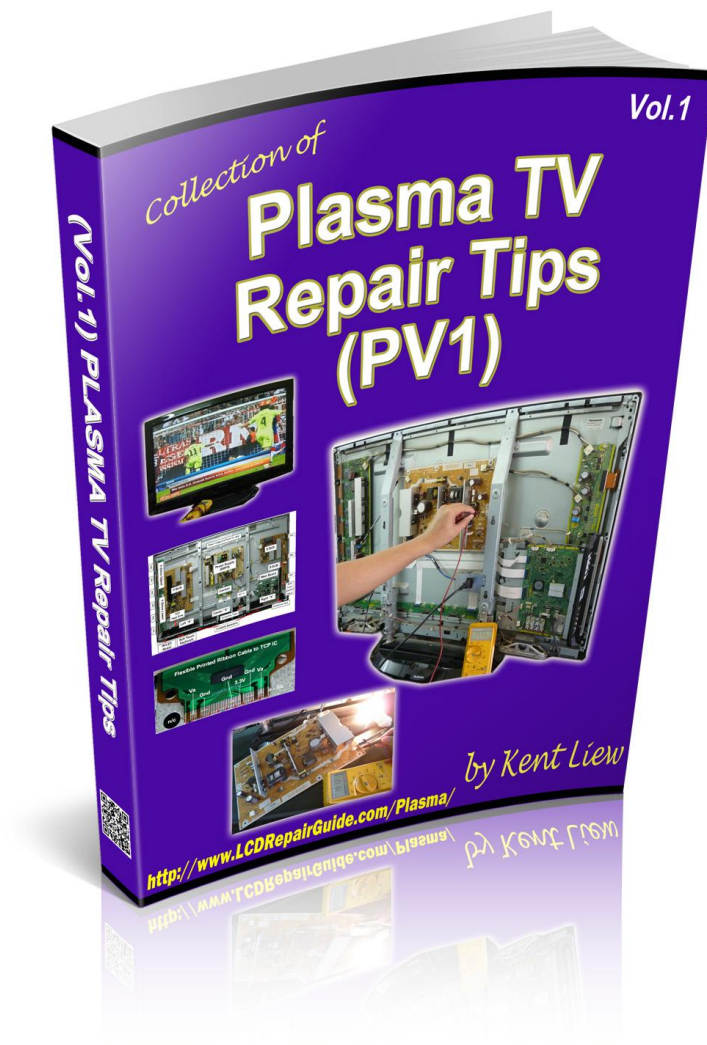

Collection of Plasma Television Repair Tips

Plasma Vol.1 (PV1)



Brought to you by *Kent Liew*

[Http://www.LcdRepairGuide.com/Plasma/](http://www.LcdRepairGuide.com/Plasma/)

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LG 50PS60- 50H3 Panel341

LG 60PK750- 60R1Panel344

BONUS-B: (NOT inside this eBook). It was inside the Download Page:

LG Plasma TV Training

Panasonic Plasma TV Training

Samsung Plasma TV Training

Various Models Plasma TV PSU Schematic Diagrams

(The Bonus-B section included over 500 pages & 270MB files size!)

<http://www.LCDRepairGuide.com/Plasma/>

If you want to buy the Test Equipment, Tools and Spare Parts please visit to the page here:

<http://www.LCDRepairGuide.com/Plasma/tools>

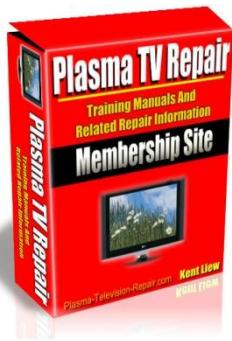
All these tools and equipments will help you in troubleshooting and repairing the electronics devices.

<http://www.lcdrepairguide.com/plasma/>

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Highly recommended other great related repair information for you:

With all these great repair information, it will help you in troubleshooting and repairing electronic and the other display devices:



Plasma TV Repair Membership Site

If you're a Plasma TV repairer, then these Plasma TV repair information is you want! Some hard to find information also included inside this Plasma TV Repair Membership Site!



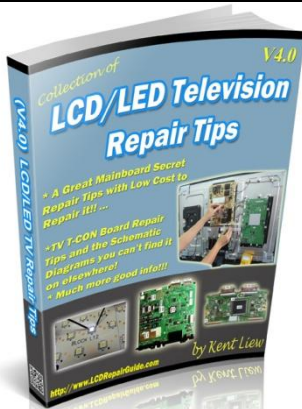
LCD & LED TV Repair Membership Site

This is complete repair information for LCD Television!
These repair information included:
training manual, service manual, psu schematic diagram, service bulletin, firmware & so on!



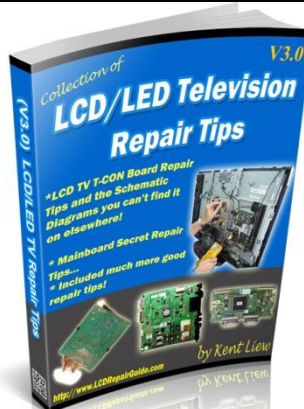
Projection TV Repair Membership Site

This membership site included two main repair information, these are Projection TV and Projector!



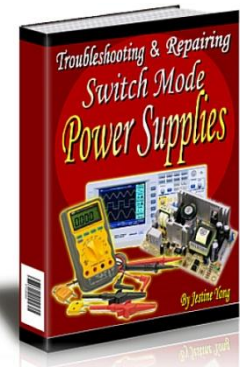
V4.0-LCD/LED Tv Repair Tips

A collection of LED/LCD TV Repair Tips ebook. It included the best repair information like, Tv Mainboard Secret Repair Tips and the T-con (Timing Control) Secret Reveal repair information. It is pair of the V3.0 ebook to learn the complete T-con repair info!



V3.0-LCD/LED TV Repair Tips

This is a collection of LCD & LED TV Repair Tips ebook. Not only that, if you want to learn what's or how the T-con (Timing Control) works, this is must have ebook to learn. Where the T-con circuit is use in LCD/LED TV & Monitor.

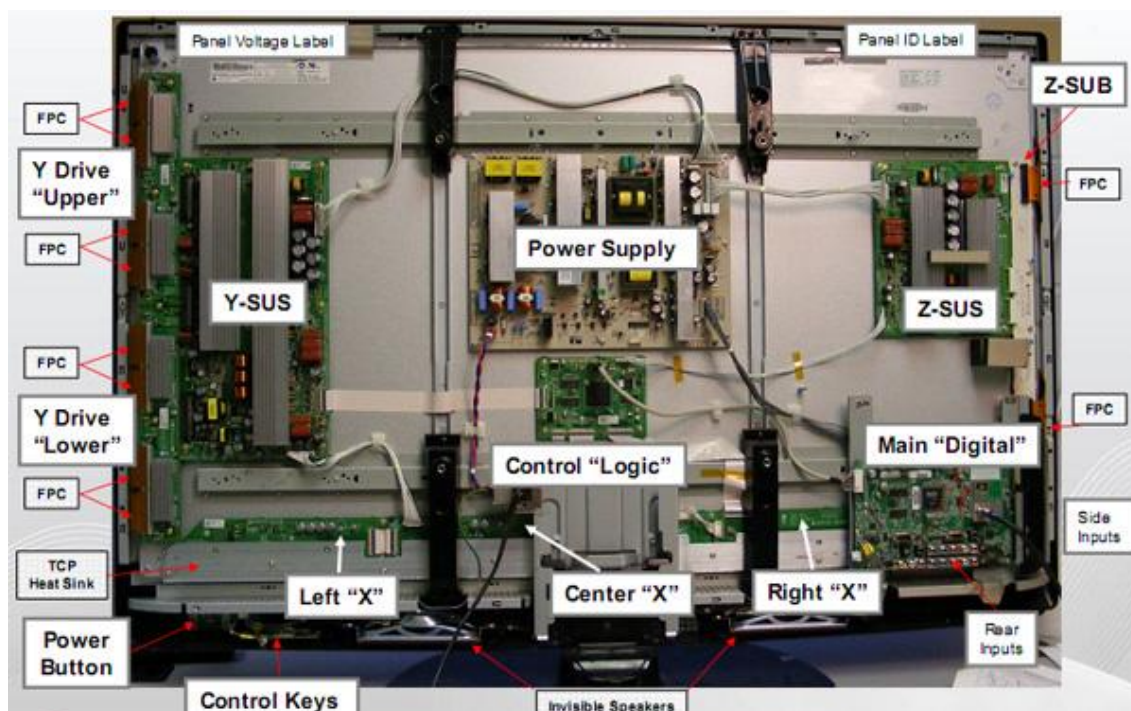


SMPS Power Supply Repair Guide

This is one of the great SMPS repair guide I have seen. Where Mr. Jestine Yong had reveal all his secret methods to troubleshooting & repairing the power supplies for the reader. Some of his tactic in this guide, I'm sure you're haven't seen it before. Highly recommended must have!

<http://www.lcdrepairguide.com/plasma/>

1. Introduction



Nowadays lots of Plasma TV need to repair in the market now. When we compare to repair Plasma TV with LCD/LED TV, the Plasma TV is harder to repair it. This is because of the Plasma TV:

1) Lots of the TV repairer they don't know how or where to starting to troubleshoot Plasma TV. This is because lack of information on troubleshooting Plasma TV.

2) Repair information like service manual. Most of the service manual is not including their Y-SUS board, Z-SUS board, Control Logic Board and X-Buffer board schematic diagrams. Normally the service manuals just include the Main board schematic diagram, front panel diagram and other non-circuits information only. Only some of the Panasonic Plasma TV service manual was included Plasma Module schematic diagram in it (but not all). This is because of Plasma TV is divided into two, Mainboard (Included their front & rear cover and stand) + Plasma Modules. The details of Plasma Modules please refer to chapter "What is Plasma Modules".

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3) Different brands of Plasma TV and Plasma Module, they have different board name! Even their functions are same, but it is using different board name. So it will confuse the repairer to learn Plasma TV repair.

4) The Plasma TV spare parts are hard to find and also expensive to purchase it. Especially when the repairer replaced the expensive PCB board also not solve Plasma TV problem or even damage again the new board. They will give up repairing it and asking customer to buy a new TV. This is because of they don't have the right way to repair the Plasma TV.

When the TV Repairer they know how to start troubleshooting the Plasma TV, it will help them to easy repair it. For your information, the profit on Plasma TV repair is more than LCD/LED TV. But the cost to repair Plasma TV is higher than LED/LCD TV.

2. Plasma TV Basic Information

When repair a Plasma TV, this basic Plasma TV information you must know and what's their purpose to use it.

2.1- General Info:

2.11) Model Number:



* The Plasma TV model number is use to search their repair information, for example: service manual, buy the spare parts, how many inches of the Plasma TV and Plasma TV specification. Normally this sticker was stick on the rear cover.

2.12) Chassis Number:



* The Chassis Number is their TV chassis (manufacturer) in Plasma TV. For example, the Philips Plasma TV or LED/LCD TV, you need to know their chassis number to find out their correct service manuals. So the chassis number is important for the Philips Plasma & LED/LCD TV to find out their repair information.

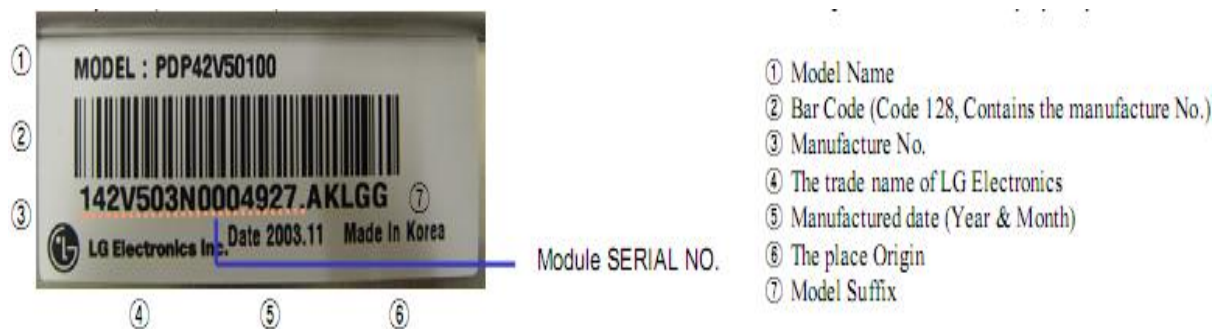
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2.13) Part Number:



* The Part Number is use to let us easy to purchase the correct spare part for the TV. Especially the Plasma TV, not only the part number, it's also need to match with their version of that PCB board too. For example, when you had purchased the same part number but new version of the Logic board, it maybe not match with their Y-SUS & Z-SUS board and causing another problem in the Plasma TV.

2.14) Plasma Panel/Module Model or Panel ID:

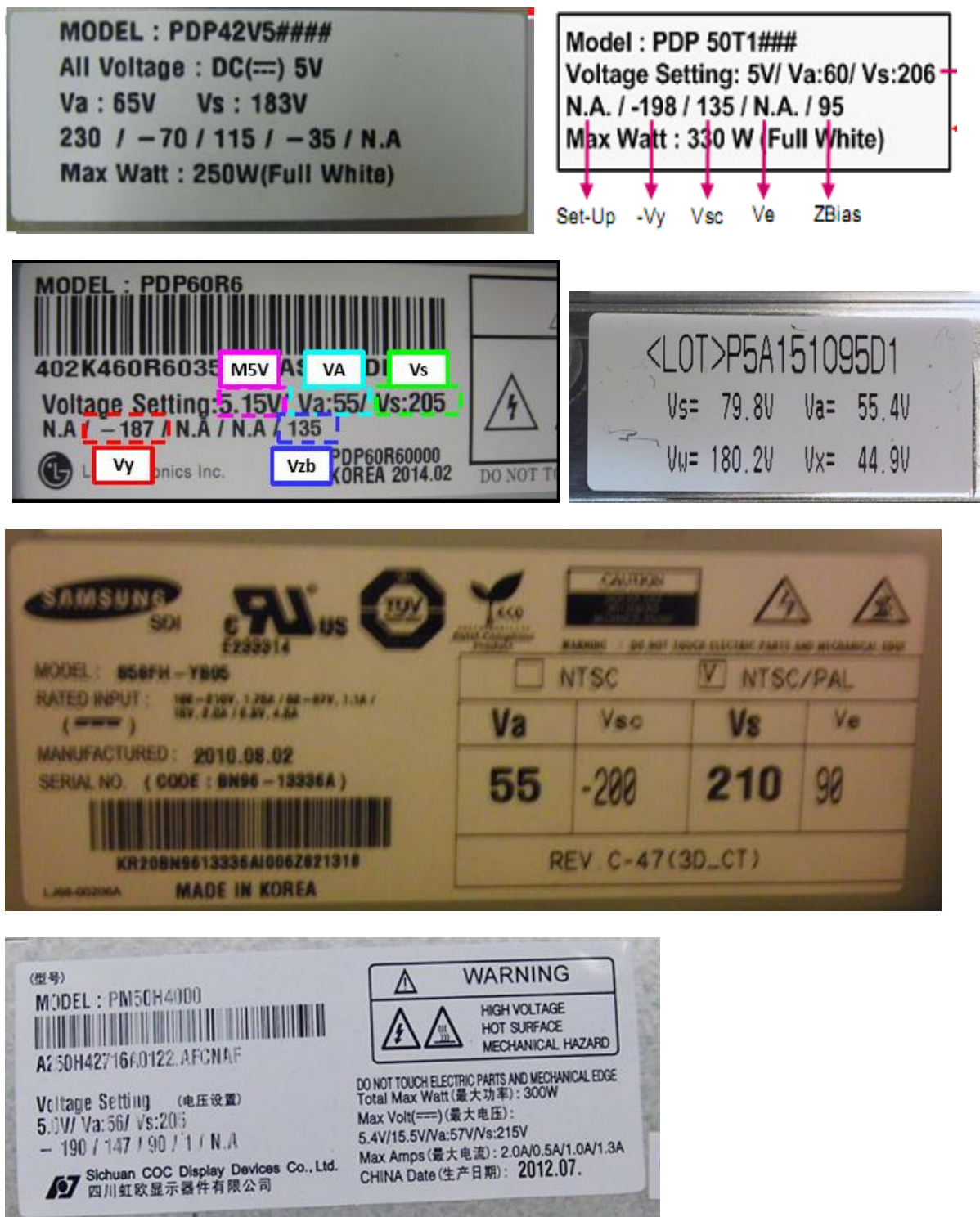


* This Plasma Module/Panel Model Number sticker normally was stick on rear Plasma Panel. This Plasma Module Model Number is: PDP42V50100 (PDP42V5 plasma module). Sometime this sticker was stick under the PCB board, so you need to remove the PCB board to get this Module model number sticker.

After we know that it is a PDP42V5 Plasma Module, we can refer to their module type to Plasma Panel Alignment Guide or similar information, to find their method to do the voltage adjustment, method to do the self test for Plasma Module & etc.

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2.15) Panel Voltage Label in Plasma Panel:



This Panel Voltage Label normally located on the Plasma Panel. Sometime need to remove the PCB board to get this information. Always refer to the Voltage Sticker located on the back of the Plasma Panel, to know the correct voltage levels for the VA, VS, -VY, Vscan, Z-Bias & etc as they will vary from Panel to Panel.

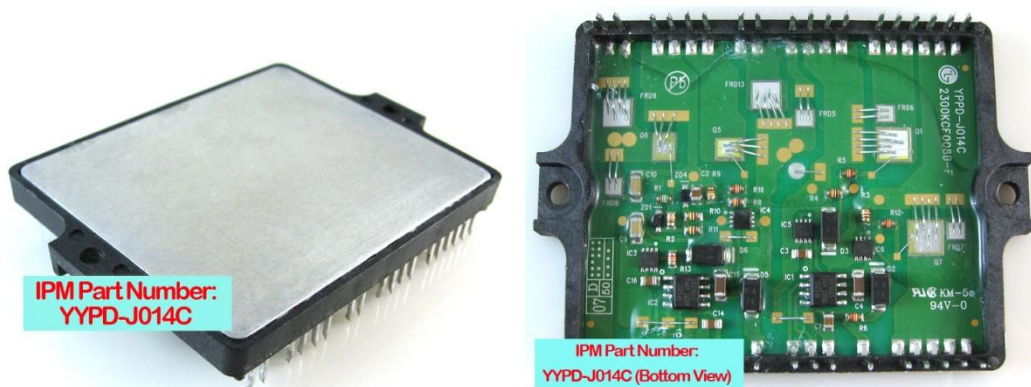
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This is important information, especially to repair the Plasma TV. When the Plasma TV have display problem on the screen, first thing to do is to find out this Voltage Label voltage information and compare their voltages. If the voltage values different than the original voltages in Voltage Label, it is need to re-adjustment their voltages.

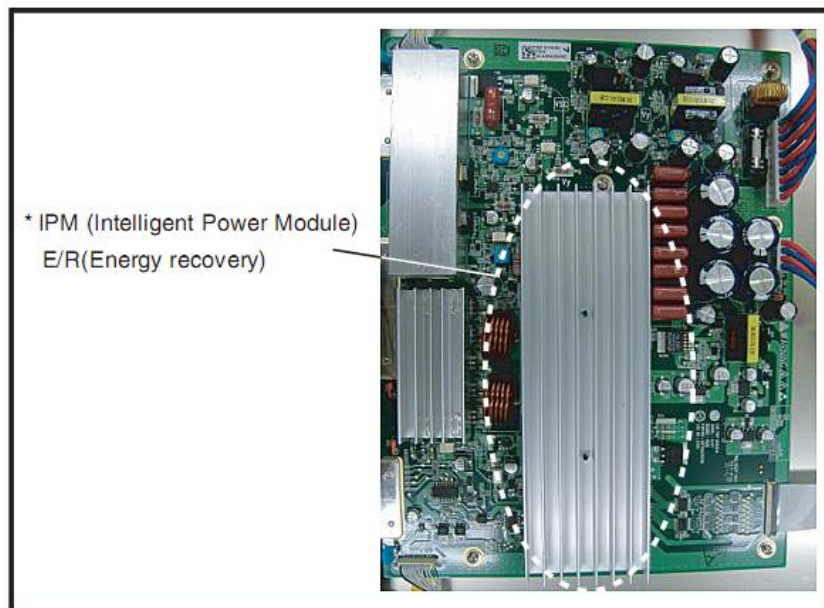
If the Plasma TV has replaced their Power Supply board, it needs to re-adjustment their VA & VS voltage values to match the Voltage Label voltages. Not only the PSU board, but their Y-SUS, Z-SUS and the Control Logic board also need to do the voltage re-adjustment to reach the best performance and lasting longer for this Plasma TV.

2.2- Components Name in Plasma TV

2.21) IPM (Intelligent Power Module or some call it as Intelligent Power Supply Management)



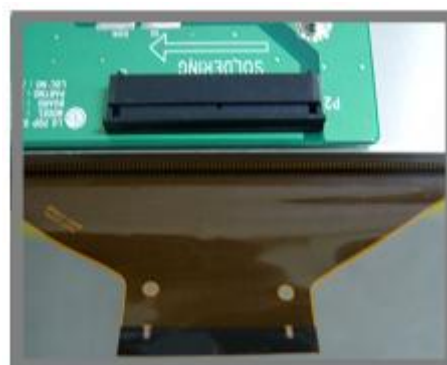
This IPM module can be found in Y-SUS & Z-SUS board. It is under the big heat sink on the Y-SUS & Z-SUS board. Normally the IPM on the Y-SUS board calls it as Y-IPM and on the Z-SUS board is Z-IPM.



2.22) FPC (Flexible Printed Circuit)



< Y drv >



< Z board >

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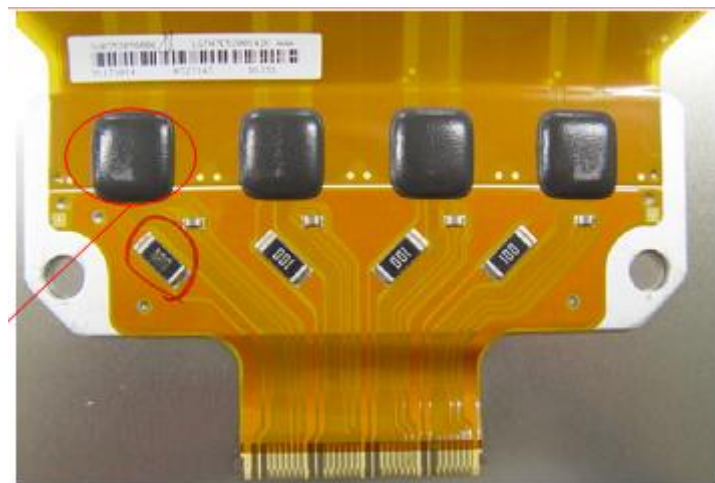
Normally the FPC cables are connected in between Panel & Y-Drive (Top & Bottom) boards and Panel & Z-SUS board. It connects Pad electrode of Panel to Y-Drive (Top & Bottom) boards and Z-SUS board.

2.23) FFC (Flat Flexible Cable)



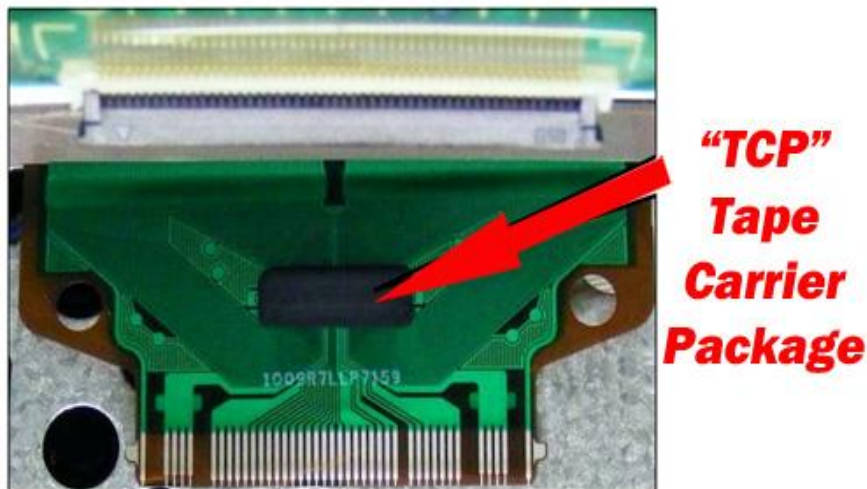
The FFC cable is used to connect the logic signal between PCB boards.

2.24) COF (Chip On Film)



The COF is an integrated form of IC Chips on PCB and FPC, which makes the structure of PCB simple and small. This COF driver IC's is permanently attached to the ACF (Anisotropic Conductive Film) of the Panel. If this IC is damaged or burnt, you need to replace the entire Plasma Panel or you can use the TAB Bonding Machine to remove the bad COF and replace it with a good COF. So you need to have this expensive machine and also need to find out the spare parts COF IC's & ACF tape to replace it.

2.25) TCP (Tape Carrier Package, some will call it as Taped Carrier Packages)



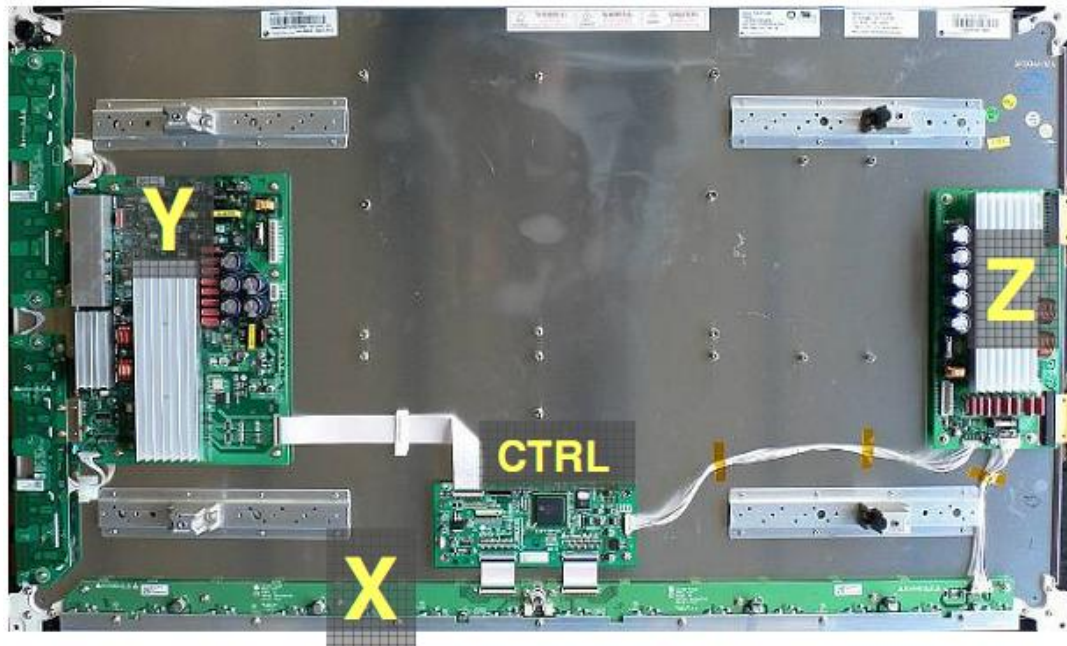
The X Buffer boards deliver the Logic (Color) signals developed on the Control board (CTRL board) to the TCPs. The TCPs are attached to the vertical FPCs (Flexible Printed Circuits) which are attached directly to the panel. The latest model of Plasma Panel is using TCP IC's than COF.

2.26) Exhaust Tip (some call it as E/X Tube)



The Exhaust Tip is part of the Plasma Panel. If the Exhaust Tip cracks, confirm exhausting Tip and find crack with eyes to check the vacuum stats of panel. If there is problem you need to replace a whole glass plasma module/panel. In case of vacuum breakdown, plasma module makes a shaking noise because of inside gas ventilation. There may be a small crack which could not see with naked eyes and this noise is different from capacitor noise.

3. What is Plasma Module?



Do you know what the Plasma Module is? Actually it is the Plasma Display Panel or normally calls it as Plasma Panel. The Plasma Panel is included Y-SUS board, Y-Drive Top board, Y-Drive Bottom board, Z-SUS board, Logic board & their X-Buffer board. Some Plasma Panel is included the Power Supply into it. So the Main board is not including the Plasma Module or Plasma Panel! If included the Main board, TV Covers (with front panel buttons) and Plasma Panel, it is call a Plasma TV!

That's why the Plasma TV service manual is not including their Plasma Panel PCB schematic diagram in it. So lots of the repairer sent me an email and asked why the Plasma TV service manual did not include the Plasma Module/Panel schematic diagram.

If you're repair the Plasma TV, you will know that the Plasma TV repair information is hard to find and also confuse about their PCB boards too. Because different brands of Plasma Panel, they have different name of their PCB boards and make us confuse to it. That's why before you repair the Plasma TV, you must know which & what is the PCB board name and their function too.

The top 3 Plasma Module/Panel in the market now is LG, Samsung & Panasonic! Also some older Plasma Module manufacturer like Pioneer, Hitachi,

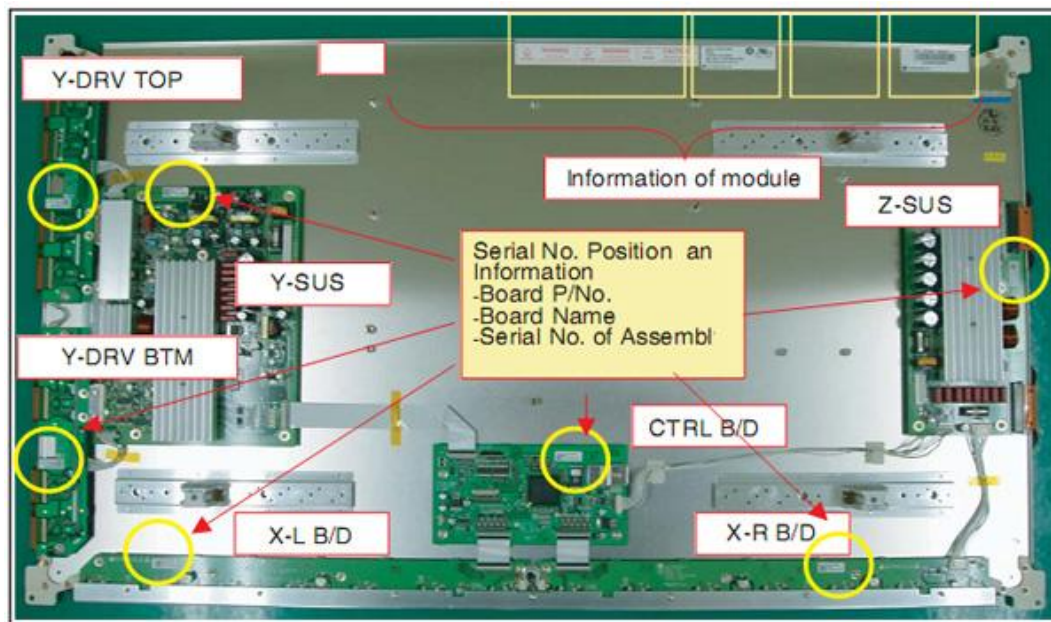
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NEC, COC PDP and etc which are no longer in business of manufacturing of Plasma Modules.

Nowadays, lots of the third party or OEM brands Plasma TV are using these top brands Plasma Panel to build their Plasma TV. Most of the OEM brands Plasma TV is using LG & Samsung Plasma Modules. But the Panasonic doesn't usually. So I just can find little percentage on Panasonic Plasma Module is inside OEM brands Plasma TV like Sanyo DP42740 and some China brands Plasma TV.

Sometime, same OEM brand Plasma TV will use different Plasma Panel in it. So don't think these OEM brands Plasma TV will just using 1 brand of Plasma Panel only. So we need to disassembly the TV and then find out what is their actual Plasma Module is.

3.1- The Plasma Modules



LG PDP42V7 Plasma Module

The Plasma Module is same like the LCD Panel. Their function are same, is to convert the video signals on the panel screen. So the human eyes can seen the display contents on the screen. The different thing is their structures only.

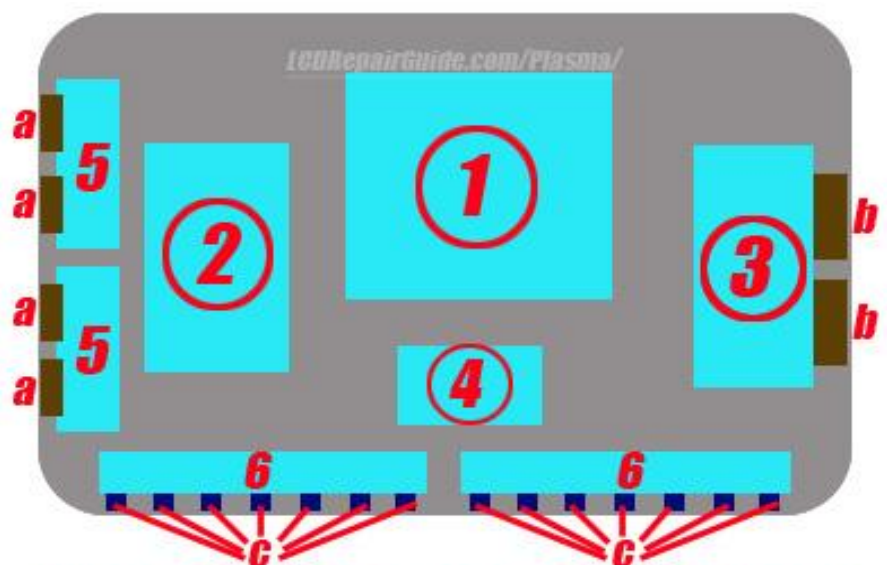
The LCD Panel included: Glass Panel, Backlight Unit (some include Inverter board) and T-Con board. For LG Plasma Module, it's included: Panel, Y-SUS board, Z-SUS board, Control Logic Board (CTRL board), Y-Drive boards (Top & Bottom) and X-Buffer boards (Left & Right or Left, Center & Right).

The most headache thing to learn Plasma TV repair is to confuse about their parts name and other marking information inside the TV. The Plasma Module, some repairer called it as a Panel, but when it is just the TV glass screen, it's also call as Panel too! For example their Common Ground board, in LG Plasma Module is call Z-SUS board, in Samsung Plasma Module is call X-Main (X Board) and so on. Even their part names are different, but all these are the same things, so it will confuse the repairer!

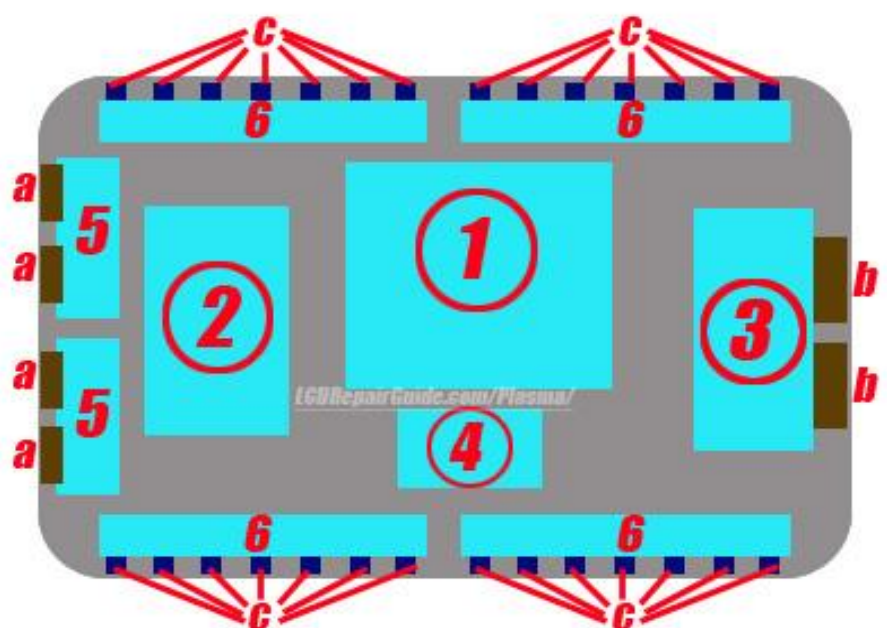
3.2- Single & Dual Scan Plasma Module/Panel

Below is a chart to let you know different Plasma Module part name:

<http://www.lcdrepairguide.com/plasma/>



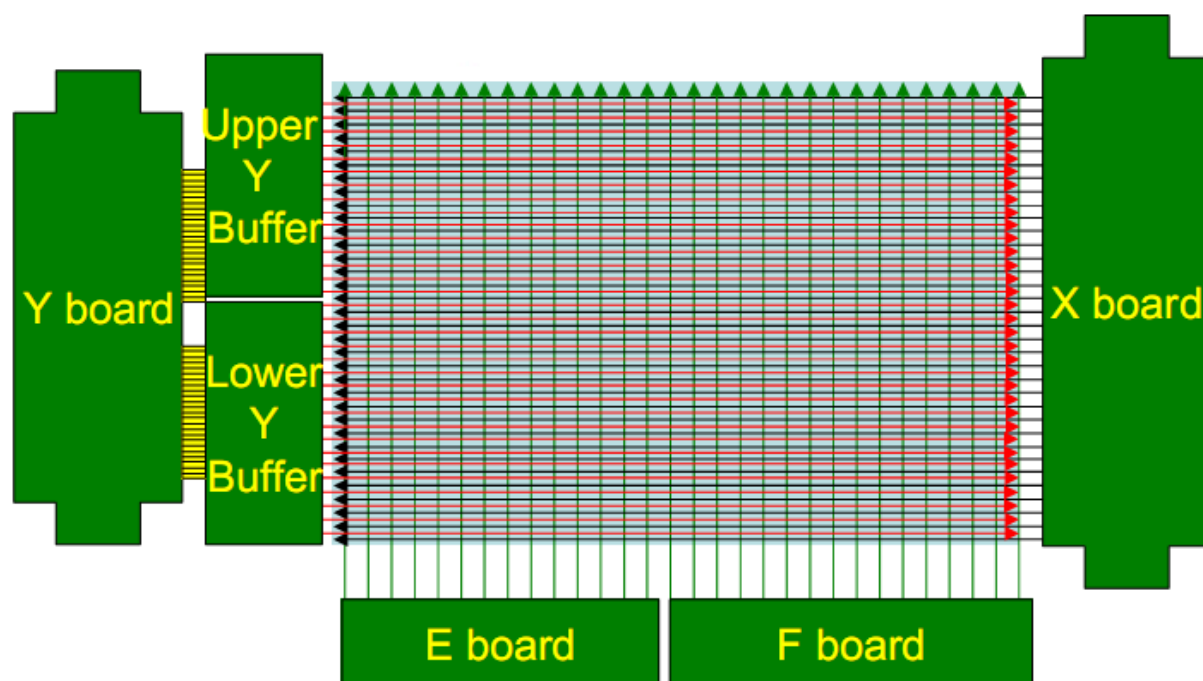
Single Scan Plasma Module/Panel



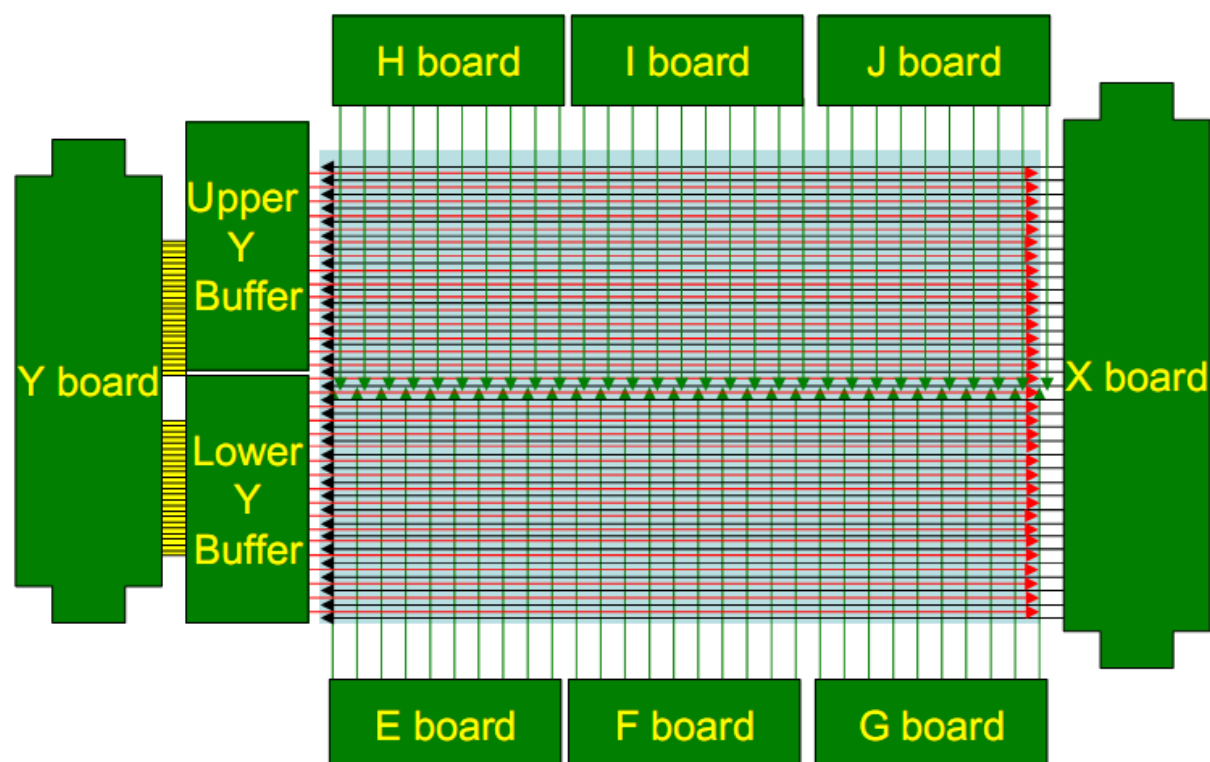
Dual Scan Plasma Module/Panel

1) Power Supply (some Plasma Module not include)	6) Address Buffer Board/s
2) SCAN/SUSTAIN Board	a) Y-FPC
3) SUSTAIN Board	b) Z-FPC / X-FPC
4) Logic Board	c) TCP (or COF)
5) SCAN Buffer Board/s	

Samsung Single Scan Plasma Panel Board Layout (42")



Samsung Dual Scan Plasma Panel Board Layout (50")



3.3- Plasma Module PCBs Terminology/Name Chart

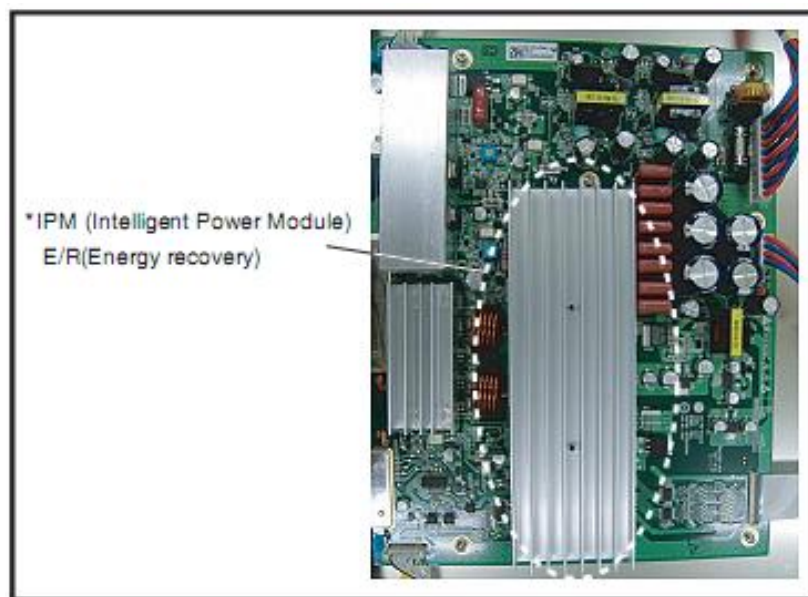
Plasma Module Manufacturer	LG	Samsung	Panasonic
Scan Board/ Sustain Board	Y-SUS Board (Y-Board) Y-Drive (Scan)	Y-Main (Y-Board) Y-Drive - X/Y Main (X and Y board 2 in 1)	SC Board Scan Drive
Sustain Board	Z-SUS Board (Z-Board) Z-Drive	X-Main (X Board) X-Drive - X/Y Main (X and Y board 2 in 1)	SS Board Sustain Drive -SN Board (Combined with SU & SD boards) PSS Board (P+SS)
Scan Buffer Board	Y-Drive Top Y-Drive Bottom	Y-Buffer (UP) Y-Buffer (LOW) Y-Main Scan X-Buffer	SU Board (Upper) SD Board (Lower) Scan out (Upper) Scan out (Lower) SM Board (SU+SD)
Address Buffer Board	X-Buffer Board XR,XL or XC (Center)	E-Buffer F-Buffer or G-Buffer - Logic Buffer (E,F,G)	C1, C2,C3 Boards - Data Driver (Lower Left) - Data Driver (Lower Center) - Data Driver (Lower Right)
Logic Board	CTRL Board - Logic Control Board	Logic Main Board Logic Board	D Board DG Board - Logic Control was Built-In A Board (latest model)
Other Boards	- SMPS= Power Supply Unit - VSC board= Video Scan Converter board - DC-DC Converter board - 3D Formatter Board	- PSU= Power Supply Unit	P Board= SMPS A Board= Main Board PSS Board= SMPS + SS Boards 2 in 1.

3.4- Plasma Module PCB Boards and Function

Description

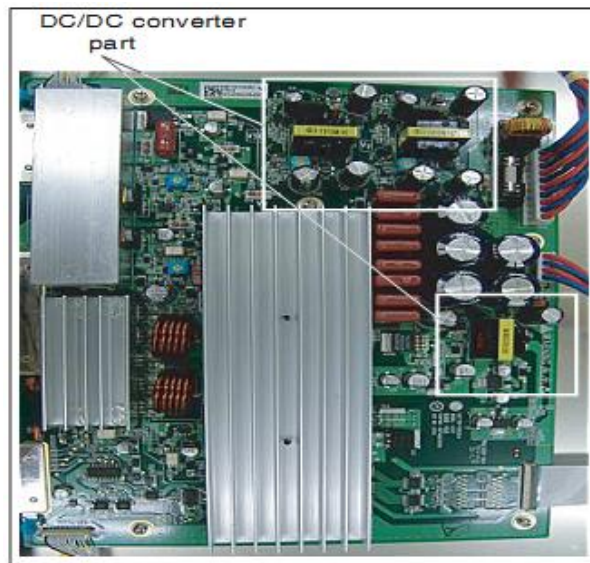
The Plasma Module PCB boards function in Plasma TV. Here is using the LG Plasma Module as a reference. For different Plasma Module manufacturer, their name PCB board, you can refer to Plasma Module PCB Name Chart. All their PCB boards function is nearly same.

Y-SUS Board (Y-Sustain board)

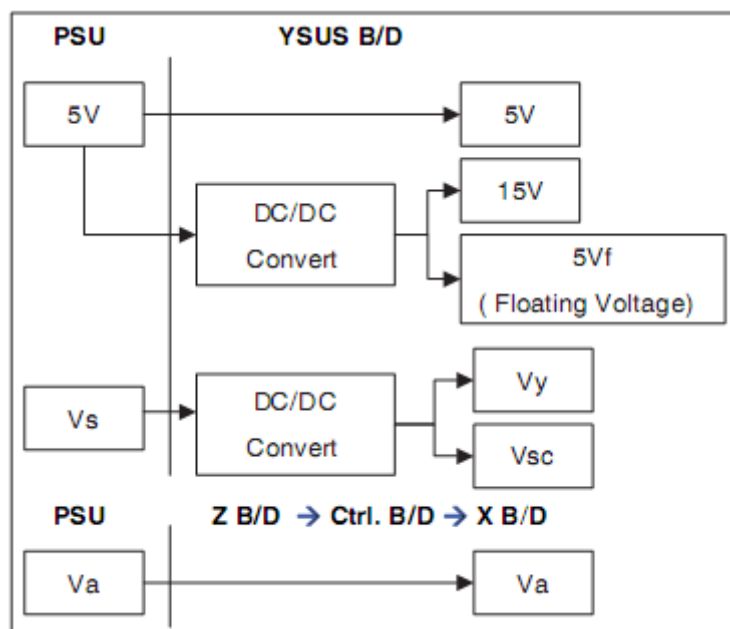


Y-SUS board generates SUSTAIN, RESET and Vsc (SCAN) voltages, and supplies them to the Y-Drive board (Top & Bottom). Main components inside the Y-SUS board are IPM, Diode, FET, Electrolytic Capacitor and etc.

DC/DC Converter Part

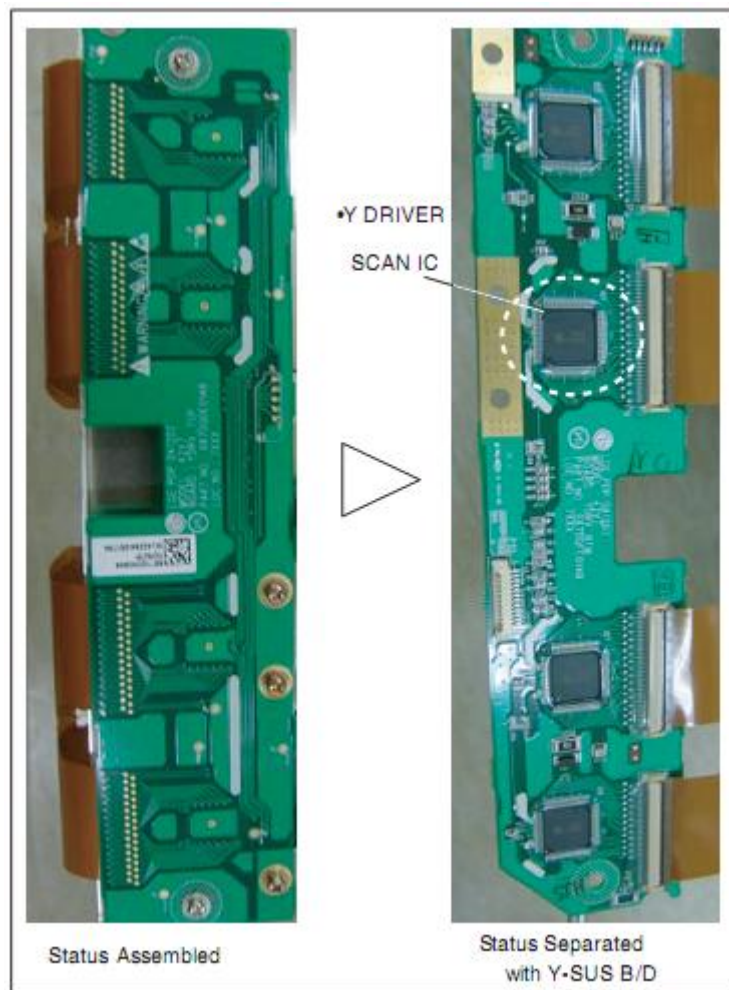


The purpose of this DC/DC converter part is to convert voltages from 5V, Vs and Va (from PSU), the DC/DC converter makes 5V, 15V, Vy, Vsc, 5Vf and Va, which are essential for each board.



[DC/DC Converter block diagram](#)

Y-Drive Top & Y-Drive Bottom



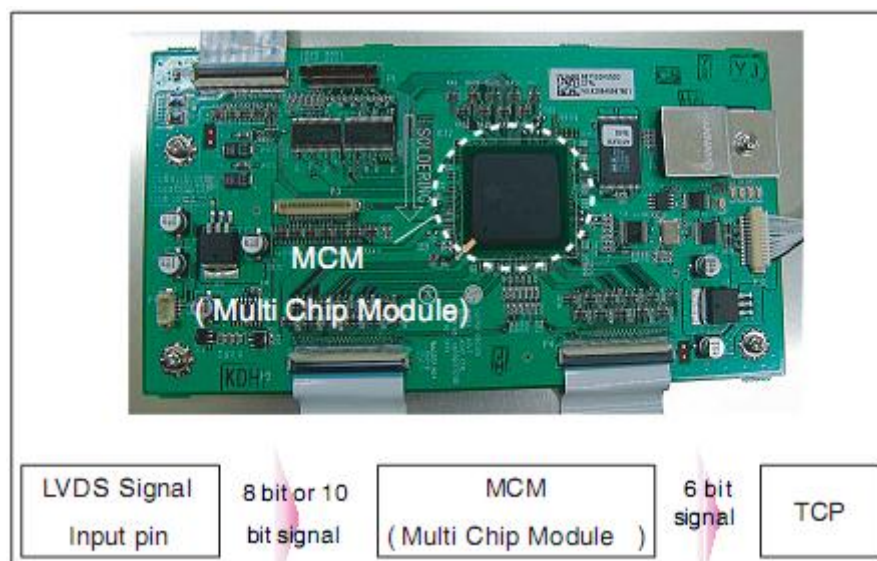
In the latest model of plasma tv, they are just using one Y-Drive board (Y-Drv board) only. It is to supply SUSTAIN, RESET waveform which are made by the Y-Sustain board and are supplied to the Plasma Panel through the SCAN DRIVER IC. The Y-drive board supplies a waveform that selects the horizontal electrodes (Y-SUSTAIN electrode) sequentially. The potential difference is 0V between GND and Vpp of Driver IC in SUSTAIN period. It's being generated potential difference between GND and Vpp only in SCAN period.

