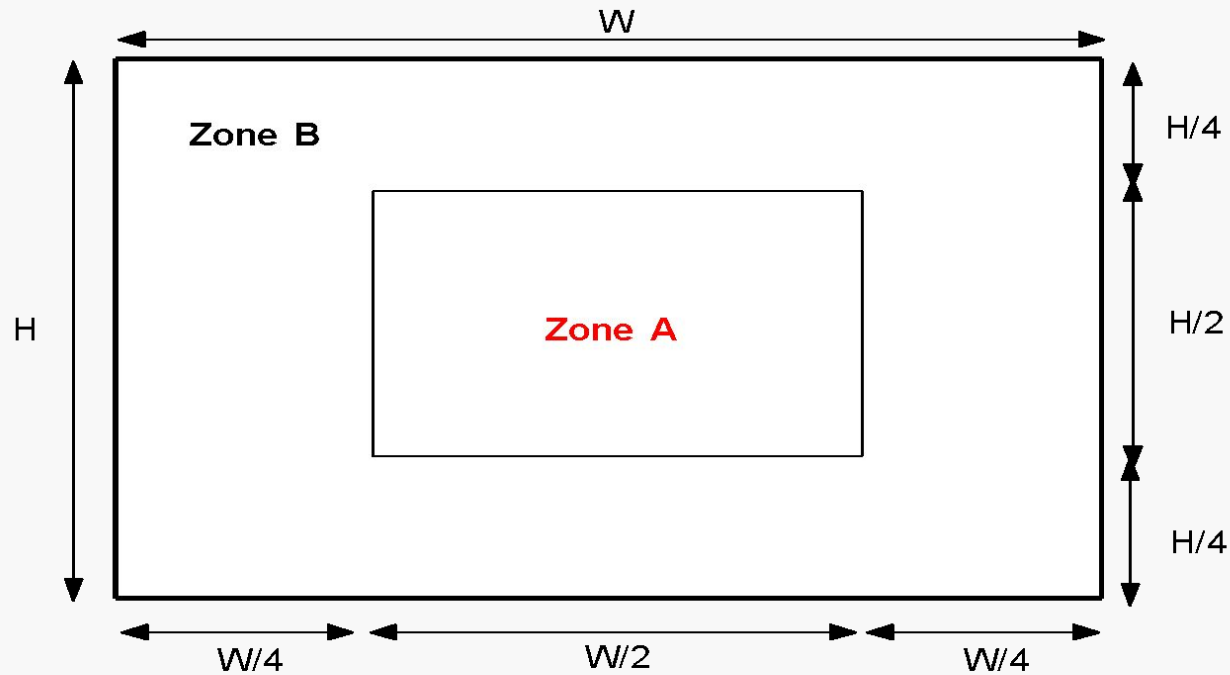
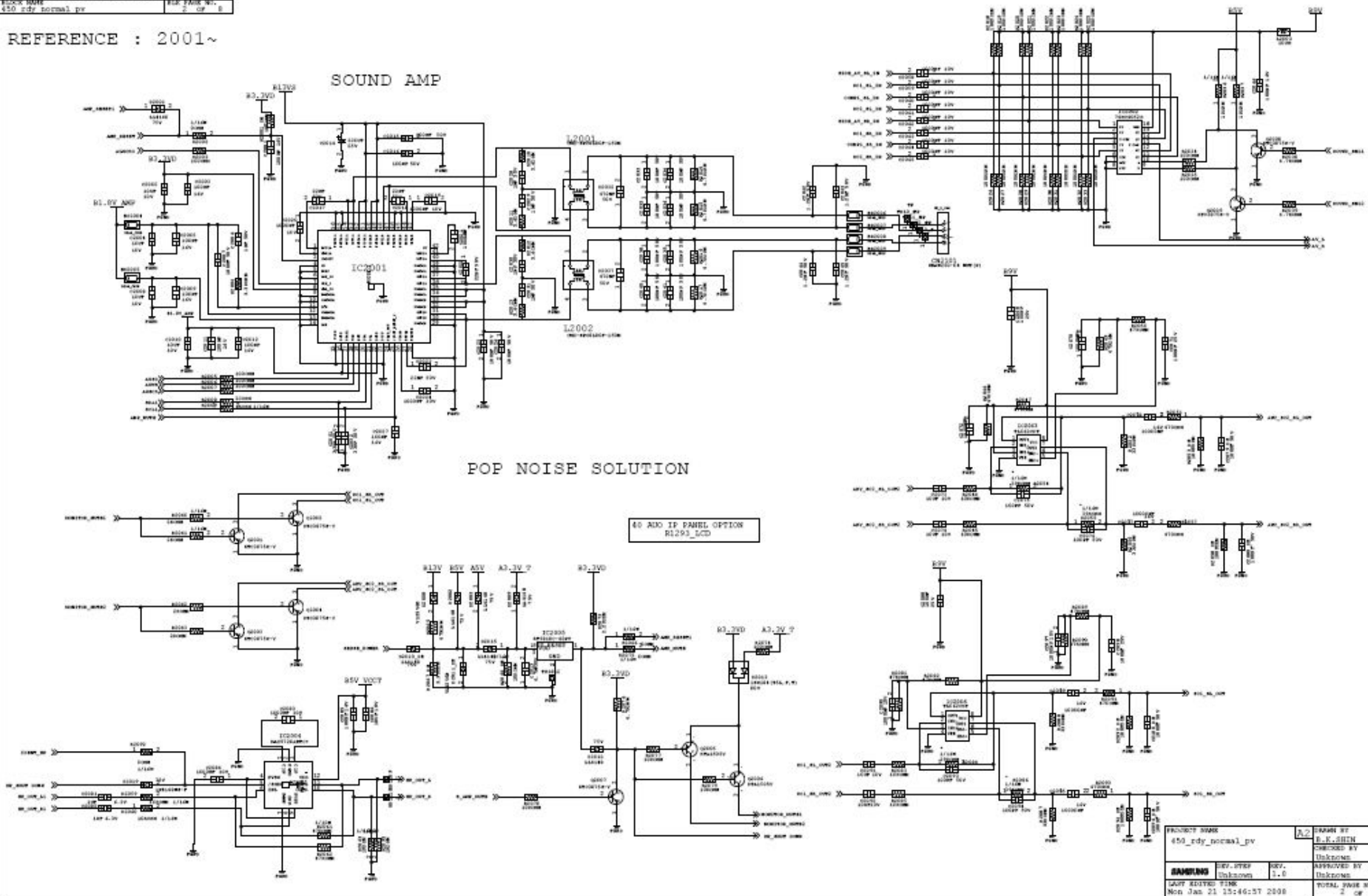