Z-SUS Board (Z-SUSTAIN board)



The Z-SUS board make the SUSTAIN and ERASE pulses that generates SUSTAIN discharge in the Panel by receiving LOGIC signals from Control board (CTRL board). This waveform is then supplied to the Panel through FPC (Z). Their main components inside this Z-SUS board are IPM, FET, Diode, E/R Coil, Electrolytic Capacitors and etc.

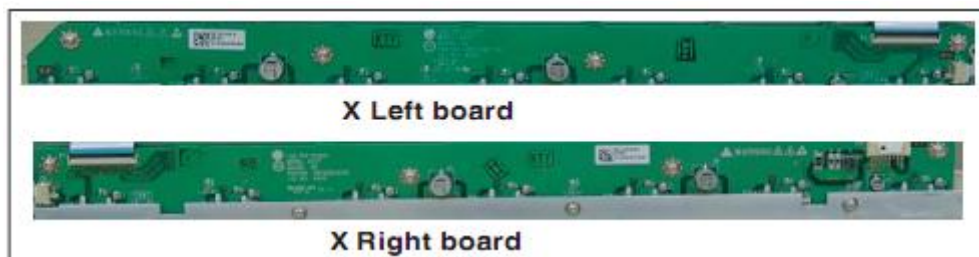
CTRL Board (Logic Control board)



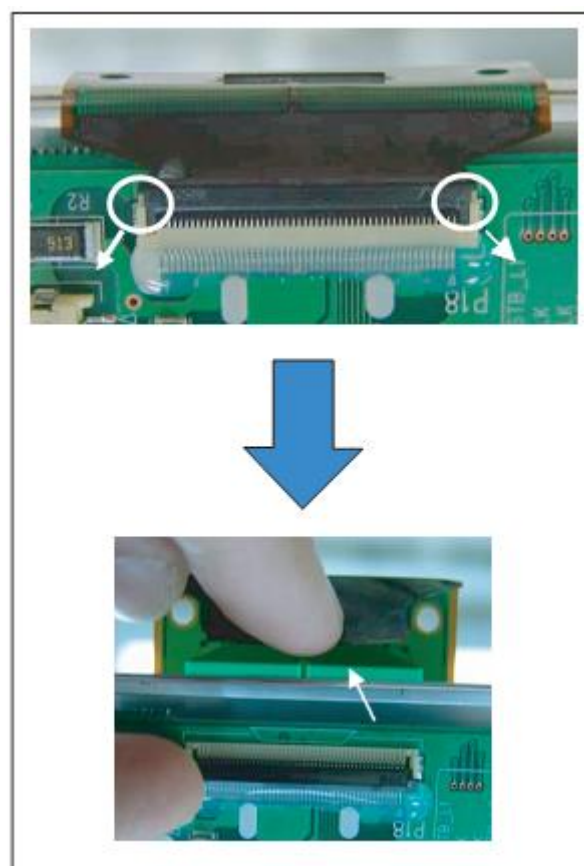
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The CTRL board creates signal processing and controls many FET on each DRIVER board with R, G and B signals. Firstly receive 5V and then use two voltages (3.3V/ 1.8V).

X-Board (X-Buffer board)



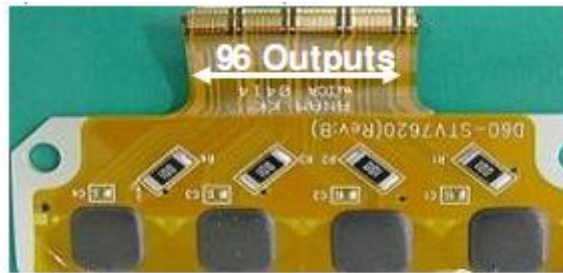
X-Board will receive LOGIC signal from the CTRL board and make ADDRESS PULSE (generates Address discharge) by ON/OFF operation and then supplies this waveform to TCP IC (data).



Lift up lock as indicated by the arrows (handle with care, as this part is easy to break). Pull TCP as indicated (handle with care, as the TCP film part is easy to damage).

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COF (Chip On Film)



The Chips and components are soldered on a flexible foil that is glued to a heat sink plate which is screwed onto the X Buffer boards. COF can found in older models of plasma tv.

Checks:

- 1) Seating and locking in connector
- 2) Contamination of contacts
- 3) Bad soldering & chip resistance
- 4) Cracks in foil

TCP (Tape Carrier Package)



The TCP IC is to supply a waveform which is made by the X board to Plasma Panel and to select an output pin that is controlled by TCP when “on” or “off” (192 output pins per IC).

- TCP is package type, which is made by Direct Bonding between IC and electrode film.
- It is more effective than Wire Bonding type by increasing number of Data Driver IC output pins (96 pins => 192 pins, pitch < 80um).

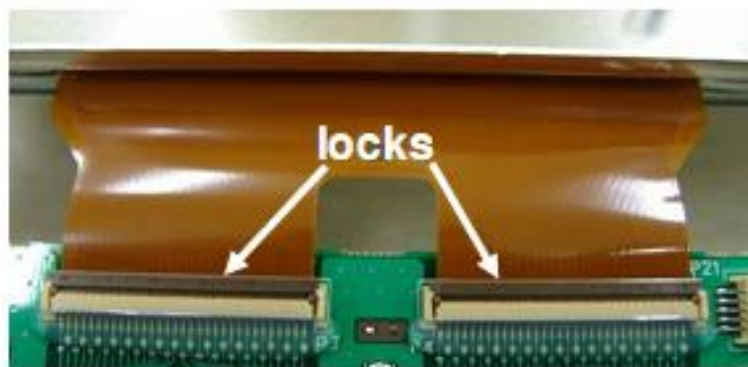
<http://www.lcdrepairguide.com/plasma/>

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Checks:

- 1) Seating and locking in connector
- 2) Contamination of contacts
- 3) Bad soldering & chip resistance
- 4) Crack in foil

FPC (Flexible Printed Circuit)



This FPC is to supply a driving waveform to the Plasma Panel by connecting a PAD electrode of the Panel with a PCB (Y and Z boards).

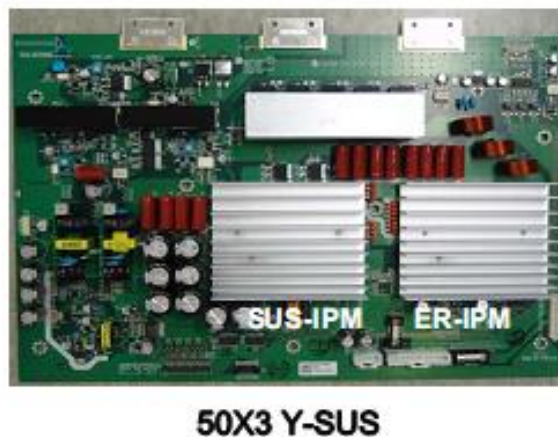
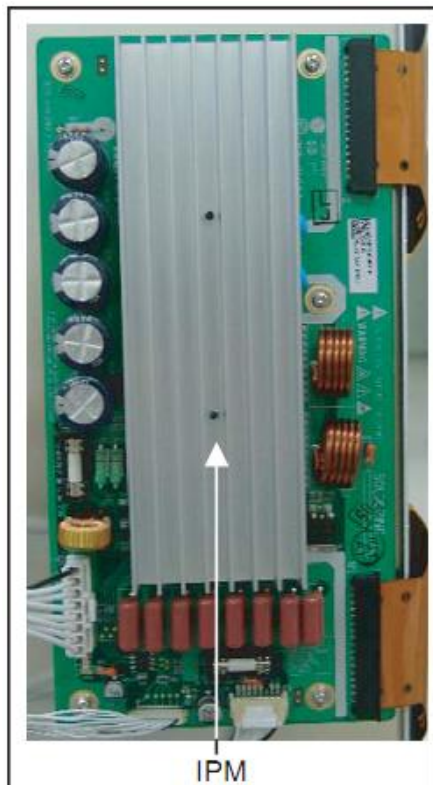
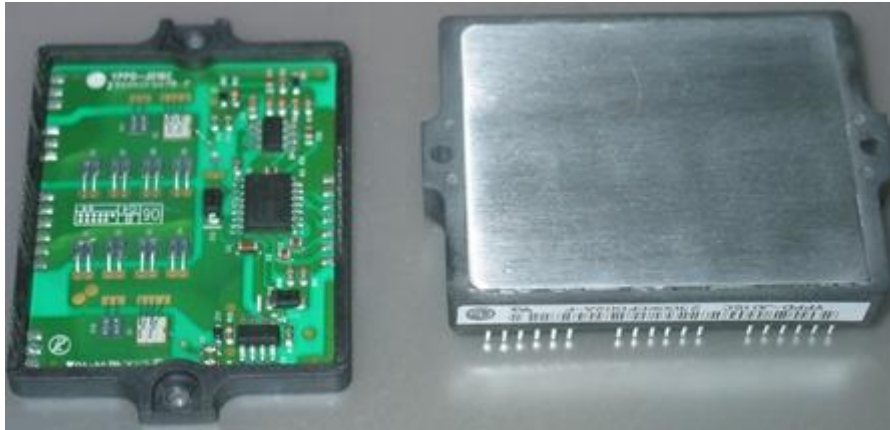
- There are two types of this for the Y board: One is single-sided; the other is double-sided (these have a pattern on it).
- For Z board there is no pattern, single-sided and Beta type (all of copper surface).

Checks:

- 1) Seating and locking in connector
- 2) Contamination of contacts
- 3) Crack in foil

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IPM (Intelligent Power Module, some will call it as: Integrated Power Module)



Intelligent Power Module and the Sustain Pulse

It is attached at Y-board and Z-board to make Sustain waveform. Sustainer: supply a square wave to the Plasma Panel to make video. Main components are: IC, FET, Diode, Transistor, Capacitor, Resistor and Heat sink. Some latest model Plasma Module is not using the IPM module and it has change to FETs' now.

3.5- Plasma Module PCB Location & Structure

Different Plasma Module manufacturer, their Plasma Module has different design. Even same Plasma Module manufacturer but different model Plasma Module will have difference PCB structure too. For example, some latest plasma module, they have Top and Bottom Y-Drive boards are combining in one board only. Or some of the Plasma Module their CTRL board was combined with the X-Left Buffer board. In Samsung Plasma Module, their latest design is combine the Y-Board and X-Board in one call X/Y Main board. Also for the old model (2008) of Samsung Plasma TV, their Y-Buffer (Y-Drive) & Y Main was combining in 1 board. Some of the Panasonic Plasma Module their D board was built in to the A board (Main board) too.

So no matter how they change and modify PCBs, we must know the basic of how Plasma TV is working, then you can roughly know that what or where to start troubleshoot and repair it. The next chapter will let you know the LG, Panasonic & Samsung Plasma Module PCBs Location & their structure. For more this Plasma TV basic info, you can refer to the “Bonus-B Section” on download page section not in this eBook.

LG

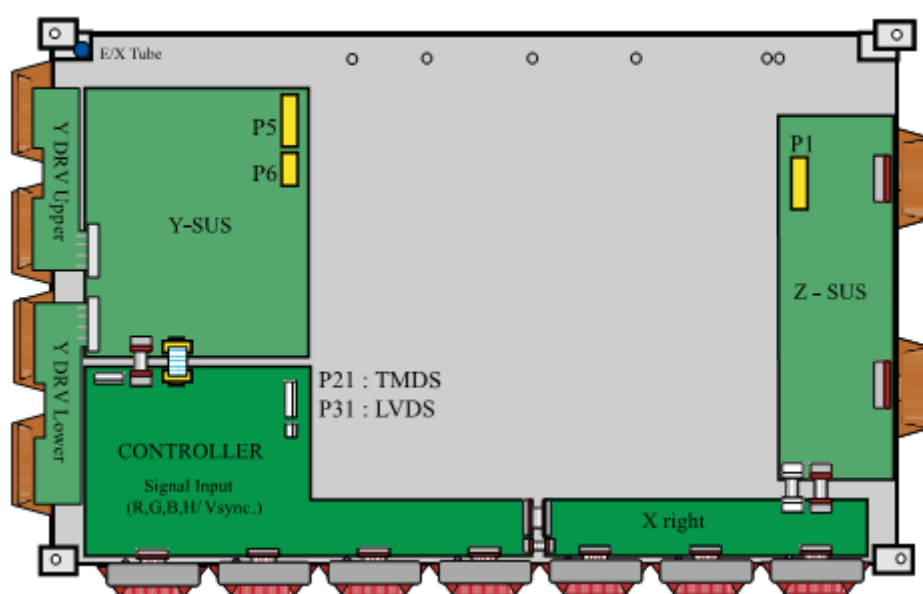
Plasma TV

4. LG Plasma Modules

The LG Plasma Modules/Panel has lots of the models. For examples, PDP42G2#### Panel is call a PDP42G2 Panel and so on.

Year 2003:

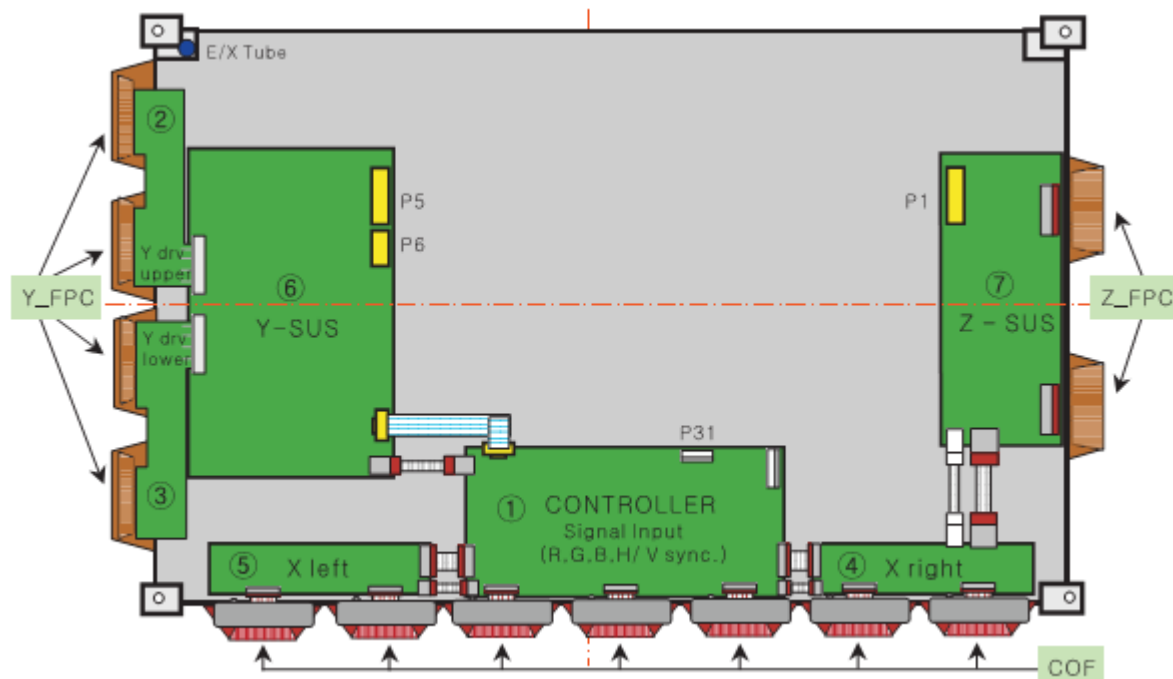
PDP42V5 Plasma Module



NO	Part No.		Description
1	6871QCH025A	PWB(PCB) ASSY	TMDS CTRL B/D ASSY
2	6871QCH029A	PWB(PCB) ASSY	LVDS CTRL B/D ASSY
3	6871QDH051A	PWB(PCB) ASSY	Y DRV UPPER B/D ASSY
4	6871QDH052A	PWB(PCB) ASSY	Y DRV LOWER B/D ASSY
5	6871QRH034A	PWB(PCB) ASSY	X RIGHT B/D ASSY
6	6871QYH027A	PWB(PCB) ASSY	Y SUS B/D ASSY
7	6871QZH030A	PWB(PCB) ASSY	Z SUS B/D ASSY

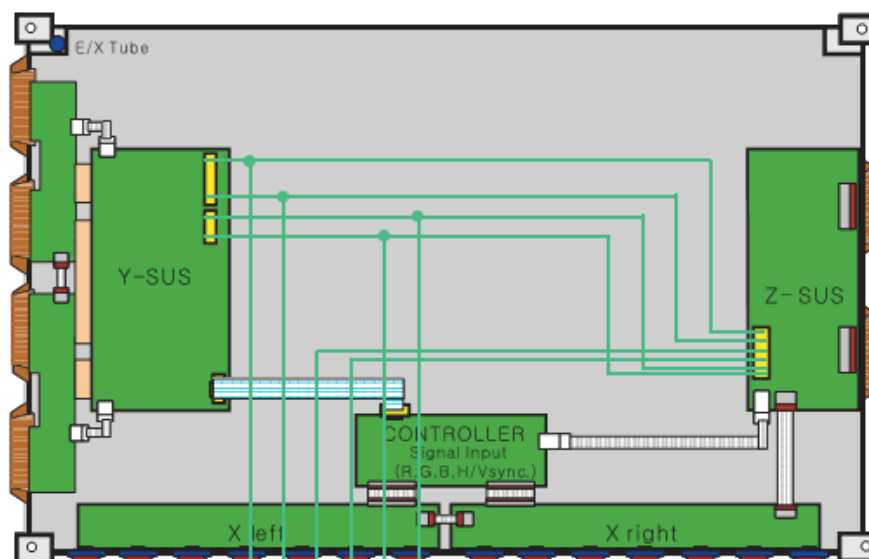
Year 2004:

PDP42V6 Plasma Module



NO	Part No.		Description
①	6871QCH034A	PWB(PCB) ASSY	LVDS CTRL B/D ASSY
②	6871QDH066A	PWB(PCB) ASSY	Y DRV UPPER B/D ASSY
③	6871QDH067A	PWB(PCB) ASSY	Y DRV LOWER B/D ASSY
④	6871QRH037A	PWB(PCB) ASSY	X RIGHT B/D ASSY
⑤	6871QLH034A	PWB(PCB) ASSY	XLEFT B/D ASSY
⑥	6871QYH029A	PWB(PCB) ASSY	YSUS B/D ASSY
⑦	6871QZH033A	PWB(PCB) ASSY	Z SUS B/D ASSY

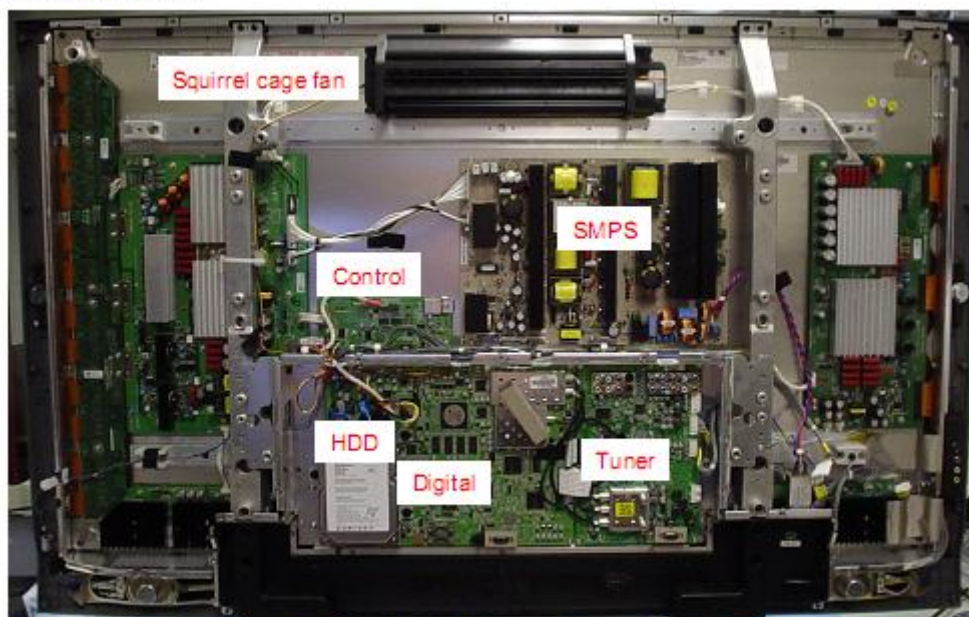
PDP42V7 Plasma Module



Year 2006:

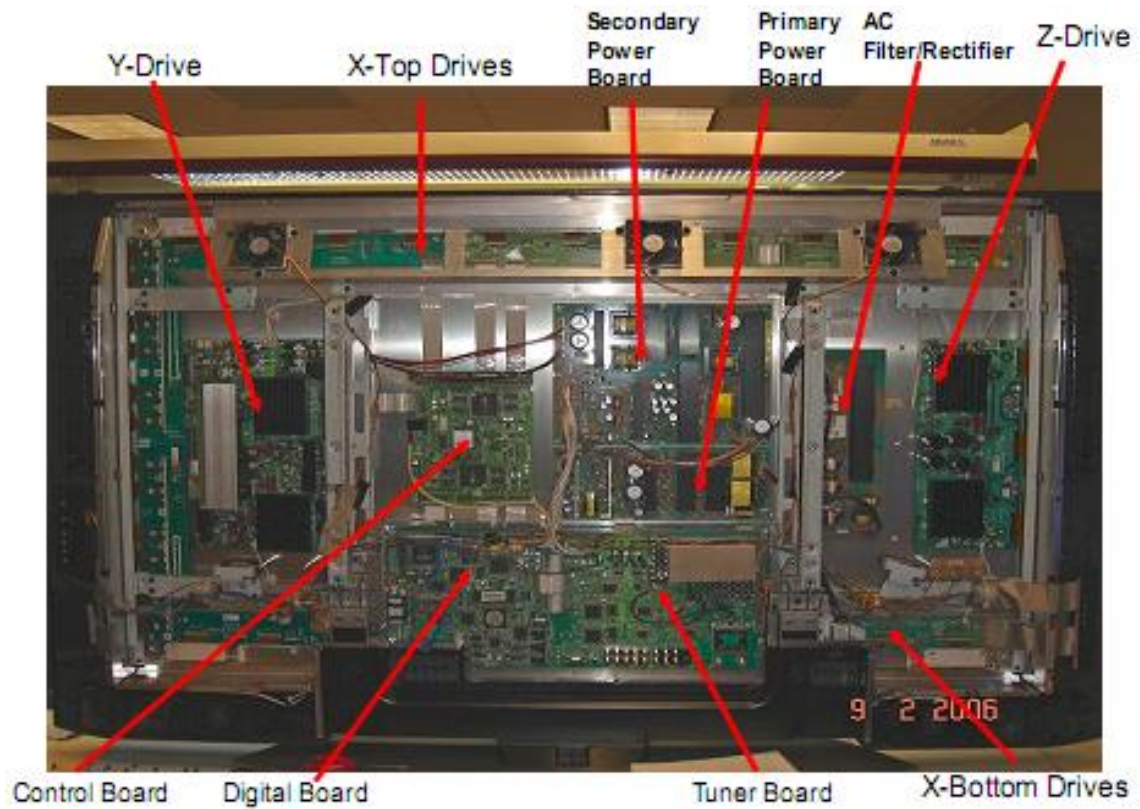
PDP50X3 Plasma Module –LG 50PC1DR Plasma TV

50PC1DR LAYOUT



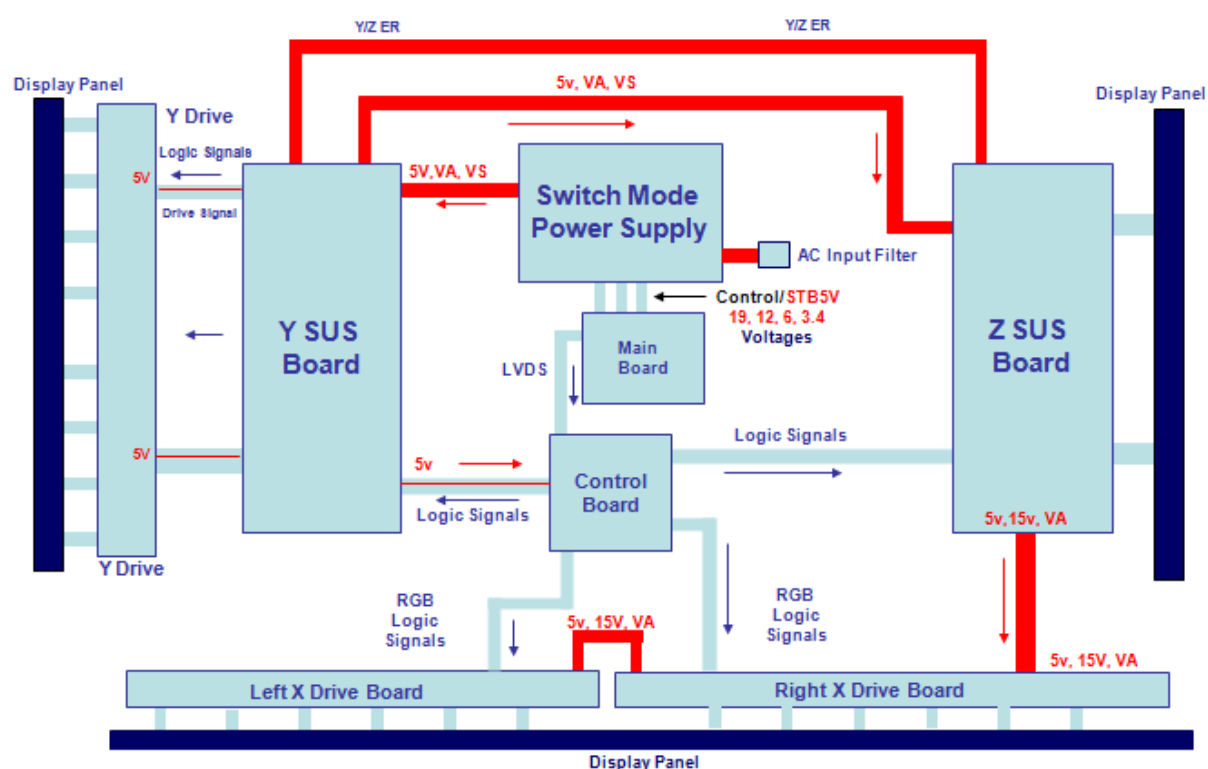
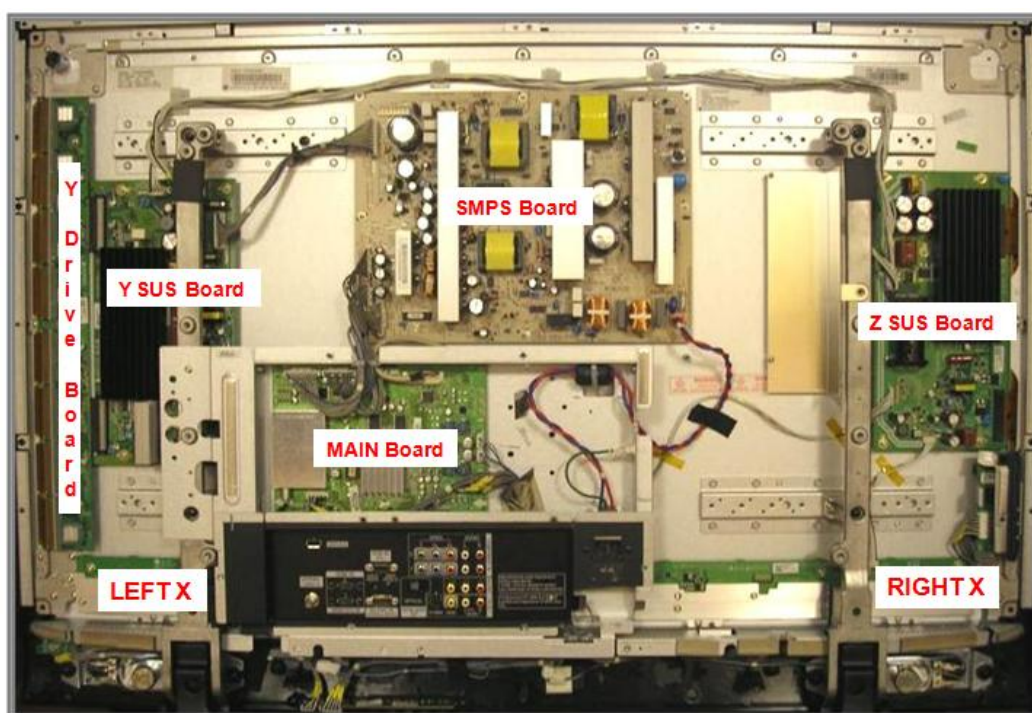
NOTE: This fan does not startup when the unit is powered on from a cold start for 2-3 minuets.

PDP60X6 Plasma Module- LG 60PY2DR Plasma TV



Year 2007:

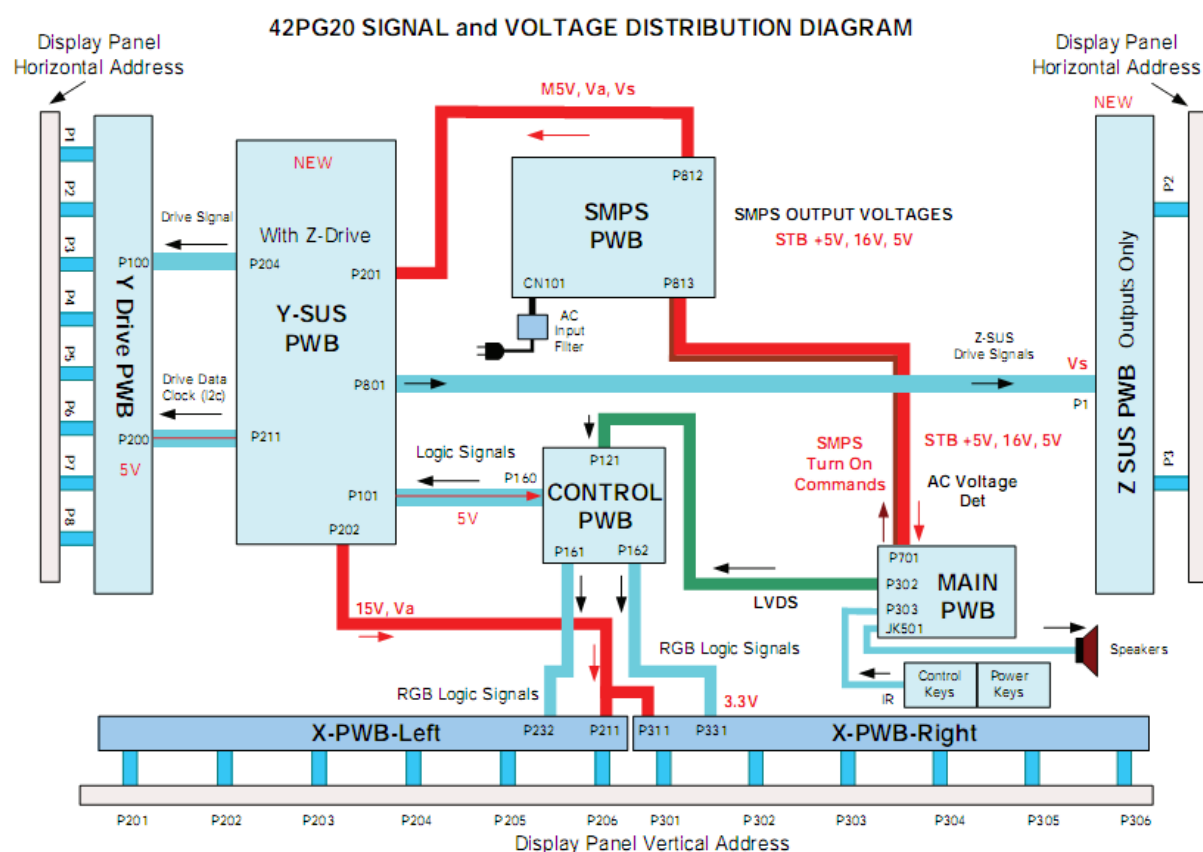
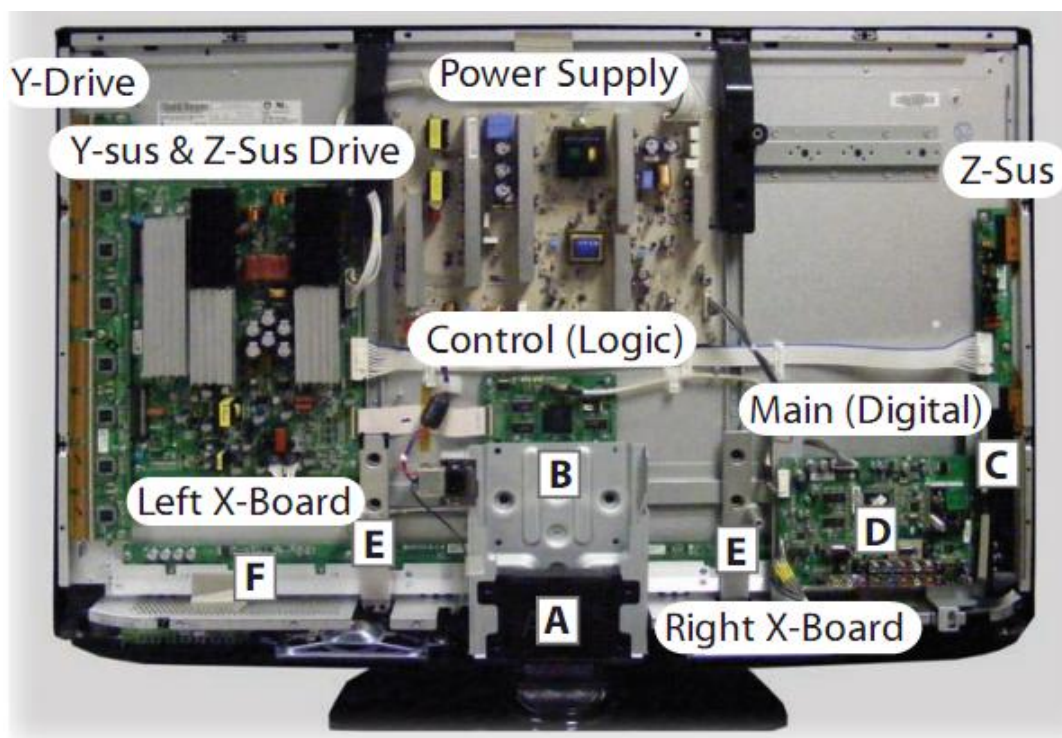
PDP42X4A Plasma Module



LG 42PC5DC Plasma TV (PDP42X4A Panel) Signals & Voltages Distribution Diagram

Year 2008:

PDP42G2 Plasma Module

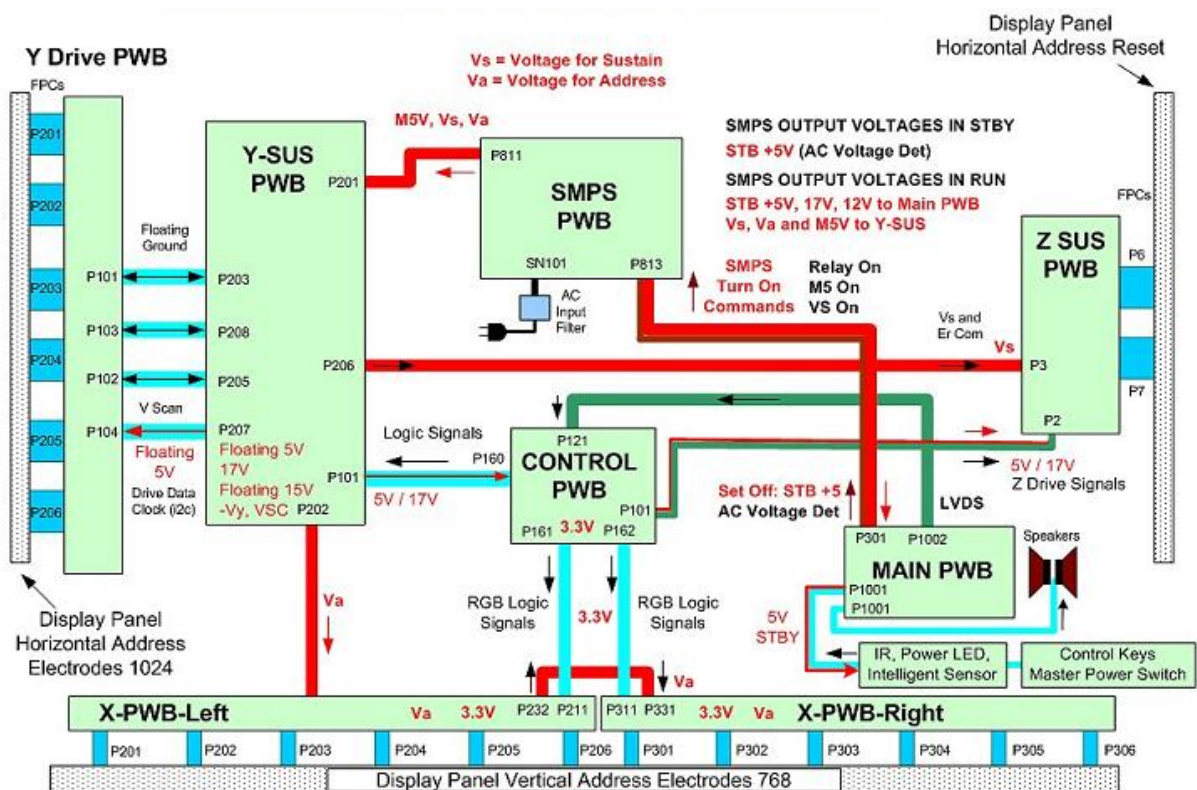
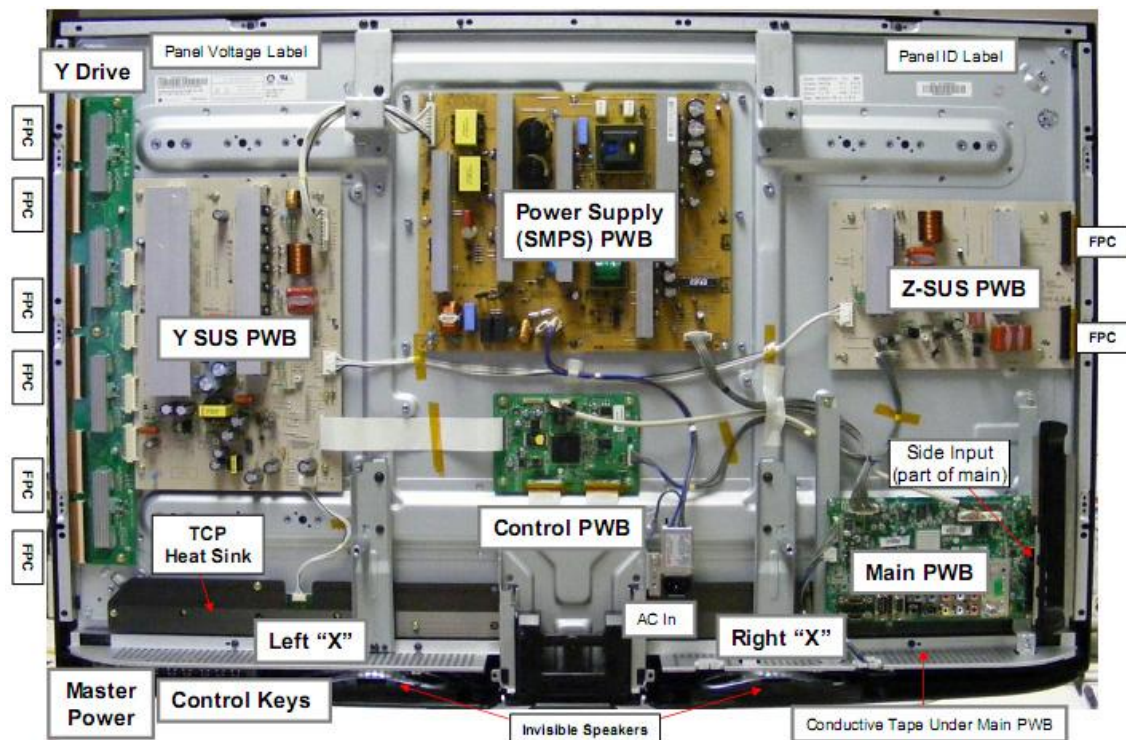


<http://www.lcdrepairguide.com/plasma/>

ImagineX Electronics

Year 2009:

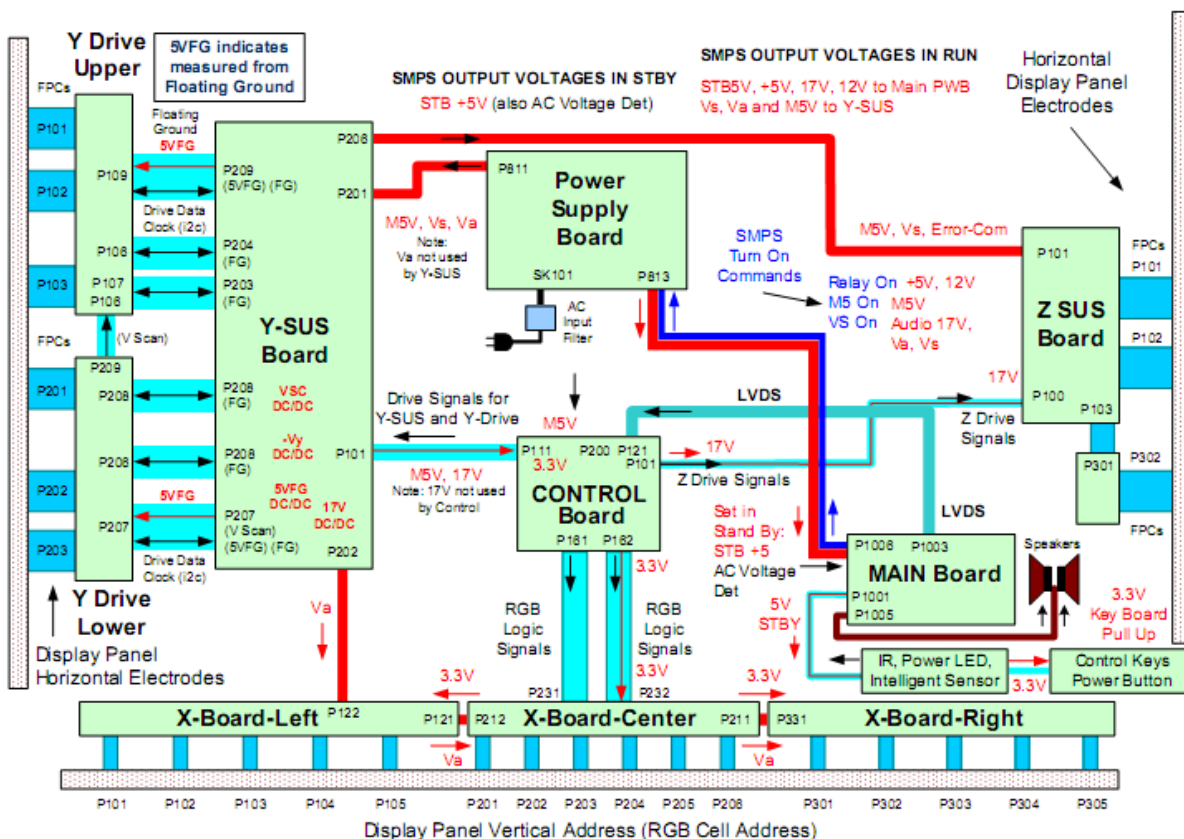
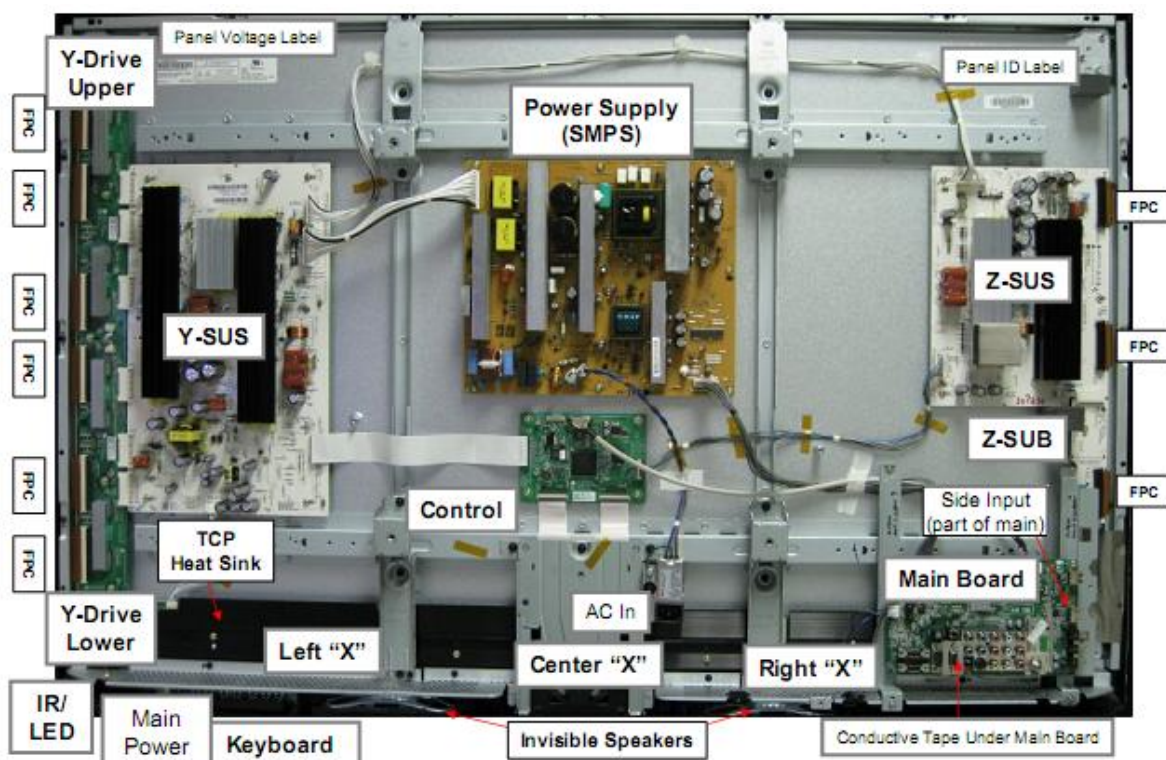
PDP42G2 Plasma Module



42PQ20 & 42PQ30 (42G2 Plasma Module) Signals and Voltages

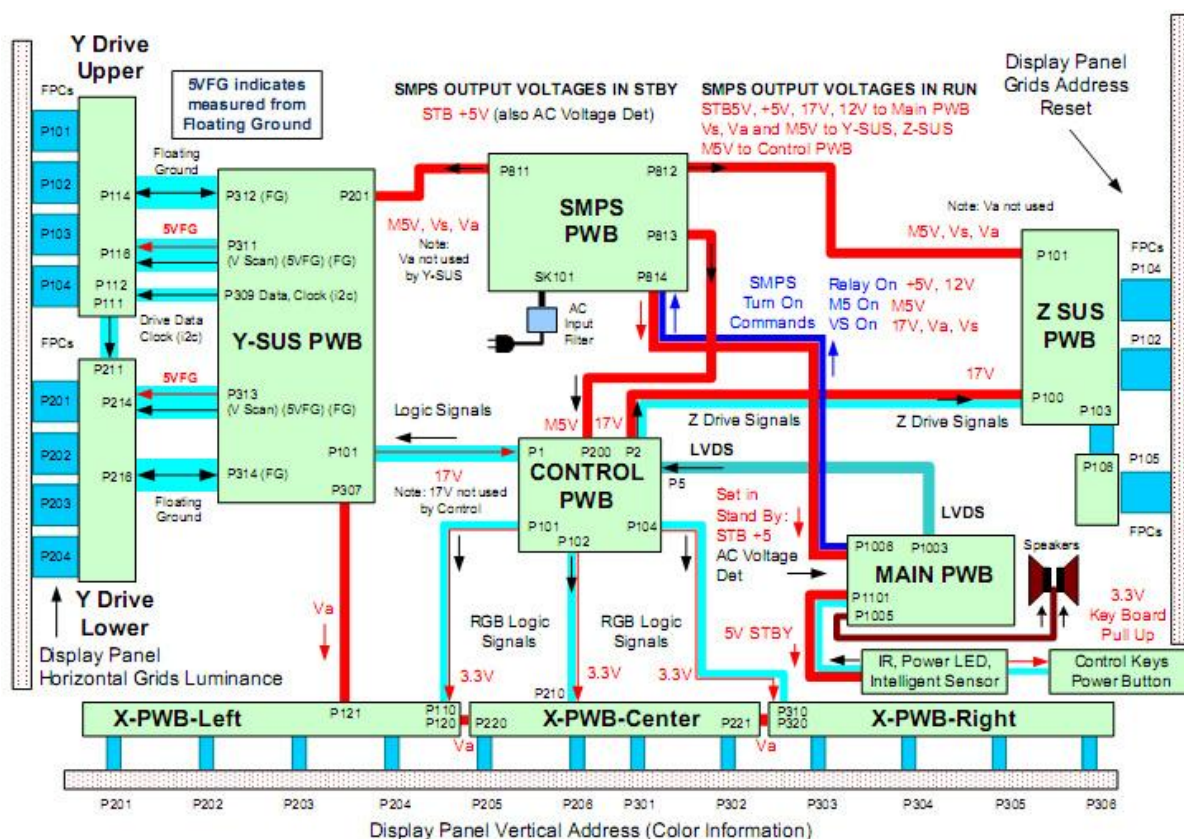
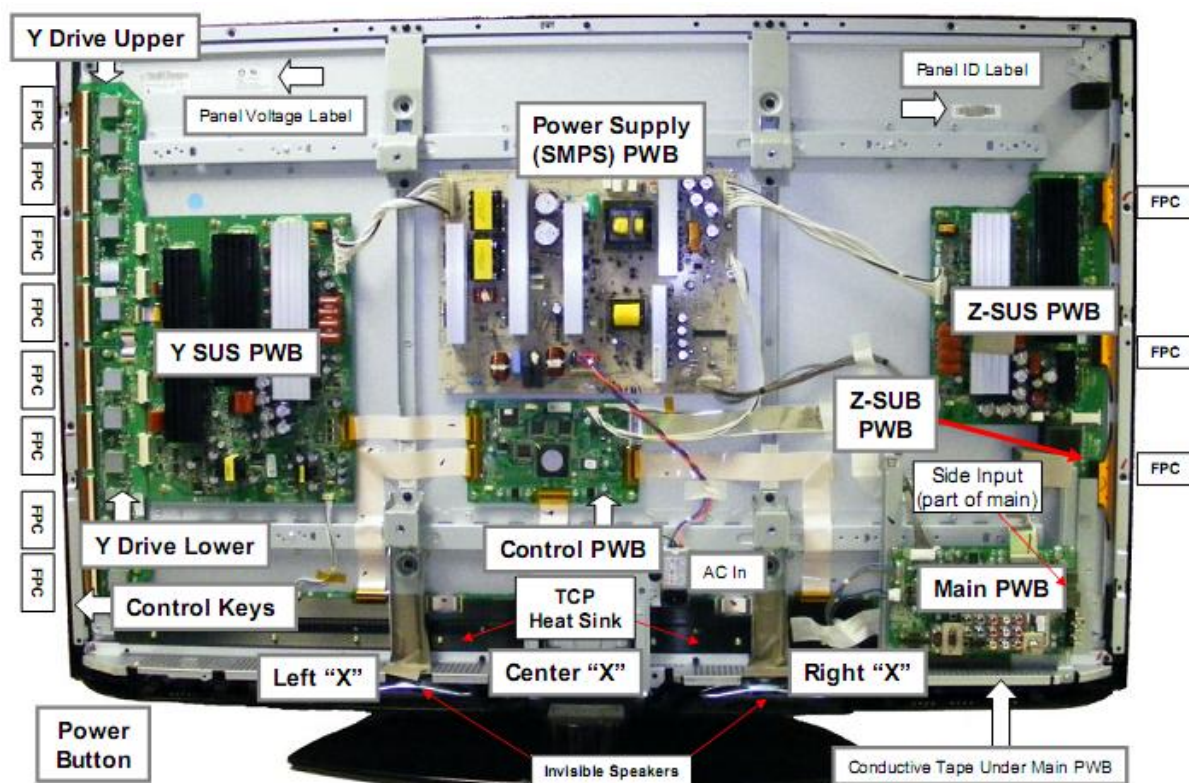
<http://www.lcdrepairguide.com/plasma/>

PDP50G2 Plasma Module



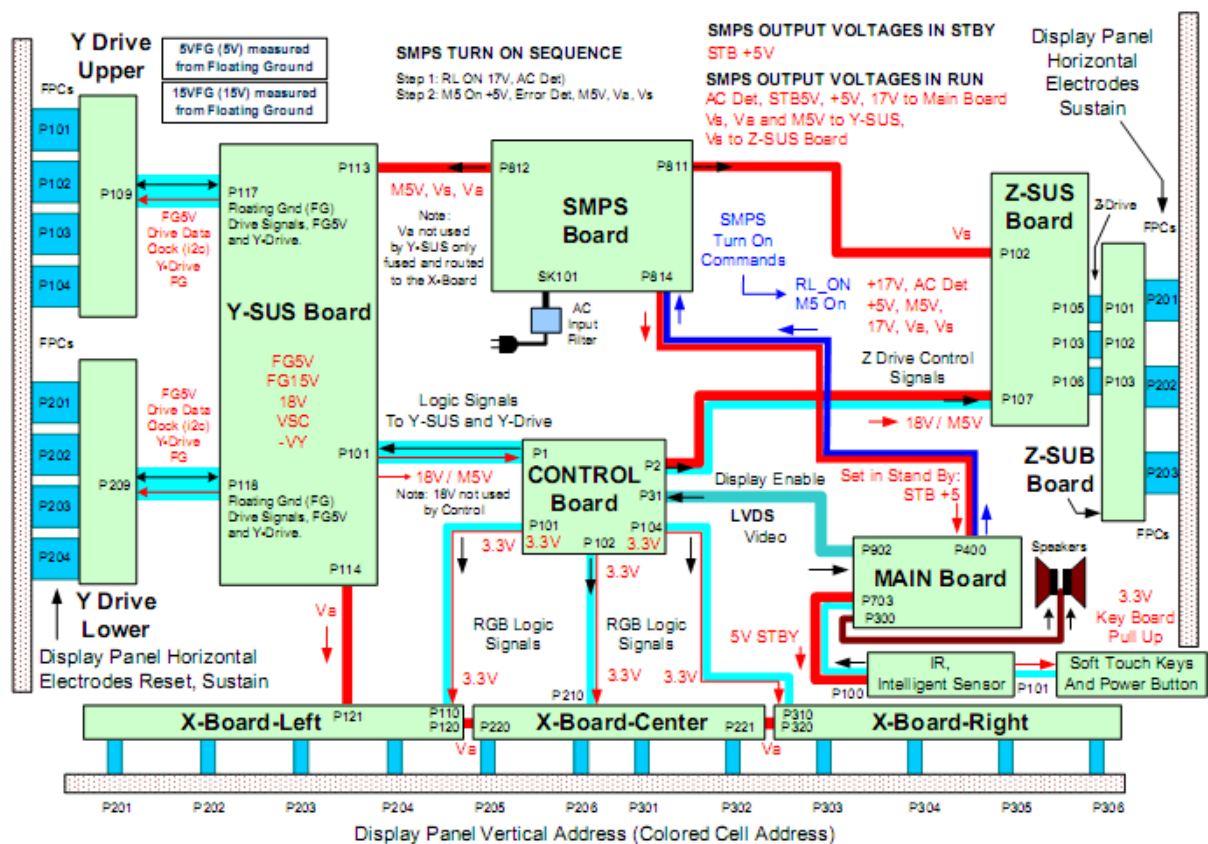
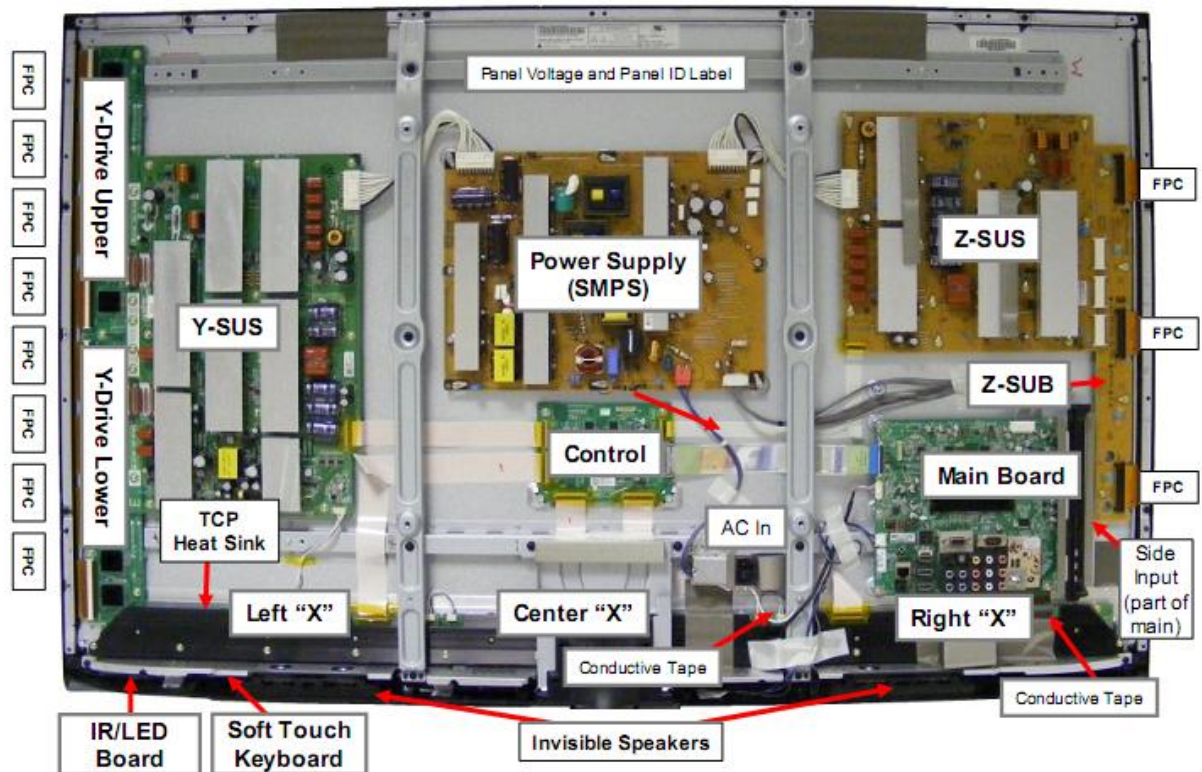
LG 50PQ30 (PDP50G2 Panel) Signal & Voltage Distribution Diagram

PDP50H3 Plasma Module



LG 50PS60 (PDP50H3 Panel) Signal & Voltage Distribution Diagram

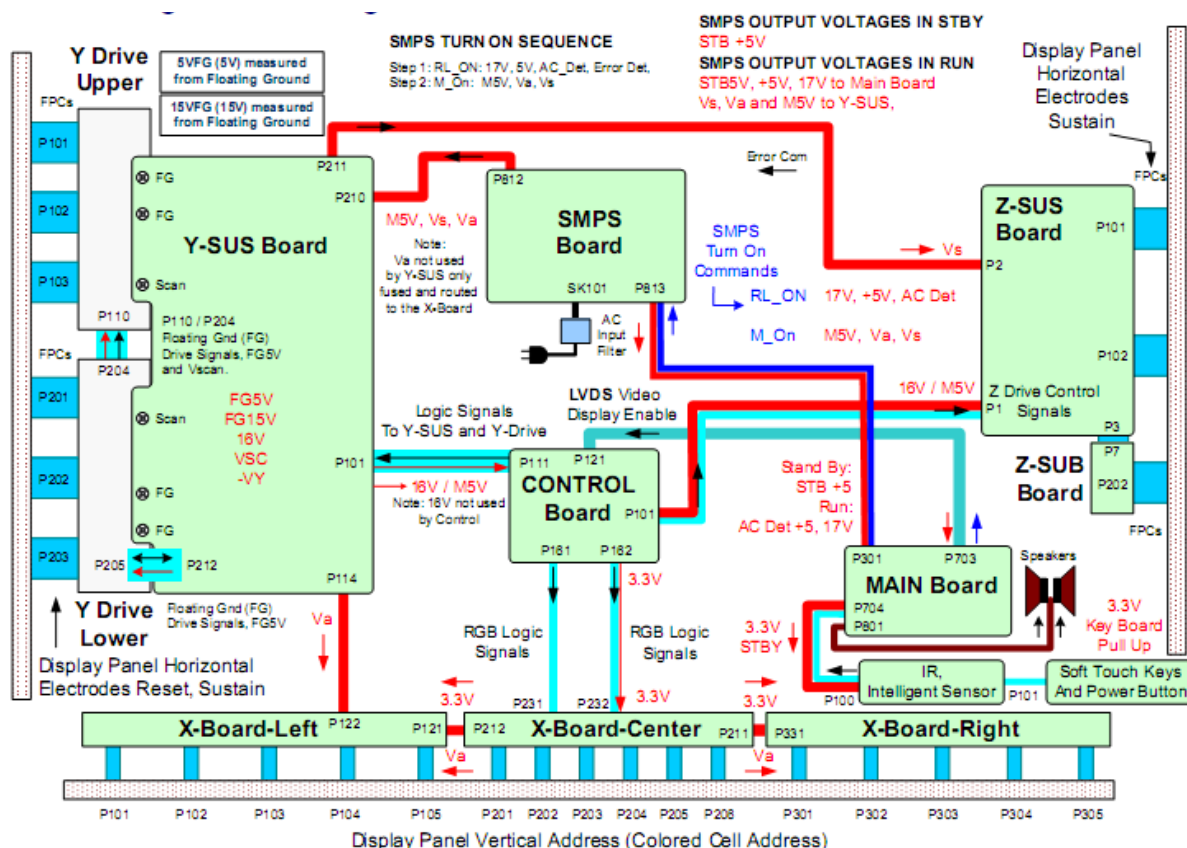
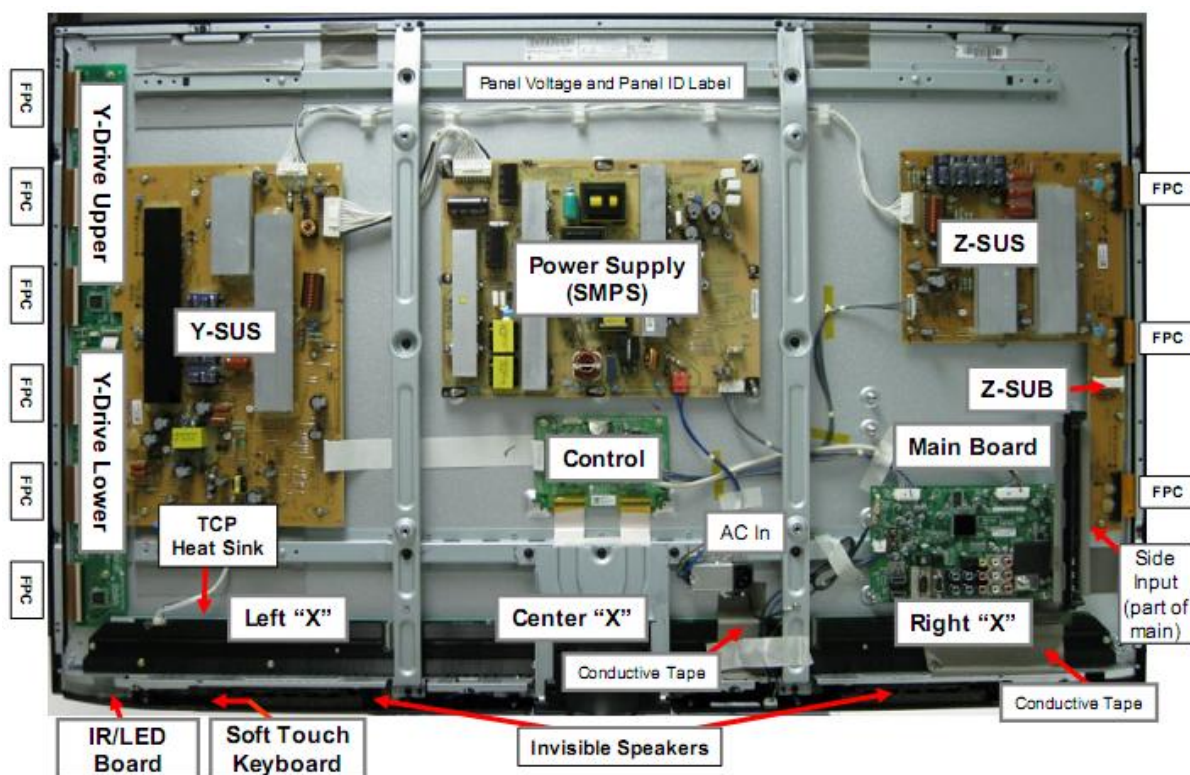
Year 2010: # PDP50R1 Plasma Module



LG 50PK750 (PDP50R1 Panel) Signal & Voltage Distribution Diagram

<http://www.lcdrepairguide.com/plasma/>

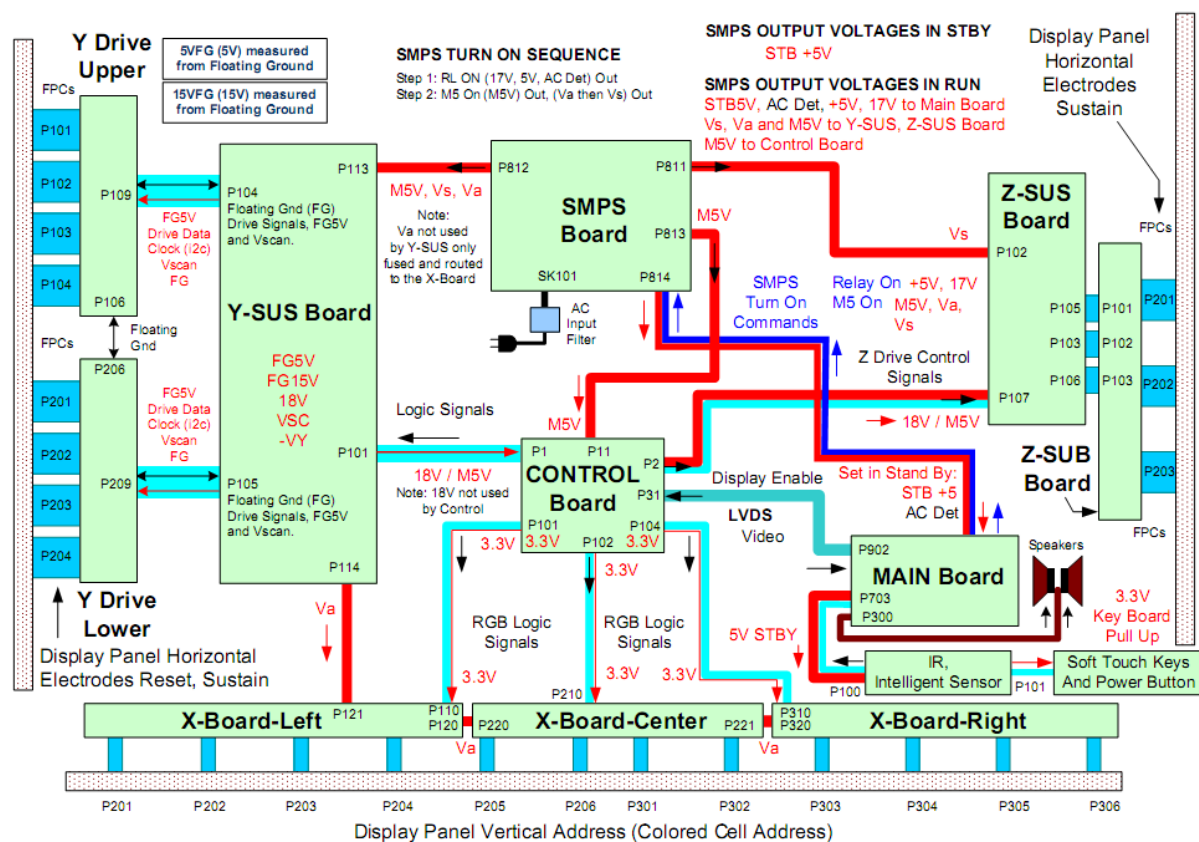
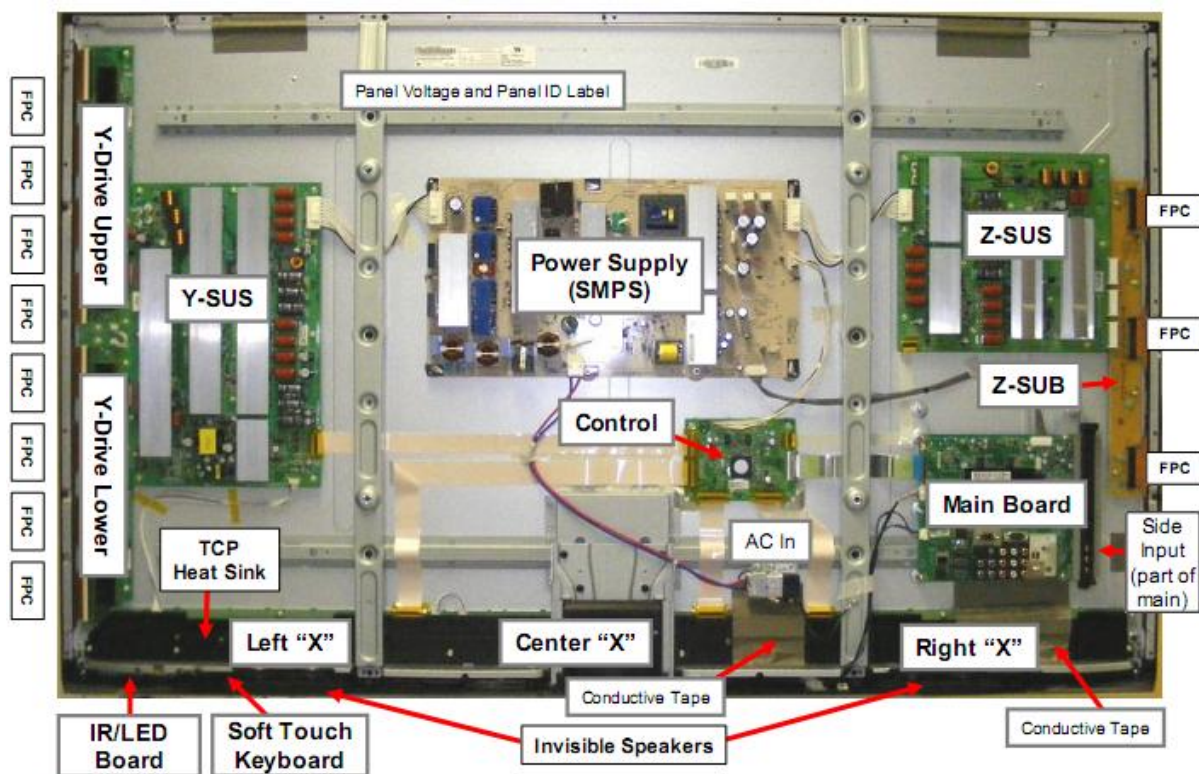
PDP50T1 Plasma Module



LG 50PJ350 Plasma TV (PDP50T1 Panel) Signal & Voltage Distribution Diagram

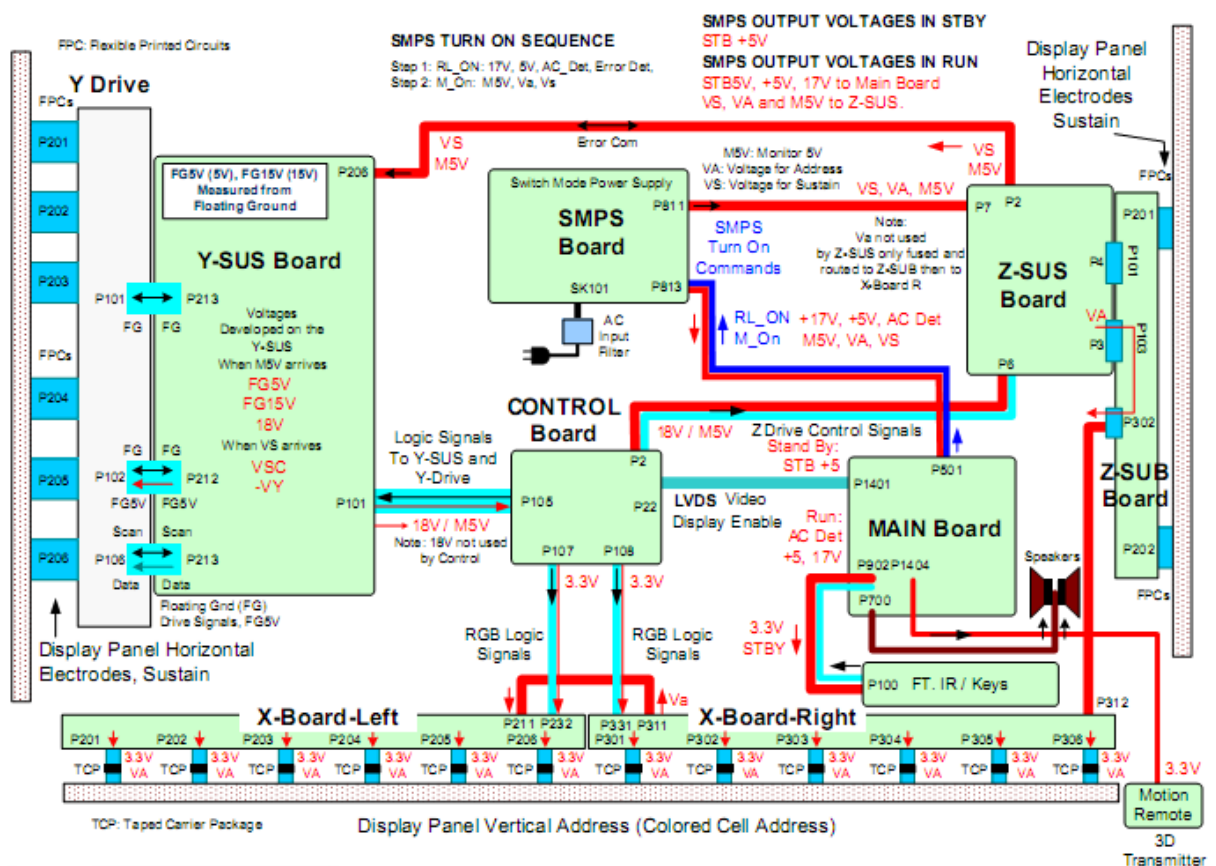
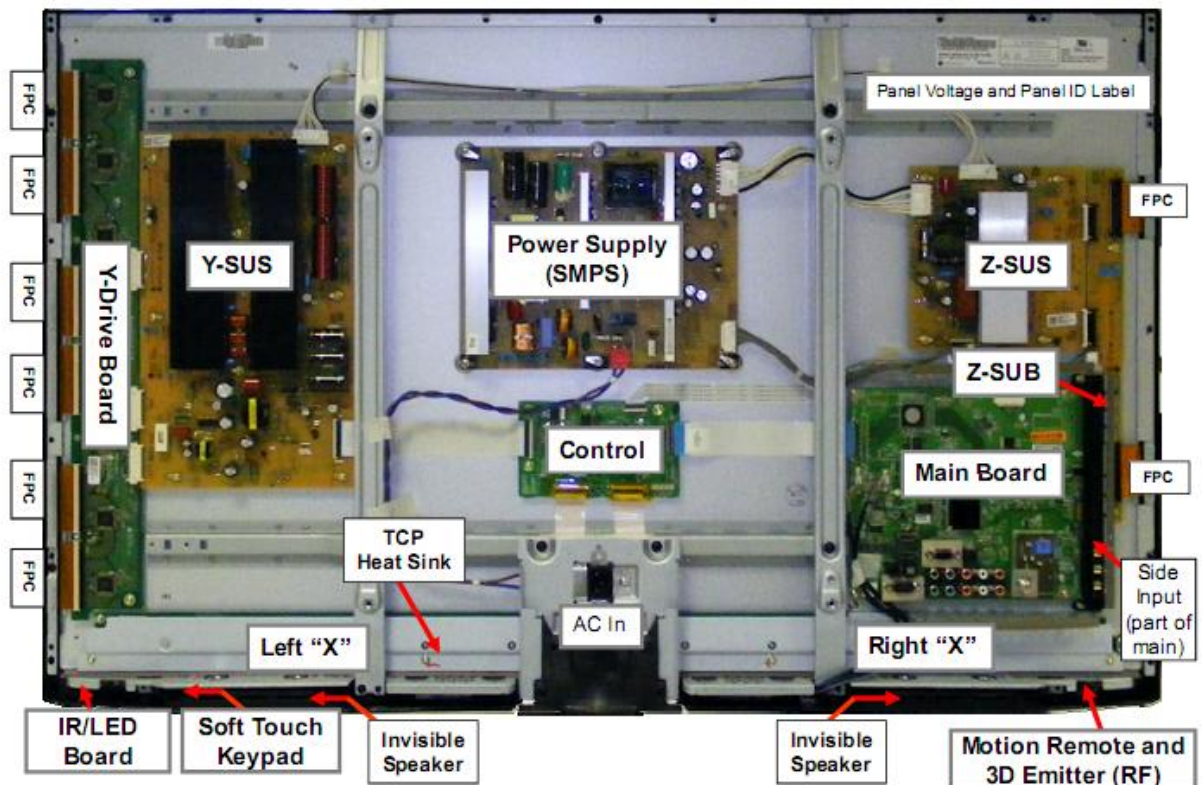
<http://www.lcdrepairguide.com/plasma/>

PDP60R1 Plasma Module



LG 60PK750 Plasma TV Signal & Voltage Distribution Block

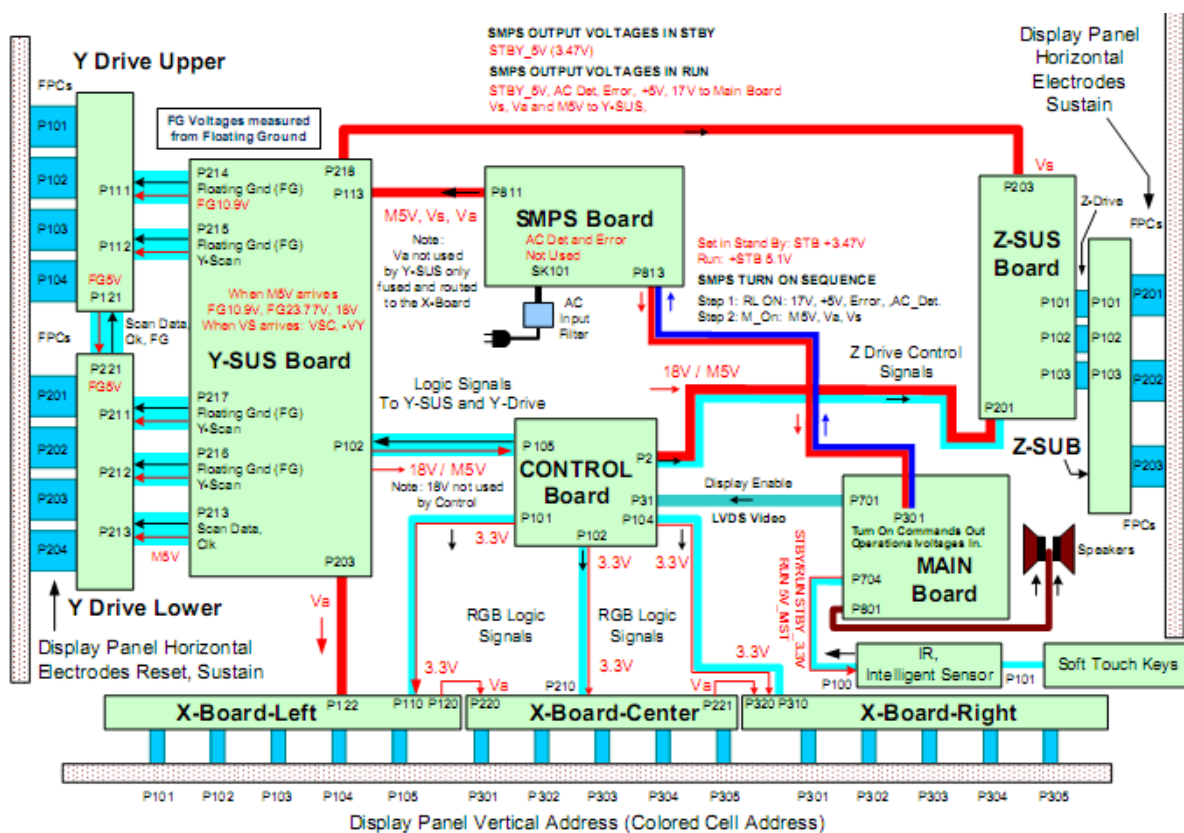
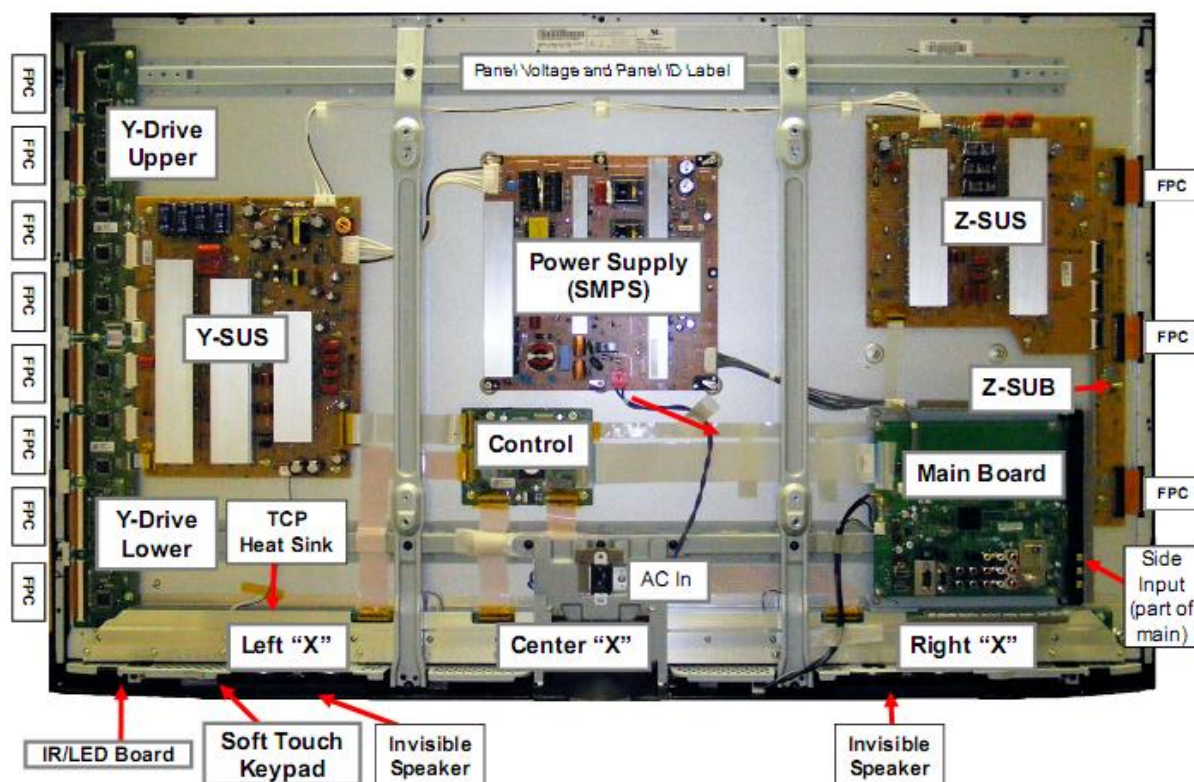
Year 2011: # PDP42T3 Plasma Module



LG 42PW350 (PDP42T3 Panel) Signal & Voltage Distribution Diagram

<http://www.lcdrepairguide.com/plasma/>

PDP50R3 Plasma Module



LG 50PV450 Plasma TV (PDP50R3 Panel) Signal & Voltage Distribution Diagram

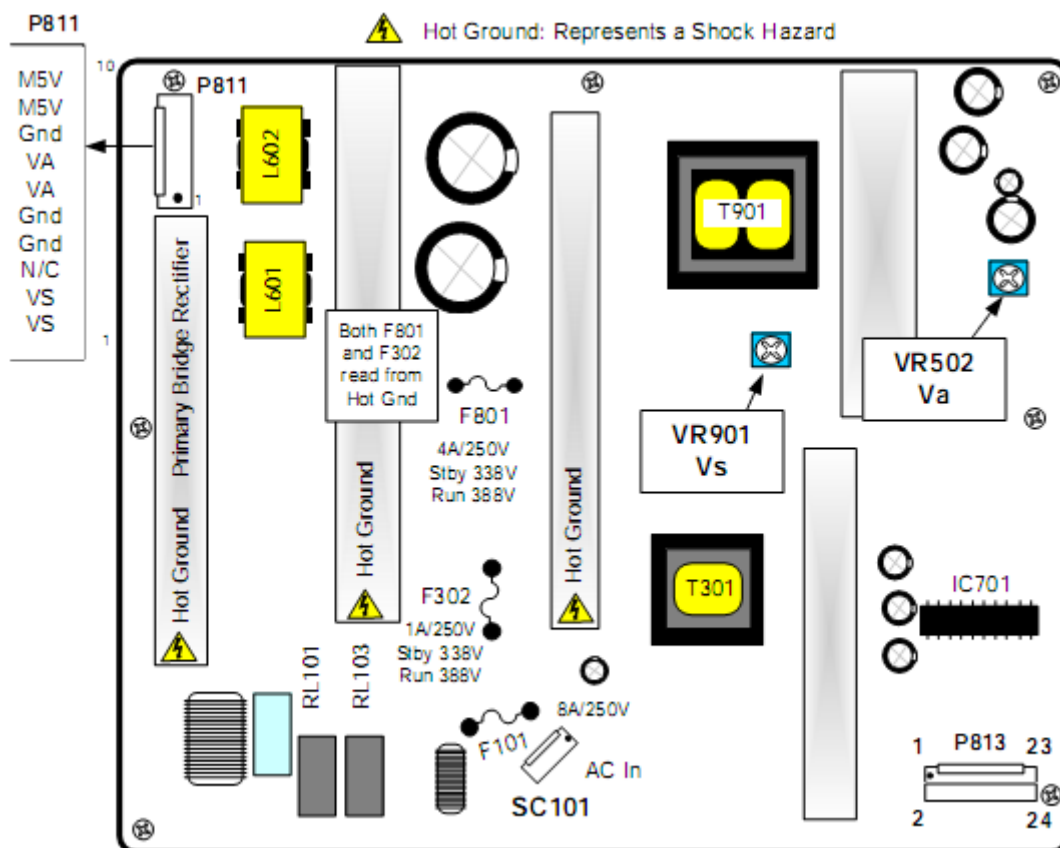
<http://www.lcdrepairguide.com/plasma/>

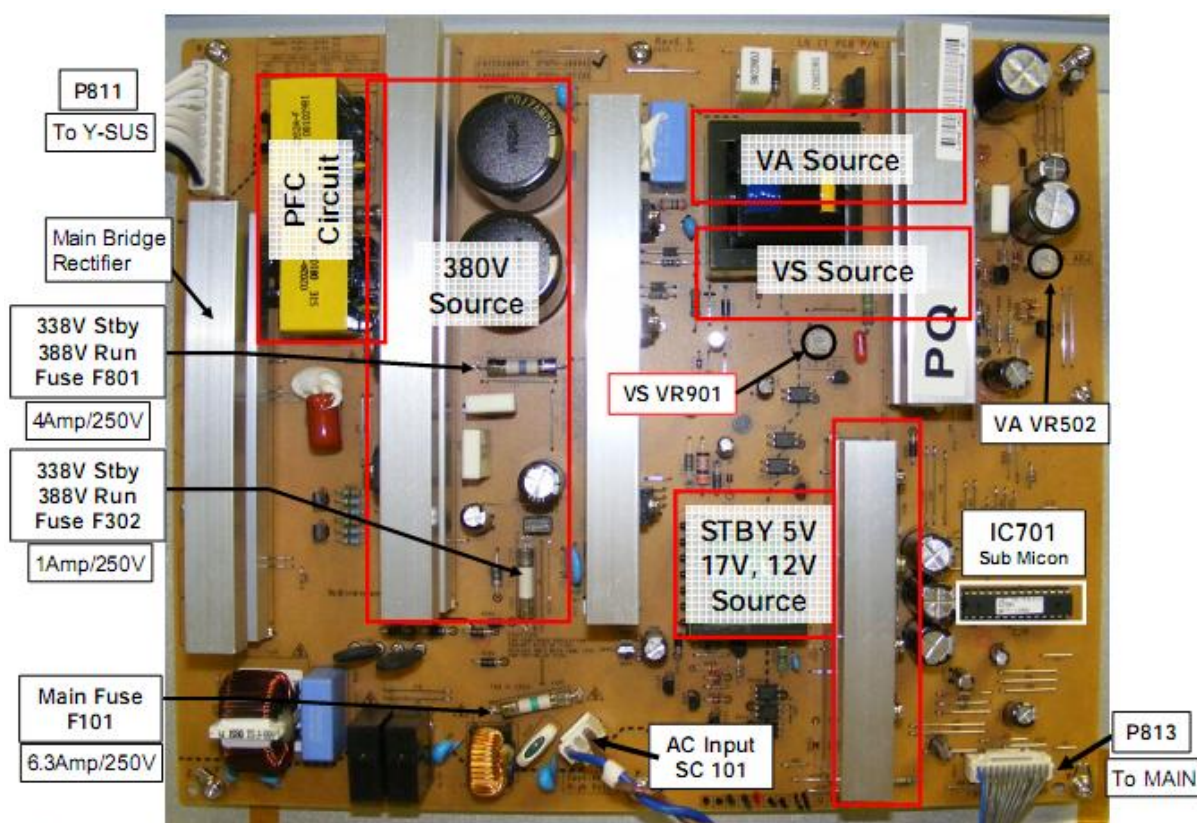
4.1- Power Startup Sequence for Plasma TV

The purpose to learn the power startup sequence or power on sequence when troubleshooting a possible power supply failure will simplify the process of isolating which circuit board failed to operate properly. This will let us understand how the Plasma TV is startup and the power supply (PSU) output all the voltages and supply to appropriate PCB boards. The Plasma TV power startup is different than the LCD/LED TV. So you need to understand and investigate the Power Startup Sequence and examine ways to locate quickly where the failure occurred.

LG Plasma TV Power Startup Sequence

A) LG 42PQ30 Plasma TV (PDP42G2 Module)

PSU /SMPS p/n: EAY58349601 (With VS_On Signal)



AC voltage is supplied to the PSU board at connector SC101 from the AC input filter. Standby 5V is developed from 90V source supply (which during run measure 359V). This supply is also used to generate all other voltages in the PSU.

The standby 5V voltage is routed to the Sub Micon (IC701) circuit on the PSU and through P813 to the Main Board for Main Micon (IC1) operation. AC detect pin 18, P813 is generated on the PSU by monitoring the AC input and rectifying a small sample voltage. This AC Detect Voltage (AC Det) is routed to IC701 the Sub Micon on the PSU and through pin 18 of PG813 to the Main Micon IC1 located on the Main board and is used to Reset Main board.

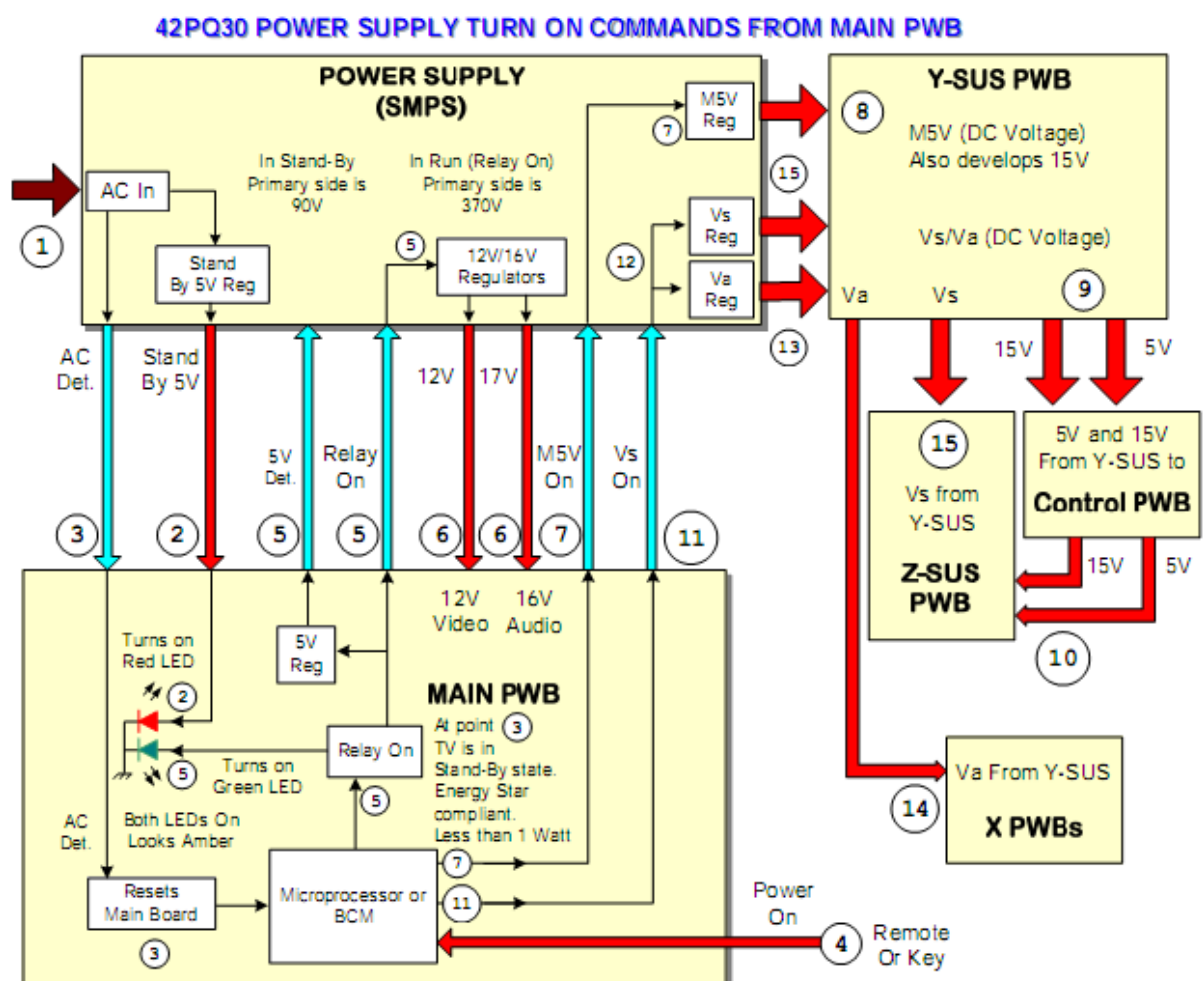
When the Main Micon IC1 on the Mainboard receives a “Power ON” command from either Power Button or IR signal from remote control it outputs a high called RL_ON signal. This signal first turns on a DC level shifter on the Mainboard which creates a voltage called 5V General. This 5V General now provides the pull up voltages which supply the output control circuits to the PSU. The RL_ON enters the PSU board (pin 19 of P813). At the same time, the 5V General voltage also creates a signal called 5V Det. This routed to the Main Micon IC1 and to the PSU (pin 17 PG813) notifying

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the PSU Sub Micon (IC701) that the Mainboard is functioning. The RL_ON Voltage is sensed by the Sub Micon circuit which causes the Relay Drive Circuit to close both relays RL101 & RL103 bringing the PFC source up to full power by increasing the 90V standby to 340V which can be read Fuse F801. At this time the 17V and 12V sources becomes active and are sent to the Mainboard via P813. (17V pins 1 and 2, and 12V at pins 5 & 6 of P813).

The next step is for the Micon IC1 on the Mainboard to output a high on M5V ON signal to the PSU at P813 pin 21 which is sensed by the Sub Micon IC701 on the PSU turning on the M5V line from P811 pins 9 & 10 to the Y-SUS board.

The last step to bring the supply to “Full Power” occurs when the Micon IC100 on the Mainboard brings the VS_ON signal high at pin 20 of P813 on the PSU board which when sensed by the Sub Micon IC (IC701) to turns on the VA and VS supplies (VA pins 6 & 7 is brought high before VS pins 1 & 2) and output from P811 to the Y-SUS board.



Power Supply Generic Troubleshooting Tips

Remember if a voltage is missing check for proper resistance before proceeding. And make sure the power is off before doing the resistance check.

When Power button is press, listen for a Relay click, the click of the Relay is an indication of RL_ON going high. RL_ON is sent from the Mainboard to the PSU and when present the IC701 controls the operation of both Relays. RL_ON going High and no Relay is a failure of the PSU, RL_ON staying low is a failure of the Mainboard or something between.

Relay Operation means that the PSU if working properly will output the 17V and 12V supplies to the Mainboard. These voltages will allow the Tuner, Audio circuits on the Mainboard to function and if connected to an Antenna input, Audio would be present. If the Relays closes and these supplies failed suspect a problem with the PSU or an excessive load on the line.

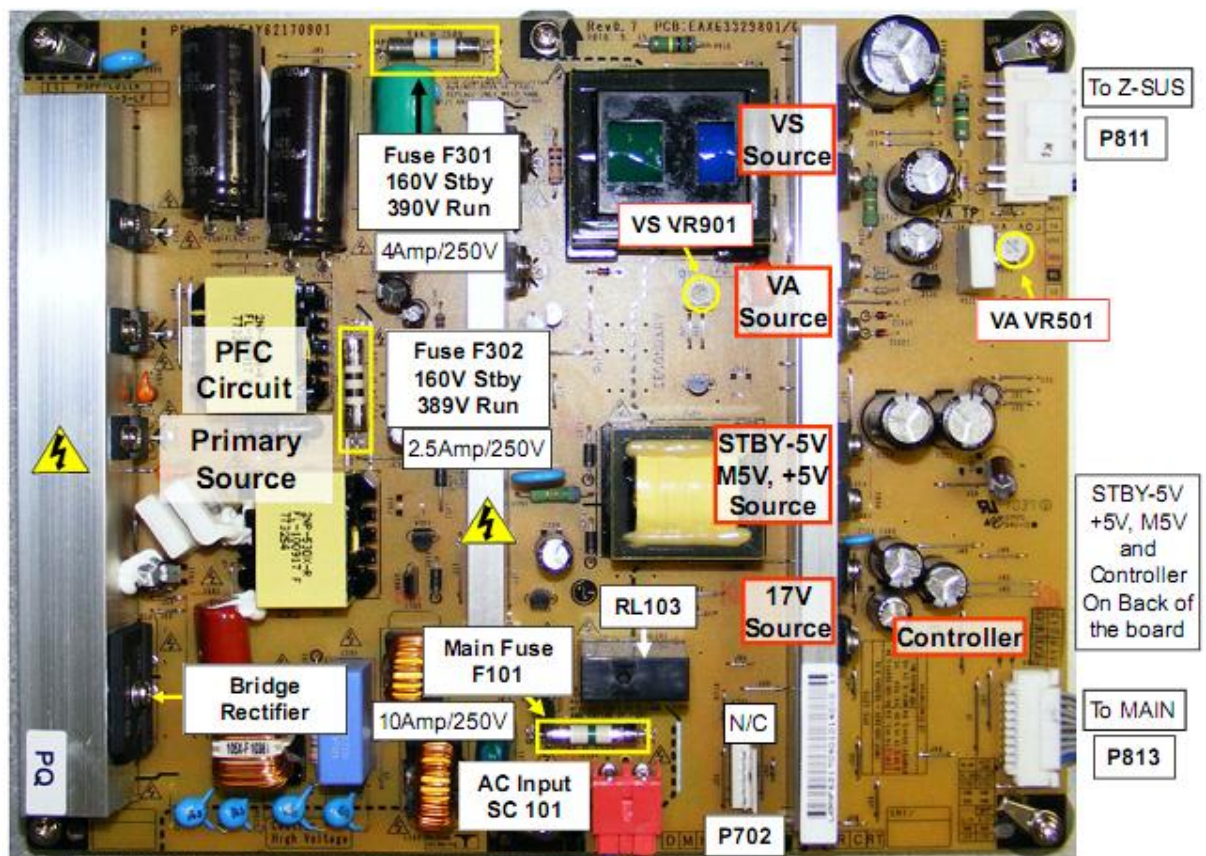
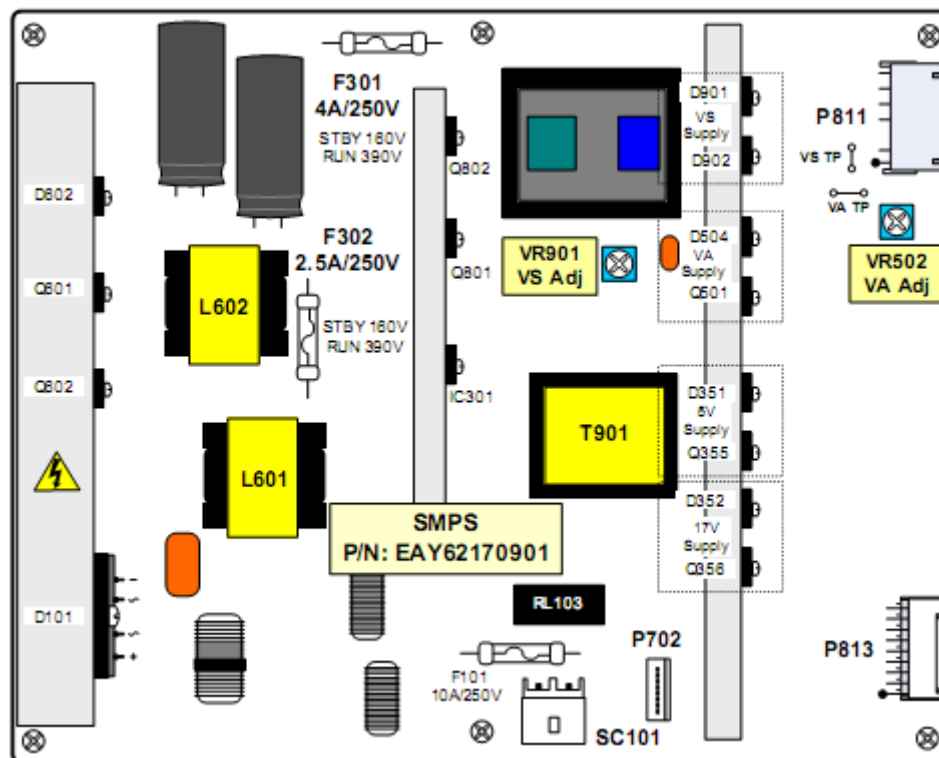
The next step of operation calls for the M5V ON line from Mainboard to the PSU to go high on P813 pin 21. A high on the M5V ON line activates the M5V line to the Y-SUS board. Loss of M5V results in no “Raster” , no Display Panel Reset, no Y, Z, Control or X board operation. Loss of M5V ON and/or M5V ON going high could be caused by any of these boards or failure of the PSU. M5V ON staying low indicates a problem on the Mainboard.

VS_ON is the last step of the Power Sequence and is responsible for bringing the VS and VA Voltages up. The VS ON signal pin 20 P813 is sent from the Mainboard to the PSU as a high, VS and VA and full operation of the Display Panel are now enabled. Loss of VS_ON results in loss of VA and VS and no Raster, no Panel Display Reset but Audio would be present. If VS_ON went high and VS and VA where missing, the problem could be the caused by a failure on the PSU or a circuit using these voltages. A Resistance check should narrow the possible failures quickly.

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B) LG 42PW350 Plasma TV (PDP42T3 Module)

PSU p/n: EAY62170901



AC Voltage is supplied to the PSU board at connector SC101 from the AC input assembly. Rectified by the bridge rectifier D101 generates a primary B+. The Power Factor circuit generates a Primary supply which can be read at Fuse F301 and F302 about 160V. This primary voltage is routed through T901 and routed to the Standby 5V (Standby) is B+ for the Sub Micon chip on the back of the board (IC701) on the PSU and output at P813 pins 13 & 14 then sent to the Mainboard for Microprocessor (IC101) operation (STBY 2.46, RUN 5.16V). The Mainboard will receive +5V_ST (STBY 3.46, RUN 5.16V) which is sent to the +3.3V_ST regulator IC500. The 3.3V_ST is used by the Micro circuitry.