Figure-5. Measuring Area

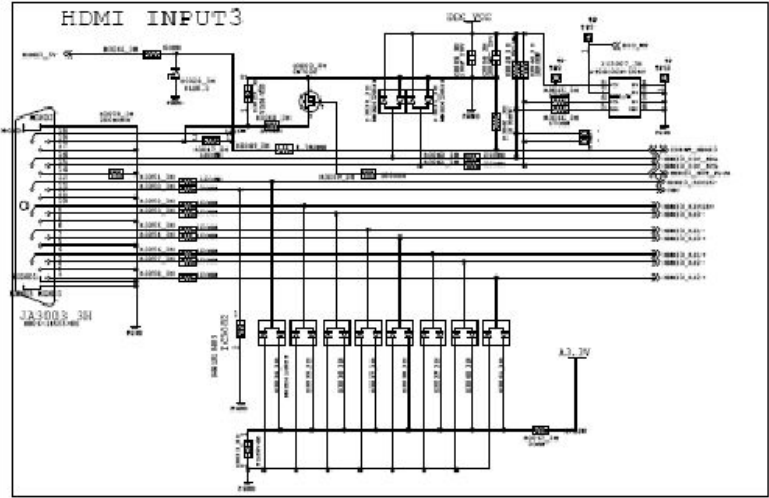
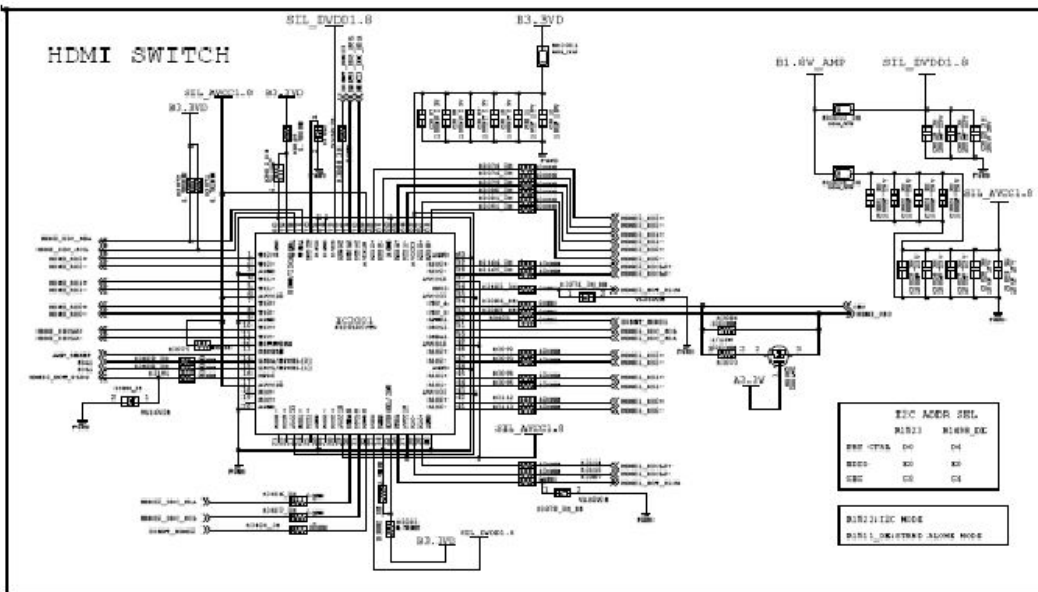
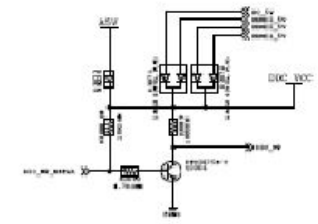
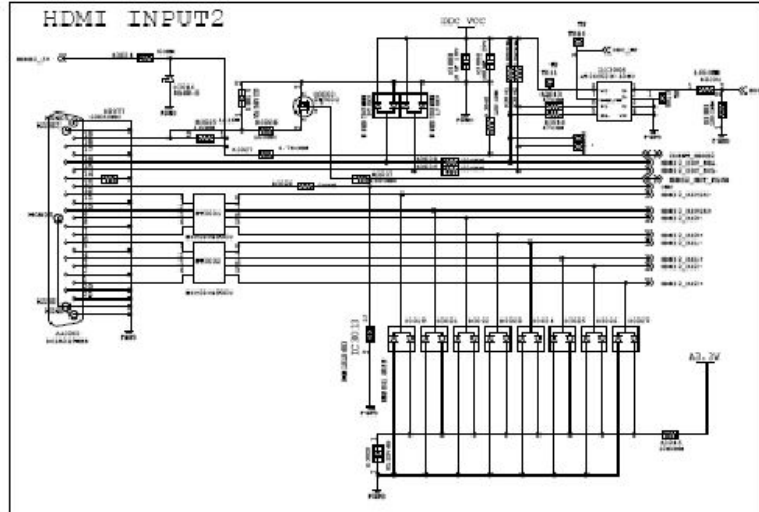
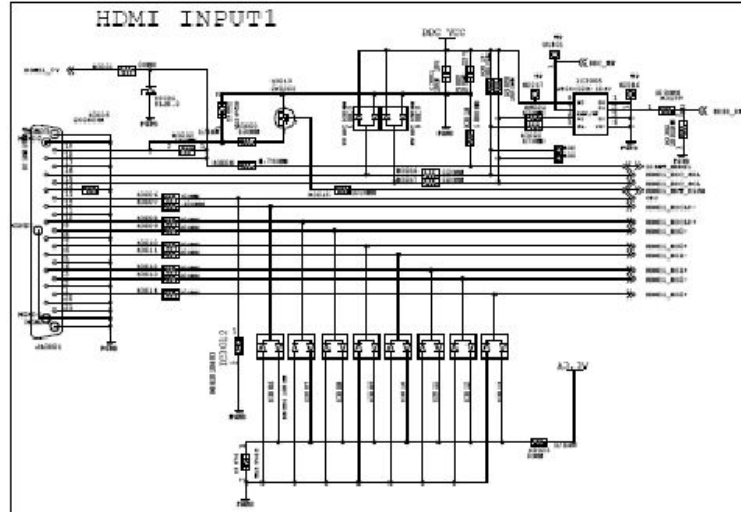
6.CIRCUIT DIAGRAM