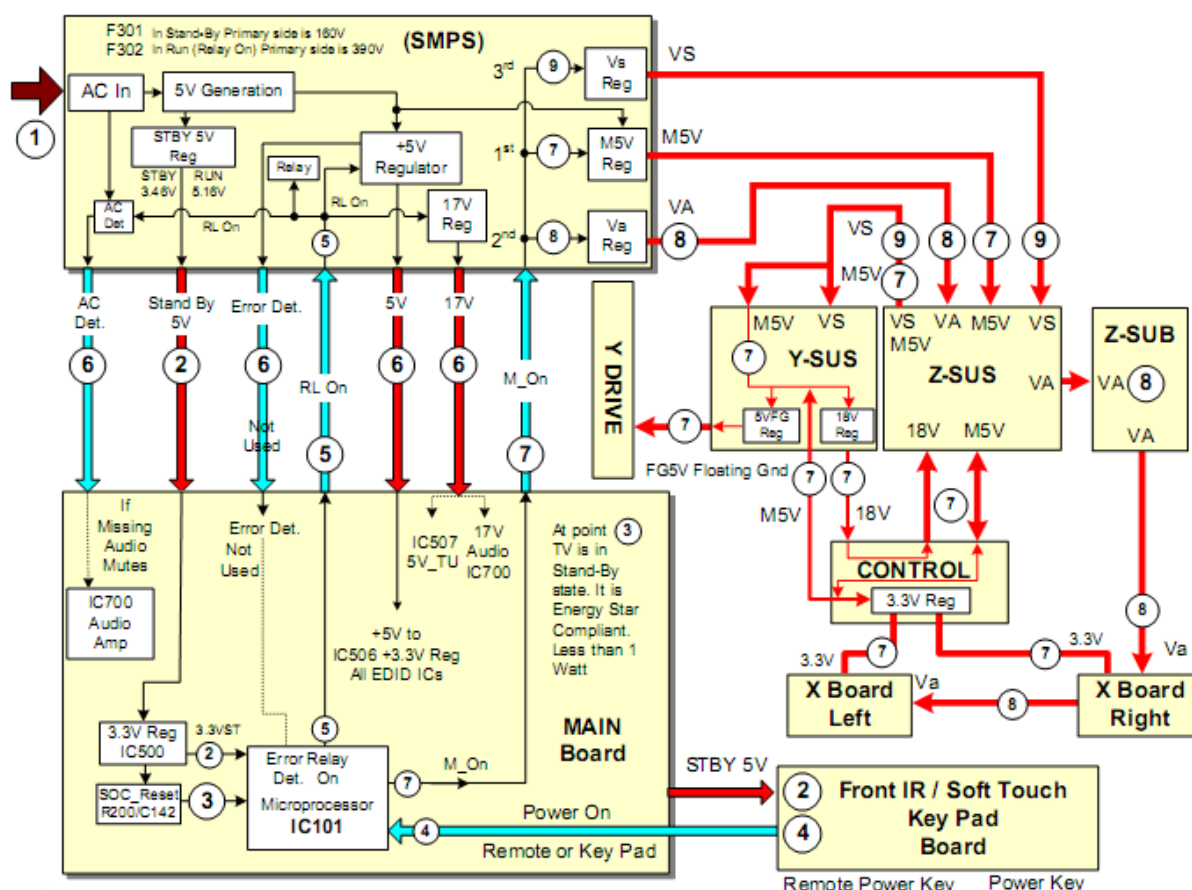
When the Microprocessor (IC101) on the Mainboard receives a “Power On” command from either the Power Button or the Remote IR signal, it outputs a high (2.22V) call RL_ON at pin 15 of P813. This signal or causes the Relay circuit to close RL103 which allows the primary voltage to the PFC circuit (Power Factor Controller) to rise to 390V which can be read measuring voltage at Fuses F301 and F302 from “Hot” Ground. AC Detection (AC Det) is generated on the PSU, by rectifying a small sample of the A/C line and routed to the Sub Micon (IC701) where it outputs at P813 pin 16 (4.15V) and sent to P601 to the Mainboard where it is sensed by the Audio Processor IC700 pin 23.

When RL_ON signal arrives, the run voltage +5V source becomes active and is sent out P813 (5.16V at pins 5, 6 and 7) to the Mainboard P501. The (Error Det) from the PSU board to the Mainboard can be measured at pin 8 of P813 (3.39V STBY and 4.89V RUN). The 17V Audio supply outputs to the Mainboard at P813 pins 1 and 2 used for Audio processing and amplification by IC700.

The next step is for the Microprocessor IC101 on the Mainboard to output a high (3.29V) on M_ON line to the PSU at P813 pin 17 which is sensed by the Sub Micon IC701, turning on the M5V line and outputs at P811 pins 6 to the Z-SUS board.

The Sub Micon (IC701) also uses the M_ON signal to turn on the VA and VS supplies. (Note there is no VS_ON signal/command in this set). VS is output at P811 to the Z-SUS and then output P203 to P312 to the X-Board (X Buffer Board) Right. VS is also routed out of the Z-SUS P2 pins 6 and 7 to the y-SUS P206.

AUTO GND pin 18 of P813: This pin is grounded on the Mainboard. When it is grounded, the Sub Micon (IC701) works in the normal mode, meaning it turns on the power supply via signal sent from the Mainboard. When AUTO GND is floated (opened), it pulls up and places the Sub Micon (IC701) into the Auto mode. In this state, the Sub Micon turns on the power supply in stages automatically. A load is necessary to perform a good test of the PSU if the Mainboard is suspect.

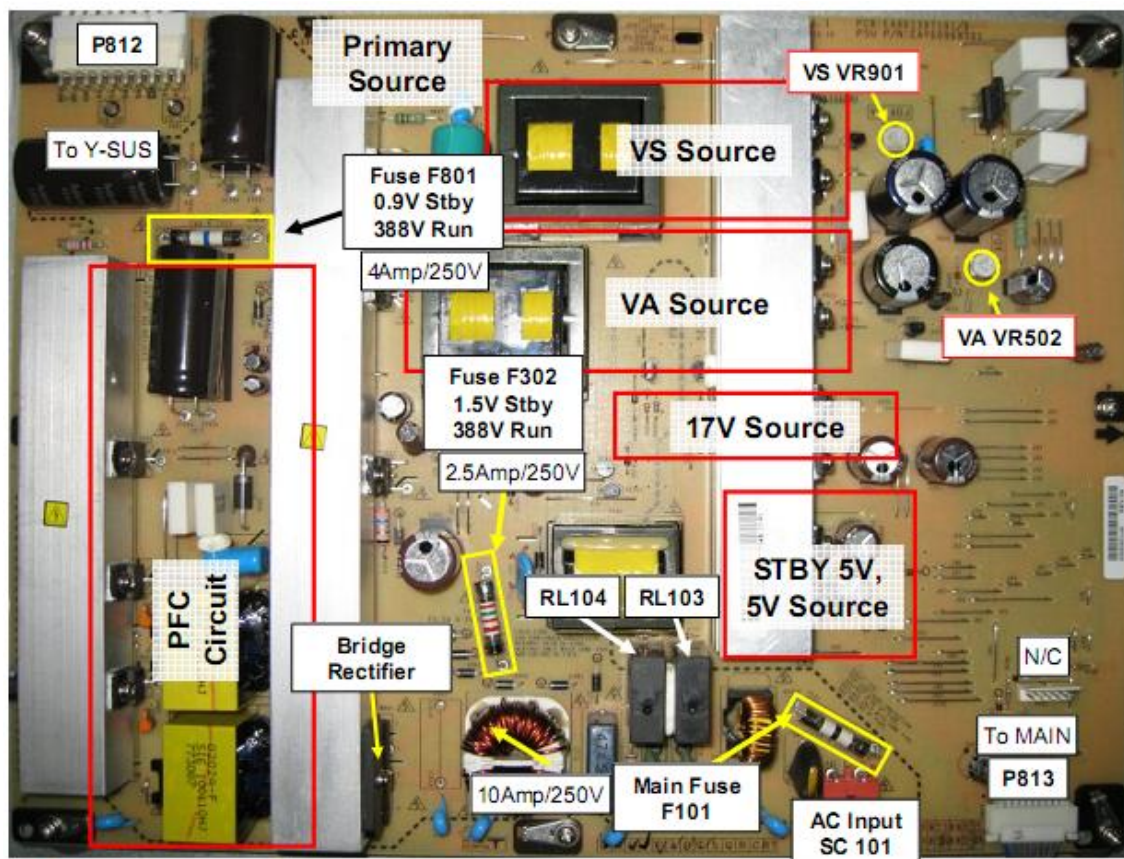
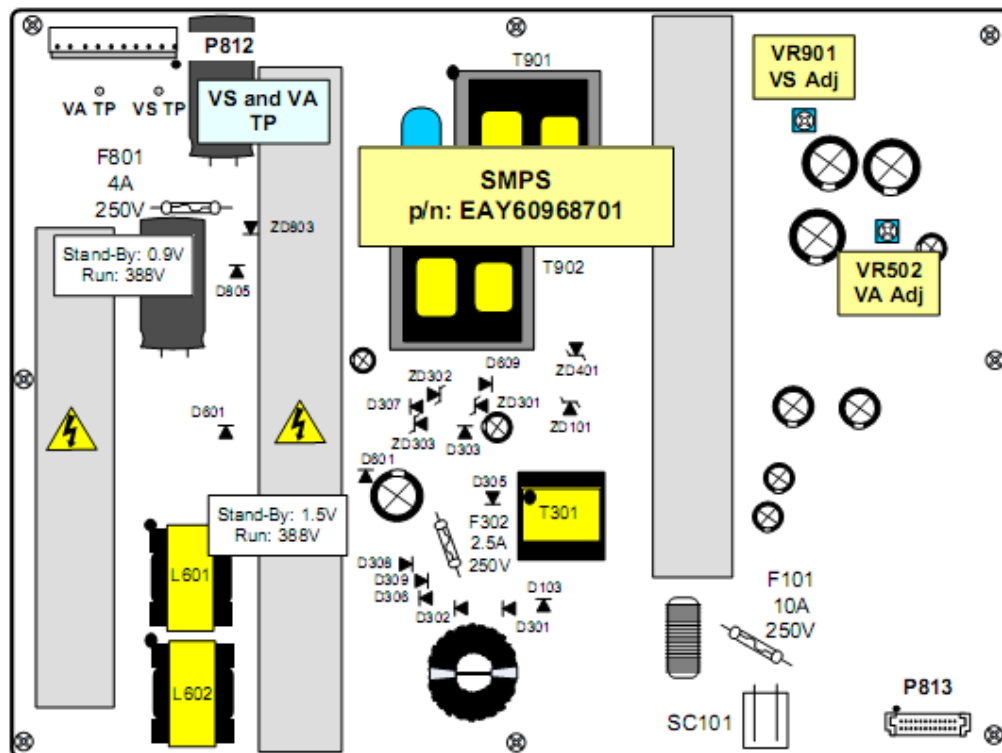


Note: AC DET will not be present until set comes on, if missing it will mute the Audio. Error Det line will not be present until set comes on, but it's not used.

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C) LG 50PJ350 Plasma TV (PDP50T1 Module)

PSU/SMPS p/n: EAY60968701



The AC voltage is applied to the PSU board at connector SC101 from AC input assembly, routed to the Standby 5V supply. The STBY5V (Standby 5V) is B+ voltage for the Controller chip on the back of the board (IC701, also call as Sub Micon) on the PSU and output at P813 pins 13 and 14 then sent to the Mainboard for Microprocessor (IC1) operation (STBY 3.46V RUN 5.14V).

When the Microprocessor IC1 on the Mainboard receives a “POWER ON” command from either Power Button (TV front or side Key Pad or Panel) or Remote IR signal, it outputs a high (2.43V) call RL_ON signal at pin 15 of P813. This command causes the Relay Circuit to close both Relays RL101 and RL 103 routing AC to the bridge rectifier D101 which then routes the primary voltage to the PFC circuit (Power Factor Controller) 388V which can be read measuring voltage at Fuses F302 and F801 from “Hot Ground”. AC Detection (AC Det) is generated on the PSU, by rectifying a small sample of the A/C line and routed to the Sub Micon IC701 where it outputs at P813 pin 16 (4.44v) and sent to P301 to the Main Board where it is sensed and monitored by the Main Microprocessor (IC1) . If AC Det is missing the set will come on, but shut off in 10 seconds (some model will just wait about 6 seconds to shut off the TV).

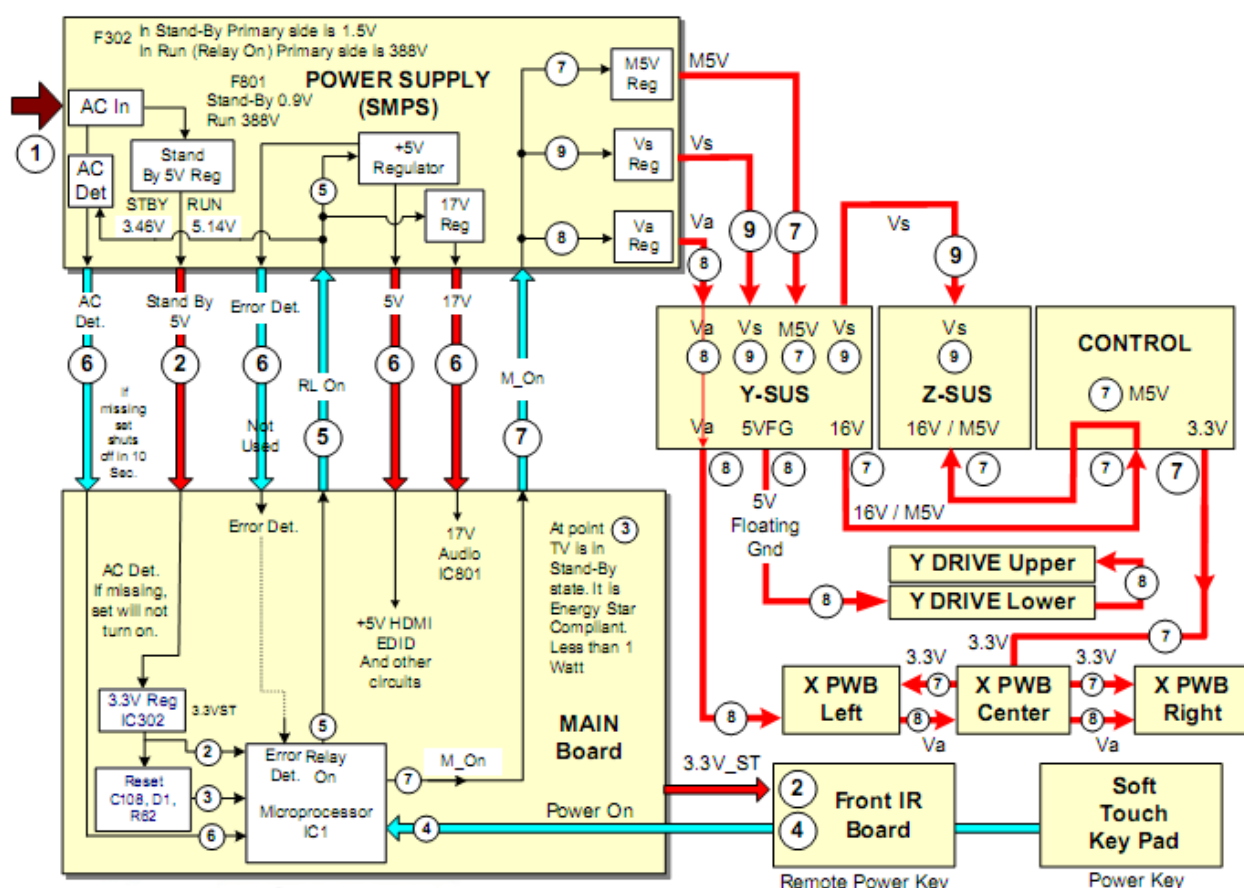
When RL_ON arrives, the run voltage +5V source becomes active and is sent to the Main board via P813 (5.17V at pin 5, 6 and 7). The (Error Det) from the PSU board to the Mainboard can be measured at pin 8 of P813 (2.85V Standby and 4.9V Run), but it is not used. The RL_ON signal also turns on the 17V (Audio B+) which is also sent to the Mainboard. The 17V Audio supply outputs to the Mainboard at P813 pins 1 and 2 and used for audio processing and amplification.

The next step is for the Microprocessor (IC1) on the Mainboard to output a high (3.29V) on M_ON signal to the PSU at P813 pin 17 which is sensed by the Sub Micon IC701, turning on the M5V line and outputs at P812 pins 9 & 10 to the Y-SUS board.

The Sub Micon (IC701) also uses the M_ON signal to turn on the VA and VS supplies. (Note there is no VS ON command/signal in this set). VS is output at P812 to the Y-SUS board P210. (VA pin 6 and 7 and VS pins 1 and 2). Note: The VA is fused on the Y-SUS then routed out P203 to the X

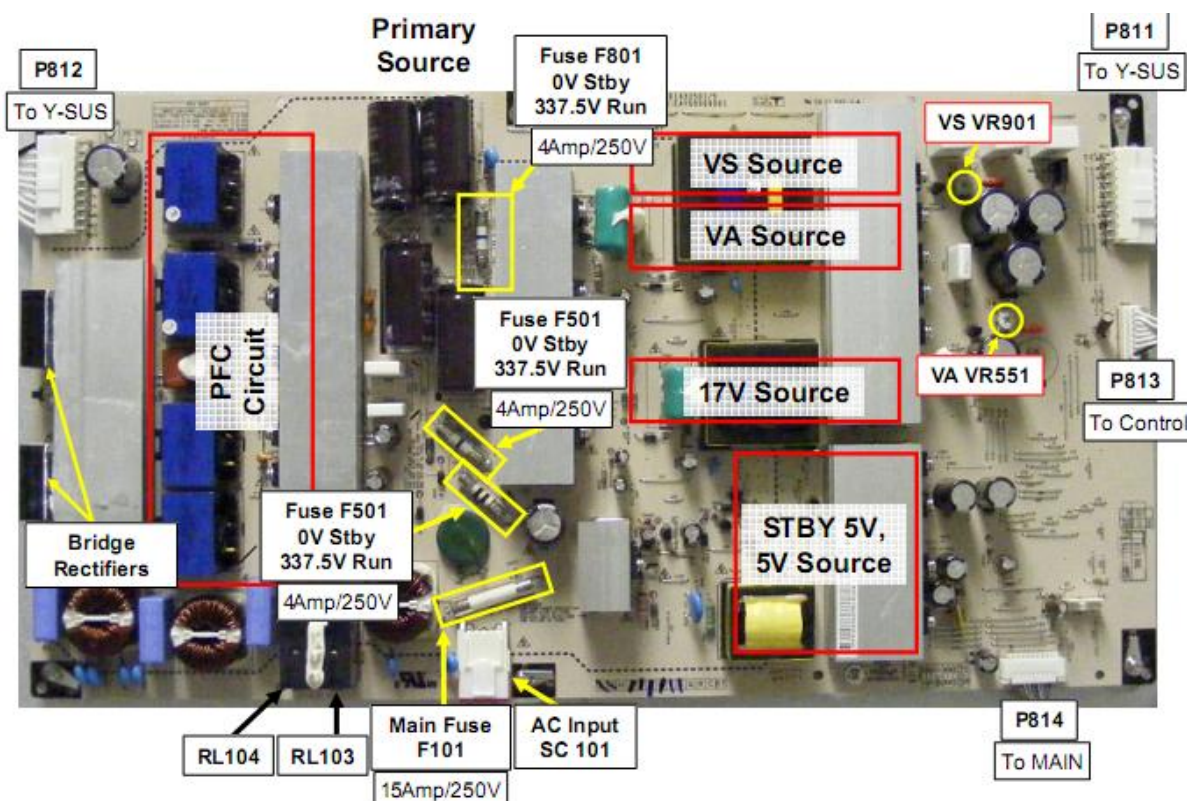
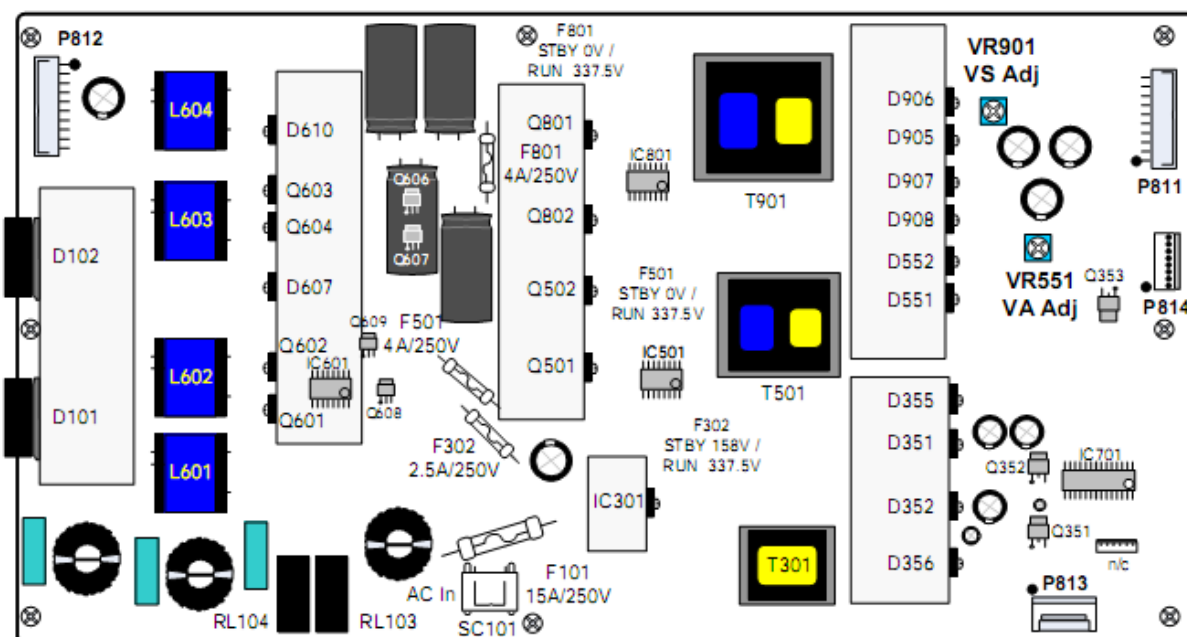
Buffer Board left. VS is also routed out of the Y-SUS P211 pins 4 and 5 to the Z-SUS P2.

AUTO_GND pin 18 of P813: This pin is grounded on the Mainboard. When it is grounded, the Sub Micon IC701 works in the normal mode, meaning it turns on the power supply via command/signal sent from the Mainboard. When AUTO_GND is floated (opened), it pulls up and places the Sub Micon IC701 into the Auto mode. In this state, the Sub Micon turns on the power supply in stages automatically. A load is necessary to perform a good test of the PSU if the Mainboard is suspect.



D) LG 60PK750 Plasma TV (PDP60R1 Module)

PSU p/n: EAY60968901

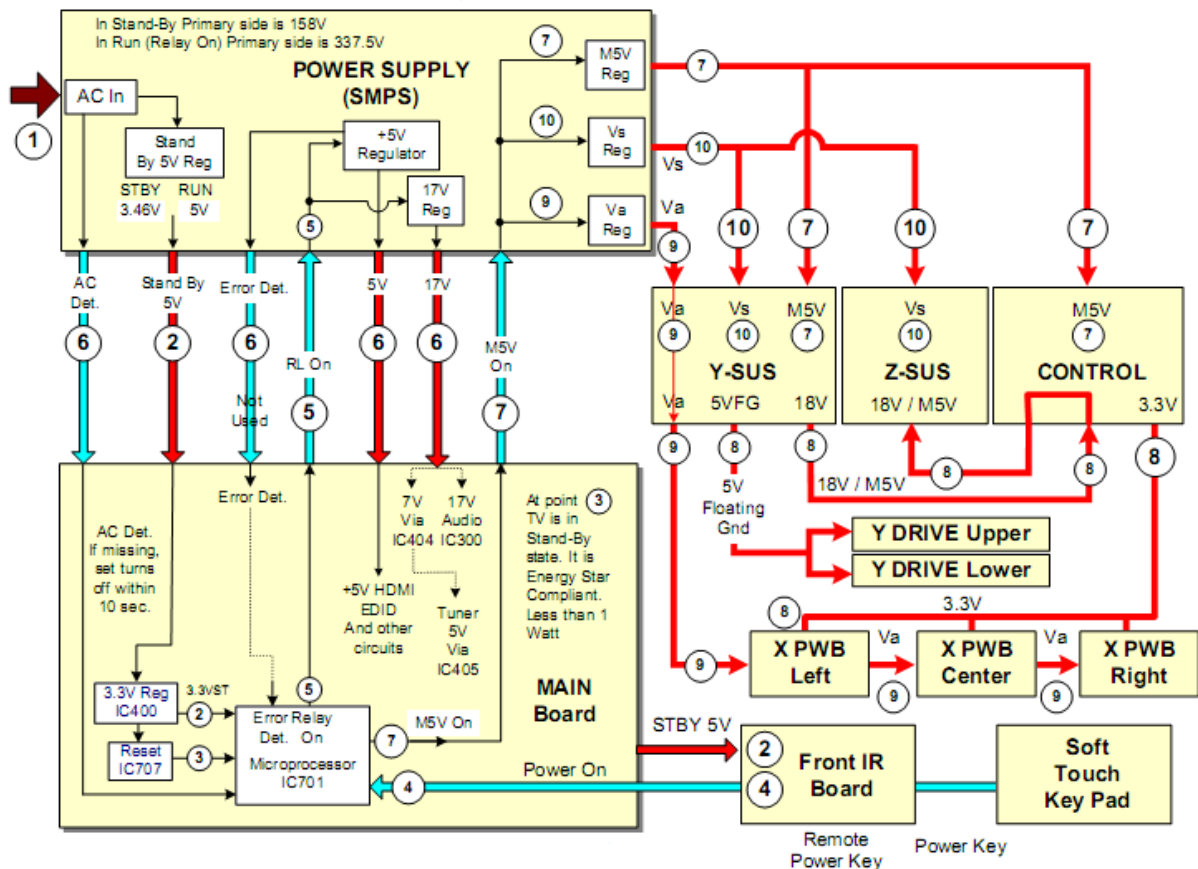


P812 1-2) VS 3) n/c 4-5) Gnd 6-7) VA 8) Gnd 9-10) M5V	P811 9-10) M5V 8) Gnd 6-7) VA 4-5) Gnd 3) n/c 1-2) VS	P814 1-4) M5V 5-8) Gnd	P813 1-2 17V 3-4 Gnd 5-7 5V 8 Error Det 9-12 Gnd 13-14 STBY 5V 15 RL-ON 16 AC-Det 17 M5 On 18 Auto Gnd	STBY 0V Gnd 0V 3.4V Gnd 3.46V 0V 0V 0V Gnd	Run 17V Gnd 5.1V 4.1V Gnd 5.1V 3.28V 4.08V 3.28V Gnd
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PV1- Collection of Plasma TV Repair Tips

This PSU board Power On Sequence same like LG 50PJ350. Only the M5_ON is same as M_ON only.

60PK750 POWER SUPPLY START UP SEQUENCE



The SMPS/PSU Board Outputs to the:

Y-SUS Board :

VS = Drives the Display Panel's Horizontal Electrodes.
(From Y-SUS to Z-SUS)

VA = To Y-SUS, fused then to the X Buffer Boards. (Not used by Z-SUS).
Primarily responsible for the Display Panel Vertical Electrodes.

M5V = Used to develop Bias Voltage on the Y-SUS then routed to the Control board and then to the Z-SUS board.

Z-SUS Board:

VS = VS is routed to the Y-SUS first then to the Z-SUS board which Drives the Display Panel's Horizontal Electrodes.

Mainboard:

STBY 5V = Microprocessor Circuits

17V = Audio B+ Supply, Tuner B+ Circuits

5V = Signal Processing Circuits

AC_Det = If missing, shuts of TV in 6 or 10 seconds) and Error_Det (not used).

Adjustment: There are 2 adjustments located on the Power Supply board VA and VS. The M5V is pre-adjusted and fixed. All adjustment is made reference to Chassis Ground. Use "Full White Raster" 100 IRE.

VS = VR901

VA = VR502

Notes:

If the LG Power Supply board has these signals pins in their PCB connector, here is some description of the signals (but not all these signals pins the PSU board included):

1) **STBY5V** = This standby line (5V) is send to Main board. Any time AC is applied to the PSU, STBY 5V will be 3.46V (LG 50PJ350) and will be 5.14V when the set turns on.

2) **RL_ON** = This signal sent from Mainboard to PSU board to start-up the PFC circuit. The voltage values for this signal is about 2V~4.8V. It will depend on their models of Plasma TV. When RL_ON signal arrives the PSU board, it will turns on the 17V, 5V, AC_Det and Error Det.

3) **VS_ON** = Not all the LG Plasma TV PSU board has this signal line. This signal is the last step for PSU to outputs the VS and VA voltages to Y-SUS board. It is active high to function.

4) **M_ON** = This M_ON (Monitor On) signal is sent from Mainboard to PSU board Sub Micon. When the PSU sensed this signal, it will turning on the M5V, VA and VS voltage outputs.

5) **+5V** = Turns on by relay on (RL ON) command/signal.

6) **AC Det** = If the AC Det signal is missing, the TV will shut off after 6~10 seconds (depends on PSU board design). If using the PSU Self Test method, it will not shut off after 6 seconds. But in normal TV working condition, if this signal missing, it will shut off TV after 6~10 seconds. Normally this signal line is about 4V (LG 50PJ350 = 4.44V).

7) **Auto GND** = This pin is grounded on the Mainboard. If this line is floated, the PSU will turns on automatically when AC is applied.

8) **Key On** = When Power button is opened, pin 24(LG 50PS60) pulls up to 4.3V. Standby 5V turns off. AC Det remains. If the Key ON line has more than 0.6V, the PSU will not turn on, even with Mainboard disconnected.

9) **Err Det** or **Error Det** = This signal line is seldom use. Normally this signal line is about 4.9V (for LG 50PJ350).

10) **17V** = If VS is unloaded, this 17V line will pulsate. It will turn on by VS On command/signal.

Attention: When using the Multi-meter (or VOM) to testing the PSU voltage, make sure to select the correct Ground (GND) to check it. For Primary side voltage testing, you MUST choose the Hot Ground. For Secondary side you can choose any Chassis Ground (GND) as their -ve (Black Probe).

If you need to check their components in PSU board, it is highly recommend you “Discharge” their biggest filter electrolytic capacitors (especially their PFC side and VS side) for safety purpose!

4.2- Plasma TV Power Supply (PSU)

Self Test Method

The Plasma TV PSU Self Test method is a great idea to isolate the TV problem. With this PSU Self Test method, so that you can confirm the power supply is working and also can measure their output voltages is normal & stable. If no any output voltages from this PSU, you need to re-check their connection is connecting properly or not. Is it in the right pin/s and position? Most of the time, the mistake was calculate the wrong pin/s number and connect it with wrong pin/s too. So be careful for this mistake, if the wrong pin/s just the signal pin/s is ok, if that's Vcc pin to Ground, the PSU may not work or shorted their standby circuit. But mostly, it's ok not to worry.

Not only that, with this PSU Self Test method, you can just repair the PSU board without connect to other PCB board. So it is good for spare parts sellers too.

4.2.1- How to Self Test LG Plasma TV PSU Board

- 1) Disconnect all the cables on PSU board, except the AC input cable.
- 2) Using the Light Bulbs tool (will let you know how to connect these two bulbs), connect it into the VS voltage output pin and another wire is connect to the chassis ground (GND).
- 3) Connect the Standby 5V line to other Signals pins with resistor/s or wire/s. For how to connect these pins, we will let you know later in this chapter.
- 4) All the pins are connected properly now and make sure the pins are connected in the right position. Apply the AC voltage to PSU board now.
- 5) The PSU board wills outputs all the voltages and Light Bulbs will lit brightly.
- 6) Using the Volt Meter to check their output voltages is normal and stable or not. If all output voltages are ok, that's mean the PSU board is confirm no problem. You need to check other PCB board/s to find what what's wrong to the TV.

Note:

1) If the PSU board can't output the voltages, the Light Bulbs also not lit, just got the Standby 5V only, that means the problem is in the PSU board. But before that, double check their connections of the signals pins and make sure it is connected in the right position.

If double confirm all the connection is in the right positions, so confirm it is the PSU board failure. This time you need to check the PSU board for components level repair or just replace it to solve the problem. If that's the LG PSU board, you can trace their RL_ON signal line in PSU board to repair it.

2) If the voltage checking on PSU board found one of the voltages missing, for example 17V, you need to trace this 17V line in the PSU board to find out which component is defective and causing it not output.

So this method will let you check the PSU board easily and quickly. Some of the Plasma PSU boards no need to connect any signals in it, just apply the AC voltage to the PSU board and it can output the voltages.

But I highly recommend connecting it with the Light Bulbs tool. Because some of the PSU board problem is happen when under load. Without the loading it can output the normal and stable voltages. But when connect it to the load (Light Bulbs or PCB boards), their voltage will drops or the PSU board shutdown itself.

4.3- Making the Light Bulbs Tool

Most of the time when the Plasma TV PSU board need to self test, highly recommend using the Light Bulbs as a load for VS (Vsus) voltage output . This jig or tool can be made from locally obtained parts.



<http://www.lcdrepairguide.com/plasma/>

Requirements:

- 1) 2 standard light bulb sockets
- 2) 2 x 100W light bulbs (220VAC or 110VAC is OK)



Procedure:

- a) Solder together one wire from each of the two sockets (in series).
- b) Cut the wires approximately 24" long, leaving the wire pin on one end.
- c) Solder/screw in the two wires to each of the remaining wires on the light bulb sockets like the picture below:



4.4- Various LG Plasma TV Power Supply Self Test

This test can confirm the proper operation of the PSU without the need to exchange the board. Some model of power supply (PSU) can operate in a “No Load State”, like 42PQ30. This means that by applying AC power to SC101 and all other plugs disconnected, this power supply will function.

Simply removing P813 (42PQ30, Lower Right Hand Side of the PSU board), will cause the “AUTO” pin 22 to go high from its normal low stats allowing the power supply to go to full power on mode when AC power is supplied.

Be careful after this test and make sure the VA and VS lines have enough time to discharge before reconnecting the supply cables.

The both light bulbs can use 60W or 100W is ok. For bigger inches Plasma TV, recommend to using the 100W light bulb. Resistors using the 100 ohm or 1K ohm is acceptable.

For PSU Self Test method, apply the usual 2 x 100W AC220Vac (or 110Vac) Light Bulbs in series test between VS output and chassis ground for a simulated 200Watt load. If the power supply operates in this condition, it is assured it can maintain its output power under load.

Notes:

Some of the TV repairer they just want to faster see the results PSU voltage output is ok or not, so they never apply the light bulbs (or similar device/equipment) as a load to fully test the PSU board. So it will make the mistake when the PSU board is failure under load, but they think the PSU board is ok. So it will waste their time to checking other PCB or section. Sometime it wills cause them don't know what's wrong of the Plasma TV after check all the components and board.

Notes 2:

(A) Ground the Auto Ground (pin 22) on P813. When AC Power is applied, check AC Det (Pin 18) and 5V Standby (pins 9~12) are 5V.

(B) 100 or 1K ohm 1/4watt resistor added from 5V STB (pins 9~12) to RL_ON (pin 19) closes relay RL101 and RL103 turning on the 17V and 12V supplies.

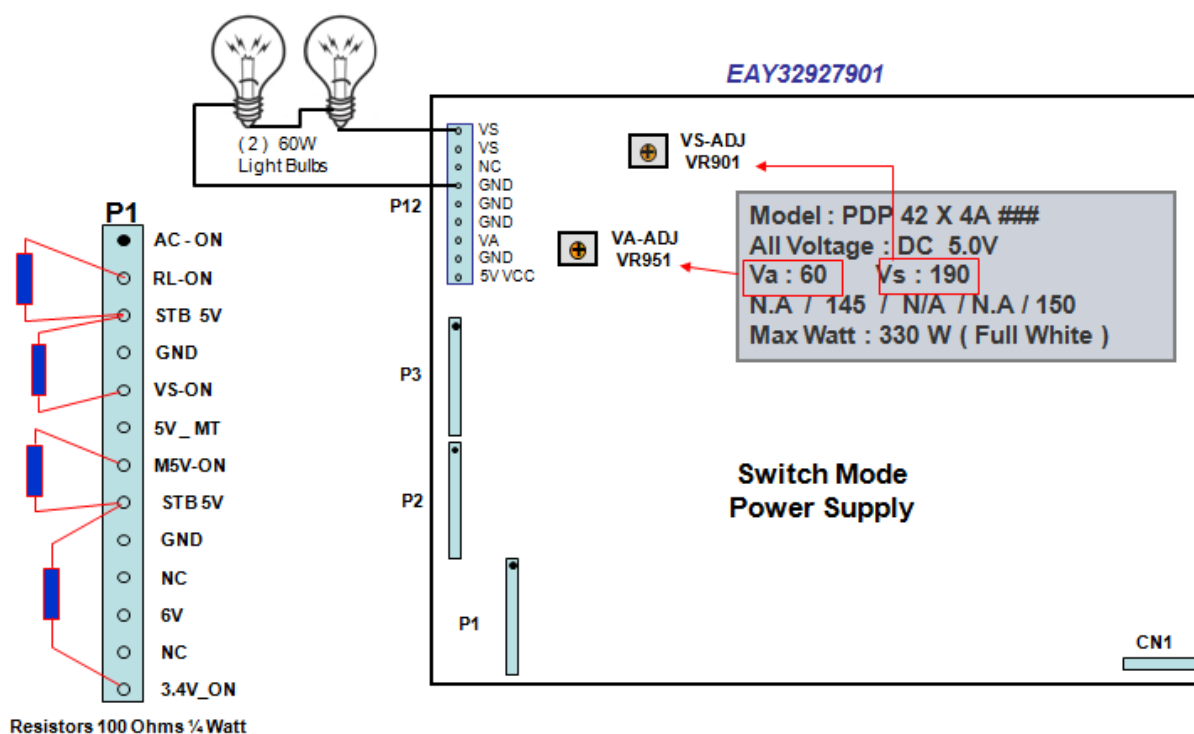
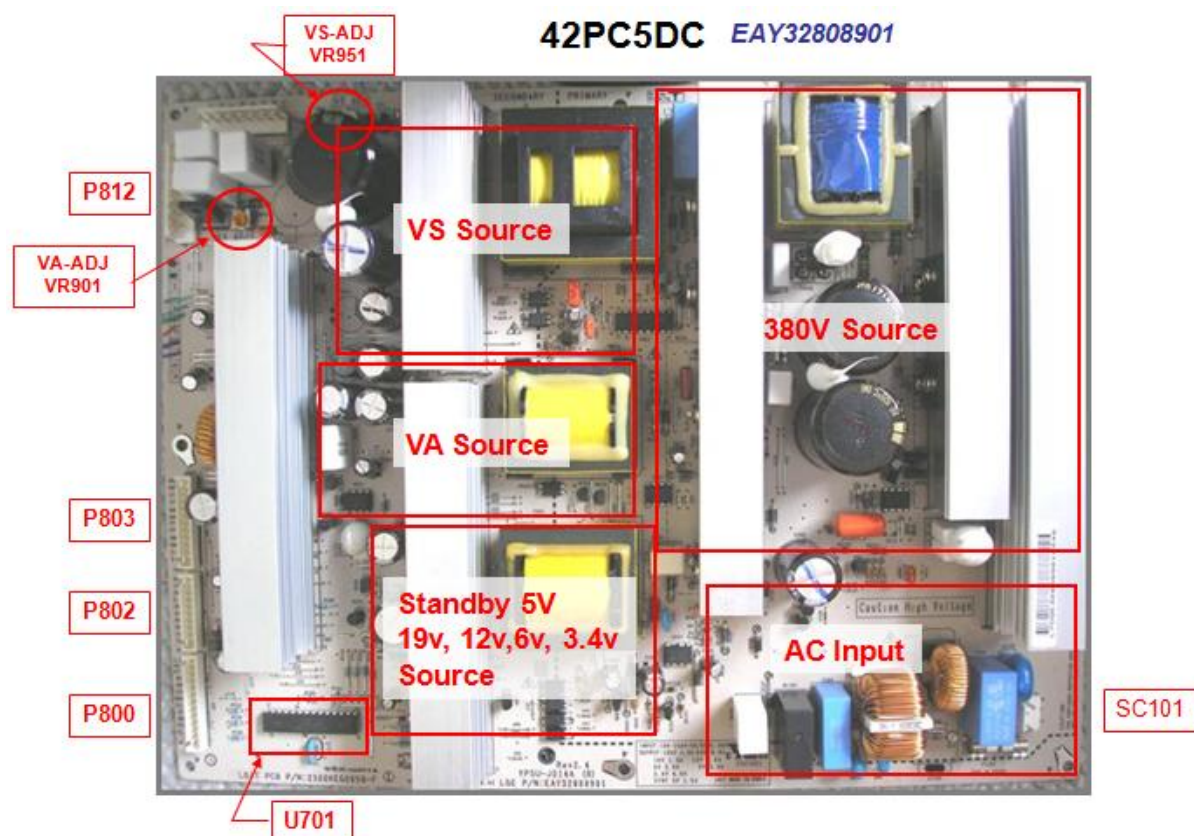
(C) 100 or 1K ohm 1/4watt resistor added from 5V STB (pins 9~12) to M5_ON (pin 21) brings the M5V (P811 pins 9 & 11) output voltage.

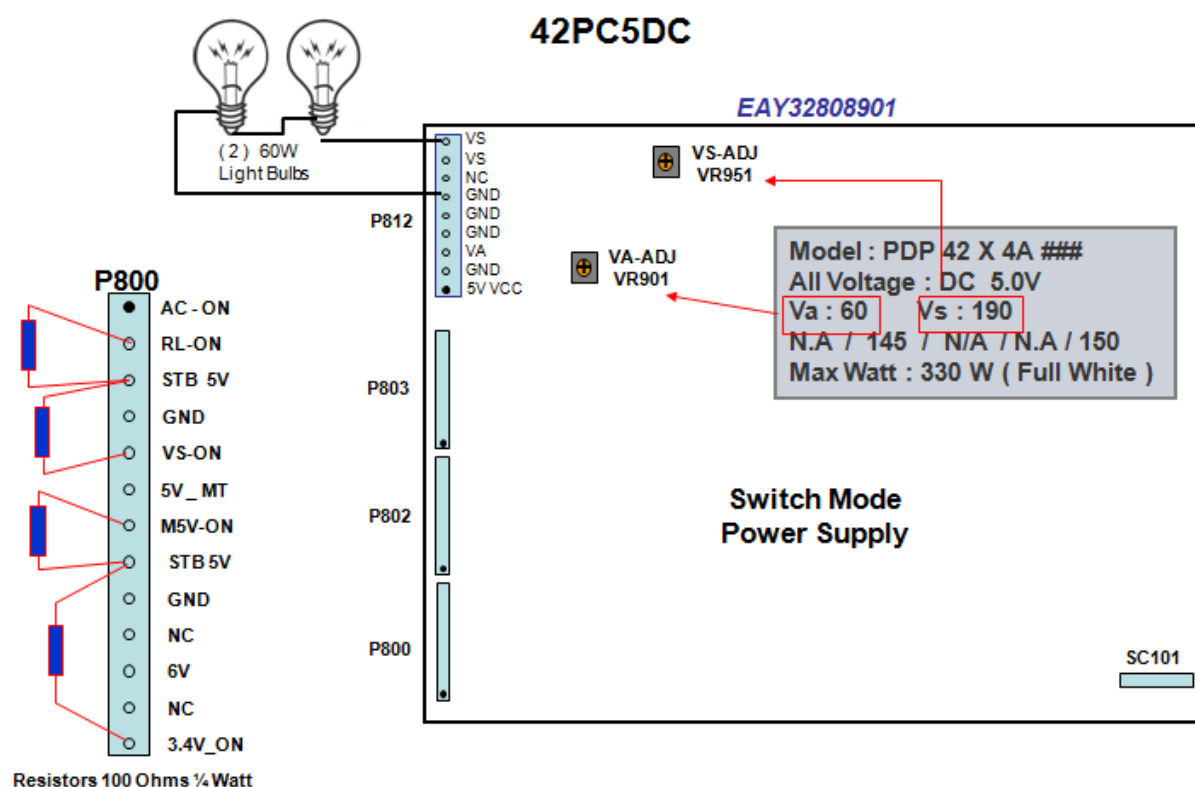
(D) 100 or 1K ohm ¼ watt resistor added from 5V STB (pins 9~12) to VS_ON (pin 20) brings the VA and VS (P811 pins 1 & 2=> VS and pins 6 & 7=> VA) output voltages.

All the above notes can apply to LG PSU board. So I will not write it again in each PSU boards. All the PSU board their connector marking number and pins position is different only.

2008 PDP Models

- 1) LG 42PC5xx (PSU board-EAY32927901)
- 2) LG 42PC5DC (PSU board-EAY32808901)

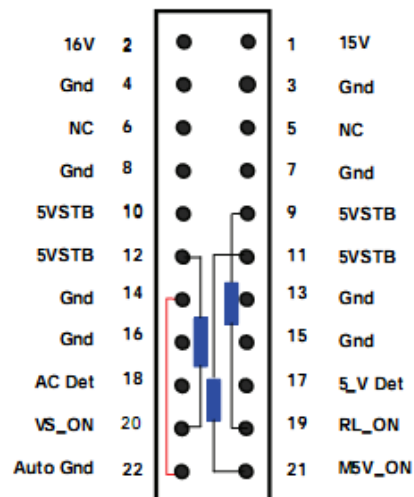
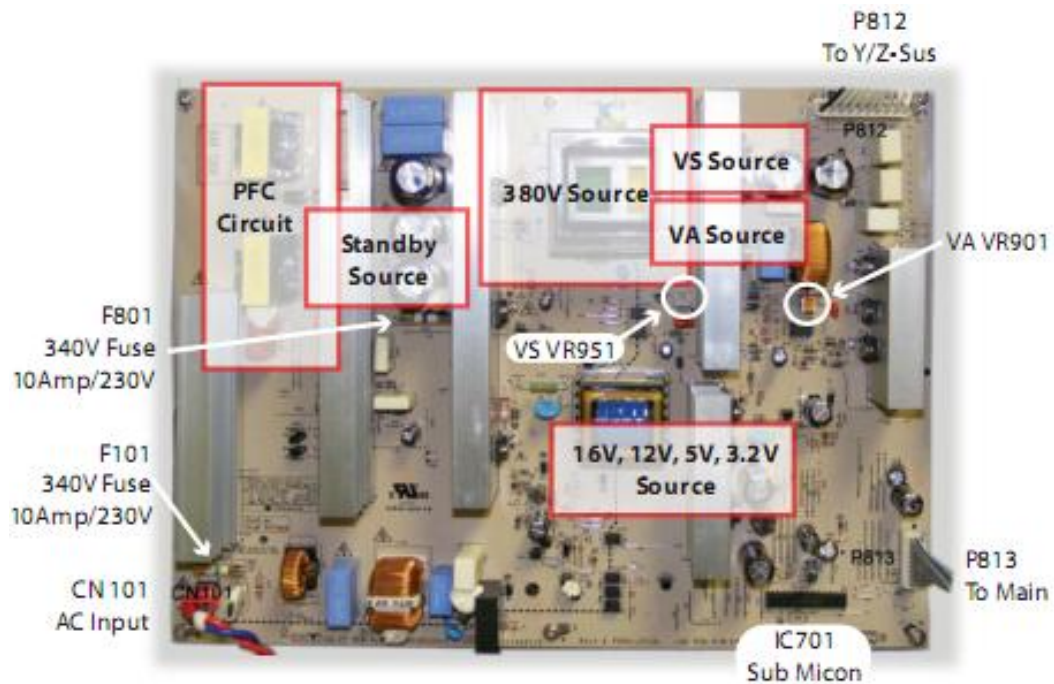




- * Use the Resistor 100 ohm to connector to their appropriate pins.
- * Also connect the Light Bulbs to VS voltage output pin and chassis ground.

PV1- Collection of Plasma TV Repair Tips

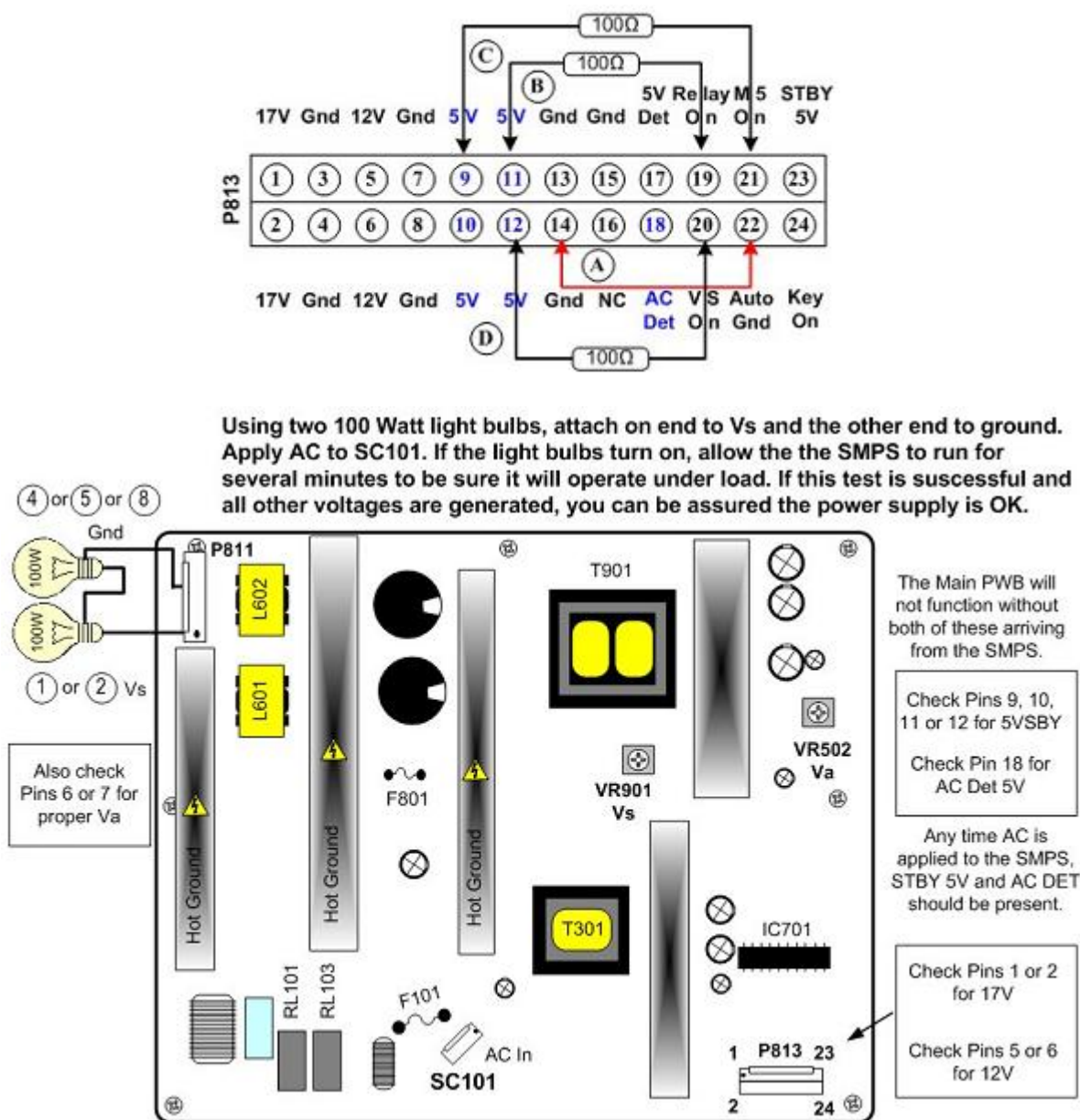
3) LG 42PG20 Plasma TV (PDP42G1 Panel, PSU Board: EAY43533901)



P813

2009 PDP Models

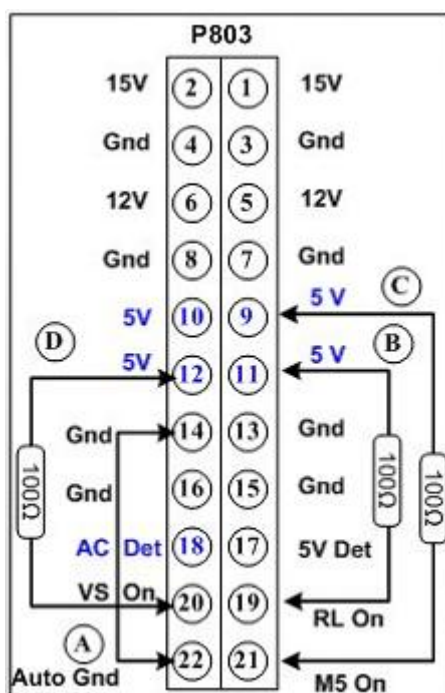
1) LG 42PQ20 Plasma TV (PDP42G2 Module)



2) LG 42PQ30 Plasma TV (PDP42G2 Panel, PSU p/n: EAY58349601)

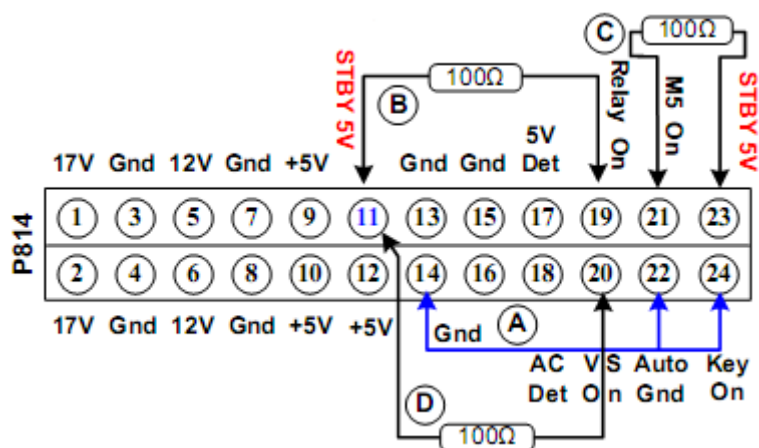
The Model Plasma TV pins connection is same as LG 42PQ20 Plasma TV.

3) LG 50PG20 Plasma TV (PDP50G1 Panel, PSU p/n: EAY41360901)



* Remember to connect the Light Bulbs to VS pin & chassis ground.