REFERENCE : 2001~



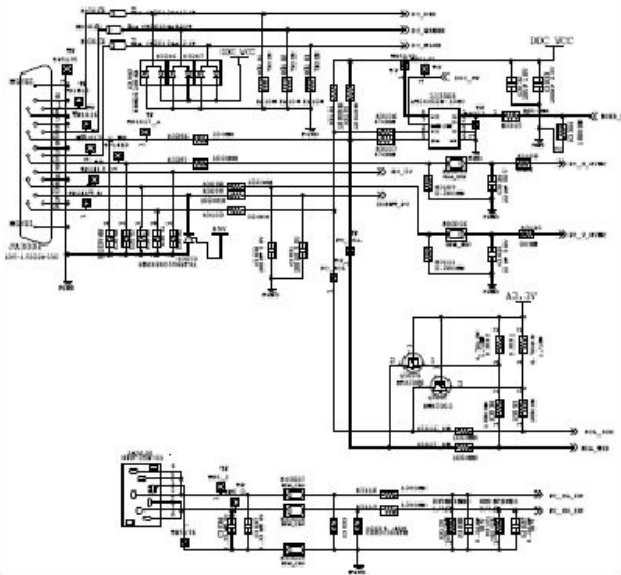
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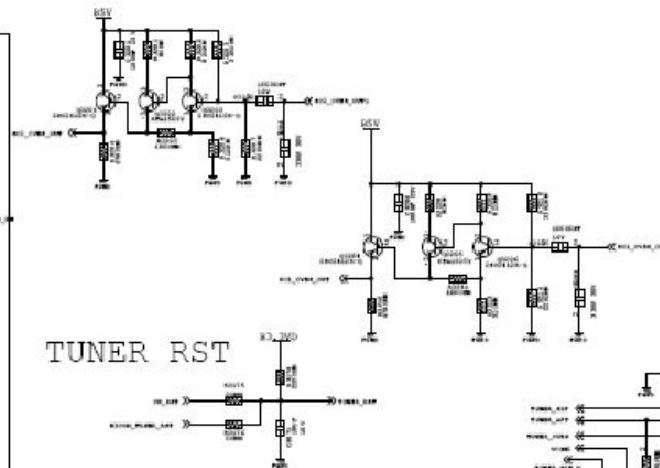
2013 年度 第 1 次 試験		
問題	正解	正解率
1	1	100%
2	2	100%
3	3	100%
4	4	100%
5	5	100%
6	6	100%
7	7	100%
8	8	100%
9	9	100%
10	10	100%
11	11	100%
12	12	100%
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99	99	100%
100	100	100%

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			COMPOSED BY
			Unknown
ISSUING	REV. STEP	REV.	APPROVED BY
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Mon Jan 26 15:46:52 2008		3 OF 8	

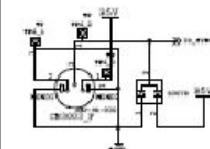
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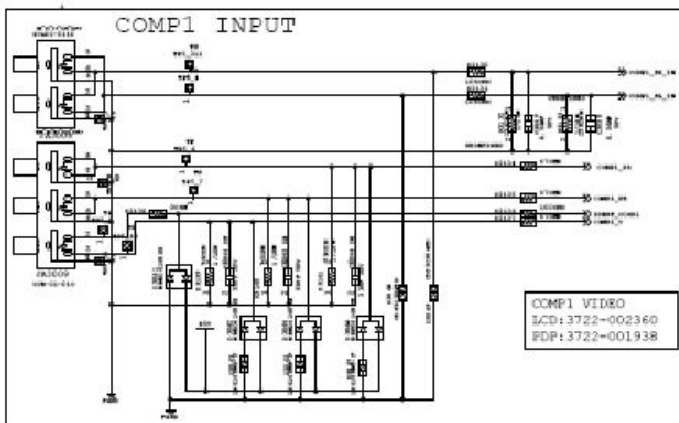
TUNER RST



3D OPTION

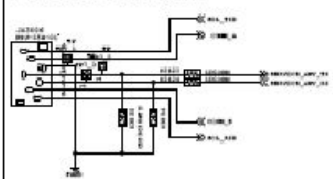


COMP1 INPUT

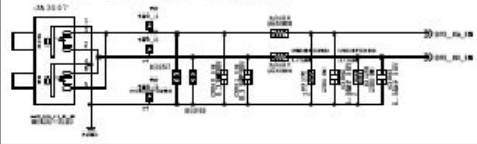


COMP1 VIDEO
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 RDP: 3722-001938

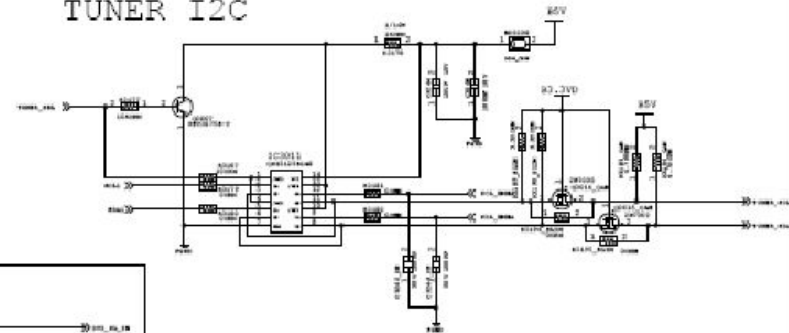
SERVICE ATV&DTV



DVI SOUND INPUT



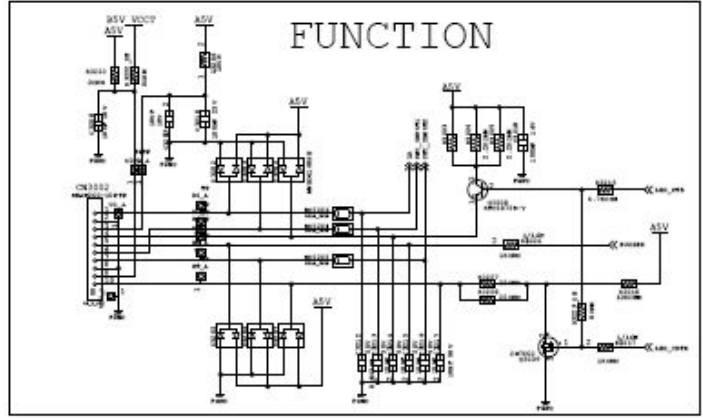
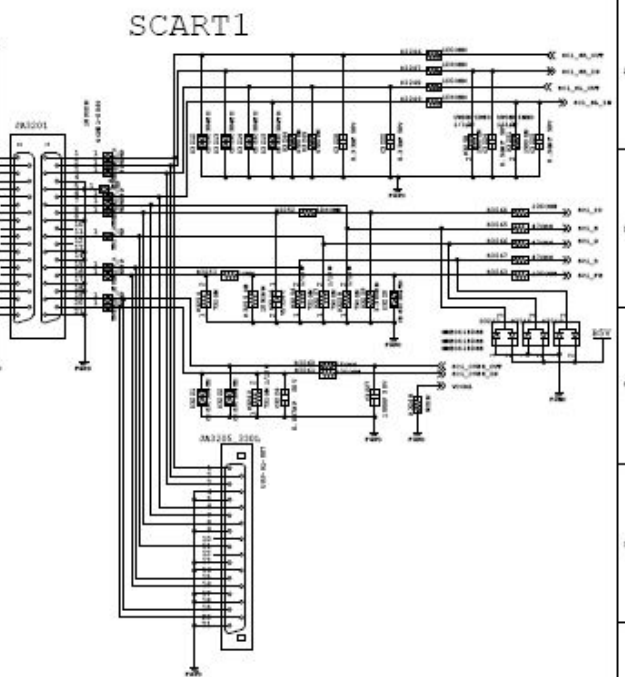
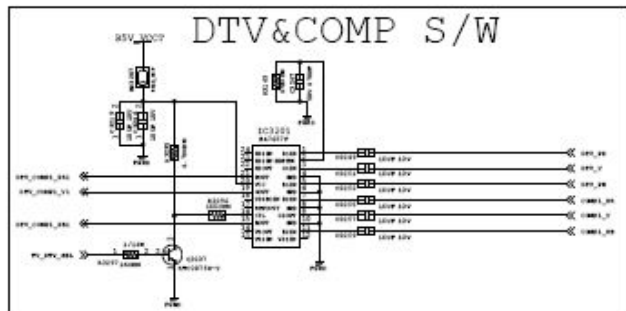
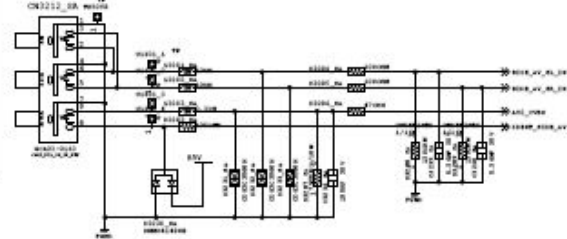
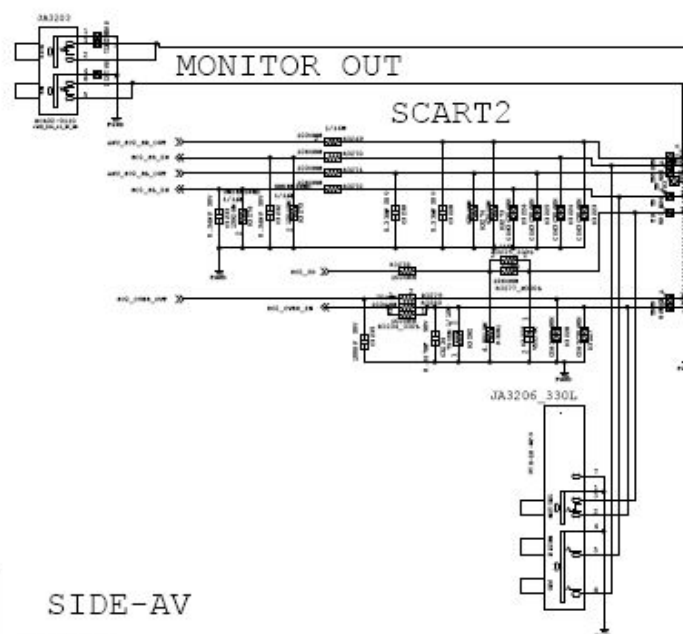
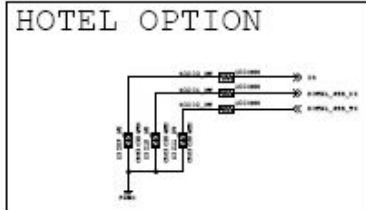
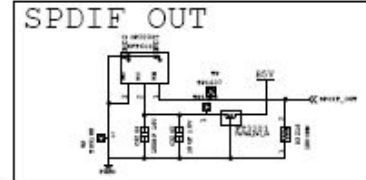
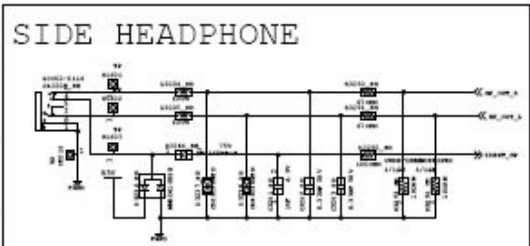
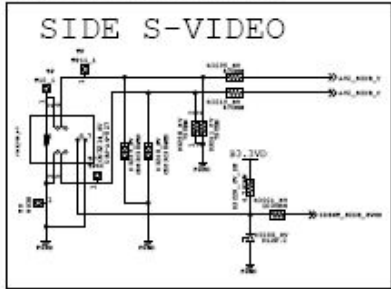
TUNER I2C



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CHECKED BY		APPROVED BY	
SAMSUNG	REV. 001	REV. 0.0	APPROVED BY
DATE REVISION	2008.03.21	DATE	2008.03.21
FIG. NO.	450_LARGE_NORMAL_PV	FIG. NO.	450_LARGE_NORMAL_PV