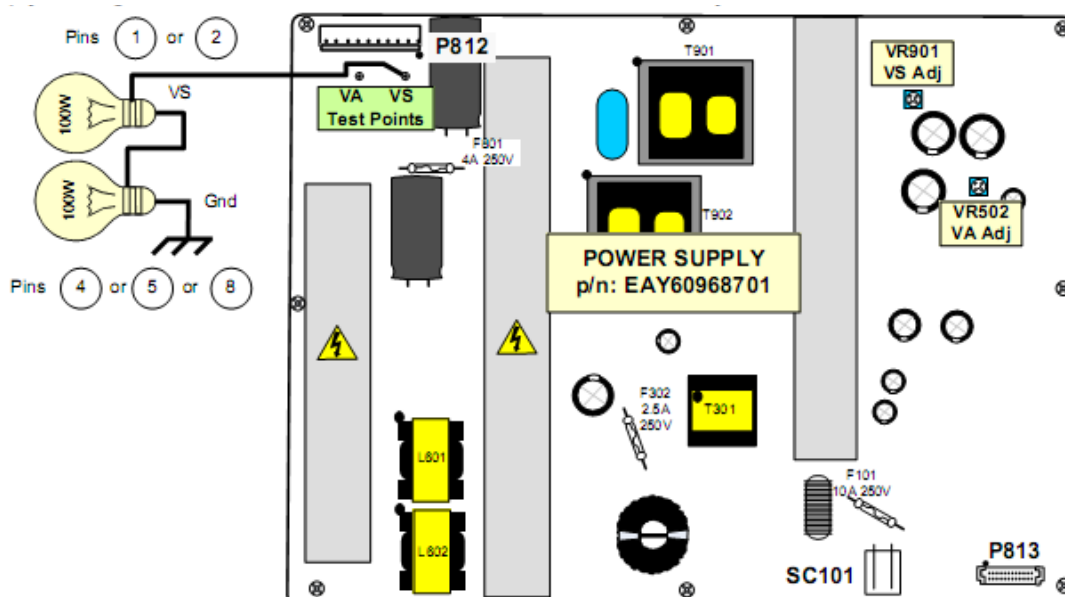
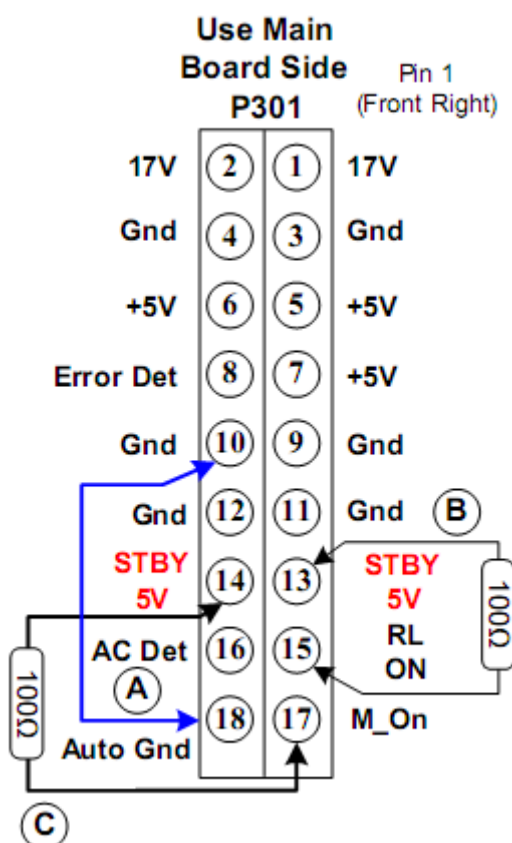
4) LG 50PS60 Plasma TV (PDP50H3 Panel)



* Remember to connect the Light Bulbs to VS pin & chassis ground.

2010 PDP Models

- 1) LG 42PJ350 Plasma TV (PDP42T1 Panel, PSU p/n: EAY60912401) &
 LG 50PJ350 Plasma TV (PDP50T1 ,PSU p/n: EAY60968701) &
 LG 50PK250 Plasma TV(PDP50R1 , PSU p/n:EAY60968801)



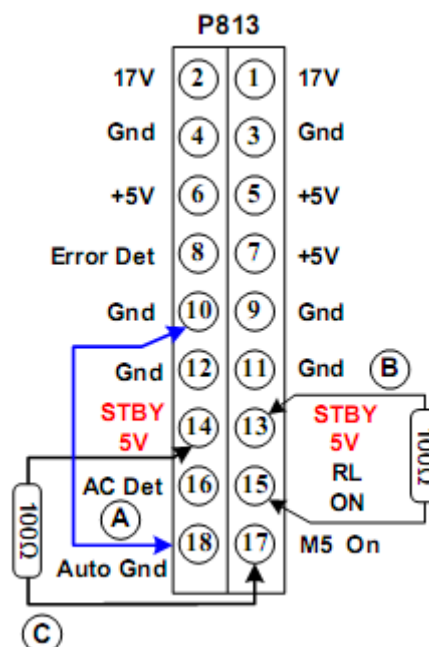
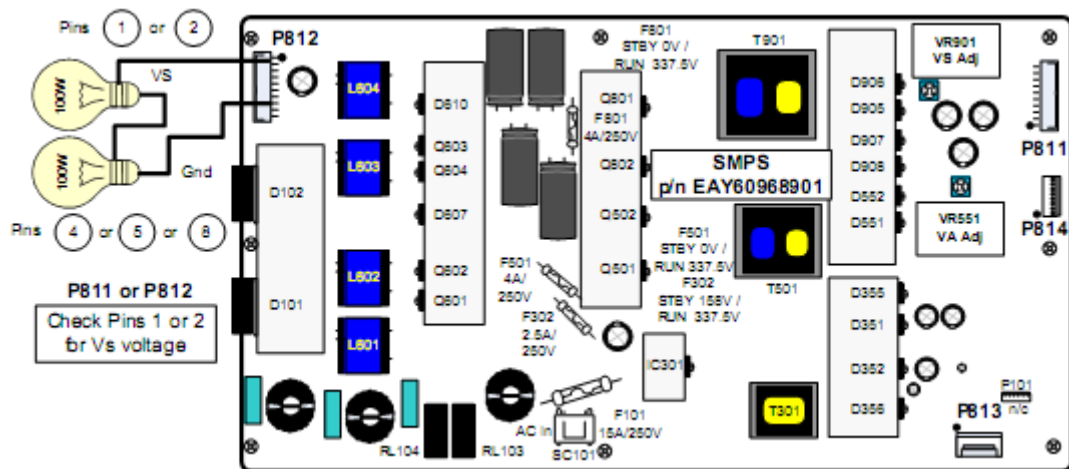
PV1- Collection of Plasma TV Repair Tips

2) LG 50PK750 Plasma TV (PDP50R1, PSU p/n: EAY60968801)

The Model Plasma TV pins connection is same as LG 50PJ350 Plasma TV. But the connector is use P400.

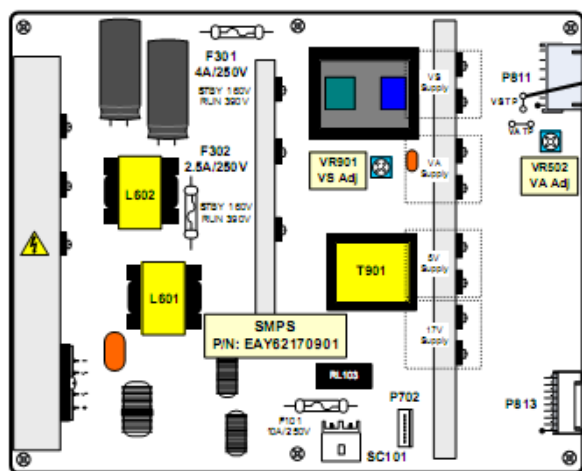
Actually can use the PSU board P813 as a reference too. Depends on which method you like to use.

3) LG 60PK750 Plasma TV (PDP60R1, PSU p/n: EAY60968901)



2011 PDP Models

1) LG 42PW350 Plasma TV (PDP42T3, PSU p/n: EAY62170901)



Note:

To turn on the Power Supply;

1) With Main Board connected, press power.

2) Without Main Board connected SMPS will turn on automatically.

Any time AC is applied to the SMPS, STBY 5V will be 3.46V and will be 5.14V when the set turns on.
AC DET WILL NOT be present until set comes on, if missing it will mute the audio.
Error line WILL NOT be present until set comes on, but it's not used.

Note:

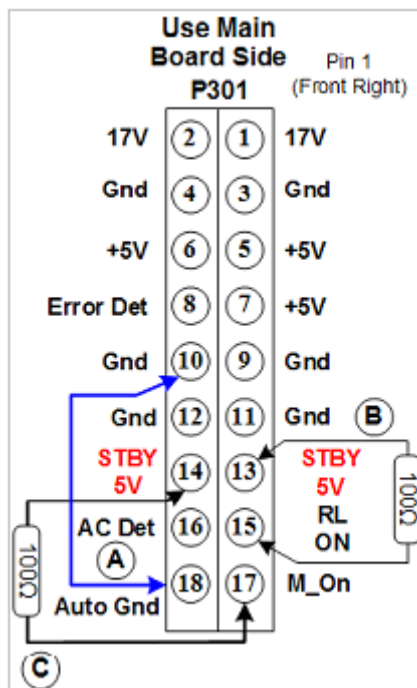
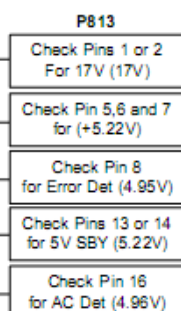
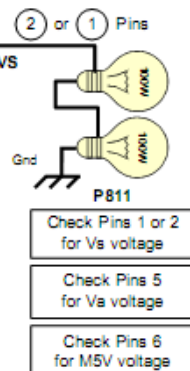
Always test the SMPS under a load using the

2 light bulbs.

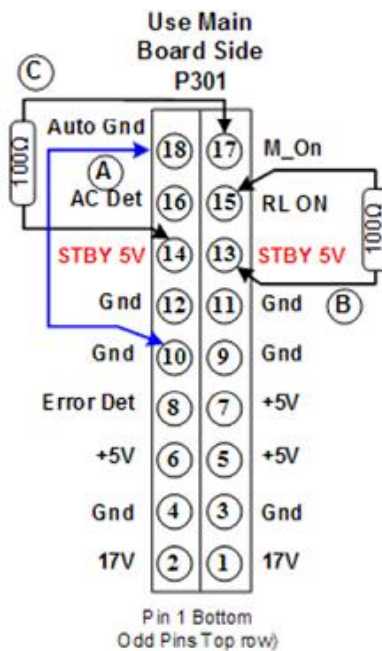
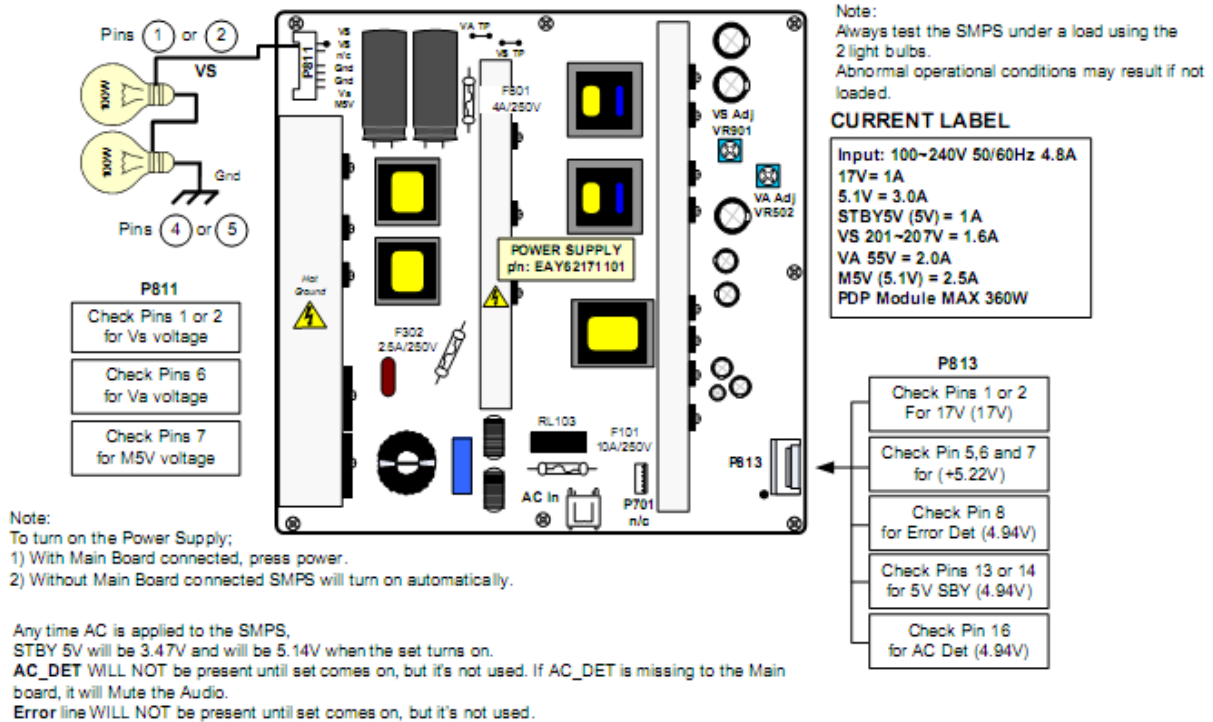
Abnormal operational conditions may result if not loaded.

CURRENT LABEL

XP5 42T3	
INPUT: 100~240V ~ 50/60Hz 3.2A	
17V: 17V = 1.0A	VS: 199-203V = 1.3A
5.1V: 5.1V = 3.0A	VA: 55V = 1.5A
STBY5V: 5V = 1.0A	M5V: 5.1V = 2.5A
PDP Module Max: 210W	
LG Electronics	



2) LG 50PV450 Plasma TV (PDP50R3, PSU p/n: EAY62171101)



Note: Leave previous installed 100Ω resistor in place when adding the next resistor.

- (A) Ground the Auto Gnd Line (Pin 18) will allow the supply to be powered up one section at a time.
- (B) Add a 100Ω ¼ watt resistor from 5V Standby to RL_ON and the 17V and 5V Run Lines on P813 will become active. Also AC-Det (4.06V) and Error_Det (4.1V) become active (Not Used).
- (C) Add a 100Ω ¼ watt resistor from any 5V line to M_ON to make the (Monitor) M5V, VS and VA lines operational.
P811 (VS pins 1 and 2) and (VA pins 6).
P811 (M5V pin 7)

4.5- LG Old Models PDP PSU Board

Self Test Method

The old Panel model for LG Plasma TV means that the TV was manufactured before year 2008. Most of these model Plasma TV PSU board just disconnect all their connection cables except the AC input cable and applied the AC power to the PSU board, it will start-up and output the voltages. But has little model need to connect the Light Bulbs to their VS voltage output line as a load to start-up the PSU board.

* No matter it is necessary or not, highly recommends putting the Light Bulbs to testing the PSU Board.

1) LG 32 inches Plasma Panel/Module

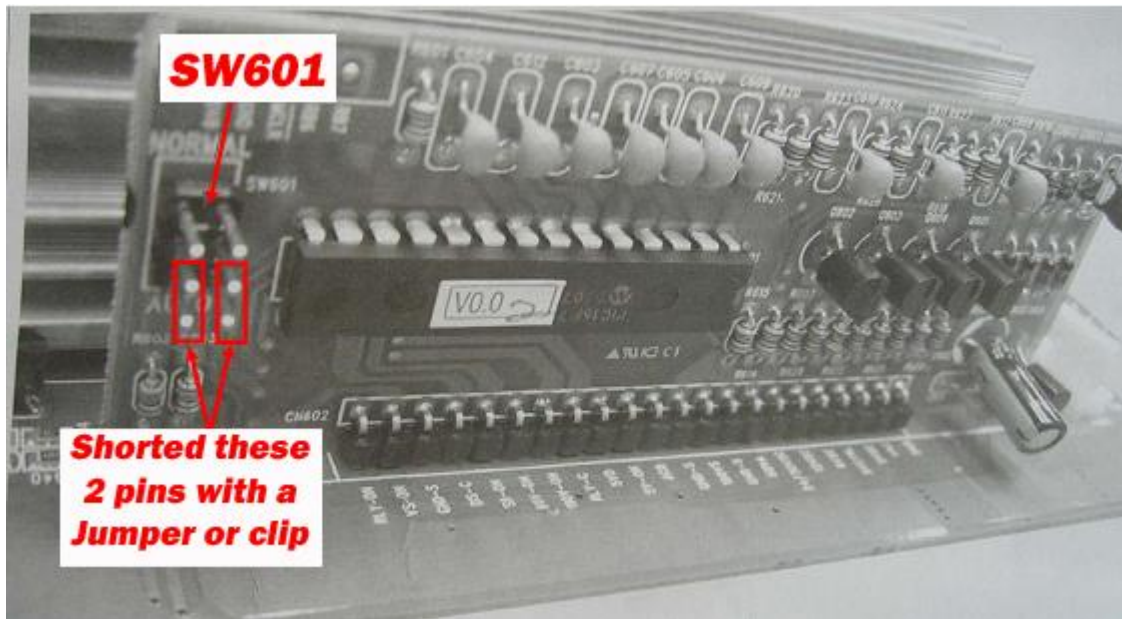
Model: PDP32F10000, PDP32G1T001, PDP32F1T031, PDP32F1X031, PDP32F1Y031, PDP32F1X374, PDP32F2 & so on. (Note: The PDP32F10000 is built-in with the Sustain board).

- a) Disconnect all the connection cables to PSU board, except AC input cable.
- b) Apply the AC power to PSU board, all voltages are outputs normally.

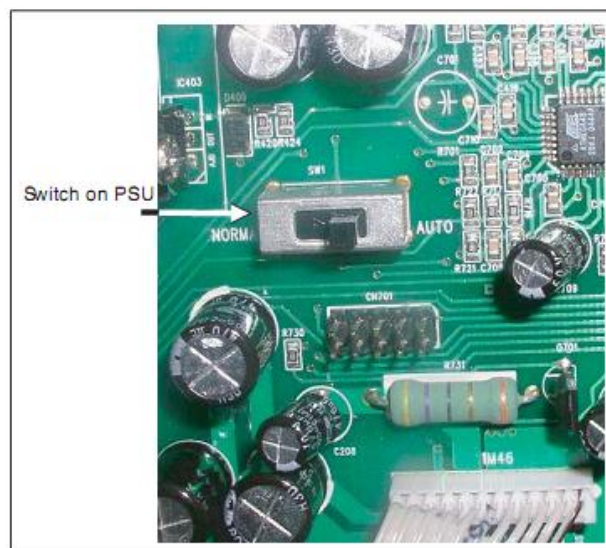
2) LG PDP42V7 Plasma Panel

This Model Plasma Panel using two different PSU board, normally call it as White PSU board and Black PSU board. Their schematic diagram is different, but voltages outputs are same. So can be exchange use.

Step 1: (a) The PSU board has a Sub Module (small PCB) in it, shorted the SW601 pins in Sub Module to Auto mode (Auto pins and middle pins position).



(b) If the PSU board didn't have the Sub Module, find their SW1 switch from Normal position to AUTO mode. Looks like the picture below:



Step 2: Connect a 10 ohm 3W (or 5W is ok) resistor to 5VCTRL (5Vsc) pin and chassis ground as a load.

Step 3: Apply the AC power to PSU board, all voltages are output normally.

3) LG PDP42S1, PDP42G1T001 (PDP42G1), PDP42G1T245 (PDP42G1) and PDP50G1 Plasma Panel

a) Disconnect all the connection cables to PSU board, except AC input cable.

b) Apply the AC power to PSU board, all voltages are outputs normally.

4) LG PDP60X7 Plasma Panel

a) Disconnect all the connection cables to PSU board, except AC input cable. PSU board connector P800 pin 3 (5VSB) connect to pin 5 (VS_ON).

b) Connected the Light Bulbs to VS voltage output pin and the chassis ground (GND). This PSU board if not connect the Light Bulbs, it will not working properly.

c) Apply the AC power to the PSU board, all their secondary side voltages have output.

4.6- LG Plasma TV Panel/Module Self Test Method

This Plasma Panel Self Test Method is to use when the Plasma TV is problem is no display or display abnormal. With this self test method, we know that the Plasma TV display problem is on the Module or Mainboard (or LVDS cable). So it will short cut the troubleshooting time to repair plasma tv.

4.6.1- How to Self Test LG Plasma Panel

When need to do the Plasma Panel Self Test, here is the steps:

- 1) First to disconnect the Mainboard connection cable from PSU board and the LVDS cable to CTRL Board (Logic Control Board).
- 2) The PSU board needs to connect as PSU Self Test Method. But the Light Bulbs are unnecessary to connect to VS output pin. All the cables need to connect in PSU board, except the Mainboard connector.
- 3) Follow the instruction on how to set the Pattern Test setting in CTRL board. For LG CTRL Board, just use a jumper or wire to connect/solder their AUTO GEN pins. But different Brands and Models Plasma Panel have different method.
- 4) Apply AC power to PSU board and the Plasma TV will start-up the TV screen and show the Test Pattern.

If the Plasma TV show a perfect White Display on screen, that's mean the Plasma Panel/Module is ok, the problem is in the Mainboard or their LVDS cable.

If the Plasma TV show a same problem display on the screen, that's mean their Mainboard and LVDS cable are ok. So the problem is in the Plasma Module and need to further check their PCB boards.

4.7- Various LG Plasma Panel Self Test

LG Plasma TV to Self Test their Panel, just need to set the PSU board to AUTO mode or short the AUTO GND to chassis ground (GND). After that, disconnect the Mainboard cable connector to PSU board and their LVDS cable to CTRL board. Follow by short together their AUTO GEN pins on CTRL board (Logic Control Board). Finally apply the AC Power to PSU board and the Plasma TV should show the Test Pattern on the screen.

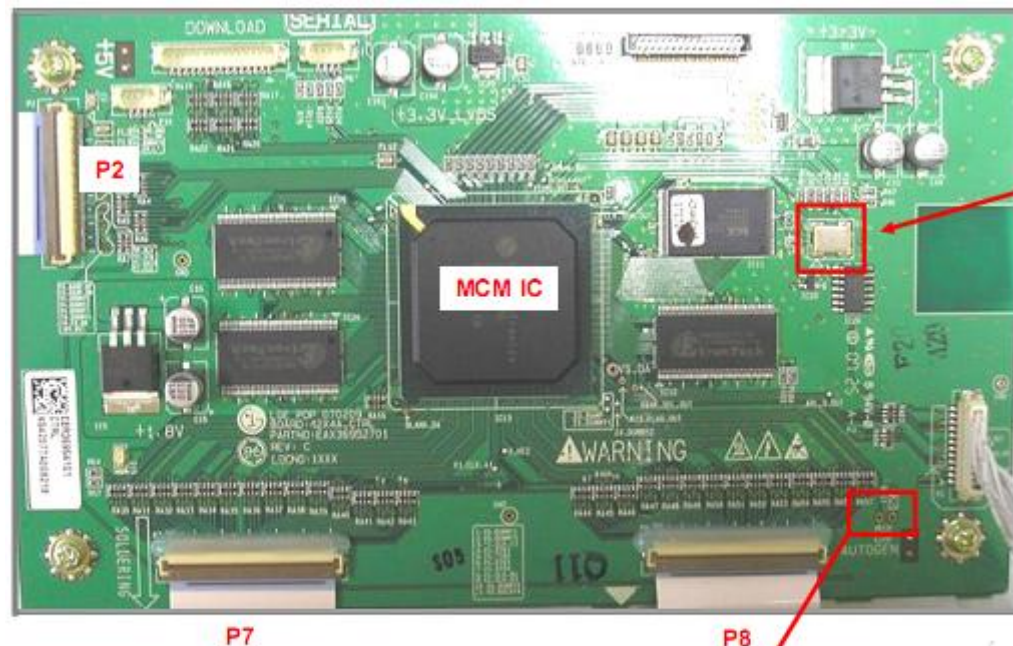
1) LG PDP42V7 Panel Self Test

PSU board SW1 or SW601 set to AUTO Mode, Remove the Mainboard connector to PSU board and their LVDS cable. The CTRL board R407 SMD resistor need to remove and put it in a save place. After Panel test, the resistor needs to solder it back to their original place R407.

Apply the AC power to PSU board, it should show the Test Pattern on the TV screen.



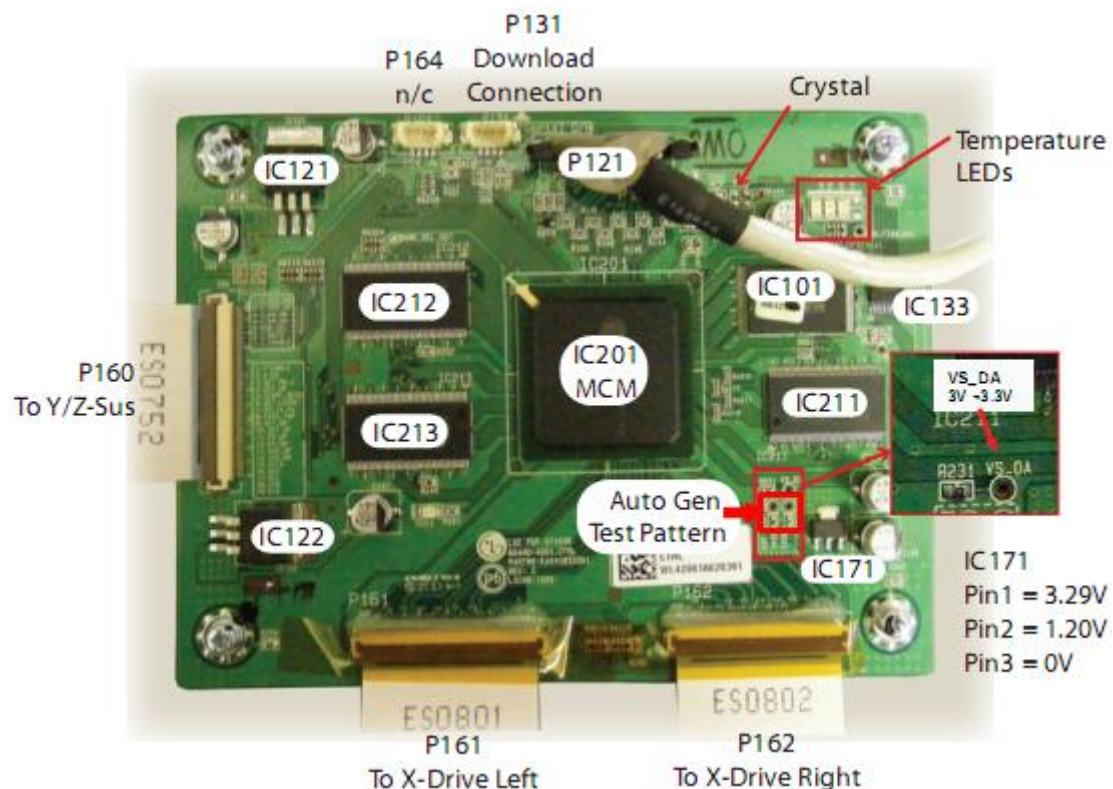
2) LG PDP42X4A Panel => LG 42PC5DC Plasma TV



Panel Test: Remove the LVDS Cable.
Short the Auto Generator.
Patterns should appear on the Screen.

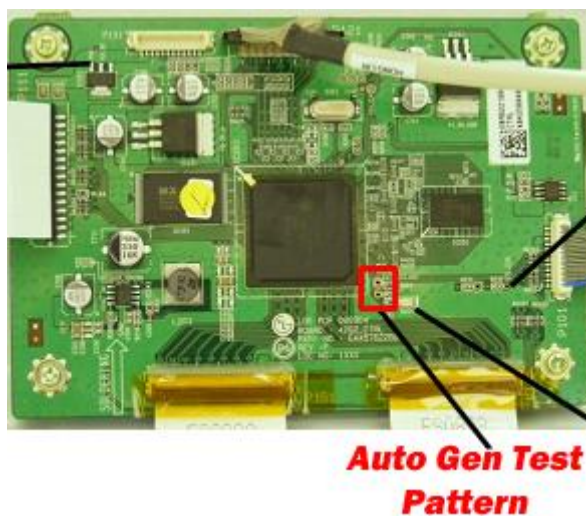
AUTO GEN
Internal Pattern Generator

3) LG PDP42G1 Panel => LG 42PG20 Plasma TV

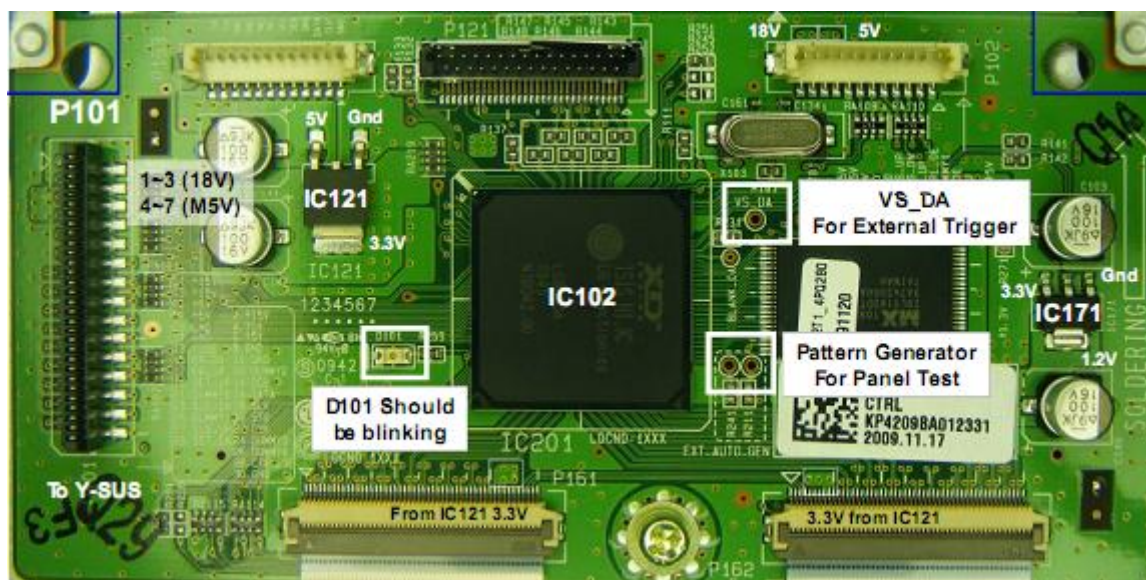


PV1- Collection of Plasma TV Repair Tips

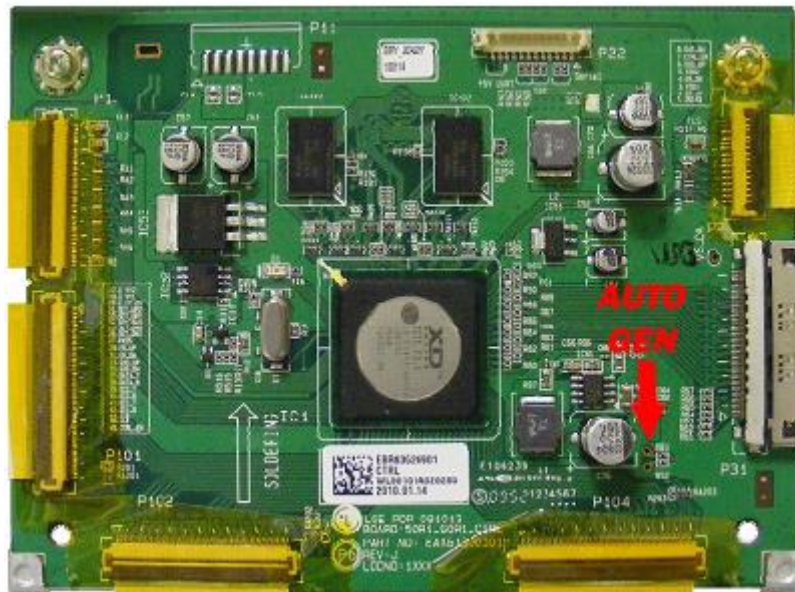
4) LG PDP42G2 Panel => LG 42PQ20 & 42PQ30 Plasma TV



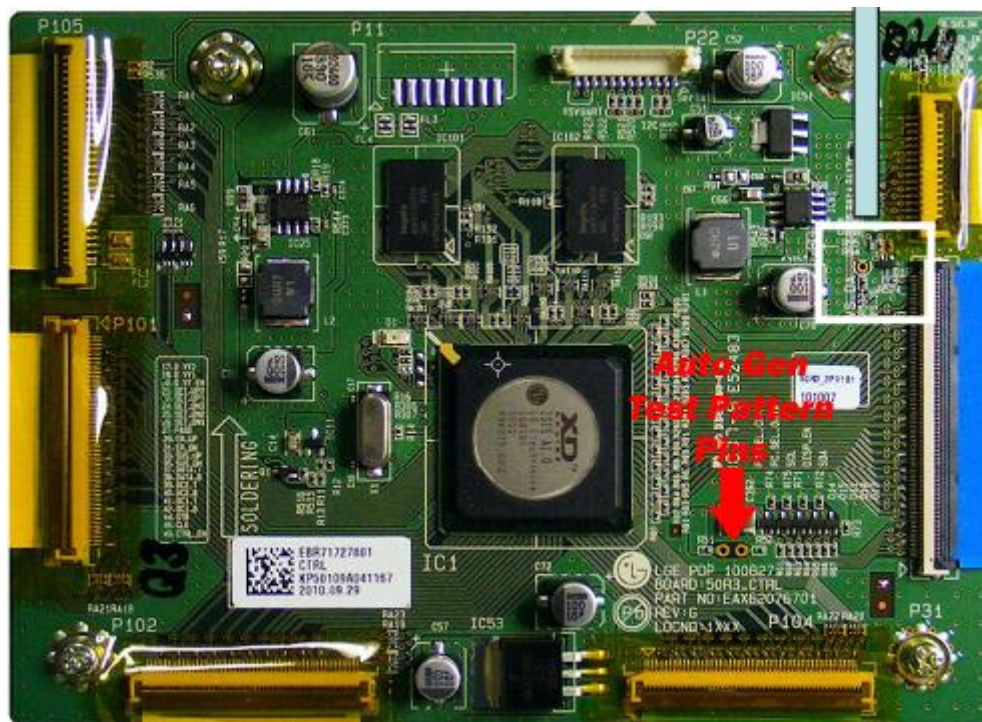
5) LG PDP42T1 Panel => LG 42PJ350 Plasma TV



6) LG PDP50R1 Panel => LG 50PKK750 Plasma TV



7) LG PDP50R3 Panel => LG 50PV450 Plasma TV



4.8- How to Test Plasma TV PCB Boards & Components

This chapter is to let you know how to check the Plasma TV Module PCB boards, components and their waveform test points. It will help to troubleshoot the Plasma TV quickly and to locate their defective PCB board or even the defective components too.

LG Plasma TV

For LG Plasma TV Panel on how to do the Voltage Adjustment, Check Points and Waveform test points, please refer to the Bonus-B section to “**LG Plasma Panel Alignment Guide**” handbook (over 300 pages!). This handbook included nearly 30 types Plasma Panels and over 100 models of Plasma TV.

For more details on the Mainboard voltages, waveform & other details, please refer to the Bonus-A (inside this eBook last section) for their Interconnect Diagrams.

*** Attention: SAFETY First! For ALL brands of Plasma TV Panels**

You MUST know:

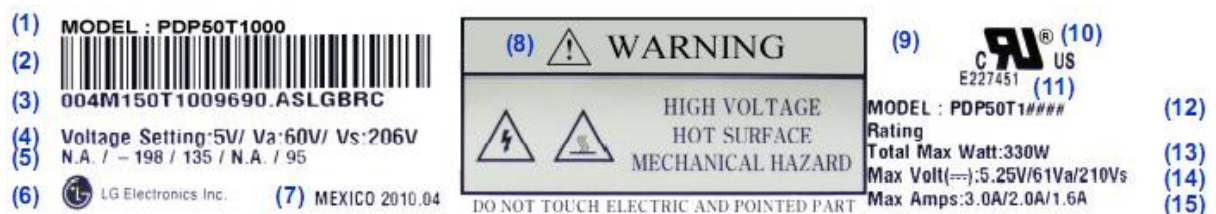
- 1) How to testing the voltages with your Multi-meter (or VOM).
- 2) For the Oscilloscope waveform test, you MUST use the Isolation transformer. If not it will damage your Oscilloscope or the PCB board. Recommend to use the 100MHz or above Oscilloscope.
- 3) Remember when perform the “Diode Test”, you must POWER OFF the TV to do the Diode Range test.
- 4) Not all the VR (Variable Resistor) can be adjusted. Just follow the instruction and the right method to adjust their Voltages and the Waveforms. If not, it will damage your Plasma TV! Be careful, if you don't know how to

testing the voltages and the waveform, will not recommend you to do these steps. All about Safety First!

LG 50PJ350 Plasma TV

Since this model of Plasma Tv has lots of request in my support email, here is their detail to checking and troubleshooting information:

Panel Label Explanation



- | | |
|--|----------------------------------|
| (1) Panel Model Name | (9) TUV Approval Mark (Not Used) |
| (2) Bar Code | (10) UL Approval Mark |
| (3) Manufacture No. | (11) UL Approval No. |
| (4) Adjusting Voltage DC, Va, Vs | (12) Panel Model Name |
| (5) Adjusting Voltage (Set Up / -Vy / Vsc / Ve / Vz) | (13) Max. Watt (Full White) |
| (6) Trade name of LG Electronics | (14) Max. Volts |
| (7) Manufactured date (Year & Month) | (15) Max. Amps |
| (8) Warning | |

Adjustment Notice:

All adjustment (DC or Waveform) are adjusted in WHITE WASH.
Customer's Menu, Select "Options", select "ISM" select "WHITE WASH".

It is critical that the DC Voltage adjustment be checked when:

- 1) PSU, Y-SUS or Z-SUS board is replaced.
- 2) Panel is replaced, Check VA/VS since the PSU does not come with new panel.
- 3) A Picture issue is encountered.

4) As a general rule of thumb whenever the back is removed.

ADJUSTMENT ORDER “IMPORTANT”

DC VOLTAGE ADJUSTMENTS

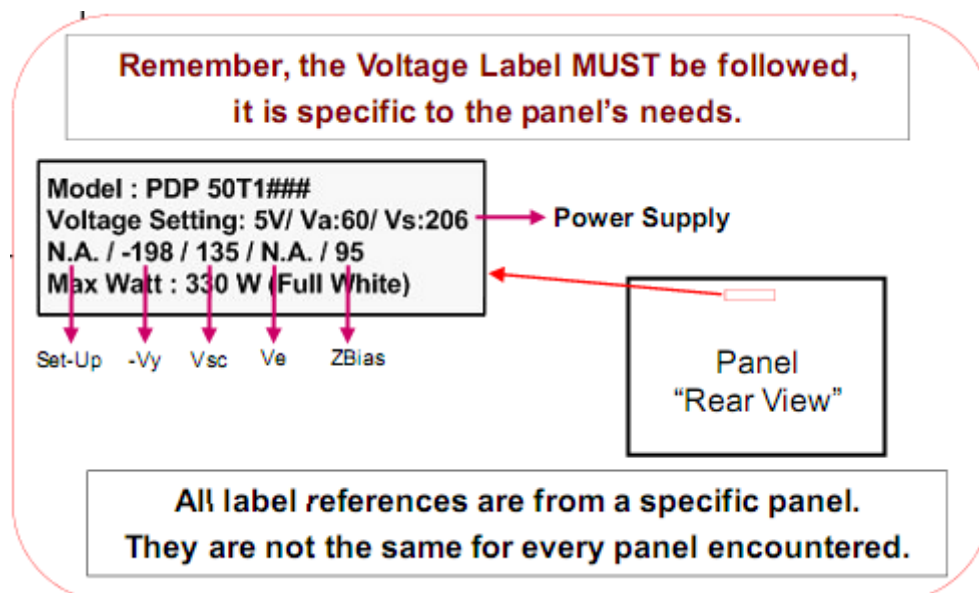
- 1) POWER SUPPLY: VS, VA (Always do first)
- 2) Y-SUS: Adjust $-V_y$, VSC
- 3) Z-SUS: Adjust Z-Bias (VZB)

WAVEFORM ADJUSTMENTS

- 1) Y-SUS: Set-UP, Set-Down

The Waveform adjustment is only necessary:

- 1) When the Y-SUS board is replaced.
- 2) When a “Mal-Discharge” problem is encountered
- 3) When an abnormal picture issues is encountered.



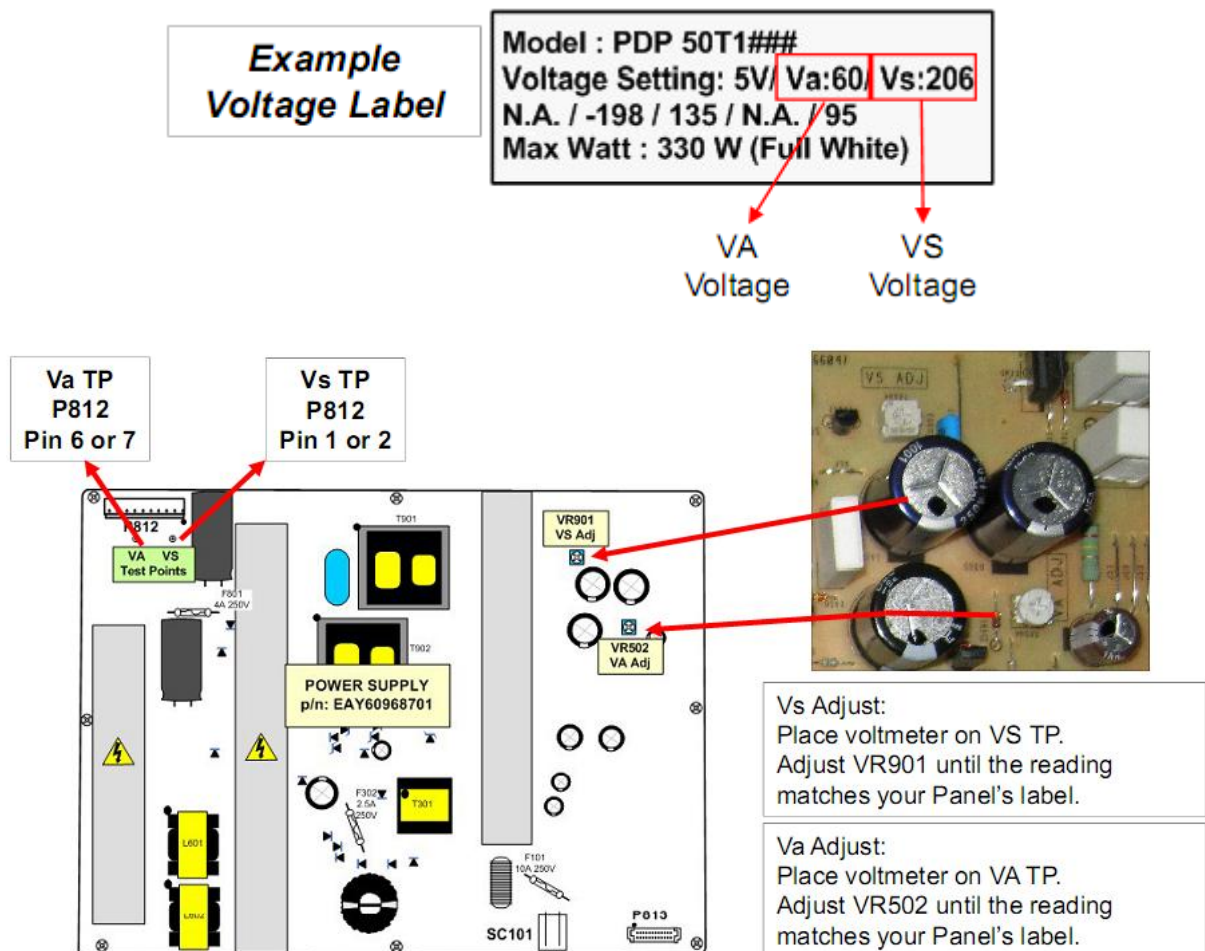
Power Supply VA and VS Adjustments for Switch Model Power Supply Board (PSU)

This section will cover the adjustment of VA and VS voltage. For the DC Voltages developed on the SMPS/PSU, please refer to the Chapter “Power Start-Up Sequence for Plasma TV”.

Always refer to the Voltage Sticker located on the back of the panel, in the upper Left Hand side for the correct voltage levels for the VA, VS, -VY, VSC and Z-Bias (VZB) as these voltages will vary from Panel to Panel even in the same size category. Set-Up and Ve are just for Label location identification and are not adjusted in this panel.

PSU p/n: EAY60968701

Important: Use the Panel Label Not this book for all voltage adjustments.



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Please refer to the Chapter of “PSU Board Self Test Method” to start-up the power supply to testing their VA & VS voltages.

Always test the PSU under a load using the 2 Lights Bulbs. Abnormal operational conditions may result if not loaded.

If the light bulbs turn on and VS is the correct voltage, allow the PSU to run for several minutes to be sure it will operate under load. If this test is successful and all other voltages are generated, you can be fairly assured the power supply is OK.

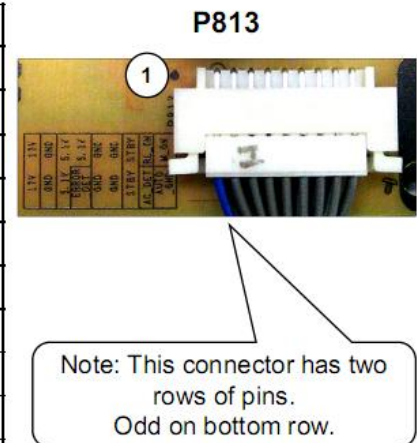
Note: To be 100% sure, you would need to read the current handling capabilities of each power supply listed on the silk screen on the PSU and place each supply voltage under the appropriate load.

PSU Board Connector P813 Identification, Voltages and Diode Check

Diode Mode readings taken with all connectors disconnected. Multi-meter or the DVM was in Diode Mode.

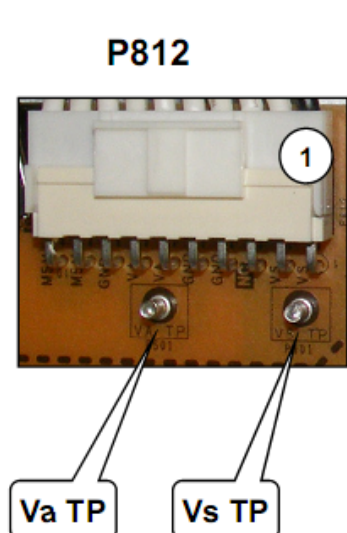
P813 Connector “SMPS” to “Main” P301

Pin	Label	STBY	Run	Diode Mode
1-2	^a 16V	0V	17V	3.17V
3-4	Gnd	Gnd	Gnd	Gnd
5-7	^a 5V	0.46V	5.17V	1.16V
8	^{a c} Error Det	2.85V	4.1V	3.09V
9-12	Gnd	Gnd	Gnd	Gnd
13-14	Stby 5V	3.46V	5.14V	2.55V
15	RL On	0V	2.43V	Open
16	^{a d} AC Det	0V	4.44V	3.06V
17	^b M_ON	0V	3.29V	Open
18	^e Auto Gnd	Gnd	Gnd	Open



PSU Board Connector P812 Identification, Voltages and Diode Check

Diode Mode readings taken with all connectors disconnected. Multi meter or the DVM was in Diode Mode.



P812 "Power Supply" to Y-SUS "P210"

Pin	Label	Run	Diode Mode
1, 2	*Vs	*206V	Open
3	n/c	n/c	n/c
4, 5	Gnd	Gnd	Gnd
6, 7	*Va	*60V	Open
8	Gnd	Gnd	Gnd
9, 10	M5V	5V	2.16V

* Note: This voltage will vary in accordance with Panel Label

Y-SUS routes Va to bottom X-Left. Vs routed to Z-SUS from P211.
M5V routed through Y-SUS to Control board and then to Z-SUS.

How to Check and Test Y-SUS Board

The Y-SUS board is develops the V-Scan drive signal to the Y-Drive boards. This LG 50PJ350 is a Single Scan Plasma TV. Upon completion of this section, the technician will have a better understanding of the operation of circuit and will be able to locate voltage and diode mode test points needed for troubleshooting and alignments.

Operating Voltages

1) SMPS/PSU Supplied: (VA) - VA supplies the Panel's Vertical Electrodes (Routed to the Left X Buffer Board).

(VS) - VS supply the Panel's Horizontal Electrodes. Also routed to the Z-SUS board.

(M5V) – M5V supplies Bias to Y-SUS. (From Y-SUS routed to the Control Board then Z-SUS board).

2) Y-SUS Developed: -Vy (VR502) - -Vy Sets the Negative excursion of Reset in the Drive Waveform.

VSC (VR501) – VSC Sets the amplitude of the complex waveform.

V SET UP (VR401) - SET UP sets amplitude of the Top Ramp of Reset in the Drive Waveform.

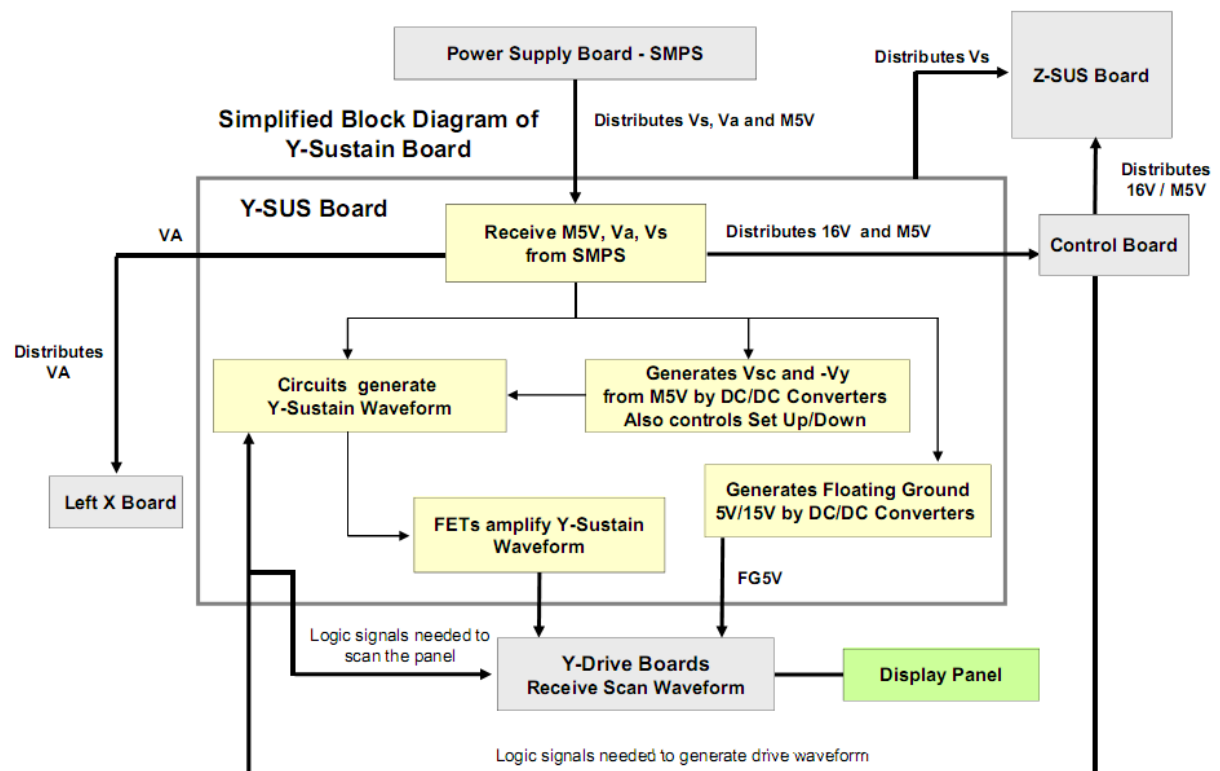
V SET DN (VR402) - SET DOWN sets the Pitch of the Bottom Ramp for Reset in the Waveform.

16V – Used internally to develop the Y-Drive signal. (Also routed to the Control Board then routed to the Z-SUS board).