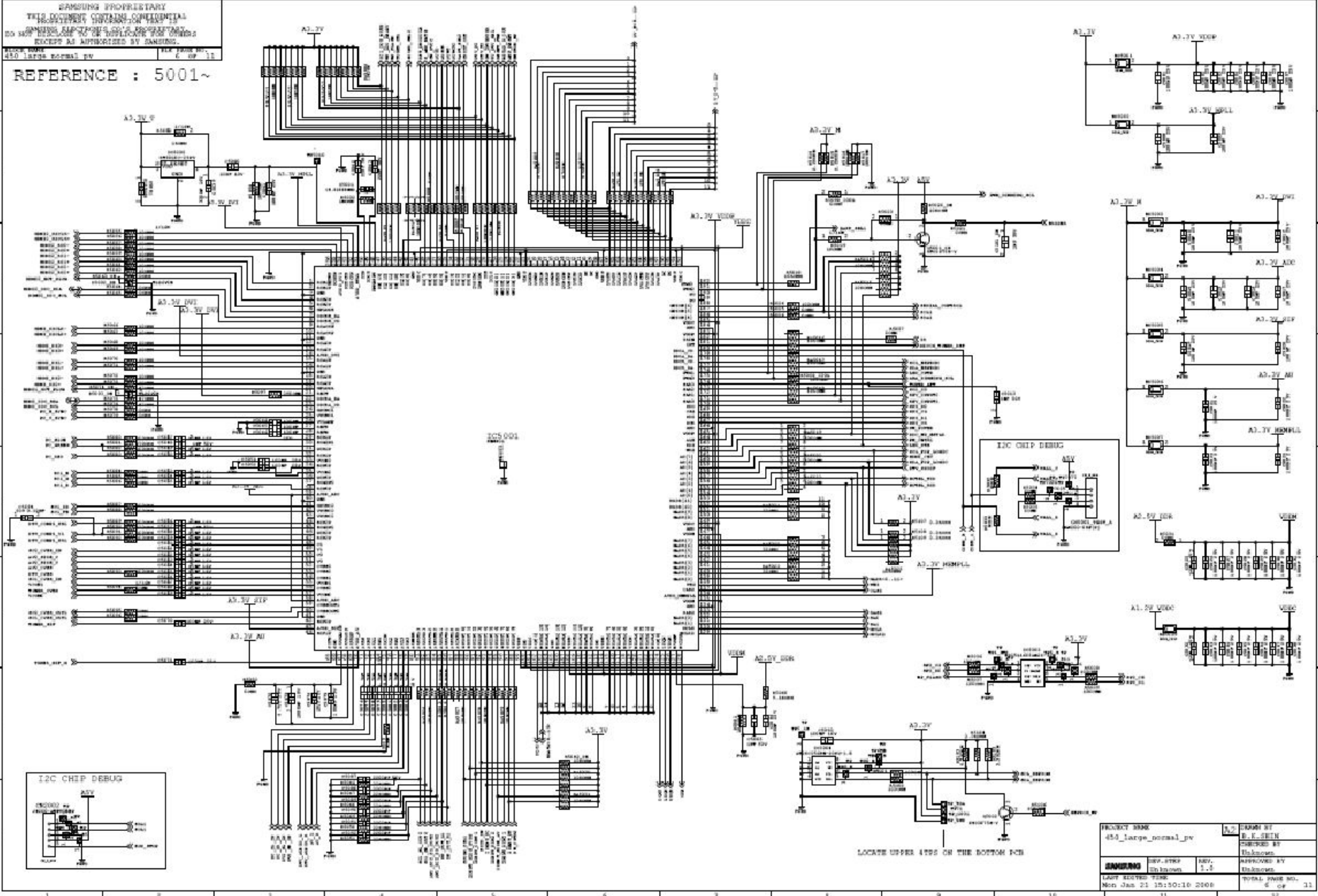
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 CONFIDENTIAL AND NOT TO BE DISCLOSED TO ANY OTHER COMPANY
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 EXCEPT AS AUTHORIZED BY SAMSUNG.

450_LARGE_NORMAL_PV 5 OF 11
 REFERENCE : 3201~



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CHECKED BY	Unknown	DATE BY	Unknown
APPROVED BY	Unknown	DATE BY	Unknown
LAST REVISION TIME	Mon Jan 21 15:14:24 2008	TOTAL PAGE NO.	5 of 11

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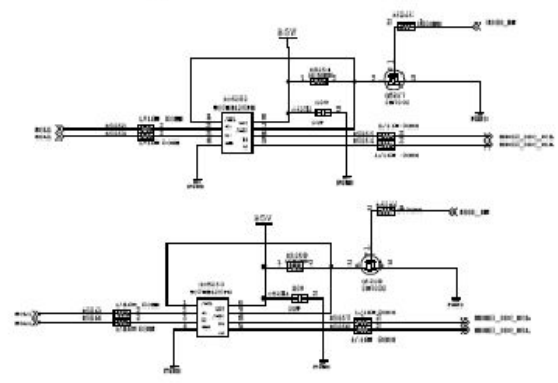
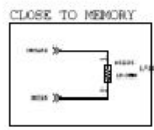
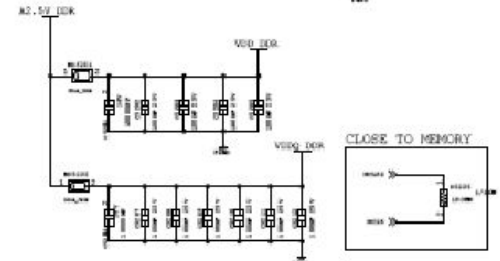
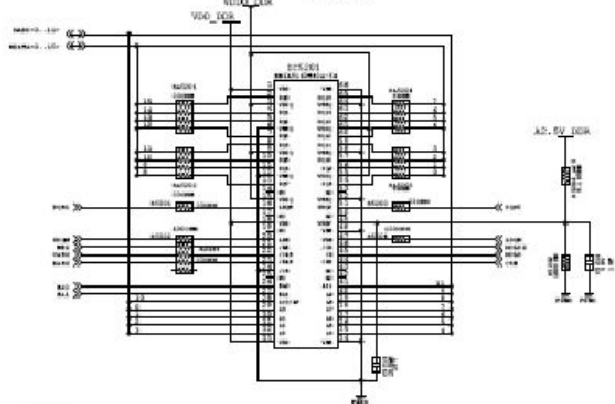


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REVIEWED BY	Unknown	APPROVED BY	Unknown
DATE	Mon Jan 21 10:50:10 2008	TOTAL PAGE NO.	6 of 11

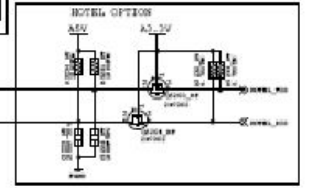
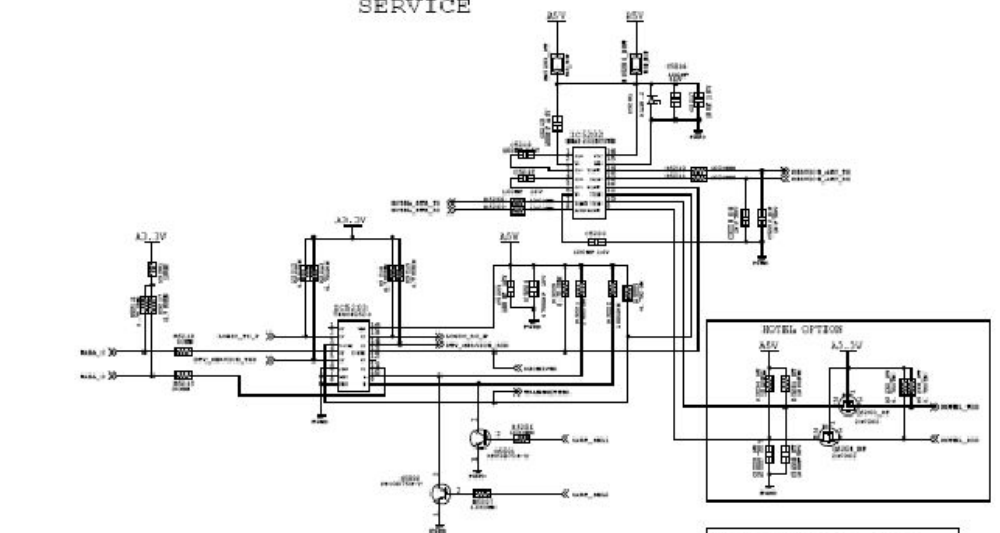
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 PAPER NAME: 4500_large_normal_pj
 PAPER NO.: 7-00-11

REFERENCE : 5201 ~

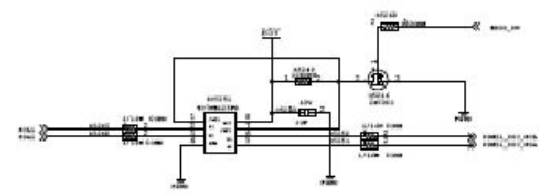
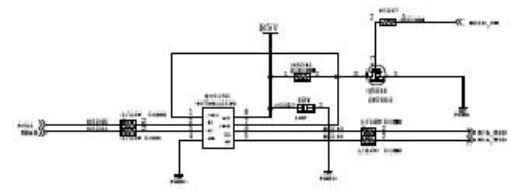
DDR



SERVICE

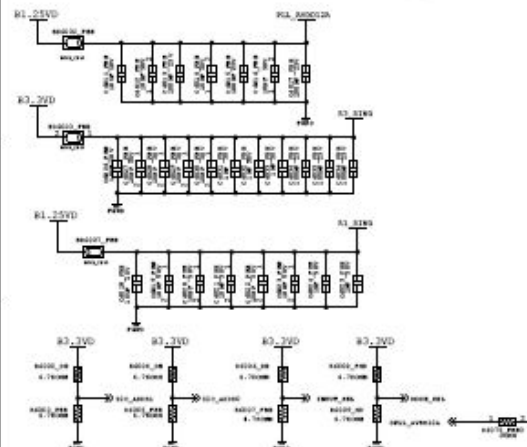
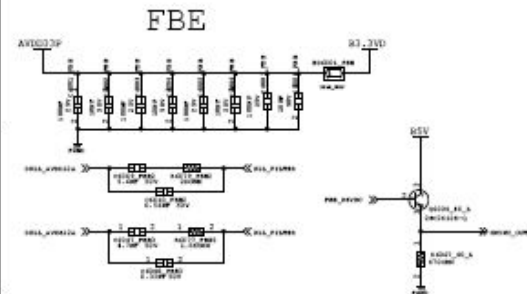


UART_SEL1	UART_SEL2	SELECT
H	H	OFF
H	L	ATV
L	H	IDTV
L	L	PDP LANE ON
L	L	PDP LANE OFF



PROJECT NAME	4500_large_normal_pj	FRONT BY	H.K. SHIN
DESIGNED BY	UNKNOWN	REVIEWED BY	UNKNOWN
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TIME	11:00	TIME	11:00
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REFERENCE : 6001 ~