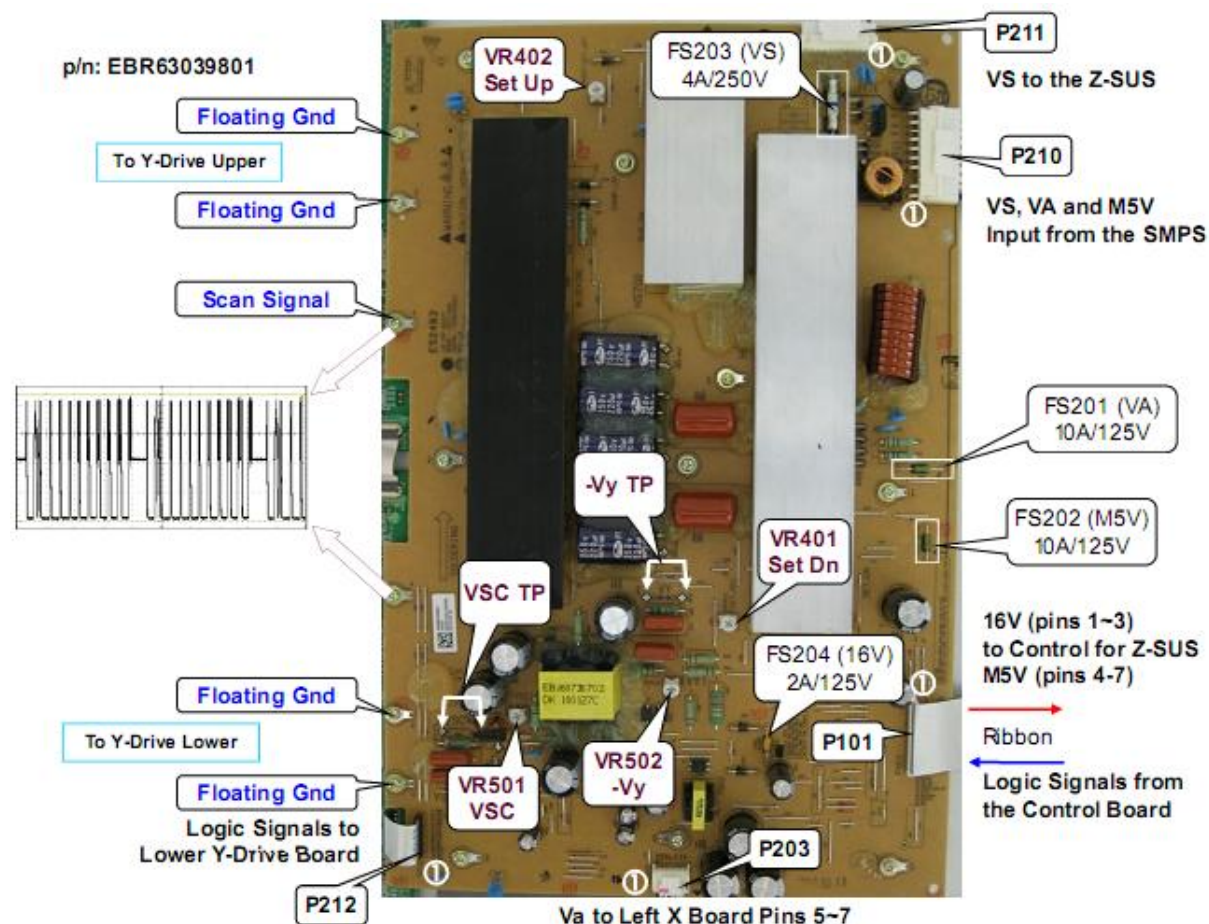
3) Floating Ground: FG 5V – Used on the Y-Drive boards (Measured from Floating GND)

FG 15V – Used in the Development of the Y-Drive Waveform (Measured from Floating GND).

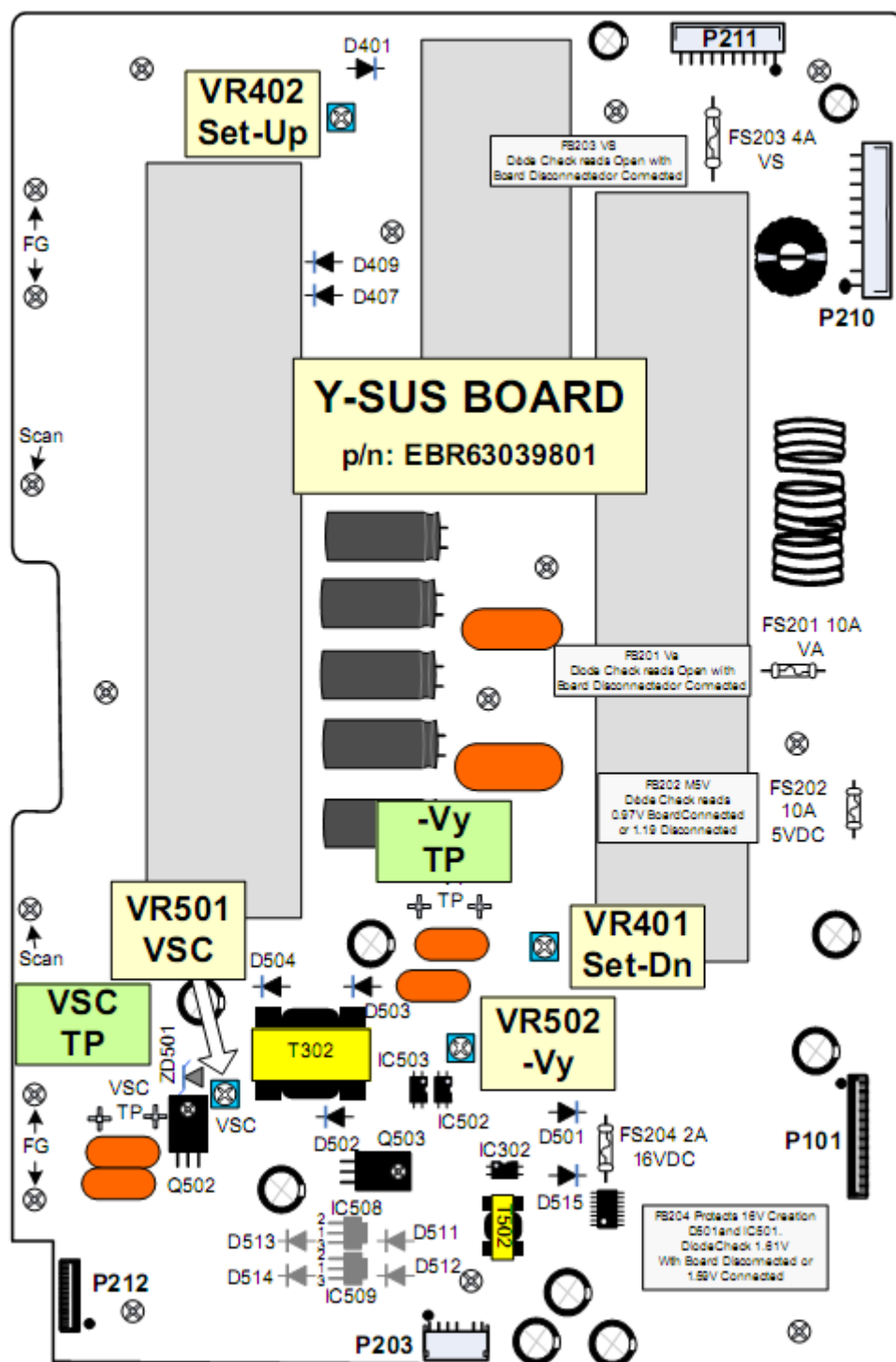
Y-SUS Block Diagram



Y-SUS Board Layout



LG 50PJ350 Y-SUS Test Points Voltages



Example:

Model : PDP 50T1###
Voltage Setting: 5V/ Va:60/ Vs:206
N.A. / -198 / 135 / N.A. / 95
Max Watt : 330 W (Full White)

-Vy VSC

WARNING:
Both Y-DRIVE Boards must be removed completely if P205 / P204 / P110 is pulled.

P212 Connector Y-SUS to Y-Drive B P205

Pin	Label	Run	Diode Check
1	SUS_DN (FG)	FG	FG
2	SUS_DN (FG)	FG	FG
3	YB_OC2	2.63V	1.47V
4	YB_OC2	2.63V	1.47V
5	YT_DATA	0V	1.38V
6	YT_DATA	0V	1.38V
7	YTB_OC1	2.2V	1.47V
8	YTB_OC1	2.2V	1.47V
9	YB_STB	2.8V	1.37V
10	YB_STB	2.8V	1.37V
11	YB_CLK	0.86V	1.38V
12	YB_CLK	0.86V	1.38V
13	SUS_DN (FG)	FG	FG
14	SUS_DN (FG)	FG	FG
15	FG5V	4.9V	1.82V
16	FG5V	4.9V	1.82V
17	SUS_DN (FG)	FG	FG

P211 Connector Y-SUS to Z Drive P2

Pin	Label	Run	Diode Check
1~2	Gnd	Gnd	Gnd
3	n/c	n/c	n/c
4~5	+Vs	*206V	Open
6	n/c	n/c	n/c
7~11	ER_PASS	98V~102V	Open

P210 Connector Y-SUS to SMPS P813

Pin	Label	Run	Diode Check
1~2	VS	*195V	Open
3	n/c	n/c	n/c
4~5	Gnd	Gnd	Gnd
6~7	VA	*60V	Open
8	Gnd	Gnd	Gnd
9~10	M5V	5.1V	1.19V

P101 Connector Y-SUS to Control P111

Pin	Label	Run	Diode Check
1~3	+15V	16V	1.61V
4~7	+5V	4.9V	1.19V
8	Gnd	Gnd	Gnd
9	CTRL_OE	0V	1.54V
10	Gnd	Gnd	Gnd
11	OE	0V	1.75V
12	Gnd	Gnd	Gnd
13	Gnd	Gnd	Gnd
14	OC2	1.78V	1.19V
15	Delta_VY_Det	2.08V	1.18V
16	DATA	0V	1.02V
17	SET_ON	2.09V	1.14V
18	OC1	1.43V	1.14V
19	Det_Level_Sel	0.03V	1.14V
20	STB	1.97V	1.14V
21	Slope_Rate_Sel	1.34V	1.14V
22	CLK	0.59V	1.14V
23	YER_DN	0V	1.14V
24	SET_UP	0.24V	1.14V
25	YSUS_DN	0.95V	1.14V
26	Ramp_Slope	1.01V	1.14V
27	YER_UP	0.62V	1.14V
28	Y_Pass_Top	1.08V	1.14V
29	YSUS_UP	0.06V	1.14V
30	Gnd	Gnd	Gnd

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VSC and -Vy Adjustmens

CAUTION: Use the actual panel label and not the book for exact voltage settings.

These are DC level Voltage Adjustments:

Set should run for 15 minutes, this is the “Heat Run” mode.

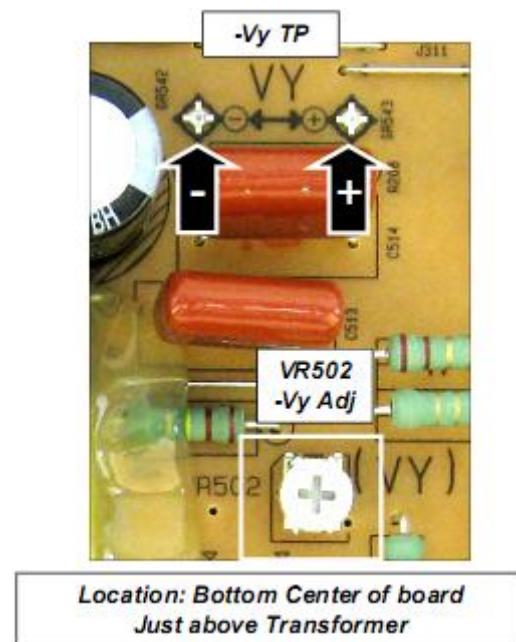
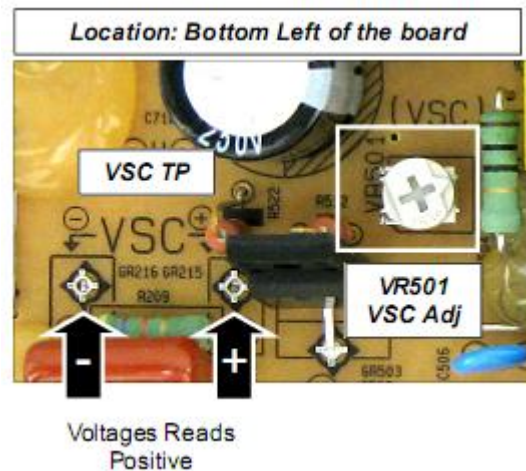
Set screen to “White Wash” or full white screen.

- 1) Adjust -Vy VR502 to Panel's Label voltage (+/- 1V)
- 2) Adjust VSC VR501 to Panel's Label voltage (+/- 1V)

This is just for example

Model : PDP 50T1###
Voltage Setting: 5V/ Va:60/ Vs:206
N.A. / -198 / 135 / N.A. / 95
Max Watt : 330 W (Full White)

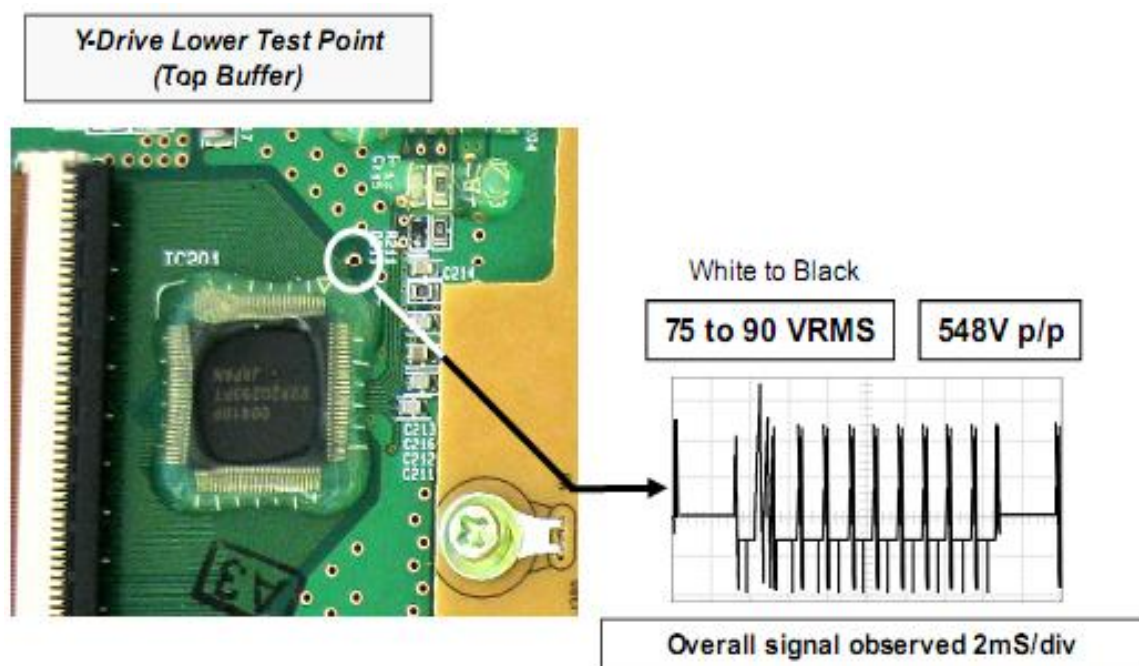
-Vy VSC



Y-Drive Signal Overview

The Waveform Test Points are fragile. If by accident the land is torn and the run lifted, make sure there are no lines left to right in the screen picture.

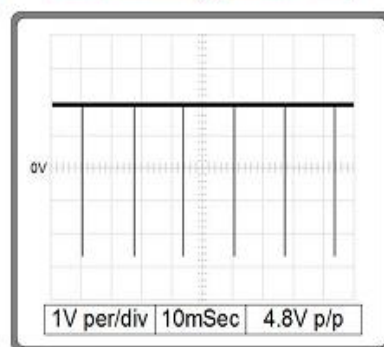
There are several other test points on either the Upper or Lower Y-Drive boards that can be used. Basically any output pins on any of the FPC to the Panel are OK to use.



Locking on to the Y-Drive Waveform Tip

Note, this TP (VS_DA) can be used as an External Trigger for scope when locking onto the Y-Drive (Scan) or the Z-Drive signal.

This signal can also be used to help lock the scope when observing the LVDS video signals.



Observing (Capturing) the Y-Drive Signal for Set Up Adjustment

Set must be in “White Wash”. All other DC Voltage adjustment should have already been made.

Fig 1:

As an example of how to lock in to the Y-Drive Waveform. Fig 1 shows the signal locked in at 2ms per/div.

Note the 2 blanking sections.

The area for adjustment is pointed out within the Waveform

Fig 2:

At 200uSec per/division, the area of the waveform to use for **SET-UP** or **SET-DN** is now becoming clear.

Now the only two blanking signals are present.

Fig 3:

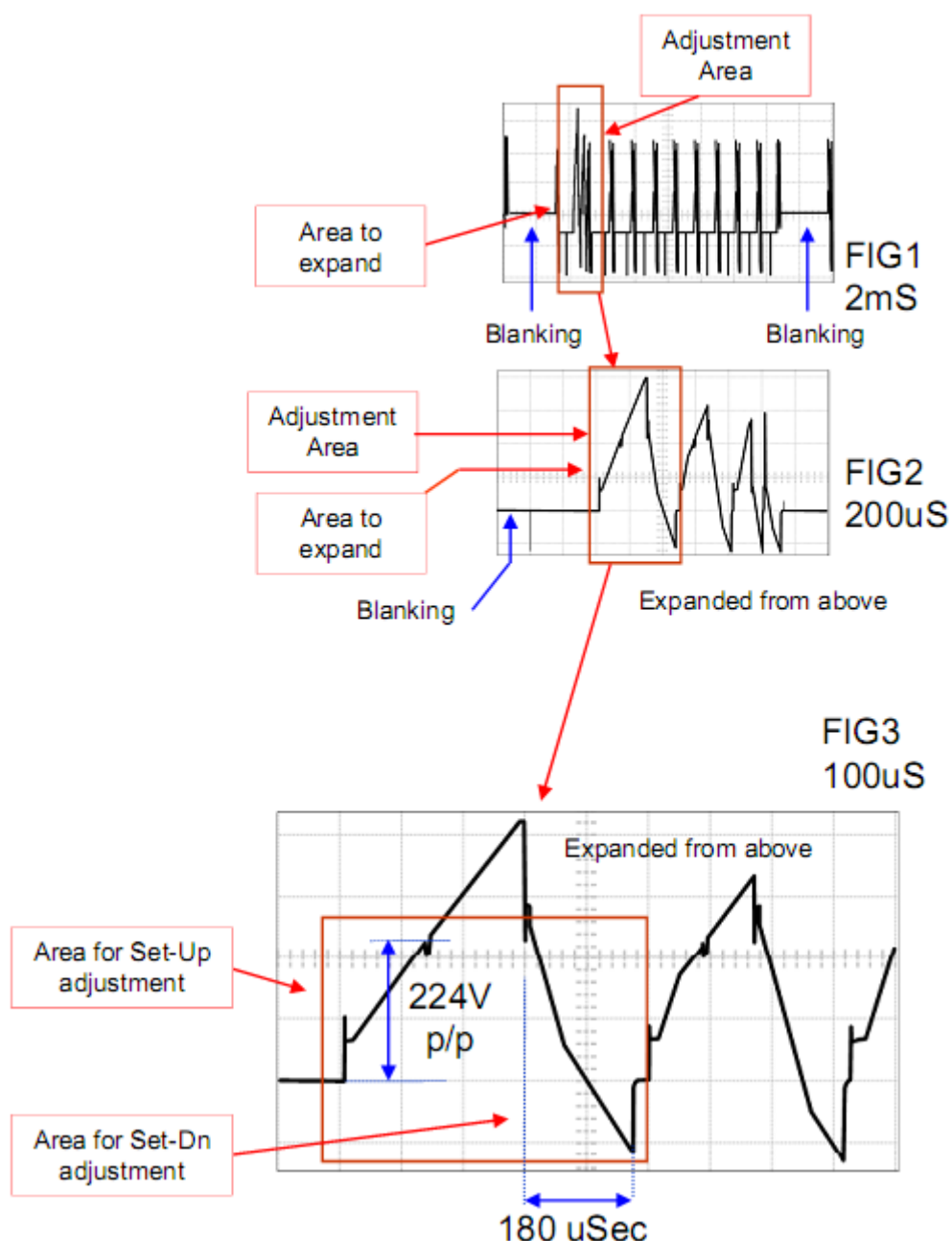
At 100us per/div the area for adjustment of **SET-UP** or **SET-DN** is now easier to recognize. It is outlined within the Waveform. Remember, this is the 1st large signal to the right of blanking.

TIP: If you expand to 100uSec per/division, the adjustment for:

SET-UP can be made using **VR402** and the

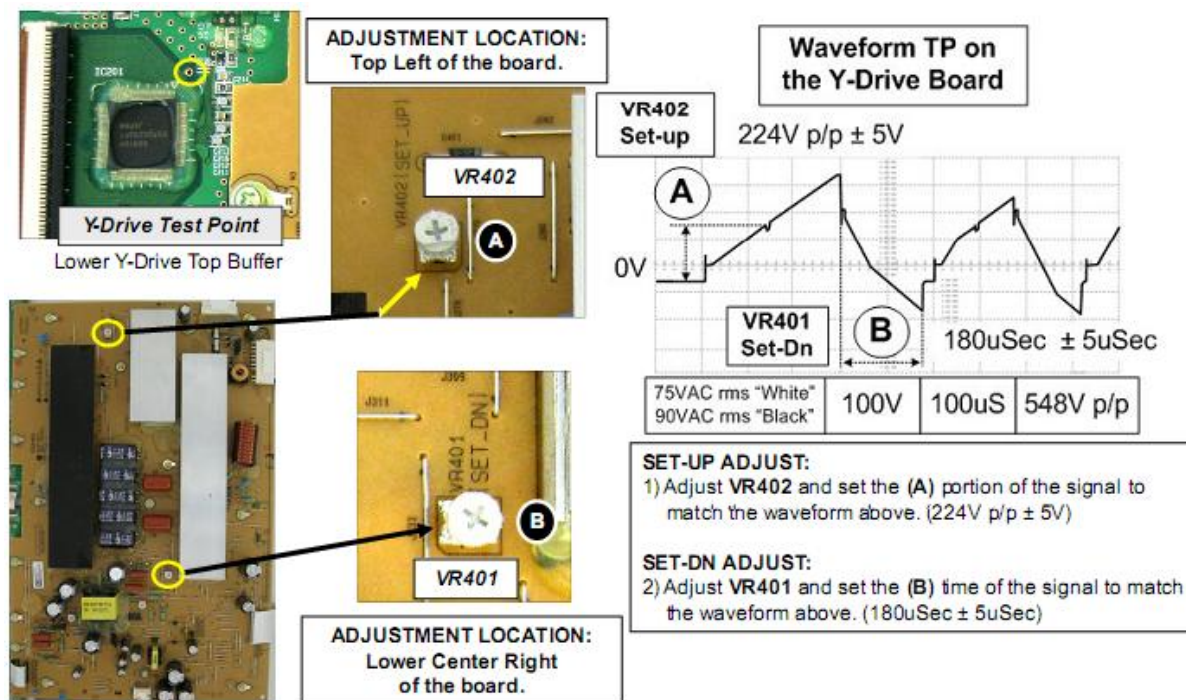
SET-DN can be made using **VR401**.

It will make this adjustment easier if you use the “Expanded” mode of your scope.



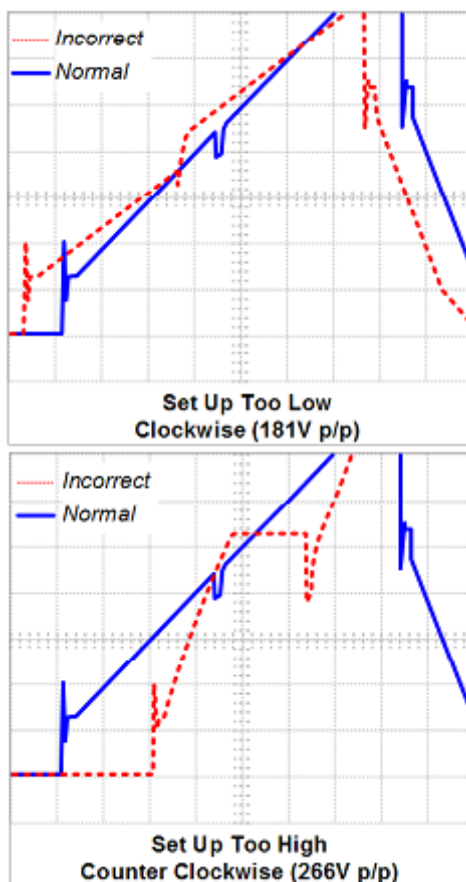
Set Up(Set UP) and Set Down (Set DN) Adjustments

Set must be in "White Wash". All other DC Voltage adjustments should have already been made. Observe the Picture while making these adjustments. Normally, they do not have to be done.

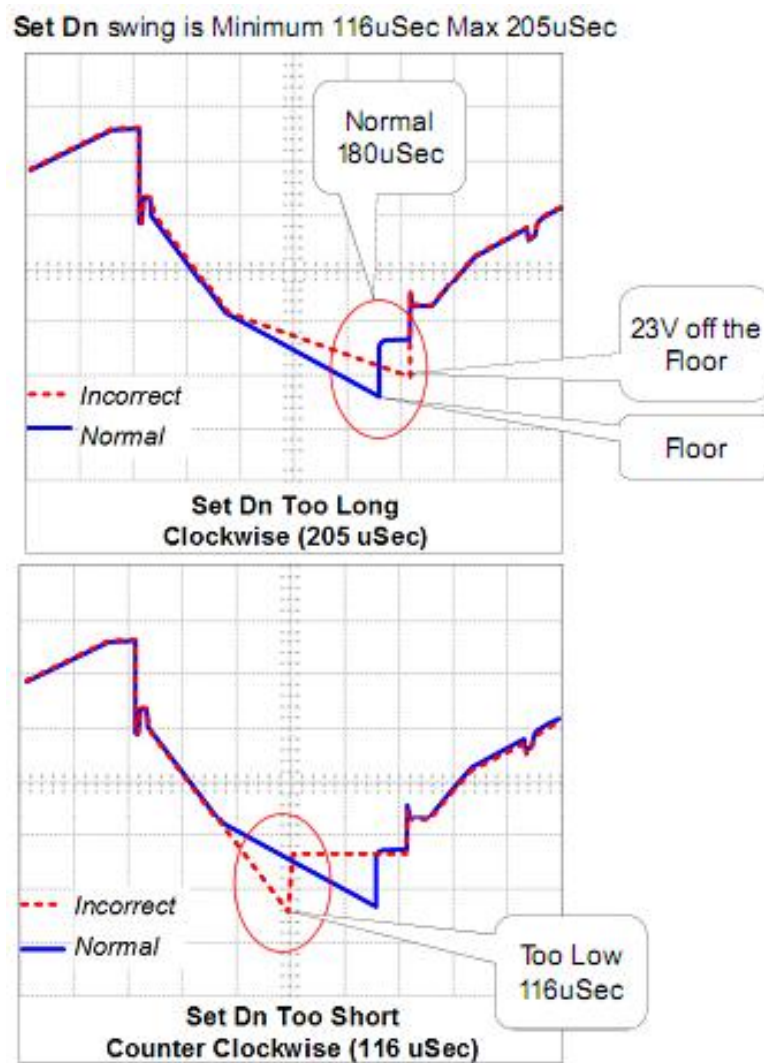


Set Up Adjustment Too High or Low

Set Up swing is Minimum 181V Max 266V p/p



Set Down (Set DN) Adjustment Too High or Low



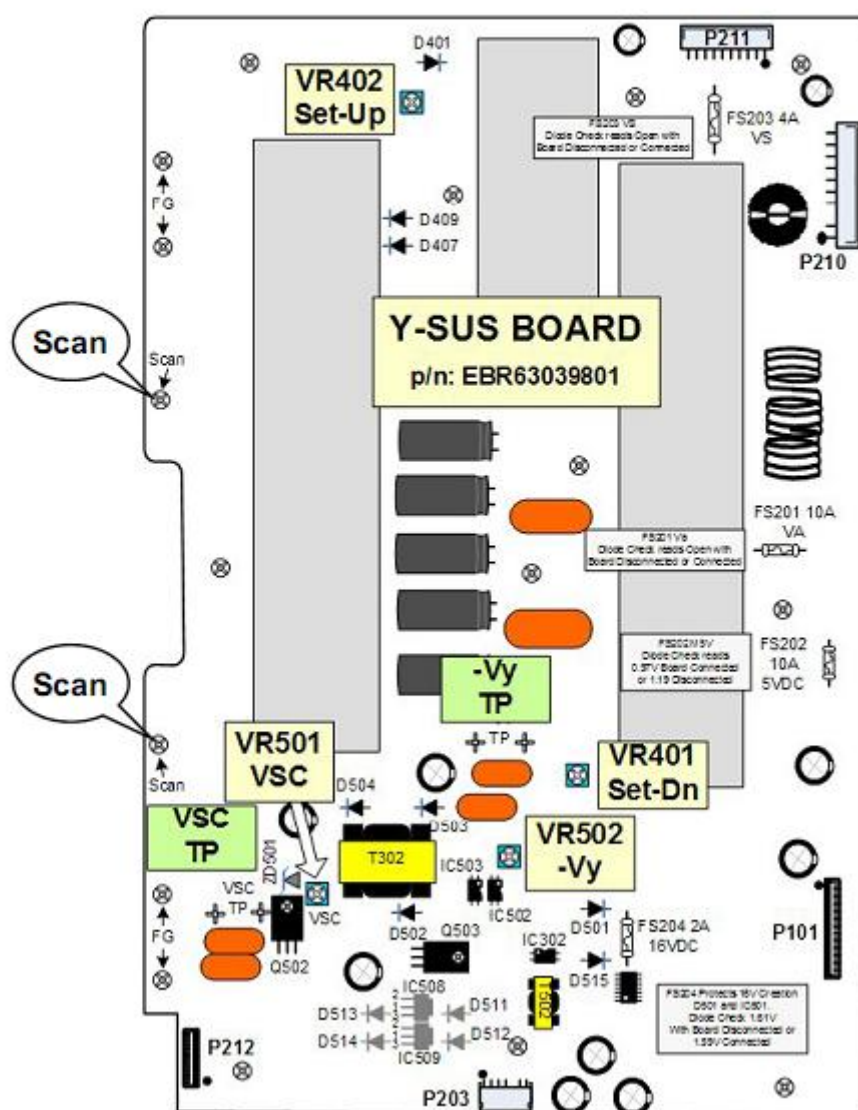
Y-SUS Board Troubleshooting VScan

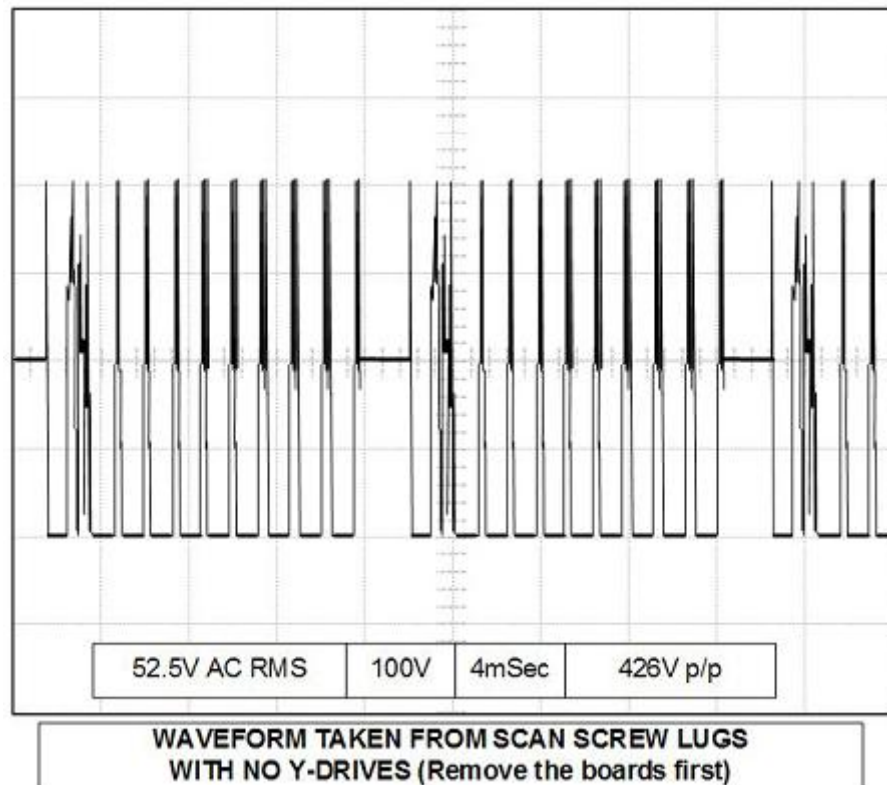
Y-SUS Board develops the V-Scan drive signal to the Y-Drive boards.

* Warning: Never run the Y-SUS with P212 (Y-SUS) or P204/P110 (Y-Drives) removed unless the Y-Drives boards are removed completely. If not, the Board Failure will occur.

TIP: Use the Scan Output Screw Lugs to test for V-Scan signal if the Y-Drive boards are removed

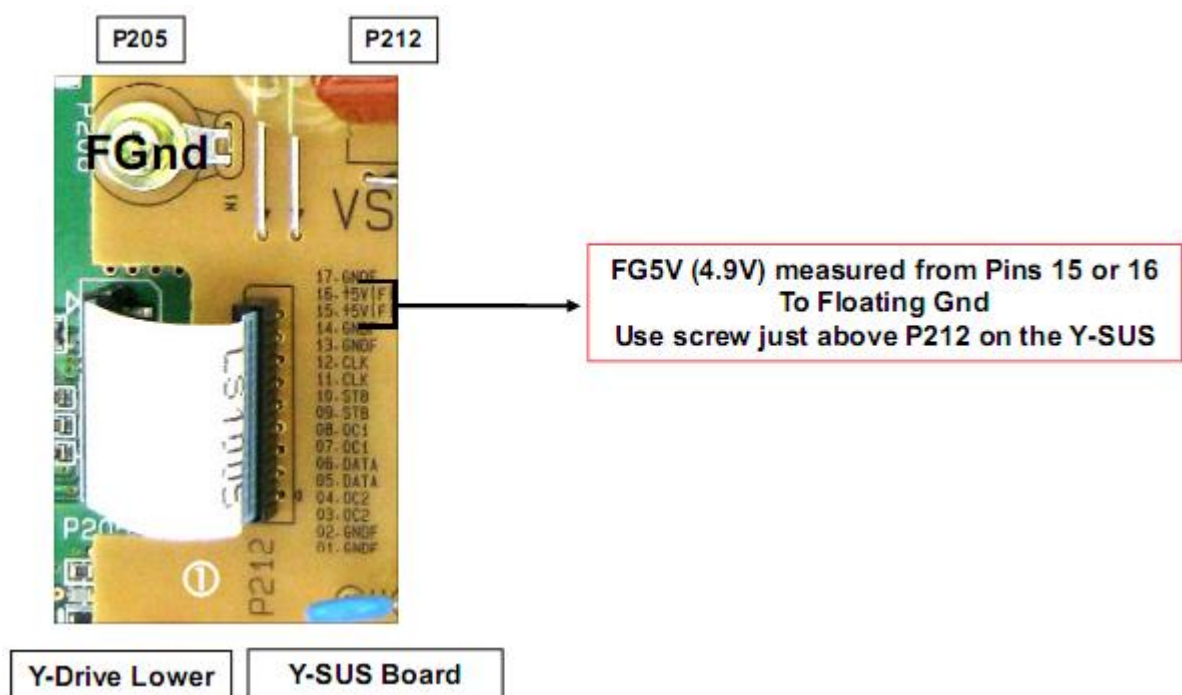
P/N EBR6303801



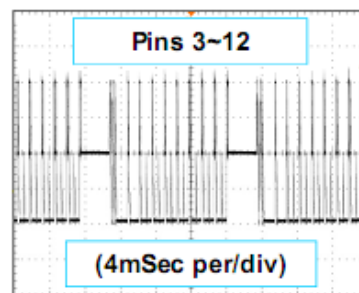
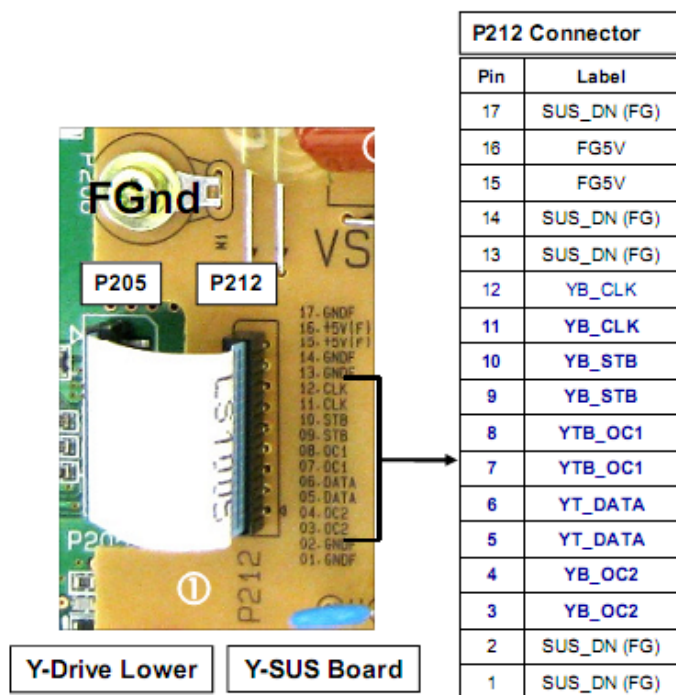


Y-SUS Board P212 Connector to P205 Lower Y-Drive (Logic and FG5V)

Tips: Connectors do not come with a new Y-SUS or Y-Drives. Use Scan Screw Lugs to test for Y-Scan signal if the Y-Drive boards are removed.



Y-SUS Board P212 to Lower Y-Drive P205 Logic Signals Explained



The signal for these pins look very similar due to the fact they are read from Chassis Gnd, but they are actually Floating Ground related. **DO NOT** hook scope Gnd to Floating Gnd TP without an Isolation Transformer.

All logic pins about (400V p/p)

Pins 3~12 are Logic (Drive) Signals to the Y-Drive Upper.

Y-SUS P212 Connector Diode Mode Testing

Meter in the Diode Mode.

* Attention: TV must power off first for Diode Mode testing.



Y-Drive Lower

Y-SUS Board

Y-Drive Board should be disconnected for this test.

P212 "Y-SUS" to "Lower "Y-Drive" P205

Red Lead on FG

Pin	Label	Run	Diode Check	Diode Check
17	SUS_DN (FG)	FG	FG	FG
16	FG5V	4.9V	1.82V	0.56V
15	FG5V	4.9V	1.82V	0.56V
14	SUS_DN (FG)	FG	FG	FG
13	SUS_DN (FG)	FG	FG	FG
12	YB_CLK	0.86V	1.38V	0.54V
11	YB_CLK	0.86V	1.38V	0.56V
10	YB_STB	2.8V	1.37V	0.66V
9	YB_STB	2.8V	1.37V	0.66V
8	YTB_OC1	2.2V	1.47V	0.68V
7	YTB_OC1	2.2V	1.47V	0.68V
6	YT_DATA	0V	1.38V	0.54V
5	YT_DATA	0V	1.38V	0.55V
4	YB_OC2	2.63V	1.47V	0.68V
3	YB_OC2	2.63V	1.47V	0.68V
2	SUS_DN (FG)	FG	FG	FG
1	SUS_DN (FG)	FG	FG	FG

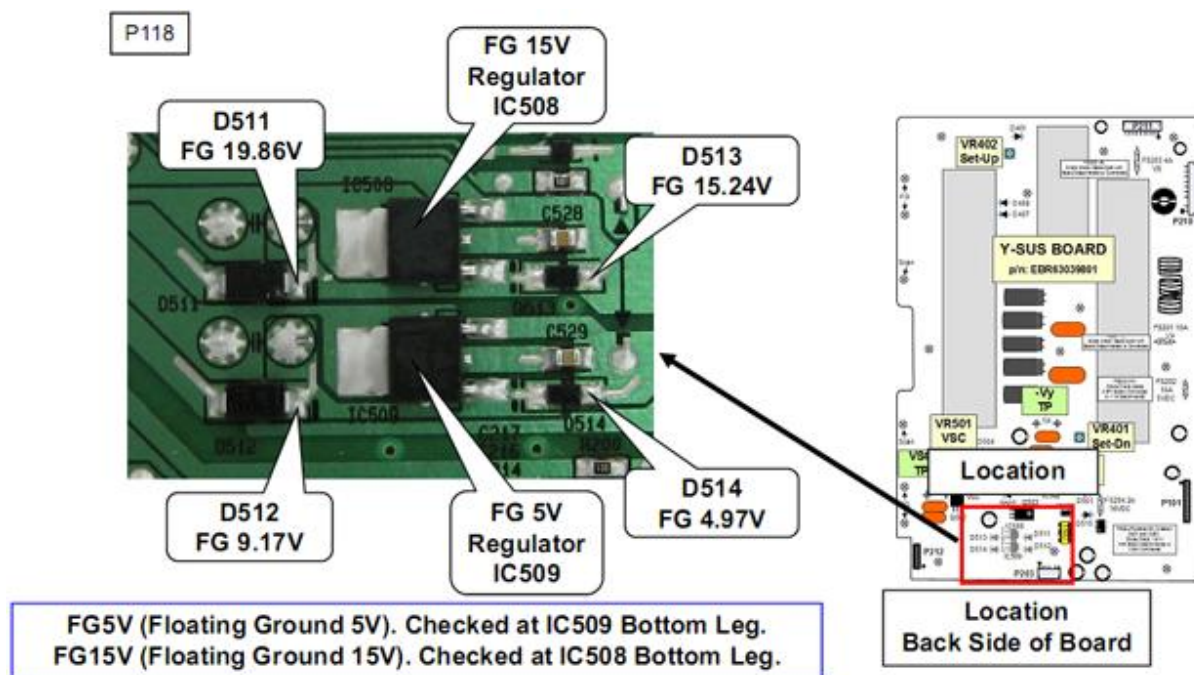


Y-SUS Floating Ground (FG15V) and (FG5V) Checks

The Voltage Measurements for the Y-SUS board.

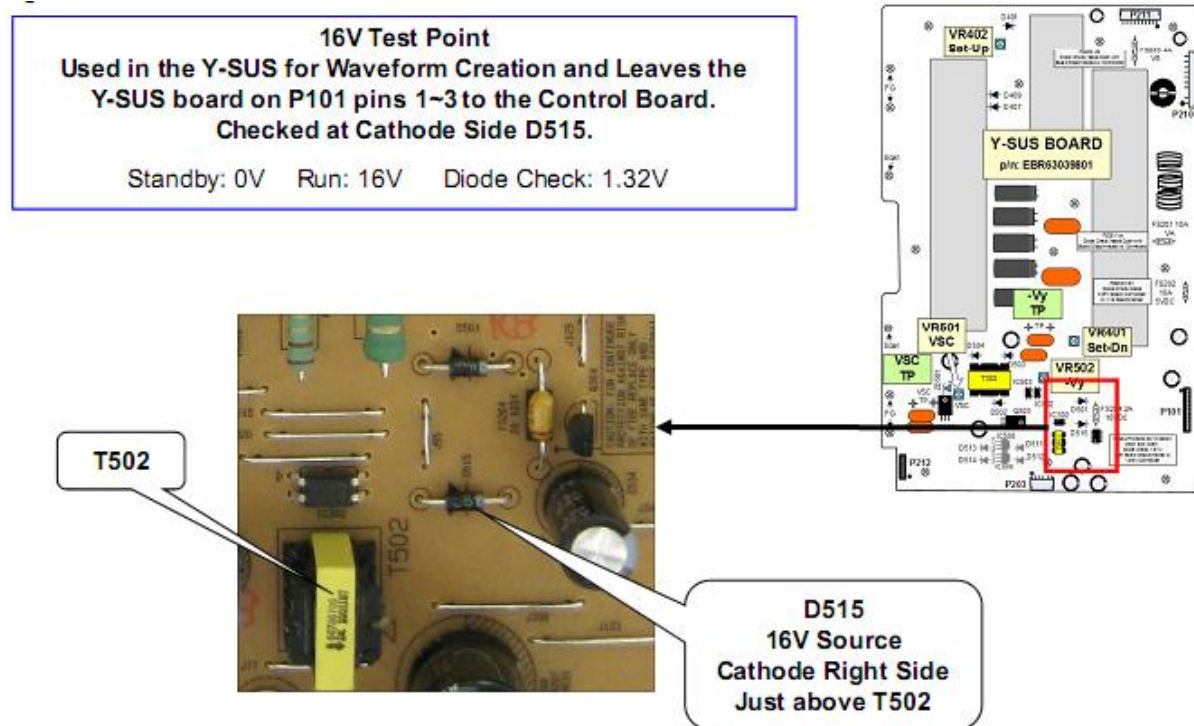
Tip: These components are on the back of the board. To Test these voltages, remove the board completely, supply Ground and any 5V supply to M5V fuse FS202.

Floating Ground checks **MUST** be made from the Floating Ground (NOT the chassis ground, GND). Use bottom two or top two screws on the far left hand side of the Y-SUS.

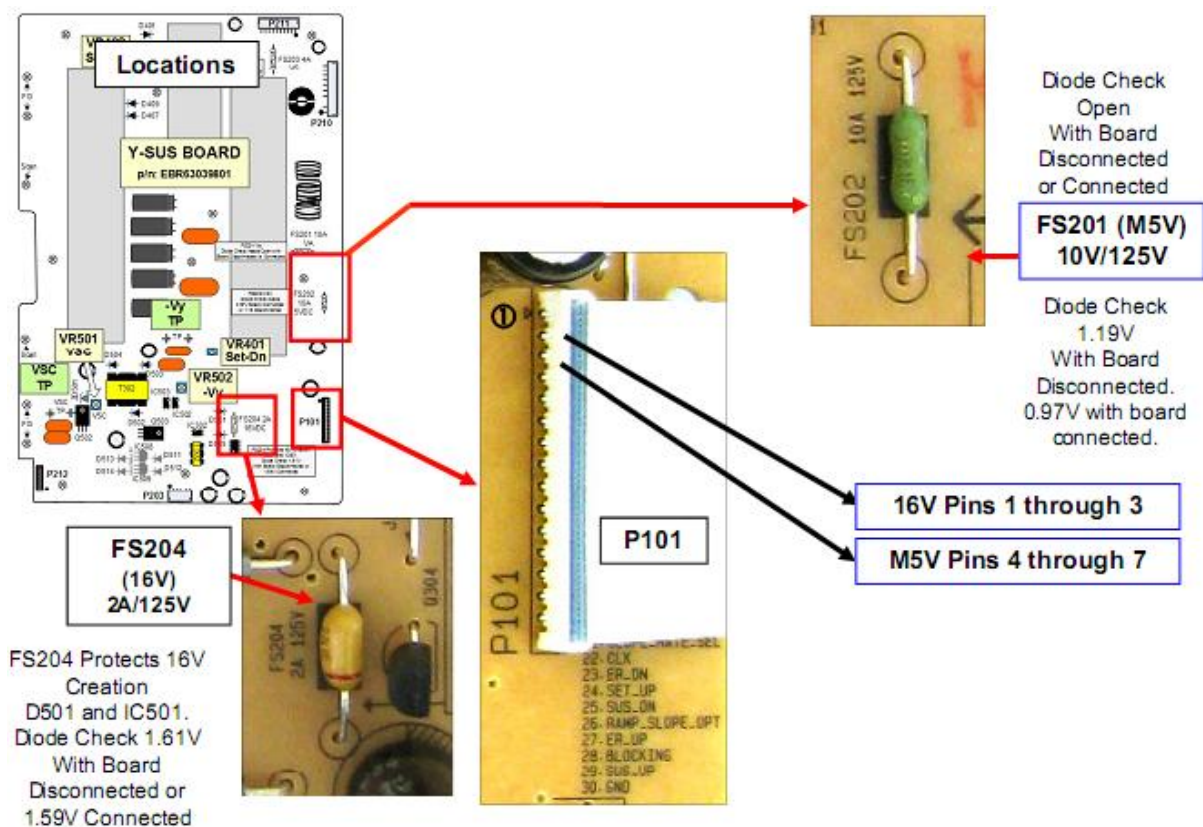


Y-SUS 16V Generation Checks

The Voltage Measurements for the Y-SUS board.



P101 Y-SUS to Control Board Fuse Information



Locations

Y-SUS BOARD
p/n: EBR0303801

FS204 (16V) 2A/125V

FS204 Protects 16V Creation D501 and IC501.
Diode Check 1.61V
With Board Disconnected or 1.59V Connected

FS201 (M5V) 10V/125V

Diode Check
Open
With Board Disconnected or Connected

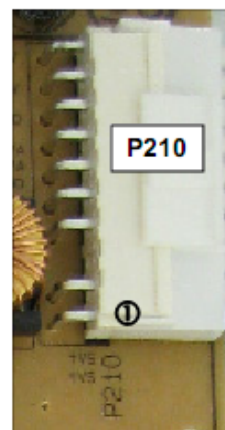
P101

16V Pins 1 through 3
M5V Pins 4 through 7

Y-SUS P113 and P114 Plugs Information

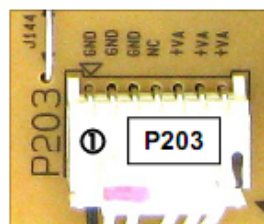
P210 Connector "Y-SUS" to "Power Supply" P812

Pin	Label	Run	Diode Check
1~2	Vs	*195V	Open
3	n/c	n/c	n/c
4~5	Gnd	Gnd	Gnd
6~7	Va	*60V	Open
8	Gnd	Gnd	Gnd
9~10	M5V	5.1V	1.19V



P203 "Y-SUS" to "X-Drive Left" P122

Pin	Label	Run	Diode Check
1~3	Gnd	Gnd	Gnd
4	n/c	n/c	Open
5~7	Va	*60V	Open



* Note: These voltages will vary in accordance with Panel Label

Y-SUS P211 Plug Information

P211 Connector "Y-SUS" to "Z-SUS" P2

Pin	Label	Run	Diode Check
1~2	Gnd	Gnd	Gnd
3	n/c	n/c	n/c
4~5	*Vs	*206V	Open
6	n/c	n/c	n/c
7~11	*ER_PASS	98V~102V	Open



* Note: These voltages will vary in accordance with Panel Label

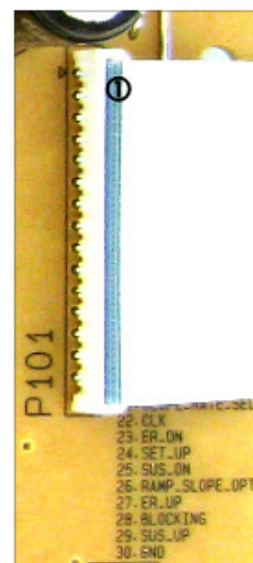
Y-SUS P101 to Control P111 Plug Voltage Checks

P101 Connector "Y-SUS" to P111 "Control"

Pin	Label	Run	Diode
1	+15V	16V	1.61V
2	+15V	16V	1.61V
3	+15V	16V	1.61V
4	+5V	4.9V	1.19V
5	+5V	4.9V	1.19V
6	+5V	4.9V	1.19V
7	+5V	4.9V	1.19V
8	Gnd	Gnd	Gnd
9	CTRL_OE	0V	1.54V
10	Gnd	Gnd	Gnd
11	OE	0V	1.75V
12	Gnd	Gnd	Gnd
13	Gnd	Gnd	Gnd
14	OC2	1.78V	1.19V
15	Delta_VY_Det	2.08V	1.18V

Pin	Label	Run	Diode
16	DATA	0V	1.02V
17	SET_ON	2.09V	1.14V
18	OC1	1.43V	1.14V
19	Det_Level_Sel	0.03V	1.14V
20	STB	1.97V	1.14V
21	Slope_Rate_Sel	1.34V	1.14V
22	CLK	0.59V	1.14V
23	YER_DN	0V	1.14V
24	SET_UP	0.24V	1.14V
25	YSUS_DN_IN	0.95V	1.14V
26	Ramp_Slope	1.01V	1.14V
27	YER_UP	0.62V	1.14V
28	Pass_Top	1.08V	1.14V
29	YSUS_UP_IN	0.06V	1.14V
30	Gnd	Gnd	Gnd

There are No Stand By Voltages on this Connector

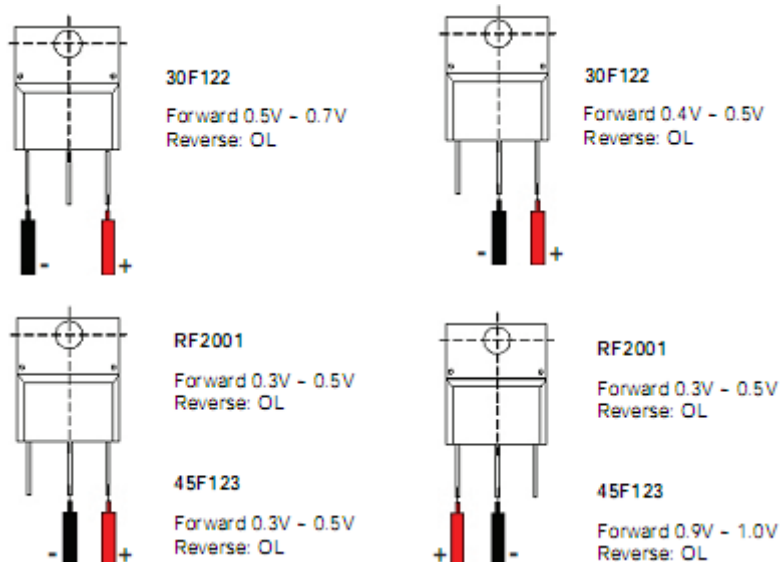


Diode Mode Readings taken with all connectors Disconnected. DVM in Diode Mode.

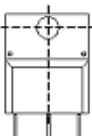
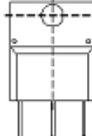
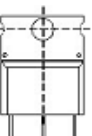
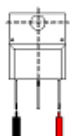
How to Check Y-SUS FETs

For the Plasma TV Panel their Y-SUS and Z-SUS boards not built-in the IPM, they got lots of the FETs inside these two boards. Here is some example of testing the FETs in these boards. Please refer to the components part number for accurate Diode test values. Readings “In Circuit” with Board Removed.