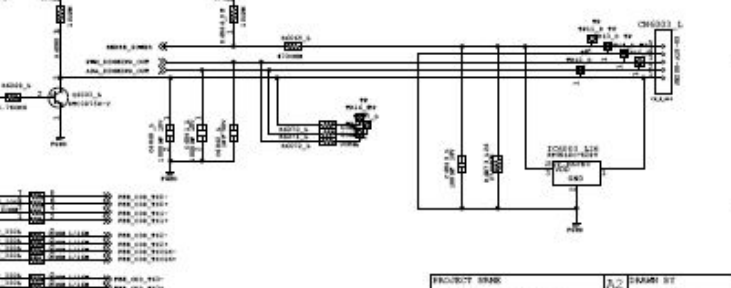
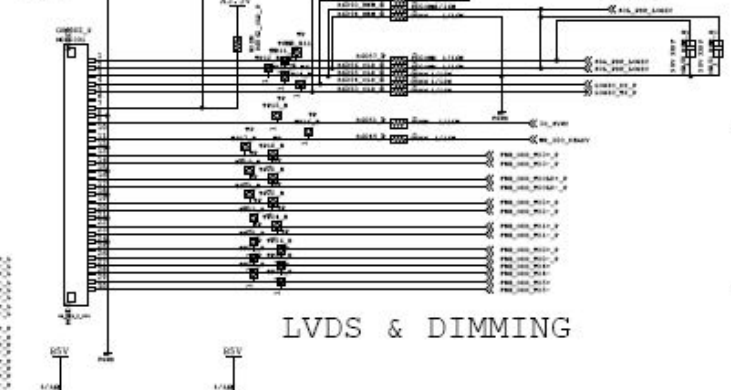
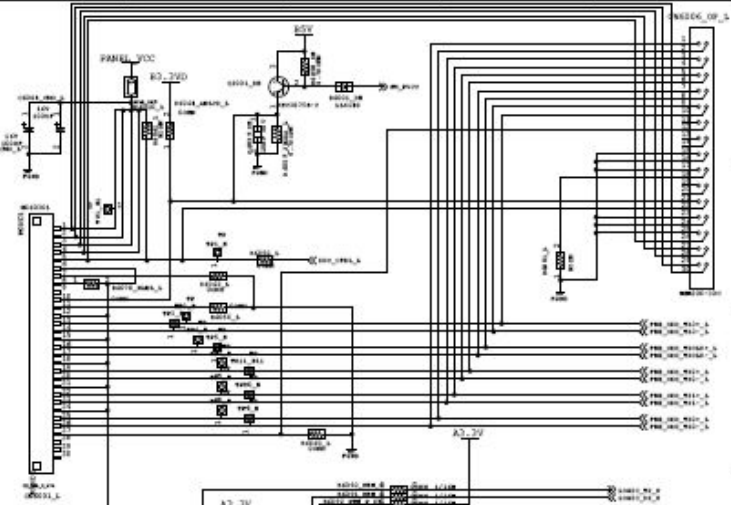
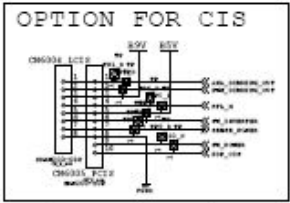
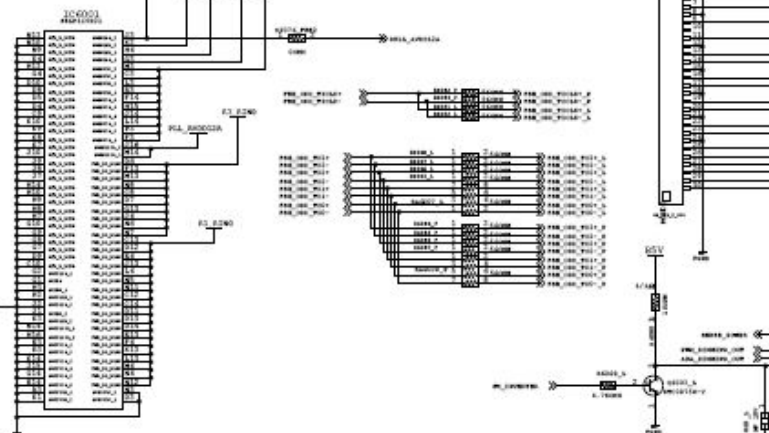
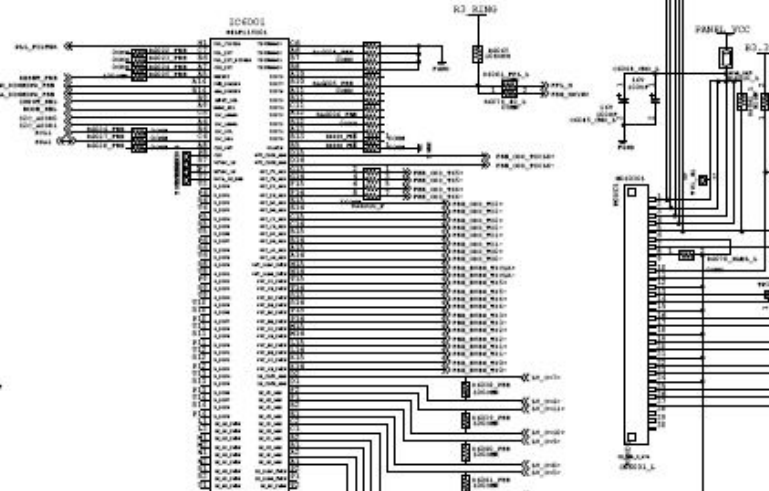
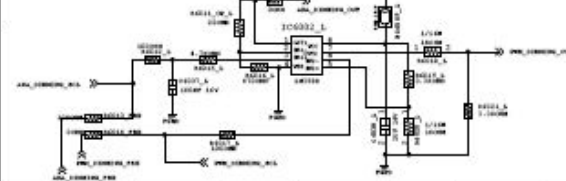
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*MODE-SEL : H-FWD, L-BE

*LCD PANEL OPTION

812481_00
-> COFL 1120404

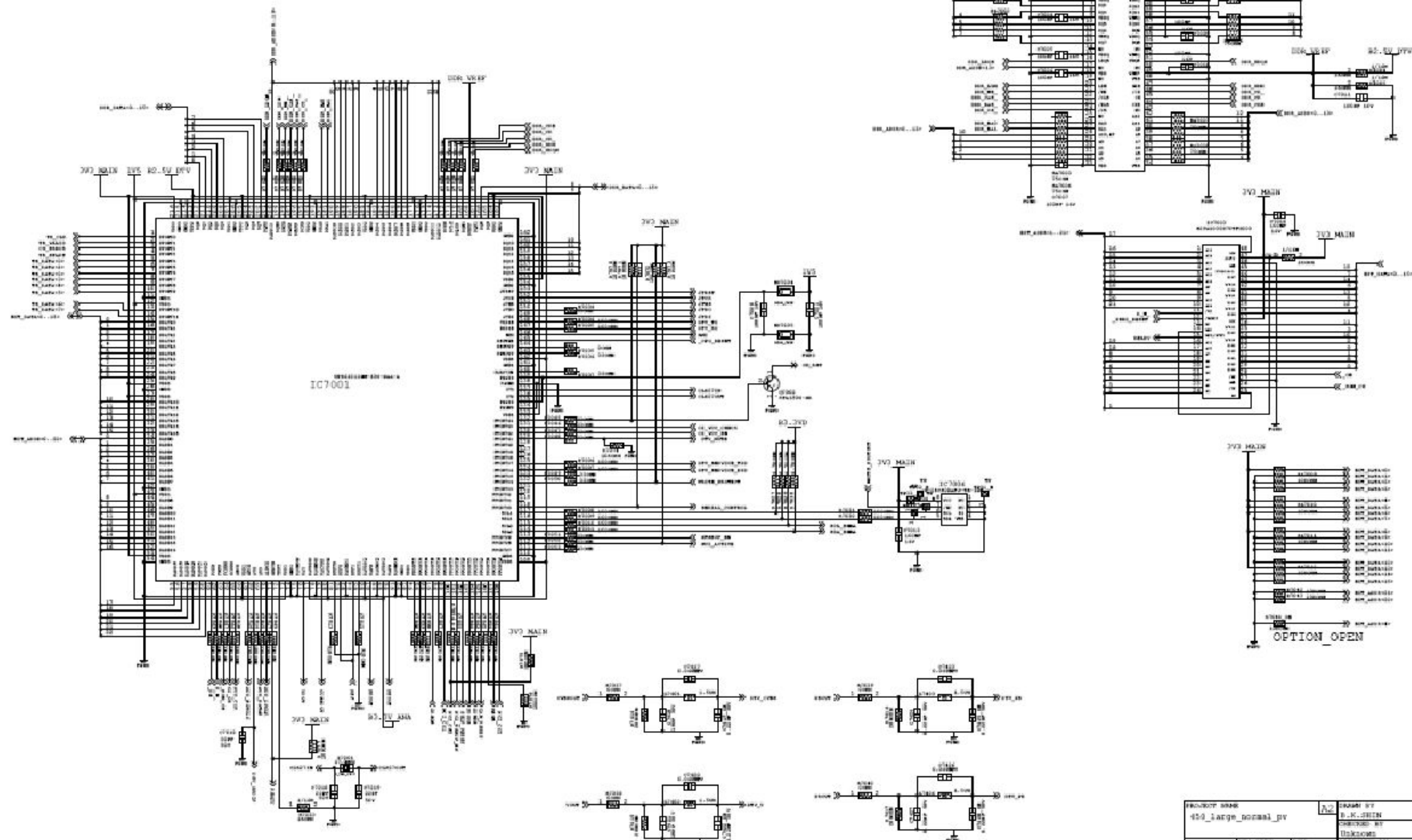
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Mon Jan 21 15:14:47 2008			8 of 13