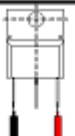
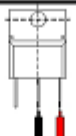
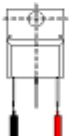
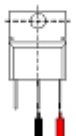
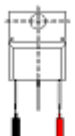
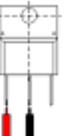
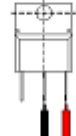
LG 42PG20 Y-SUS Board FETs



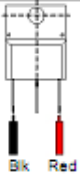
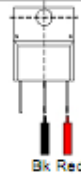
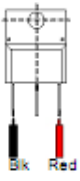
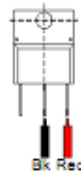
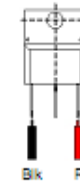
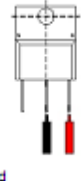
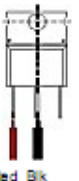
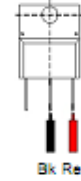
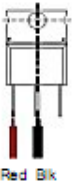
LG 42PQ30 Y-SUS Board FETs

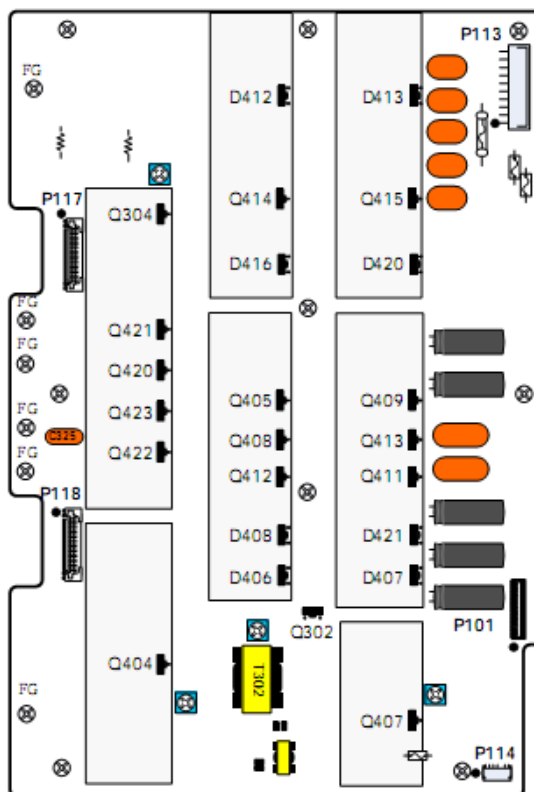
 IRFP4332 Forward: 0.5V ~ 0.7V Reverse: 1.1V IRGP4086 Forward: 0.6V ~ 0.7V Reverse: 1.3V	 IRFP4332 Forward: 0.4V ~ 0.5V Reverse: Open IRGP4086 Forward: 0.39V ~ 0.5V Reverse: Open	 IRFP4332 Forward: 1.6V Reverse: Open IRGP4086 Forward: 0.6V ~ 0.7V Reverse: 1.3V
 RF2001 Forward: Shorted Reverse: Shorted 30N45T Forward: 0.6V Reverse: Shorted K3667 Forward: 0.22V Reverse: Open	 RF2001 Forward: 0.4V Reverse: Open 30N45T Forward: 0.6V Reverse: Shorted K3667 Forward: 0.5V Reverse: Open	 RF2001 Forward: 0.38V Reverse: Open IRGP4086 Forward: 0.39V ~ 0.5V Reverse: Open K3667 Forward: 0.4V ~ 0.5V Reverse: Open

LG 50PK250 Y-SUS Board FETs

30F124 Q405, Q408, Q409, Q411, Q412, Q413, Q414, Q415, Q416	 Shown: 1.13V Reverse: 1.9V Blk Red	 Shown: 0.35V Reverse: Open Blk Red	 Shown: 2.23V Reverse: Open Red Blk
1K38BY Q420, Q421, Q423 1A02BT Q302 1K38AK Q422 1K44AB Q304	 Shown: 0.7V Reverse: 1.78V =Open Blk Red	 Shown: 0.5V Reverse: Open Blk Red	 Shown: 2.16V =Open Reverse: Open Red Blk
K3667 =Q404 Q407	 Shown: 0.51V Reverse: 1.37V =1.9V Blk Red	 Shown: 0.36V =0.5V Reverse: Open Blk Red	 Shown: 1.4V =2.1V Reverse: Open Red Blk
RF2001 D406, D407, D408 D413, D420, D421, D412	 Shown: Shorted Reverse: Shorted 0.3 Ohms Blk Red	 Shown: 0.35V Reverse: Open Blk Red	 Shown: 0.35 Reverse: Open Red Blk

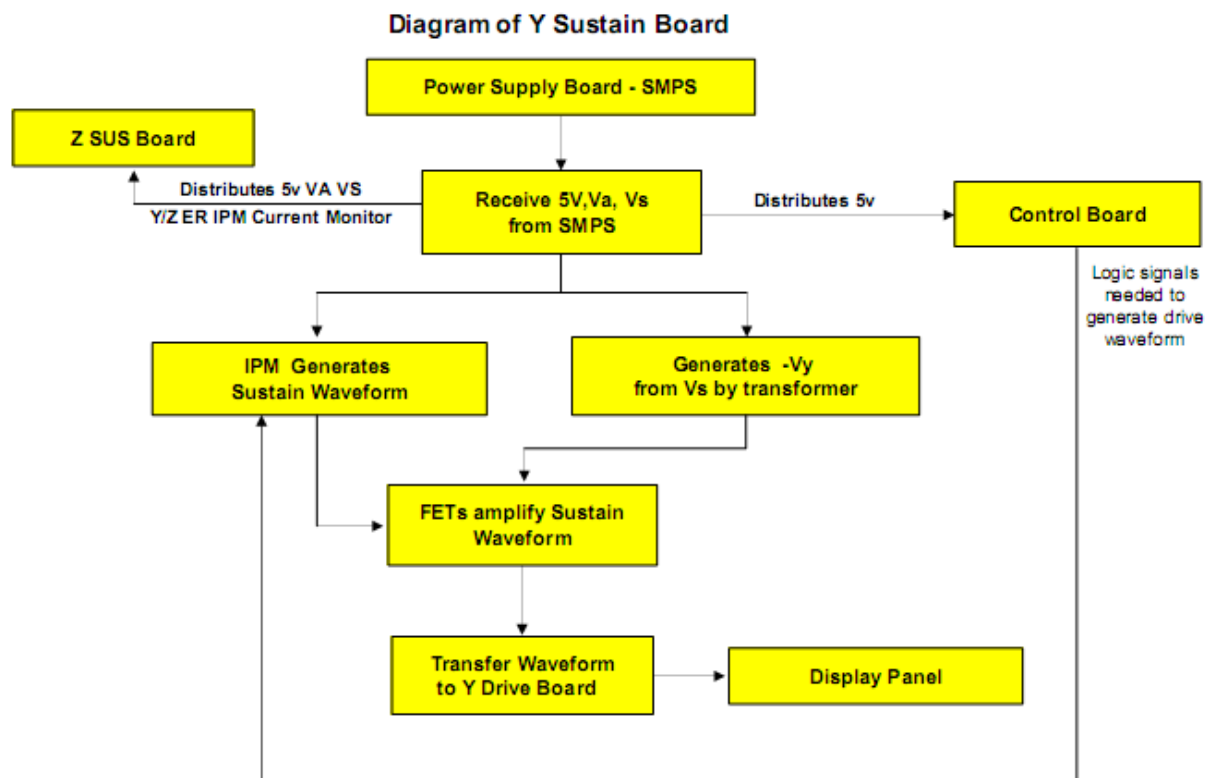
LG 60PK750 Y-SUS Board FETs

30F124 Q405, Q406, Q408, Q409, Q410, Q411 Q412, Q413, Q414, Q415, 416, Q417		 Shown: 1.13V Reverse: 1.9V	 Shown: 0.35V Reverse: Open	 Shown: 2.23V Reverse: Open
1A01BT Q420, Q421, Q422, Q423 Q424, Q425, Q426		 Shown: 0.7V ≈0.54V ≈0.75V Reverse: 1.53V ≈Open	 Shown: 0.46V ≈0.64V Reverse: Open	 Shown: 1.88V Reverse: Open
1A02DA ≈Q302	1A03BB ≈Q304			
K3667 ≈Q404 Q407		 Shown: 0.51V Reverse: 1.37V ≈1.9V	 Shown: 0.36V ≈0.5V Reverse: Open	 Shown: 1.4V ≈2.1V Reverse: Open
RF2001 D406, D407, D408 D413, D415, D416 D420, D421, D414 D412		 Shown: Shorted Reverse: Shorted 0.3 Ohms	 Shown: 0.35V Reverse: Open	 Shown: 0.35 Reverse: Open



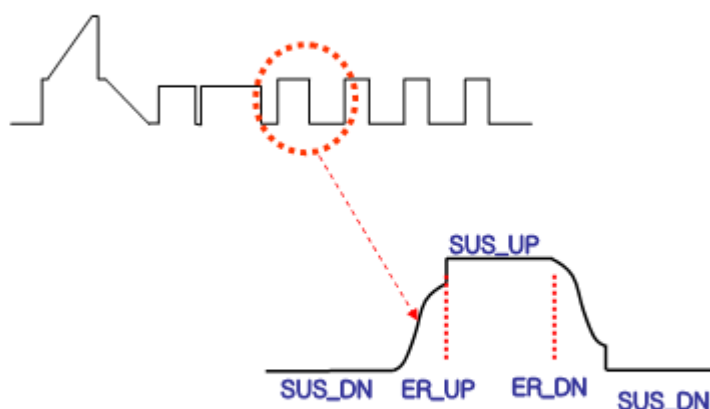
Y-SUS Board Section (With IPM Module)

The latest model of Plasma TV like LG50PJ350 their Y-SUS and Z-SUS boards not use the IPM module and its replace with the FETs and control circuits already. For old model of plasma tv, they use the IPM in their Y-SUS and Z-SUS board. Below is the LG 42PC5DC Plasma TV (PDP42X4A Panel) Y-SUS board block diagram with IPM built-in:



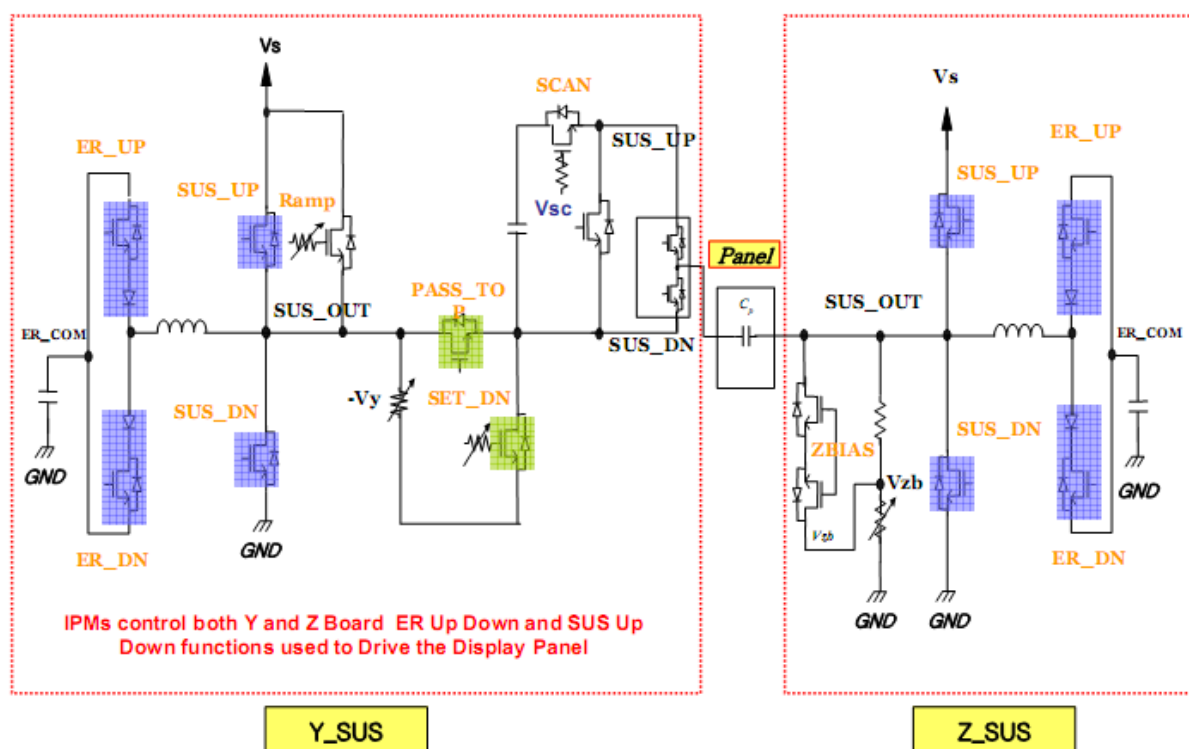
LG 42PC5DC Y-SUS IPM Explained

IPM Intelligent Power Module



There is one IPM (Intelligent Power Module) on the Y Sustain Board both the SUS and ER Functions are all controlled by IC13

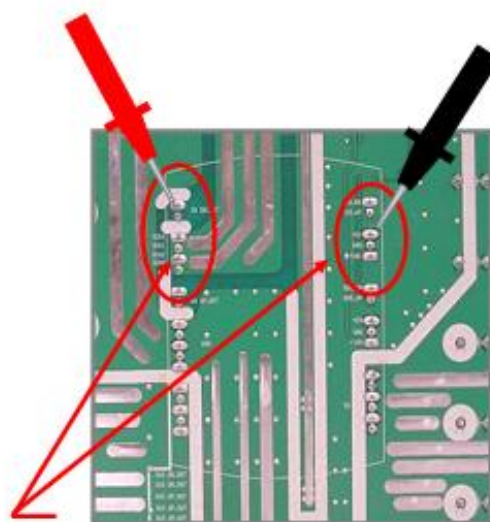
LG 42PC5DC Y-SUS and Z-SUS Panel Drive Output Circuits



LG 42PC5DC Y-SUS Testing IPMs

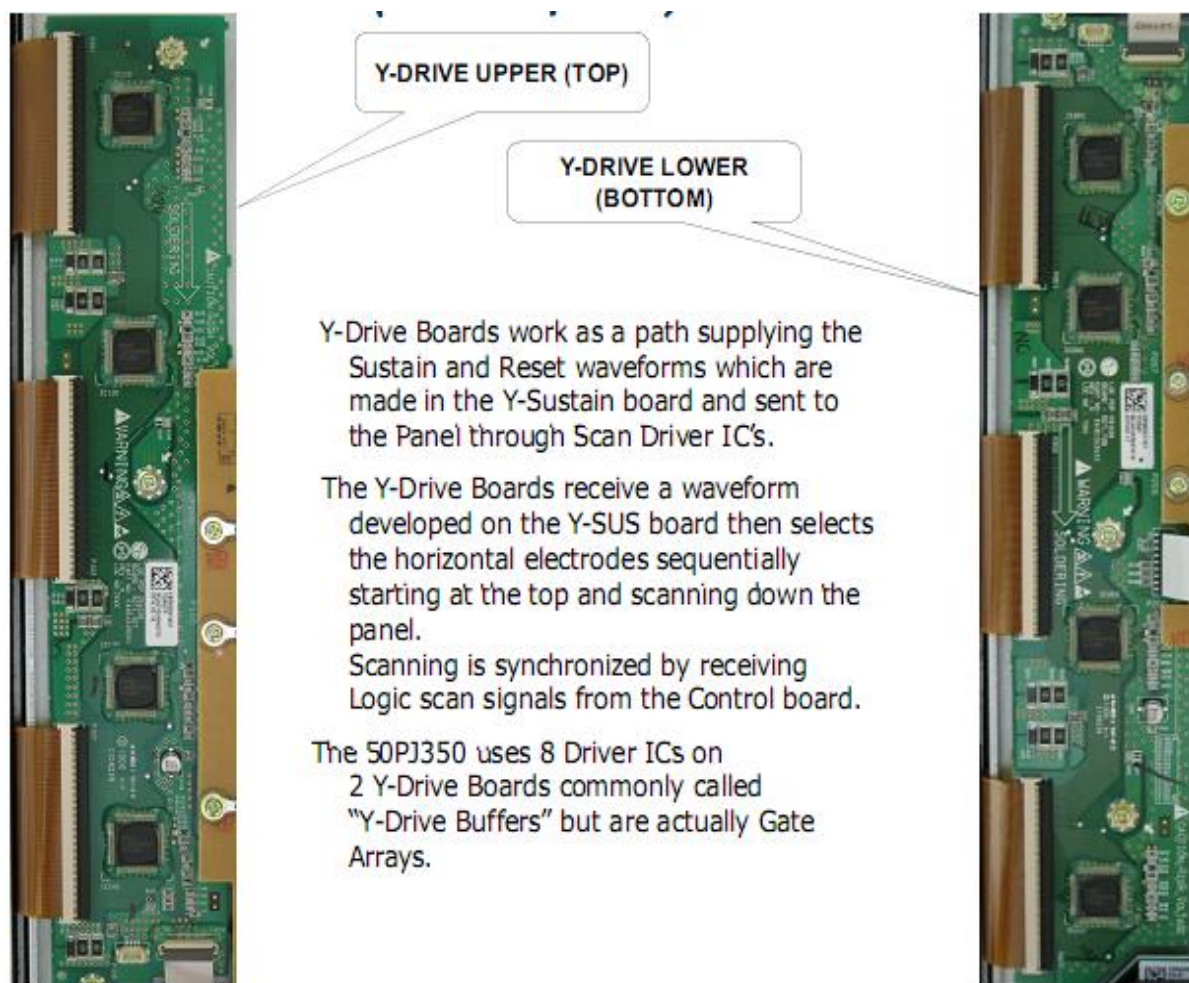
How to Check IPMs “ Diode Check”, Board Removed from Set

	IC13		
SUS_OUT		VS	.804
SUS_OUT		YER	.395
YER		VS	.410
GND		VS	.539
VS		SUS_OUT	∞
YER		SUS_OUT	∞
VS		YER	∞
VS		GND	∞
GND		SUS_OUT	∞
SUS_OUT		GND	∞

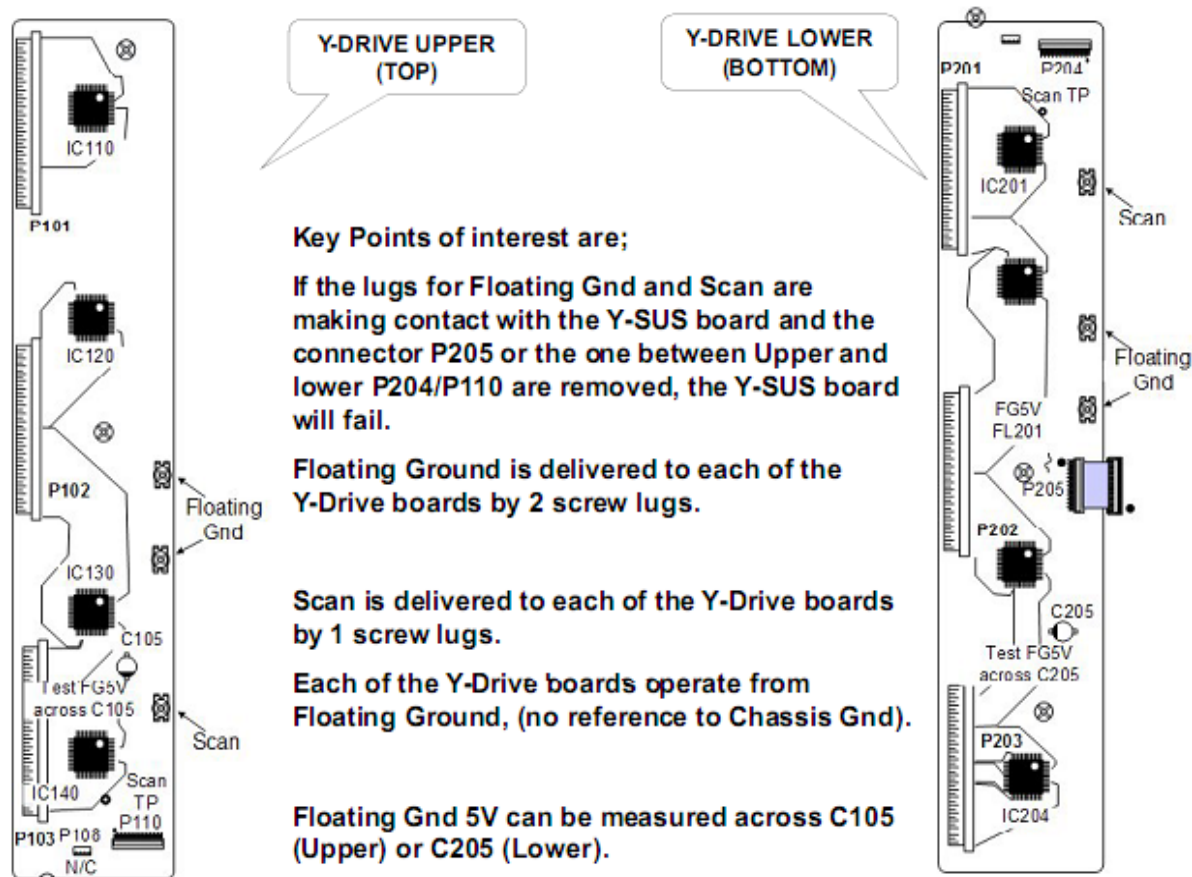


Test Points referenced from the silk screen
found on the bottom of the PC Board.

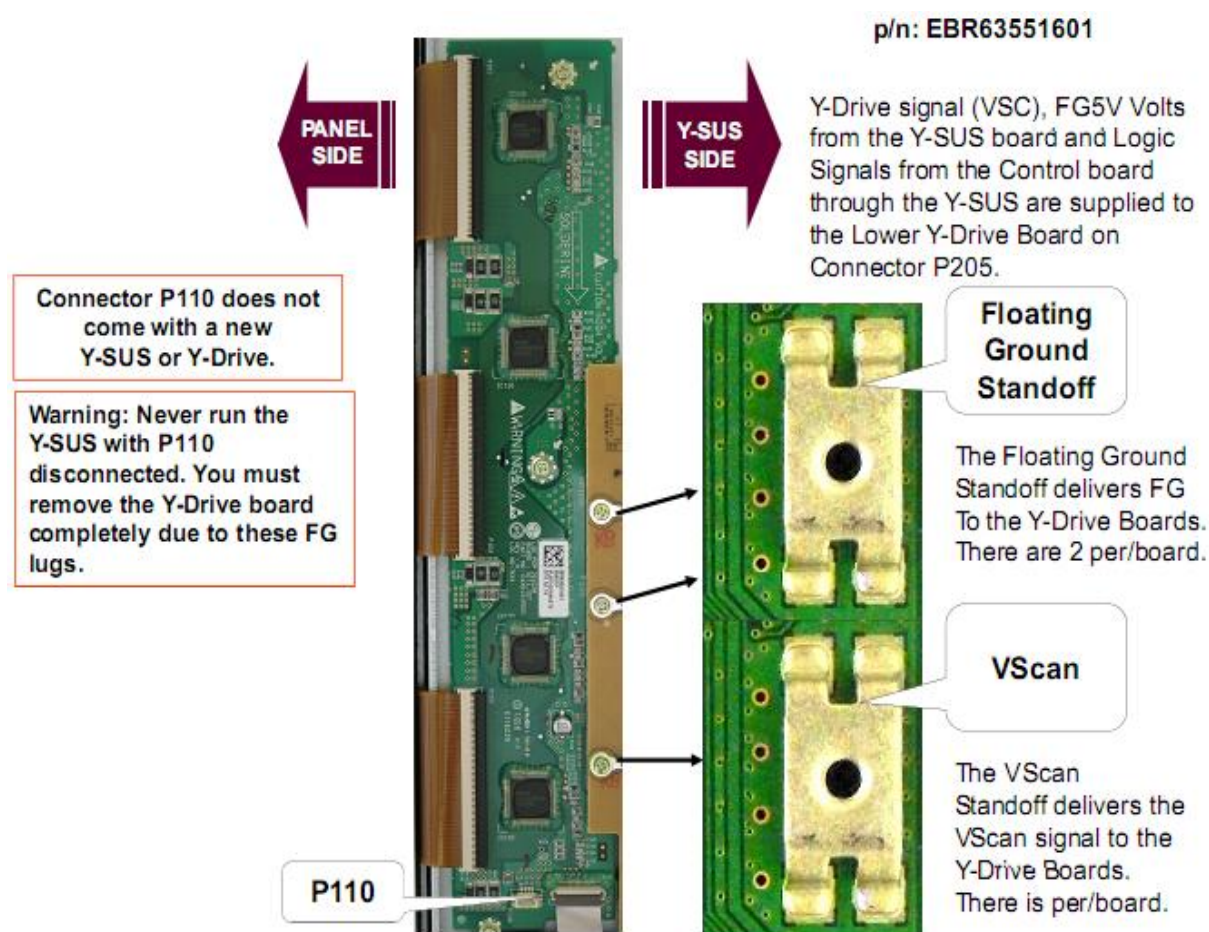
Y-DRIVE Board Section(Y-Drive Explained)



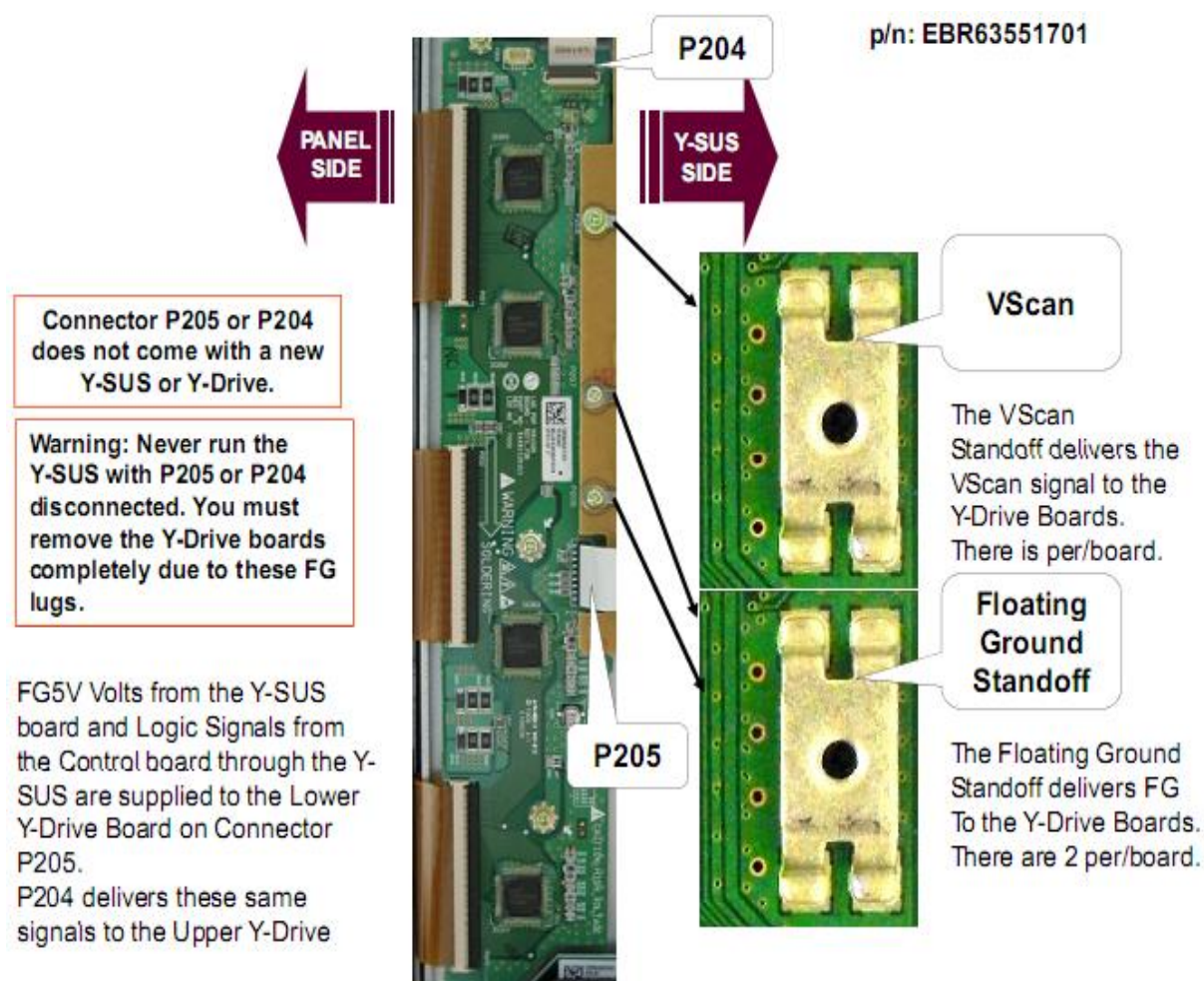
Y-Drive Board Layout



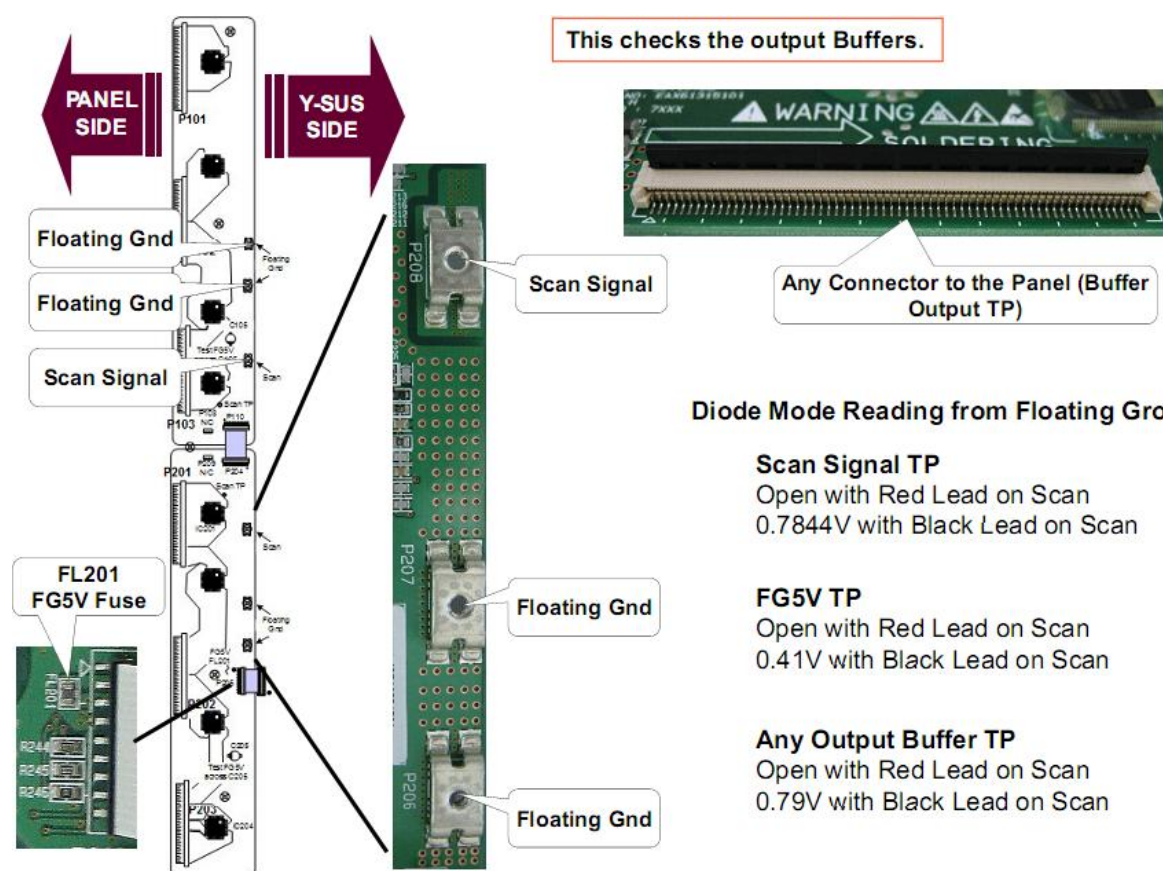
Y-Drive Upper Layout



Y-Drive Lower Layout



Y-Drive Board Diode Check for Scan and FG



Y-Drive Buffer Troubleshooting

You can check for a shorted Buffer ICs Output using this procedure.

BACK SIDE

BACK SIDE

FRONT SIDE

Any of these output lugs can be tested.
Look for shorts indicating a defective Buffer IC

Using the "Diode Test" on the DVM, check the pins for shorts or abnormal loads.

RED LEAD On Floating Ground Indicated by white outline	BLACK LEAD On "ANY" Output Lug Reads 0.79V
BLACK LEAD On Floating Ground Indicated by white outline	RED LEAD On "ANY" Output Lug Reads Open

6 Ribbon cables communicating with the Panel's (Horizontal Electrodes) totaling 768 lines determining the Panel's Vertical resolution pixel count.

Y-Drive Upper P110 Connector Voltage and Diode Check

This connector does not come with a new Y-Drive.

Y-Drive Upper

Y-Drive Lower

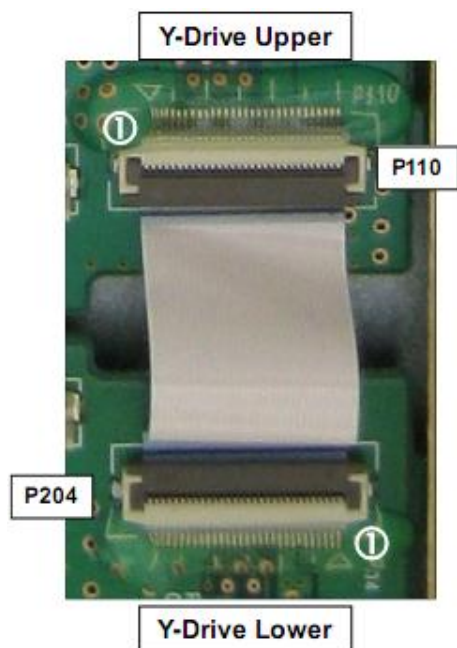
P110 "Upper Y-Drive"

Pin	Label	Run	Black Lead on FG Diode Check	Red Lead on FG Diode Check
1~10	SUS_DN (FG)	FG	FG	FG
11	YSUS_DATA	0V	Open	Open
12	YT_OCR	2.4V	Open	0.53V
13	YT_OC1	2.2V	Open	0.55V
14	YT_LE(STB)	2.6V	Open	0.52V
15	YT_CLK	0.8V	Open	0.52V
16	YT_DATA	0V	Open	0.52V
17~20	SUS_DN (FG)	FG	FG	FG
21~23	FG5V	4.97V	2.8V	0.41V
24~30	SUS_DN (FG)	FG	FG	FG

Voltages taken from Floating Ground

Y-Drive Lower P204 Connector Voltage and Diode Check

This connector does not come with a new Y-Drive.



P204 "Lower Y-Drive"			Black Lead on FG	Red Lead on FG
Pin	Label	Run	Diode Check	Diode Check
1~7	SUS_DN (FG)	FG	FG	FG
8~10	FG5V	4.97V	Open	0.41V
11~14	SUS_DN (FG)	FG	FG	FG
15	YT_DATA	0V	Open	0.52V
16	YT_CLK	0.8V	Open	0.52V
17	YT_I F(STR)	2.6V	Open	0.52V
18	YT_OC1	2.2V	Open	0.55V
19	YT_OCR	2.4V	Open	0.53V
20	YSUS_DATA	0V	Open	Open
21~30	SUS_DN (FG)	FG	FG	FG

Voltages taken from Floating Ground

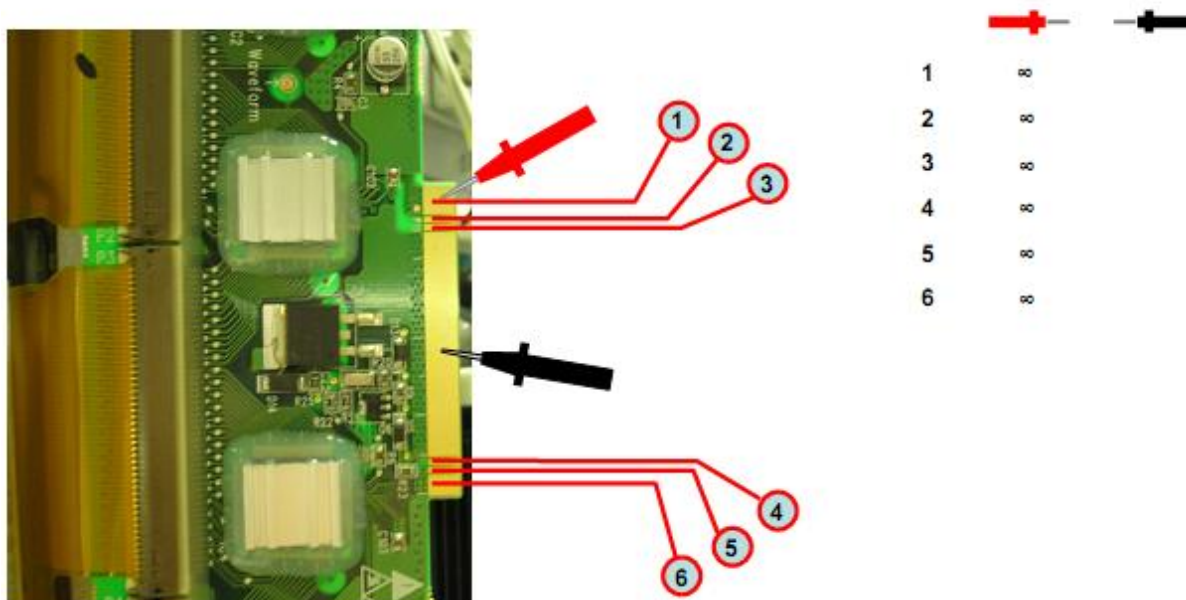
Y-Drive Buffer Troubleshooting for Other LG Plasma Panels

As usual, use the "Diode Test" on the Multimeter or DVM. You can check all buffer ICs using this procedure. Using the "Diode Test" on a digital volt meter (Multimeter), check the pins for shorts or abnormal loads. Any of the output lugs can be tested. Looks for shorts indicate a defective Buffer IC. Remember to power off the TV first, before doing the Diode test.

1) LG 42PC5DC Plasma TV (PDP42X4A Panel)

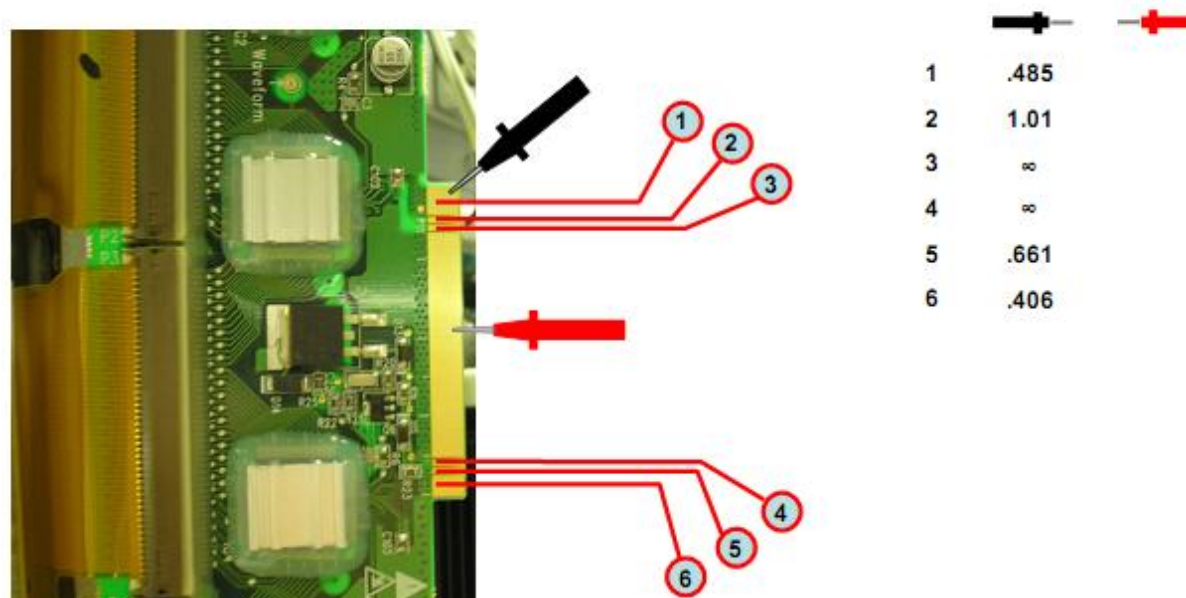
Testing the Y-Drive Buffer inputs P11 using Red Lead.

Use Diode test as shown below to test Connector P11 Y-DRIVE Board.



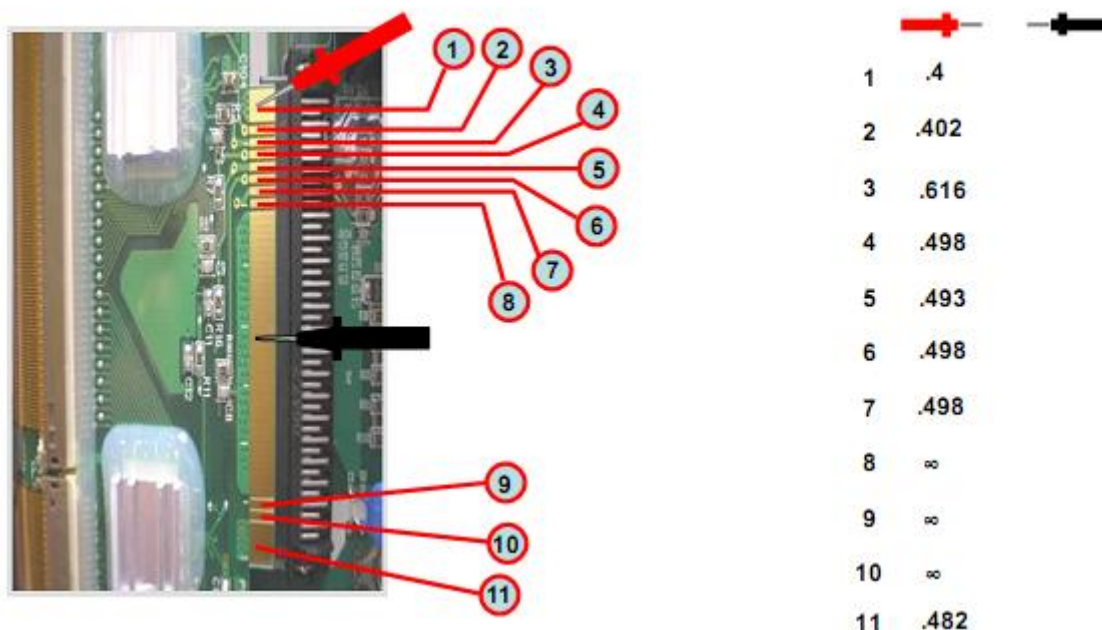
Testing the Y-Drive Buffer inputs P11 Using Black Lead

Use Diode test as shown below to test Connector P11 Y-DRIVE Board.



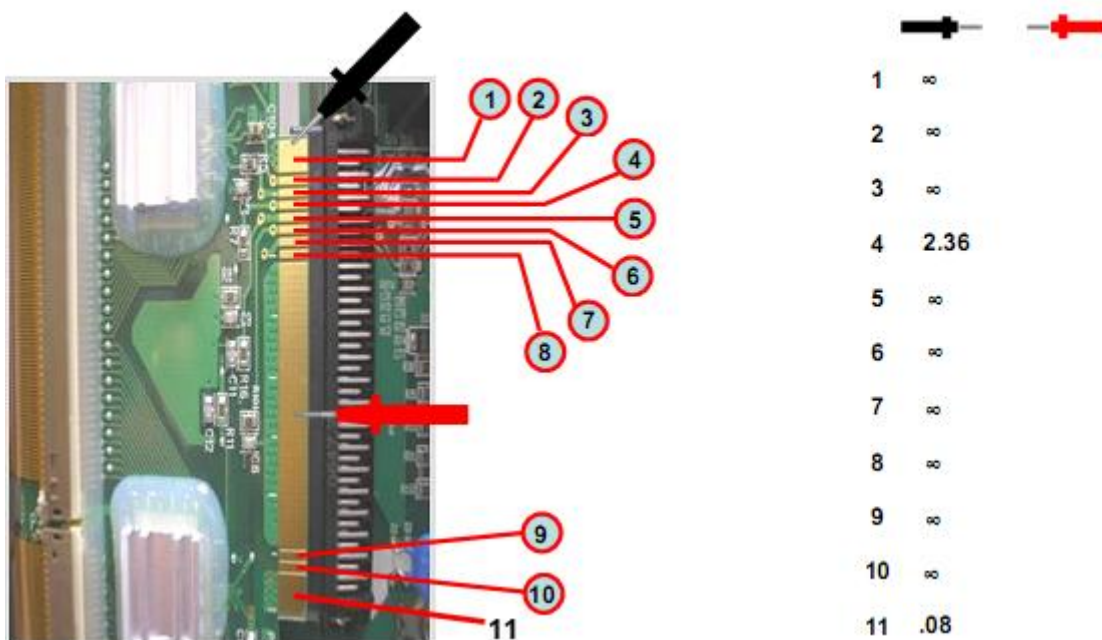
Testing the Y-Drive Buffer inputs Red Lead

Use Diode test as shown below to test P9 Connector on the Y-DRIVE Board.



Testing the Y-Drive Buffer Inputs Black Lead

Use Diode test as shown below to test the Y-DRIVE Board.
Reverse Bias test method is shown below



Testing the Y-Drive Buffer Outputs

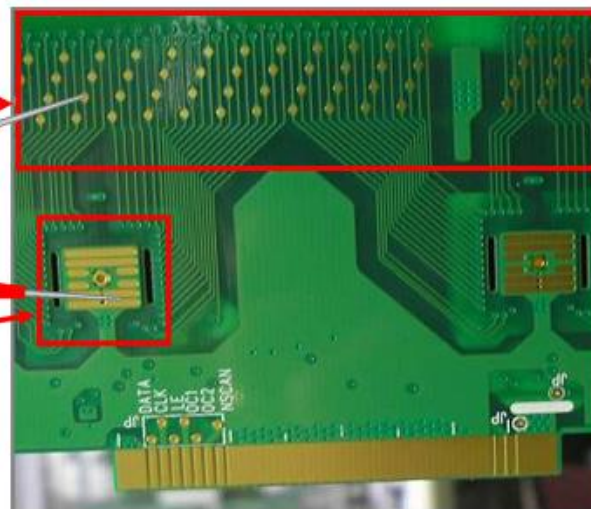
Y-DRIVE Scan IC Testing

Scan IC's can be tested to identify a defective Scan IC. Use forward reverse bias diode test to check each IC to confirm the board is defective.

Horizontal Electrode
Scan IC Test Points (-)

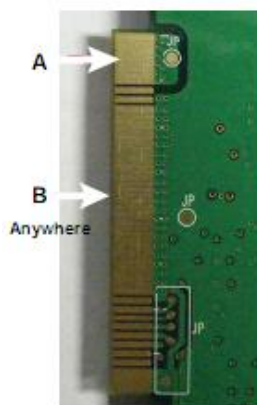
.759

Horizontal Electrode
Scan IC Test Points (+)



2) LG 42PG20 Plasma TV (PDP42G1 Panel)

BACK SIDE OF Y-DRIVE



FORWARD

BLACK LEAD ON
A

RED LEAD ON "B"
READING 0.73 V

REVERSE

RED LEAD ON
A

BLACK LEAD ON "B"
READING "OPEN"

BACK SIDE OF Y-DRIVE PWB

OUTPUT LUGS



RED LEAD ON
BUFFER IC

BLACK LEAD ON "ANY"
OUTPUT LUG.
READING 0.73 V

BLACK LEAD ON
BUFFER IC
Indicated by Red outline

RED LEAD ON "ANY"
OUTPUT LUG.
READING "OPEN"

Z-SUS Board

Note: The Z-SUS **cannot** be run “Stand-Alone” in the 50T1 Panel models.