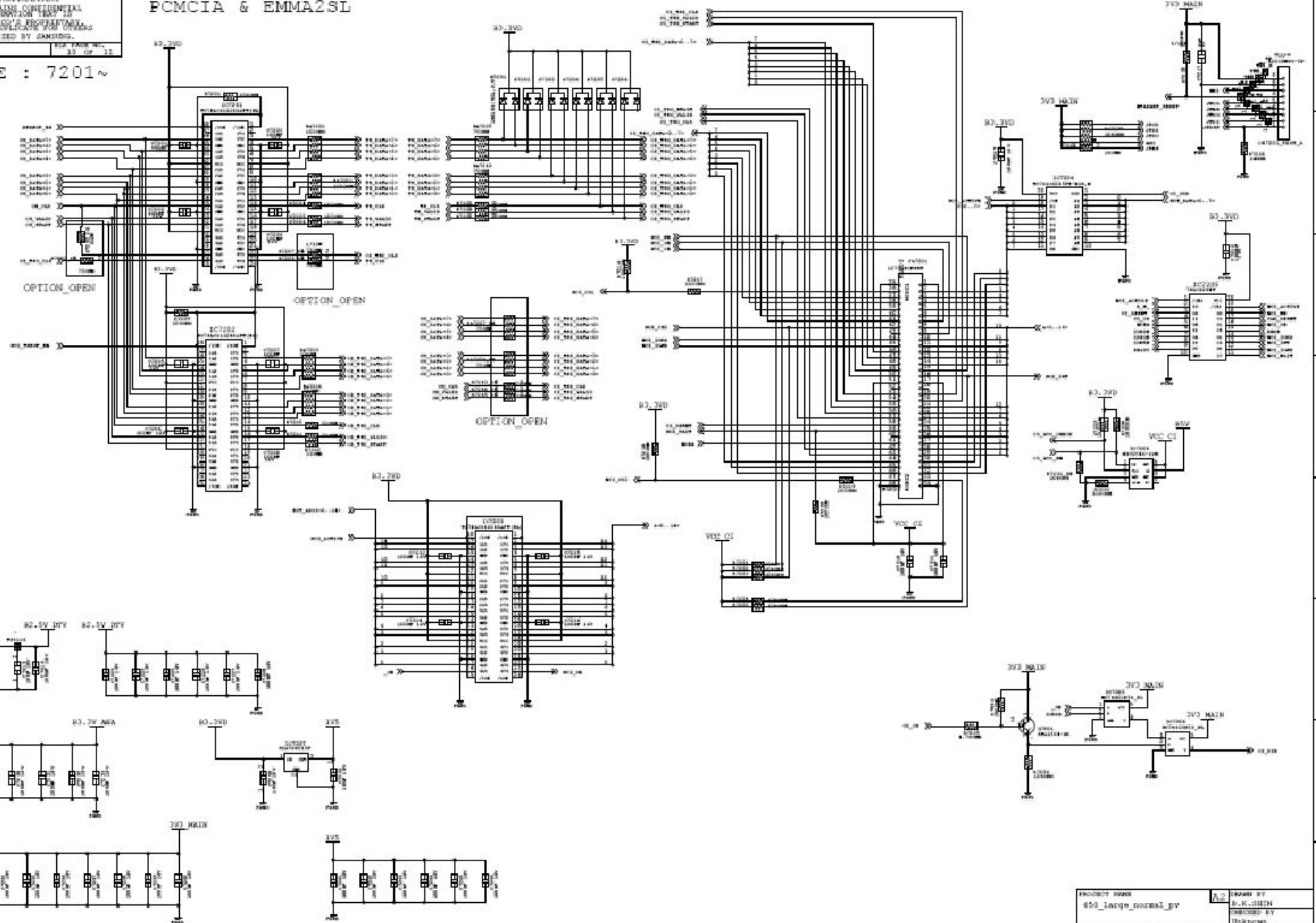
MEMORY & EMMA2SL

REFERENCE : 7001~



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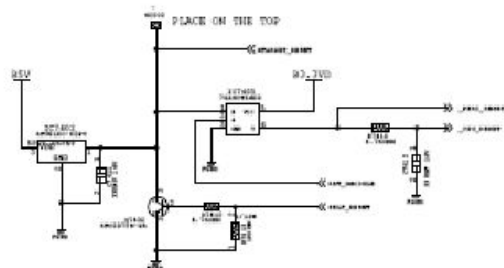
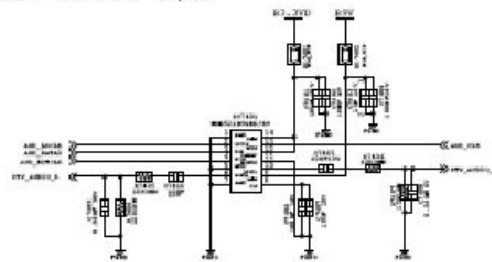
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UNKNOWN	Unknown	1.0	Unknown
LAST EDITED TIME		FORMAL REVIEW	
Mon Jan 28 15:15:00 2008		LO OP 1.0	

REFERENCE : 7401~

DTV AUDIO R/L



PRESENT NAME			P.L.C	DRAWN BY	
450_large_normal_pv				B. E. E. E. E.	
SAMSUNG			REV. NAME	CHECKED BY	
WORK DATE/TIME				B. E. E. E. E.	
Mon Jan 21 10:16:06 2008			TOTAL PAGE NO.		
			11 OF 12		