Location: # DC Voltage and Waveform Test Points

Z BIAS (VZB) Alignment

Diode Mode Test Points

Operating Voltages:

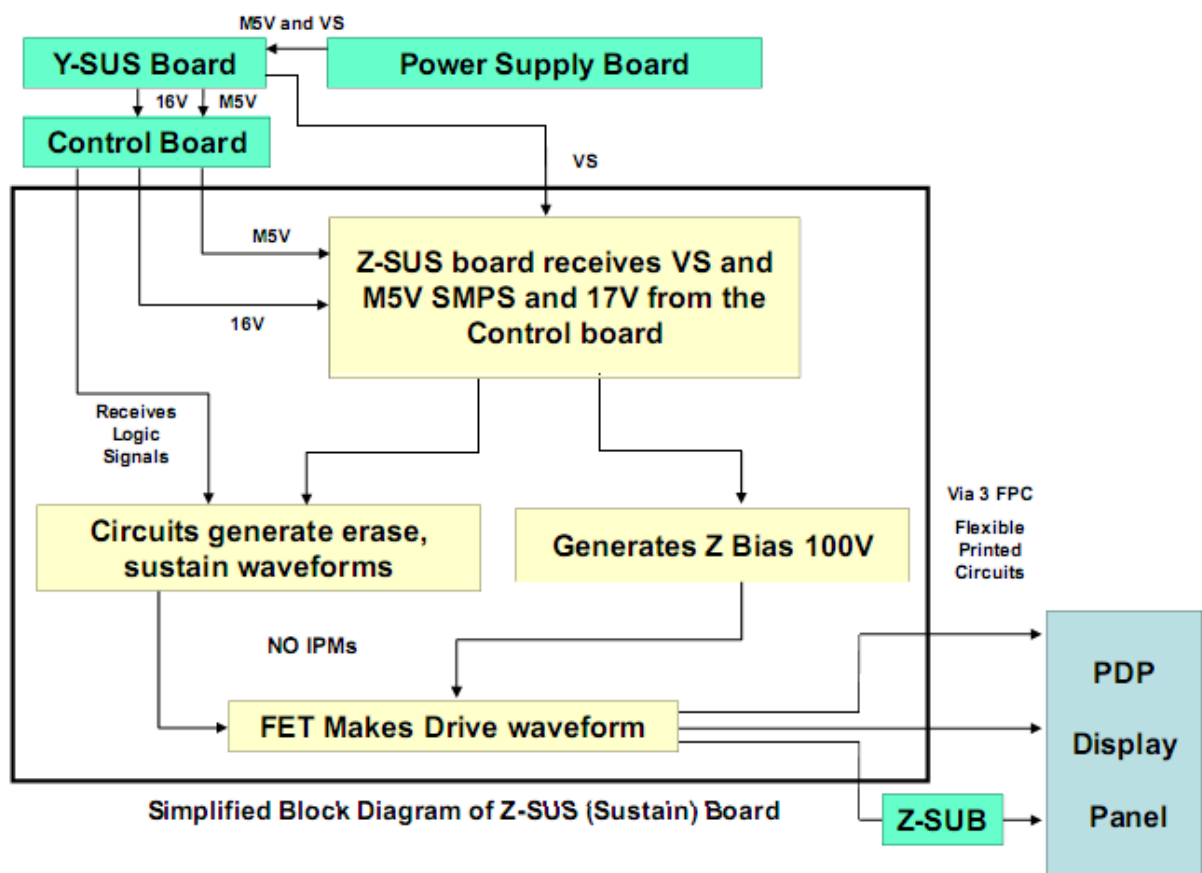
Power Supply Supplied = VS

= M5V (Routed through Control Board)

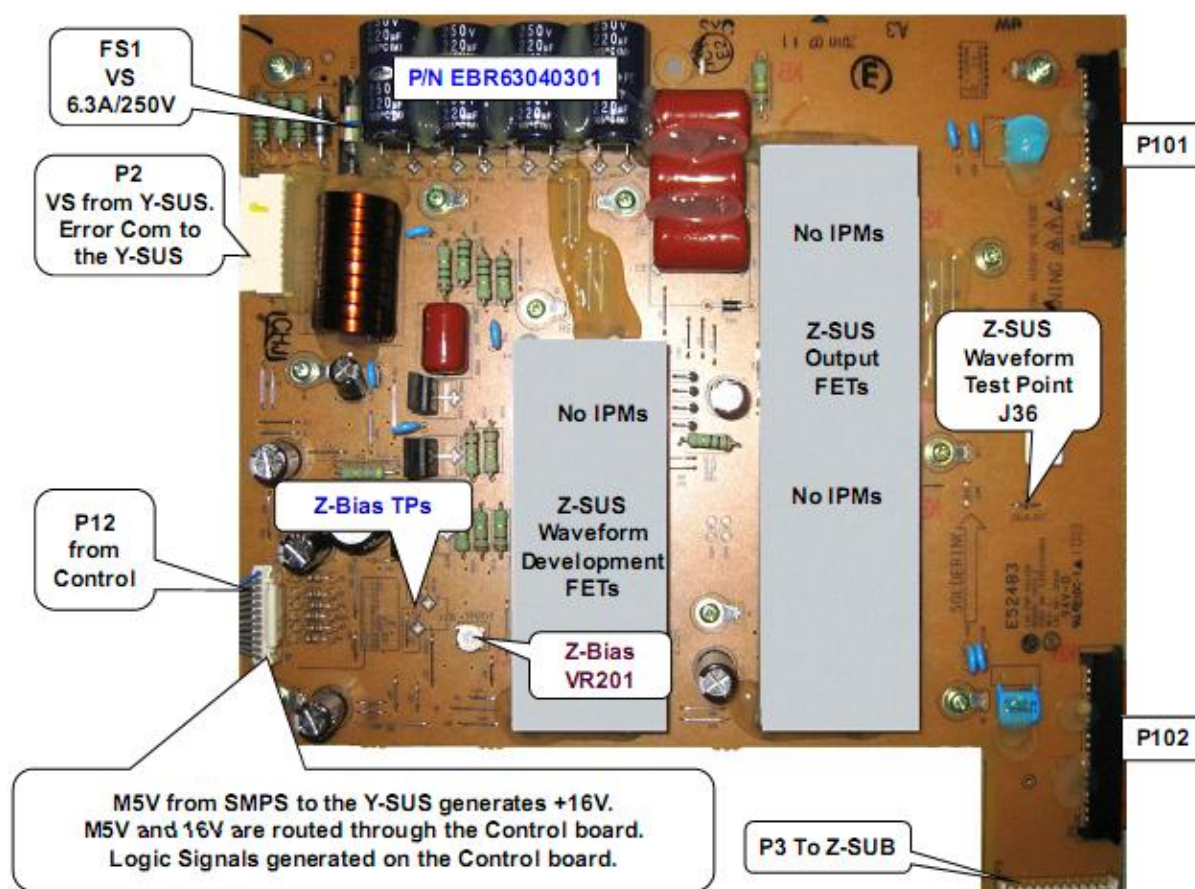
Y-SUS Supplied = 16V (Routed through Control Board)

Developed on Z-SUS = Z Bias

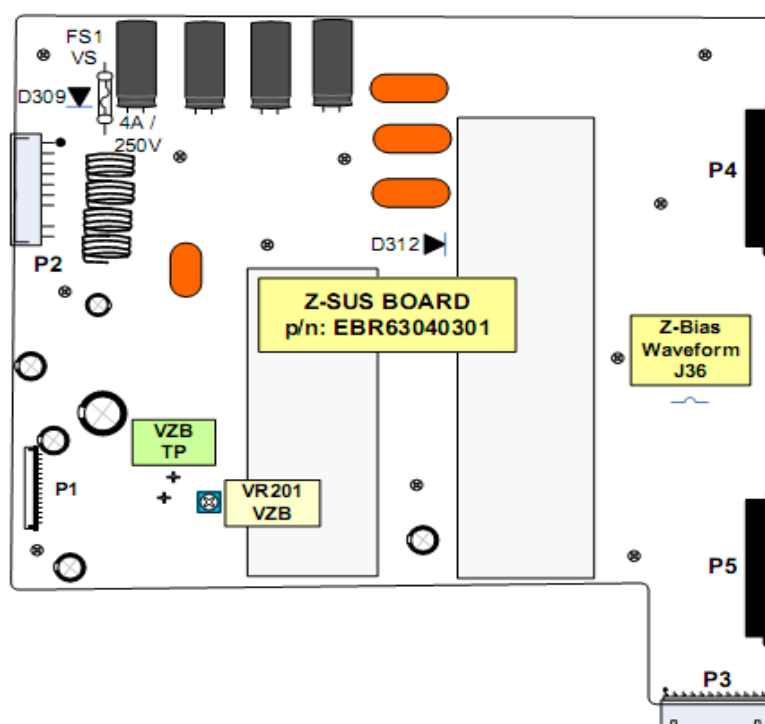
Z-SUS Block Diagram



Z-SUS Board Component Identification



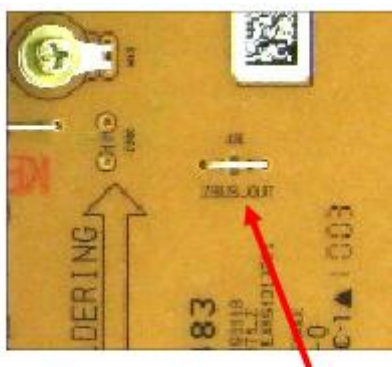
LG 50PJ350 Z-SUS Layout Drawing



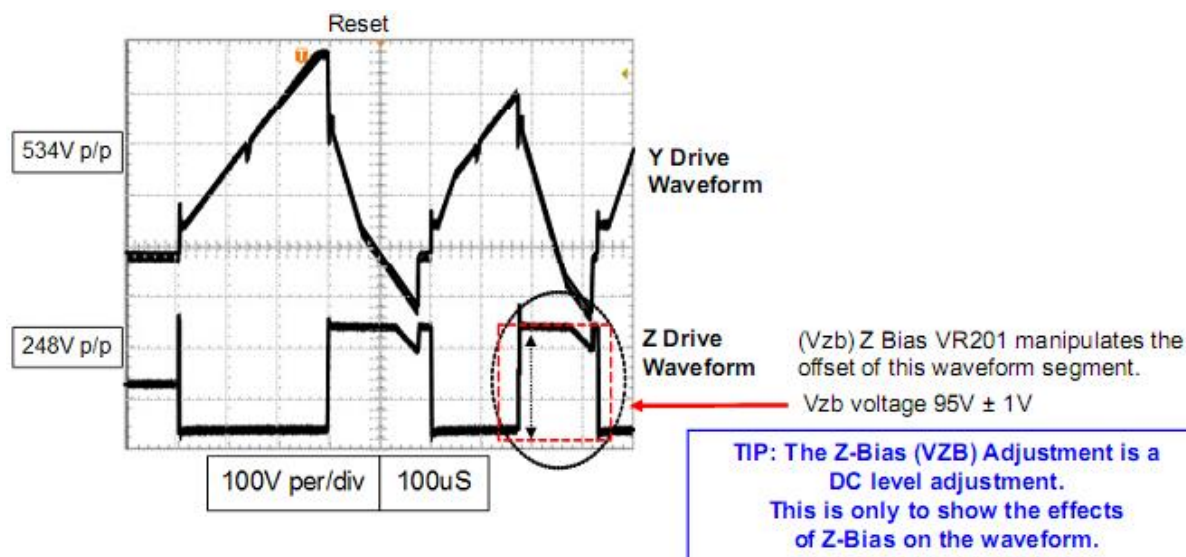
Z-SUS Waveform

The Z-SUS (in combination with the Y-SUS) generates a SUSTAIN Signal and an ERASE PULSE for generating SUSTAIN and DISCHARGE in the Panel.

This waveform is supplied to the panel through two FPC (Flexible Printed Circuit) connections P101 and P102 and to the Z-SUB P3 to P7 and then to one FPC connections P202.



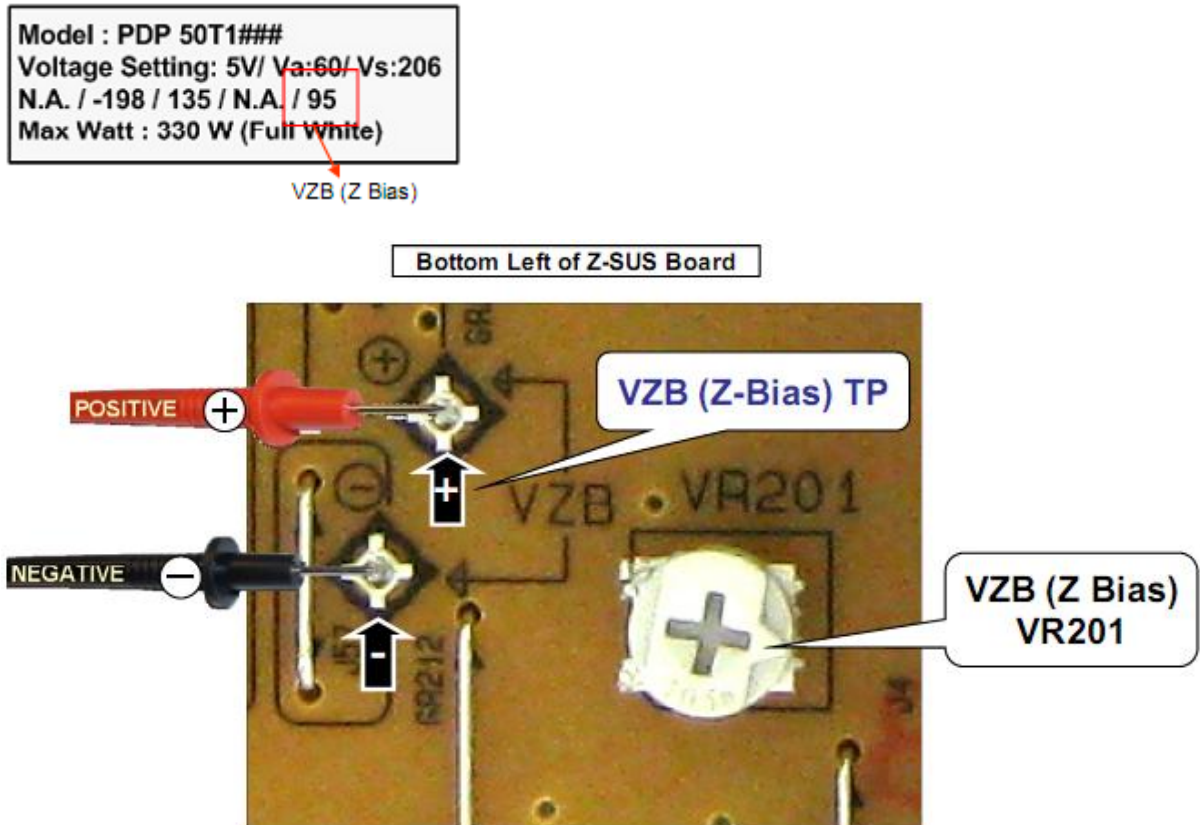
Oscilloscope Connection Point.
J36 to check Z Output waveform.
Right Hand Side Center.



This waveform is just for reference to observe the effects of Zbz adjustment.

VZB (Z-Bias) VR201 Adjustment

Read the Voltage Label on the back top center of the Panel when adjusting VR201.



Set (TV) should run for 15 minutes, this is the “Heat Run” mode. Set screen to “White Wash” mode or 100IRE White input. All PSU adjustments should have been completed.

- 1) Place DC Volt Meter (or Multimeter Volt range) between VZB TPs (Test Points).
- 2) Adjust VZB (Z-Bias) VR201 in accordance with your Panel’s voltage label.

PV1- Collection of Plasma TV Repair Tips

Connector P2 to Y-SUS P211 Voltages and Diode Check

There are no Stand-By voltages on this connector

P2 "Z-SUS" to "Y-SUS" P211

Pin	Label	Run	Diode Check
1~2	Gnd	Gnd	Gnd
3	n/c	n/c	n/c
4~5	+Vs	*206V	Open
6	n/c	n/c	n/c
7~11	ER_COM	98V~102V	Open

* Note: This voltage will vary in accordance with Panel Label

P2 Location: Top Left

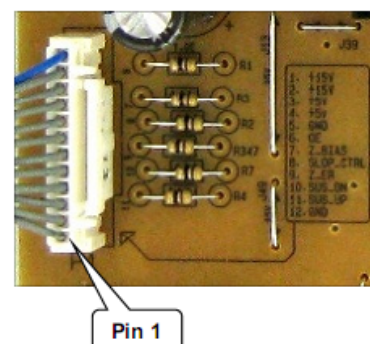


Connector P1 to Control P102 Voltages and Diode Checks

P1 "Z-SUS Board" to "Control" P101

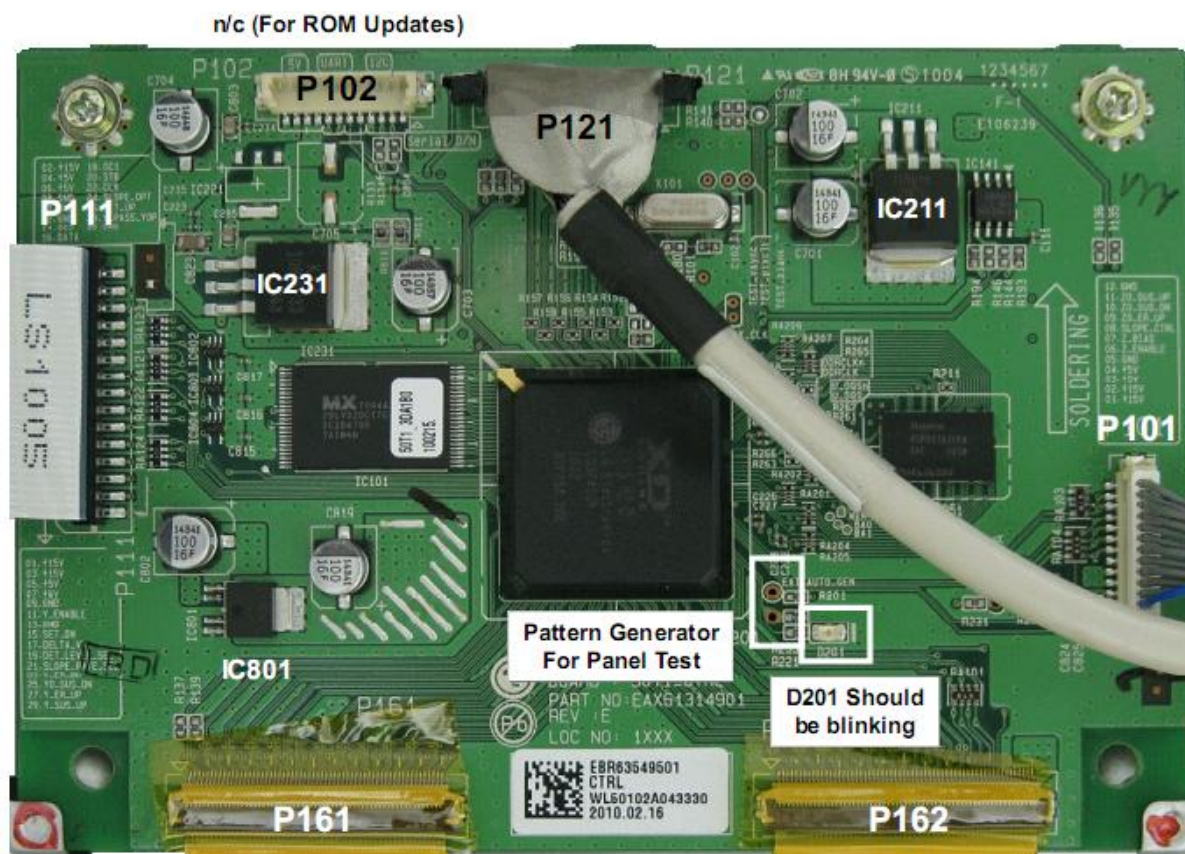
Pin	Label	Run	Diode Check
1~2	(+15V)	16V	Open
3~4	(+5V)	4.9V	1.52V
5	Gnd	Gnd	Gnd
6	Y_OE	0.058V	3.09V
7	ZBIAS	1.83V	Open
8	SLOP_CONTROL	Gnd	Open
9	Z_ER	0.14V	Open
10	ZSUS_DN	0.77V	Open
11	ZSUS_UP	0.17V	Open
12	Gnd	Gnd	Gnd

P1 Location:
Bottom Left hand side



There are no Stand-By voltages on this connector.

Control Board (CTRL Board) Section



This LG 50PJ350 Plasma TV CTRL board is use p/n: EBR63549501.

Signals: # Mainboard Supplied = Panel Control and LVDS (Video) Signals.

Control Board Generated = Y-SUS and Z-SUS Drive Signals (Sustain). X Board (X Buffer Board) Drive Signals (RGB Address).

Operating Voltages: # Y-SUS = +5V (M5V) Developed on the PSU.

= +16V (routed to the Z-SUS). (Not used by the Control Board).

Developed on the Control Board = +1.8V for internal use.

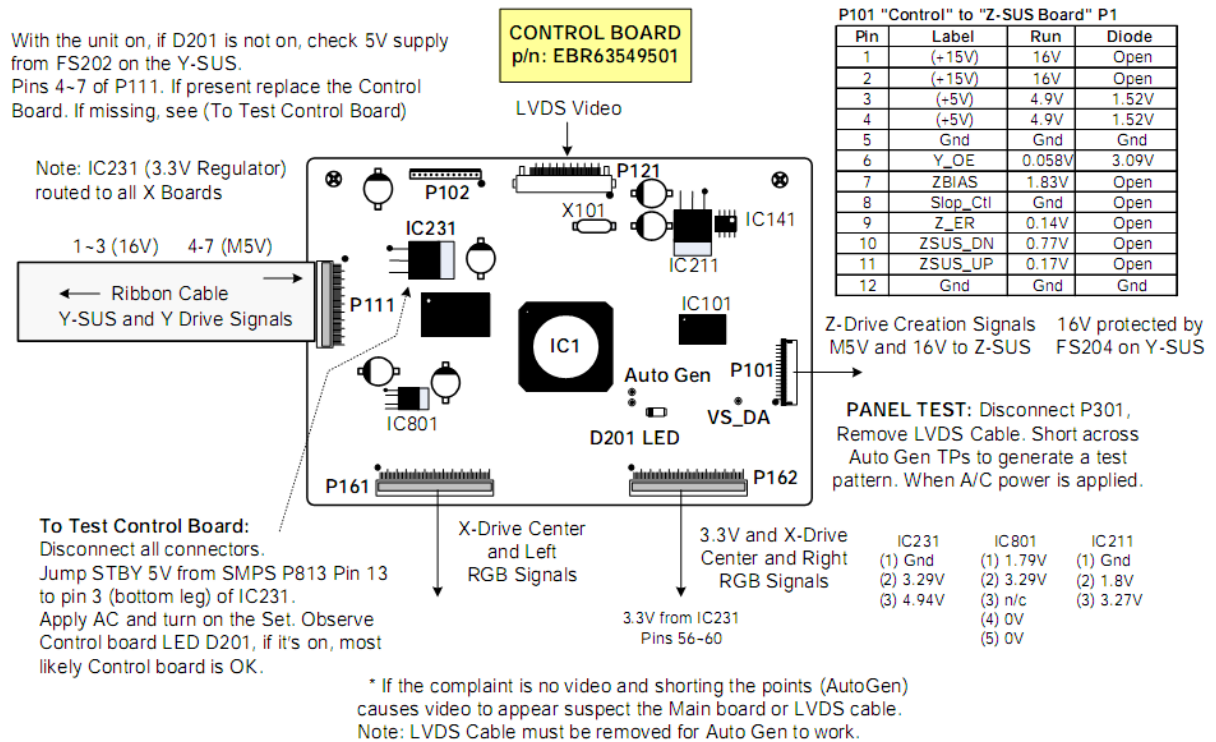
= +3.3V for internal use

= +3.3V for the X-Boards (TCPs)

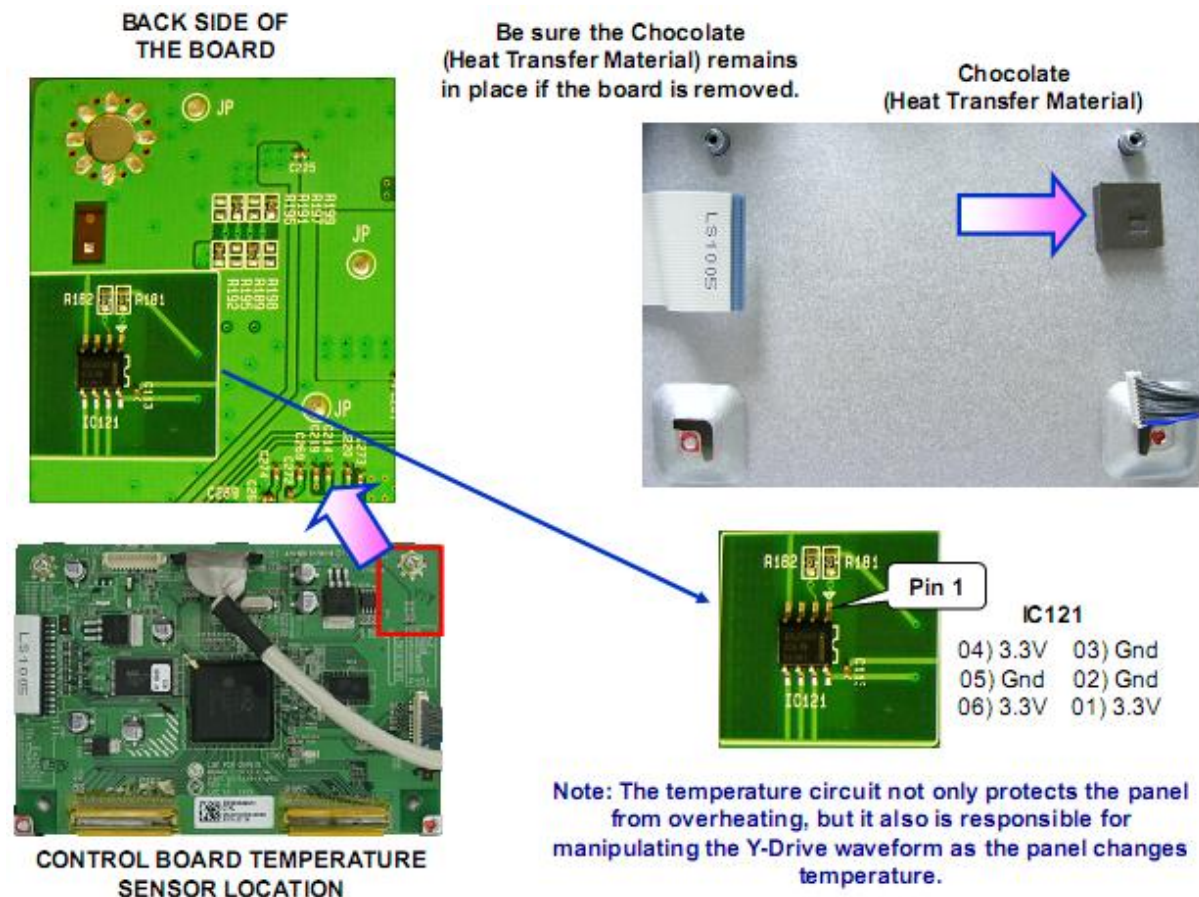
Control Board Component Identification and Checks

Control Board Component Identification and Checks

With the unit on, if D201 is not on, check 5V supply from FS202 on the Y-SUS.
Pins 4-7 of P111. If present replace the Control Board. If missing, see (To Test Control Board)



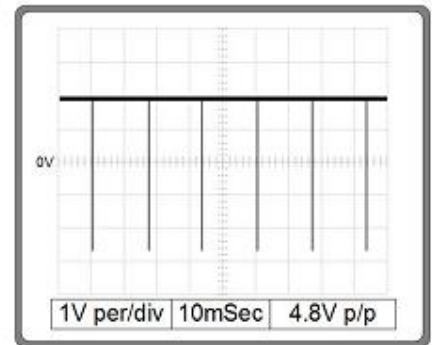
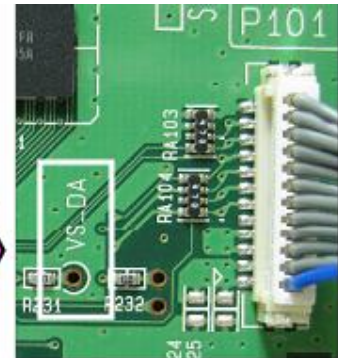
CTRL Board Temperature Sensor Location (Chocolate)



Locking on to the Y-Drive or Z-Drive Waveform Tip

Note, this TP (VS_DA) can be used as an External Trigger for scope when locking onto the Y-Drive (Scan) or the Z-Drive signal.

This signal can also be used to help lock the scope when observing the LVDS video signals.

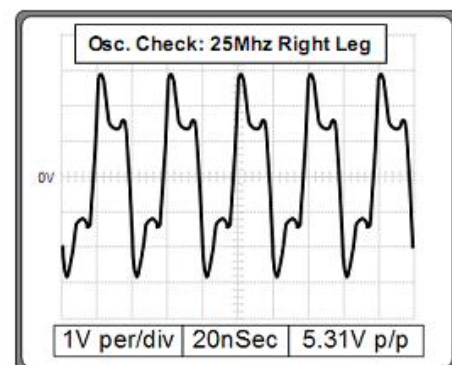
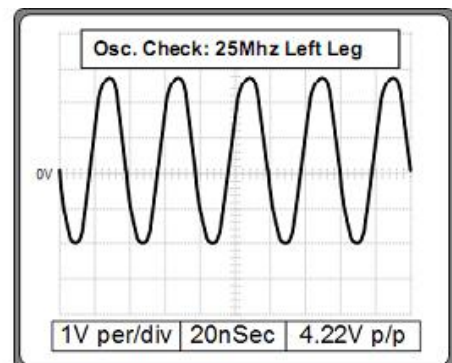


Checking the Crystal X101 “Clock” on the Control Board

Check the output of the Oscillator (Crystal) X101. The frequency of the sine wave is 25 MHZ. Missing this clock signal will halt operation of the panel drive signals.



CONTROL BOARD CRYSTAL LOCATION



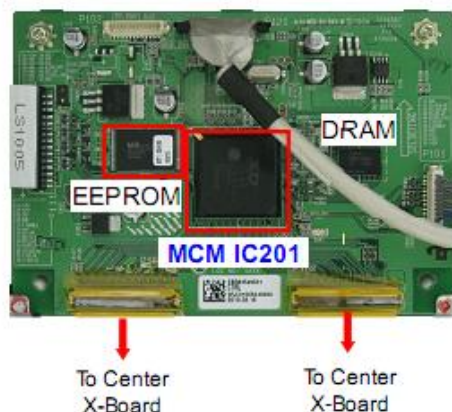
Control Board Signals (Simplified Block Diagram)

The Control Board supplies Video Signals to the TCP (Tape Carrier Package) ICs.

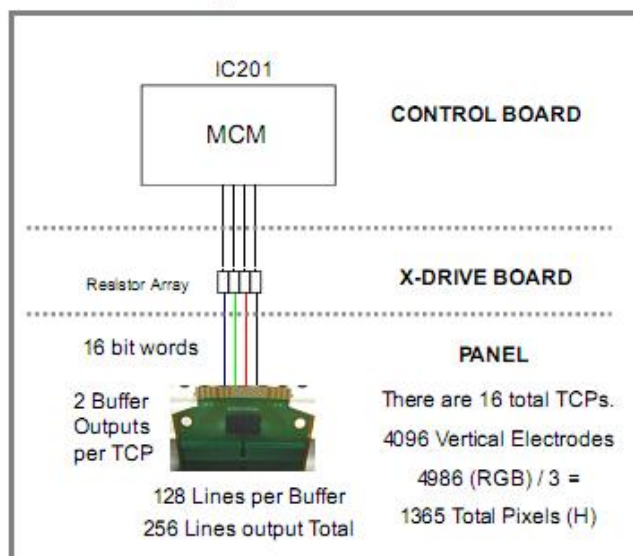
If there is a bar defect on the screen, it could be a Control Board problem.

Control Board to X Board Address Signal Flow

This Picture shows Signal Flow Distribution to help determine the failure depending on where the it shows on the screen.



Basic Diagram of Control Board



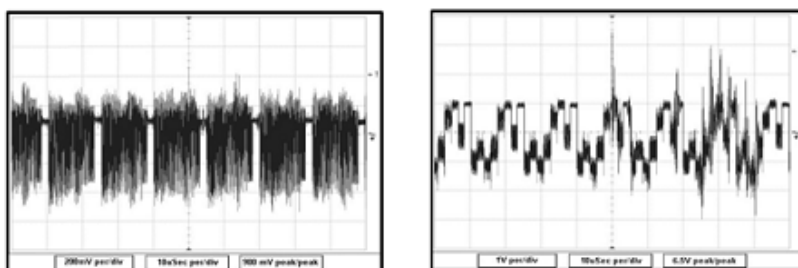
CTRL Board LVDS P121 Signals

LVDS Cable P121 on Control board shown.
Press two outside tabs inward to release.



Video Signals from the Main Board to the Control Board are referred to as Low Voltage Differential Signals or LVDS. The video is delivered in 12 bit LVDS format. Their presence can be confirmed with the Oscilloscope by monitoring the LVDS signals with SMPTE Color Bar input. Loss of these Signals would confirm the failure is on the Main Board or the LVDS Cable itself.

Example of LVDS Video Signal



Example of Normal Signals measured at 1V p/p at 10µSec

Pins 2~5, 7~8, 11~12, 15~16, 24~25 are LVDS Video Signals.
Pins 9~10 and 22~23 are clock signals for the data.

Pins are close together.

CTRL Board Connector P111 to Y-SUS P101 Voltages and Diode Mode Checks

These pins are very close together. Use the caution when taking Voltage measurements. Better use the probes are shape fine –tip type. If you're not confident in testing this type of voltage measurement, will recommend not doing it. If not, may damage the PCBs board.

Pins 1 through 3
Receive 16V from the Y-SUS.
Protected on Y-SUS by FS204

Pins 4 through 7
Receive M5V from the Y-SUS.
Protected on Y-SUS by FS202

All the rest are delivering
Y-SUS Waveform development and
Y-Drive logic signals to the Y-SUS
Board (Y-Drive logic signals are simply
routed right through the Y-SUS to the
Y-Drive boards).

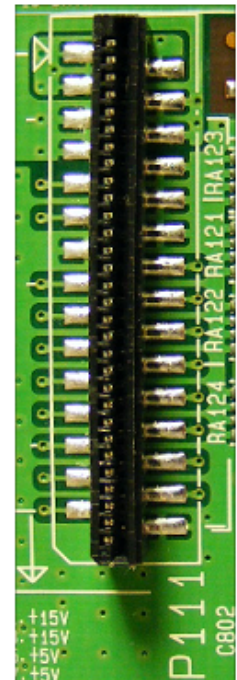


P111 Label Silk Screen

01. +15V	18. OC1
03. +15V	20. STB
05. +5V	22. CLK
07. +5V	24. SLOPE_OPT
09. GND	26. SET_UP
11. Y_ENABLE	28. Y_PASS_YOP
13. GND	30. GND
15. SET_ON	
17. DELTA_VY	
19. DET_LEVEL_SEL	
21. SLOPE_RATE_SEL	
23. Y_ER_DN	
25. Y0_SUS_DN	
27. Y_ER_UP	
29. Y_SUS_UP	

Note: The +16V is not used by the Control board, it is routed to the Z-SUS leaving on P101 Pins 1~2.
The M5V also leaves on P101 Pins 3~4.

P111 "Control" Odd Pins to P101 "Y-SUS"				P111 "Control" Even Pins to P101 "Y-SUS"			
Pin	Label	Run	Diode Check	Pin	Label	Run	Diode Check
1	+15V	16V	Open	2	+15V	16V	Open
3	+15V	16V	Open	4	+5V	4.9V	1.4V
5	+5V	4.9V	1.52V	6	+5V	4.9V	1.4V
7	+5V	4.9V	1.52V	8	Gnd	Gnd	Gnd
9	CTRL_OE	0V	2.98V	10	Gnd	Gnd	Gnd
11	OE	0V	1.84V	12	Gnd	Gnd	Gnd
13	Gnd	Gnd	Gnd	14	I_OC2	1.78V	2.84V
15	I_Delta_VY_Det	2.08V	2.81V	16	I_DATA	0V	2.84V
17	I_SET_ON	2.09V	2.81V	18	I_OC1	1.43V	2.84V
19	I_Det_Level_Sel	0.03V	2.81V	20	I_STB	1.97V	2.84V
21	I_Slope_Rate_Sel	1.34V	2.81V	22	I_CLK	0.59V	2.82V
23	I_YER_DN	0V	2.81V	24	I_SET_UP	0.24V	2.82V
25	I_YSUS_DN_IN	0.95V	2.82V	26	I_Ramp_Slope_Opt1	1.01V	2.82V
27	I_YER_UP	0.82V	2.83V	28	I_Pass_Top	1.08V	2.82V
29	I_YSUS_UP_IN	0.06V	2.84V	30	Gnd	Gnd	Gnd



There are no voltages in Standby mode. Again, Diode Mode readings taken with all connectors disconnected. The Black lead is on chassis GND.

CTRL Board LVDS P121 Connector Voltages and Diode Check

P121 Connector "Control Board" to "Main "P703"

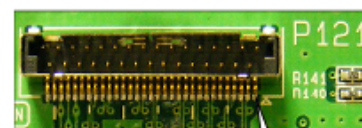
P121 LVDS "Control" to P703 "Main"

Pin	Label	Run	Diode Check
1	Gnd	Gnd	Gnd
2	RA2-	1.13V	1.32V
3	RA2+	1.35V	1.36V
4	RB2-	1.21V	1.36V
5	RB2+	1.27V	1.36V
6	Gnd	Gnd	Gnd
7	RC2-	1.26V	1.32V
8	RC2+	1.22V	1.36V
9	RCLK2-	1.23V	1.36V
10	RCLK2+	1.23V	1.36V
11	RD2-	1.21V	1.36V
12	RD2+	1.26V	1.36V
13	Gnd	Gnd	Gnd
14	Gnd	Gnd	Gnd
15	RF2-	1.23V	1.32V
16	RF2+	1.25V	1.36V

P121 LVDS "Control" to P703 "Main"

Pin	Label	Run	Diode Check
17	ROM_TX	3.3V	3.09V
18	ROM_RX	3.29V	3.09V
19	Gnd	Gnd	Gnd
20	n/c	n/c	Open
21	n/c	n/c	Open
22	PC_SER_CLK	0.59V	3.08V
23	PC_SER_DATA	3.3V	3.09V
24	RE2-	1.23V	1.36V
25	RE2+	1.25V	1.36V
26	Gnd	Gnd	Gnd
27	DISP_EN	2.87V	Open
28	Module_SDA1	3.3V	Open
29	Module_SCL1	3.3V	Open
30	n/c	n/c	Open
31	Gnd	Gnd	Gnd

Blue Pins indicate 12 bit differential video signal



Pin 27 is the reason the LVDS cable must be removed to use the EX_AUTO_GEN shorting pins to create multiple internal generated test patterns (Panel Test).

Enables the Control Board



Note: There are no voltages in Stand-By mode.

CTRL Board P101 Connector Pin ID and Voltages

Again, Diode mode readings taken with all connectors disconnected. The Black lead is on chassis GND. DVM is in Diode Mode.

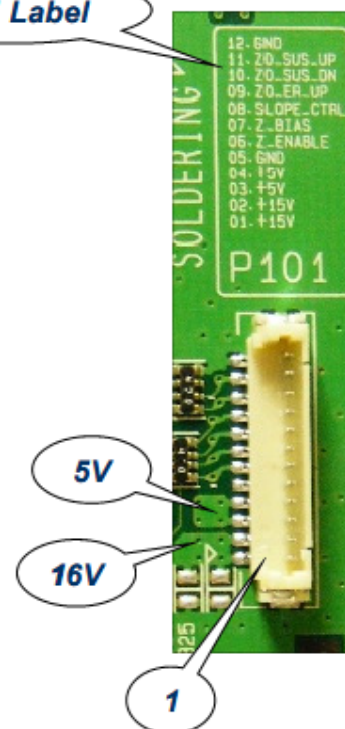
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Voltage and Diode Mode Measurements for the Control Board.
Note: There are no voltages in Stand-By mode.

P101 Connector "Control" to "Z-SUS Board" P1

Pin	Label	Run	Diode Check
1	(+15V)	16V	Open
2	(+15V)	16V	Open
3	(+5V)	4.9V	1.52V
4	(+5V)	4.9V	1.52V
5	Gnd	Gnd	Gnd
6	Y_OE	0.058V	3.09V
7	ZBIAS	1.83V	Open
8	SLOP_CONTROL	Gnd	Open
9	Z_ER	0.14V	Open
10	ZSUS_DN	0.77V	Open
11	ZSUS_UP	0.17V	Open
12	Gnd	Gnd	Gnd

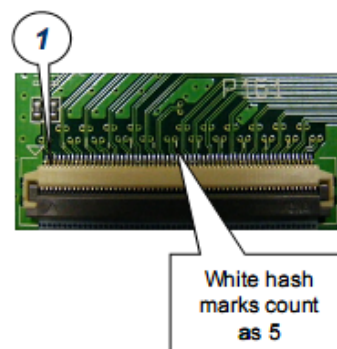
P101 Label



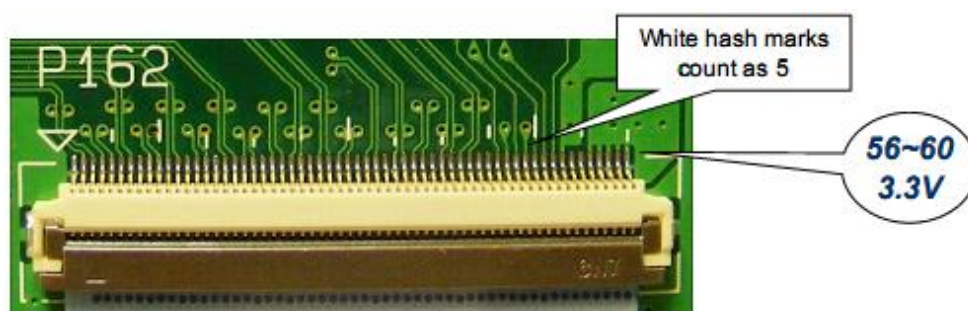
P161 Connector "Control Board" to "Center X Board" P231

P161 Connector to the Center X-Board P231 (Pins not shown are Gnd)

Pin	Run	Diode Mode	Pin	Run	Diode Mode
2	1.27V	0.97V	33	1.0V	0.97V
3	1.0V	0.97V	34	1.27V	0.97V
6	1.27V	0.97V	35	1.0V	0.97V
7	1.0V	0.97V	37	1.27V	0.97V
8	1.27V	0.97V	38	1.0V	0.97V
9	1.0V	0.97V	39	1.27V	0.97V
11	1.27V	0.97V	40	1.0V	0.97V
12	1.0V	0.97V	42	1.27V	0.97V
14	1.27V	0.97V	43	1.0V	0.97V
15	1.0V	0.97V	44	1.27V	0.97V
16	1.27V	0.97V	45	1.0V	0.97V
17	1.0V	0.97V	46	1.27V	0.97V
19	1.27V	0.97V	47	1.0V	0.97V
20	1.0V	0.97V	49	1.27V	0.97V
21	1.27V	0.97V	50	1.0V	0.97V
22	1.0V	0.97V	51	1.27V	0.97V
24	1.27V	0.97V	52	1.0V	0.97V
25	1.0V	0.97V	53	1.27V	0.97V
26	1.27V	0.97V	54	1.87V	1.2V
27	1.0V	0.97V	56	1.87V	1.2V
29	1.27V	0.97V	57	3.22V	1.2V
30	1.0V	0.97V	58	0.49V	1.1V
32	1.27V	0.97V	59	0.49V	1.1V



P162 Connector “Control Board” to “Center X Board P232



P162 Connector to the Center X-Board P232

(Pins not shown are n/c or Gnd)

Pin	Run	Diode Mode	Pin	Run	Diode Mode	Pin	Run	Diode Mode	Pin	Run	Diode Mode
2	1.27V	0.97V	15	1.27V	0.97V	29	1.27V	0.97V	43	1.0V	0.97V
3	1.0V	0.97V	17	1.0V	0.97V	30	1.0V	0.97V	46	1.27V	0.97V
4	1.27V	0.97V	18	1.0V	0.97V	32	1.27V	0.97V	47	1.0V	1.2V
5	1.0V	0.97V	19	1.27V	0.97V	33	1.0V	0.97V	48	1.27V	1.2V
6	1.27V	0.97V	20	1.0V	0.97V	35	1.27V	0.97V	49	1.0V	1.2V
7	1.0V	0.97V	22	1.27V	0.97V	36	1.0V	0.97V	50	1.27V	1.1V
9	1.27V	0.97V	23	1.0V	0.97V	37	1.27V	0.97V	51	1.0V	0.97V
10	1.0V	0.97V	24	1.27V	0.97V	38	1.0V	0.97V	52	1.27V	0.97V
11	1.27V	0.97V	25	1.0V	0.97V	40	1.27V	0.97V	56~60	3.3V	0.67V
12	1.0V	0.97V	27	1.27V	0.97V	41	1.0V	0.97V	Note: There are no voltages in Stand-By mode.		
14	1.27V	0.97V	28	1.0V	0.97V	42	1.27V	0.97V			

X-Board (LEFT, RIGHT and CENTER) Section

Normally the X Buffer Board is call as X Board in LG Plasma TV. These boards deliver the Color information signal developed on the Control board to the TCPs. The TCPs are attached to the vertical FPCs, which are attached directly to the Panel. The X boards are the attachment points for these FPCs. These boards have no adjustment on it.

X Board Operational Voltage:

VA: Originally developed on the PSU board. VA (Voltage for Address) is routed through the Y-SUS board, out on P203 pins 5~7 and then to the Left X board via P122 pins 5~7. Va leaves P121 pins 1~5 and is sent to the Center X Board via P212 pins 48~50. It then leaves on P211 pins 1~5 and goes to the Right X P331 pins 48~50.

3.3V: Control board develops 3.3V (IC231) and routes to the Center X board via ribbon connector P232 pins 1~5. It is then distributed to the other X boards.

=> To the LEFT X board via P212 pins 41~42 to P121 pins 11~12.

=> To the RIGHT X board via P211 pins 11~12 to P331 pins 41~42.

X Board Additional Information

There are three X boards, the Left, Center and the Right.

Note: Some just two X-Buffer boards for other model Panels. If that's the Dual Scan Panel, it will have 6 X-Buffer Boards, three top and three bottom)

The three X boards have very little circuitry. They are basically signal and voltage routing boards.

They route VA voltage to all of the TCPs (Tape Carrier Packages). Va is introduced to the Left X board first, then the Left X sends Va to the Center X and then the Center X sends Va to the Right X.

They route the Logic (Color) signals from the Control Board to all of the TCPs.

The X boards have connectors to 16 TCPs, 5 on the left and right. The Center X board has connections to 6 TCPs.

There are total of 16 TCPs and each TCP has 2 gate arrays, so there are a total of 32 buffers feeding the panel's 4986 vertical electrodes.

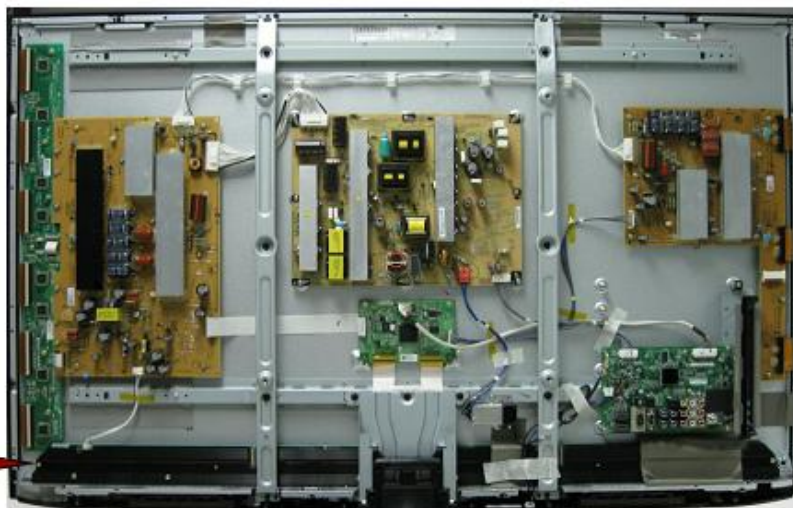
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X Board TCP Heat Sink Warning

NEVER run the TV with this heat sink removed. Damage to the TCPs will occur and cause a defective panel!

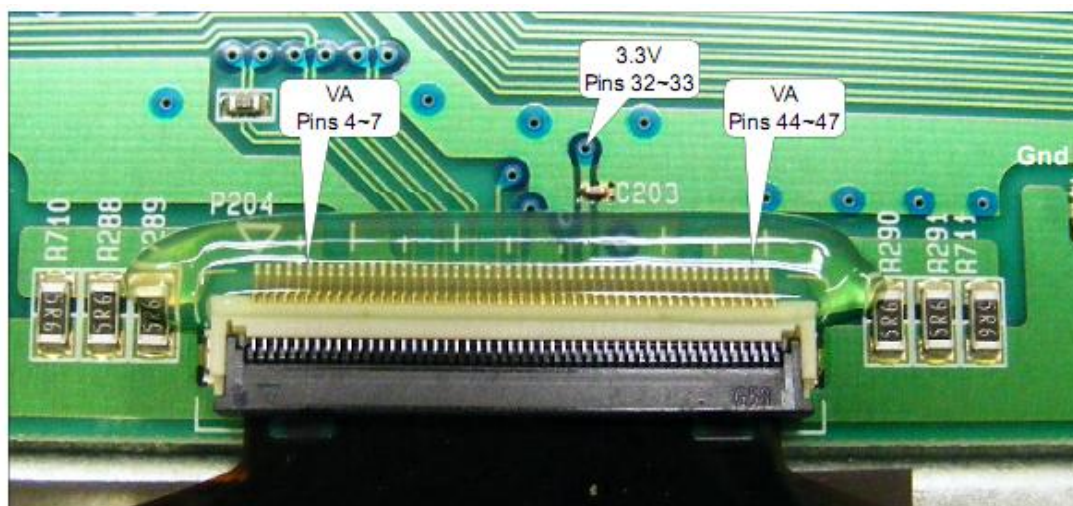
The Vertical Address buffers (TCPs) have one heat sink indicated by the arrow.

It protects all 16 TCPs.



X Board Layout Primary Circuit Diode Check

The three X Boards have similar circuit layouts for the connections going to the TCPs, as shown below:



On any Va (0.55V) TCPs connected.
On any Va (0.6V) TCPs disconnected.
On 3.3V (0.6V) TCPs connected.
On 3.3V (1.09V) TCPs disconnected.

**VA source
disconnected
from Left X board**

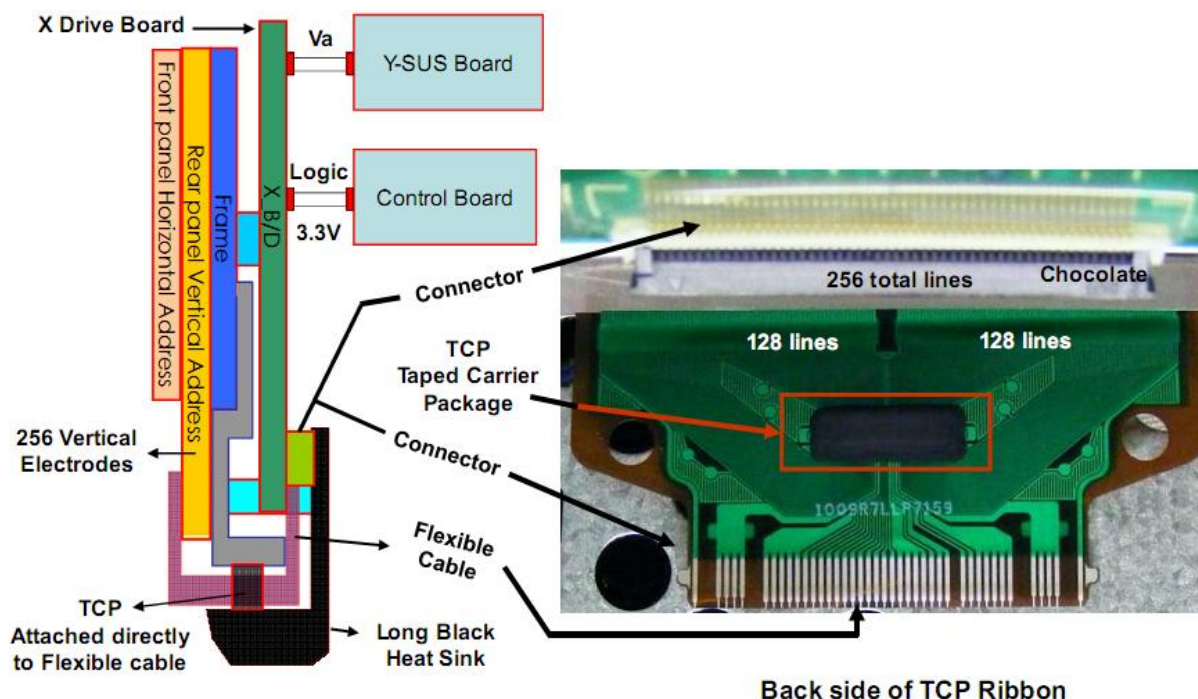


On any Va (Open) TCPs connected.
On any Va (Open) TCPs disconnected.
On 3.3V (1.9V) TCPs connected.
On 3.3V (2.5V) TCPs connected.

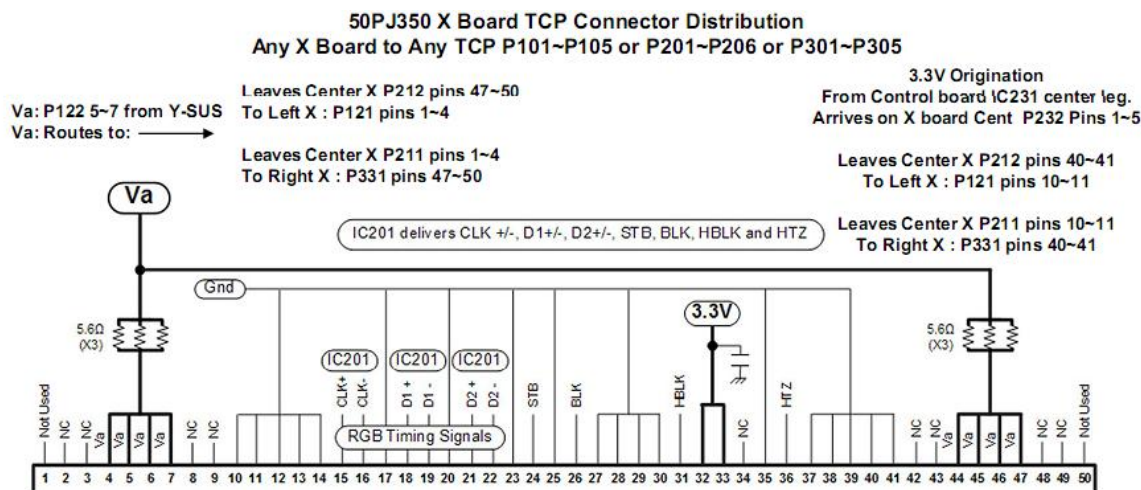
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TCP (Tape Carrier Package)

This shows the layout of the bottom ribbon cables connecting to the Panel's Vertical electrodes (Address Bus). Note that each ribbon cable has a solid state device called a TCP attached.

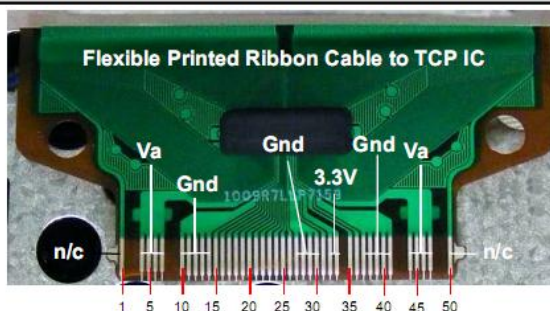


How to Testing TCP



Must be checked on flexible cable.

- + On any Gnd
 - On the below:
 Reversed
 On Va (0.51V) On Va (Open)
 On 3.3V (0.535V) On 3.3V (2.8V)



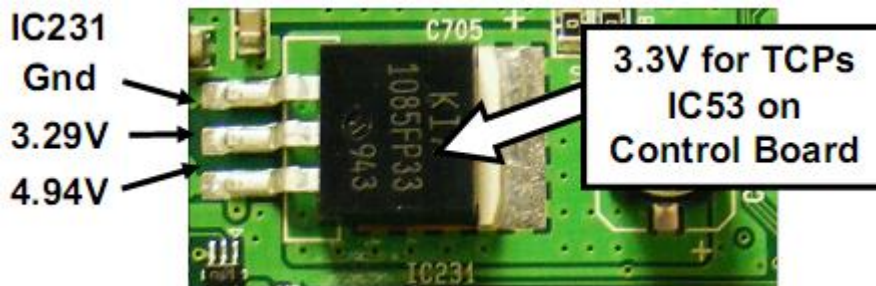
Look for any TCPs being discolored. Ribbon Damage. Cracks, folds Pinches, scratches, etc...

TCP 3.3V B+ Check

Warning: DO NOT attempt to run the set with the Heat Sink over the TCPs removed.

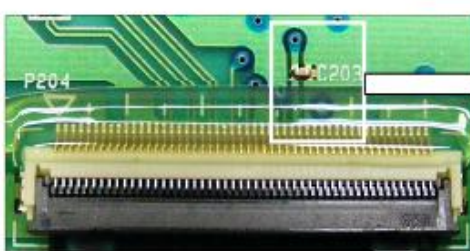
For connectors P162 on the Control Board, see Control board section.

Check the IC231 for 3.3V, use center pin or Case of component.



With all connectors connected, place the Red Lead on 3.3V Diode Check (1.9V). After that Black Lead on 3.3V Diode Check (0.6V). This is also test IC201 on the Center Board. Remember to do the Diode Check must power of TV first.

3.3V in on Pins 1 ~ 5 only on P232 connector from the Control board



All Connectors to All TCPs look very similar for the 3.3V test point. The trace at pins 32 and 33 of each connector. There is a small feed trough and a Cap, you can use for Test Points. Example here from P204. You can only check for continuity back to IC231, you can not run the set with heat sink removed.

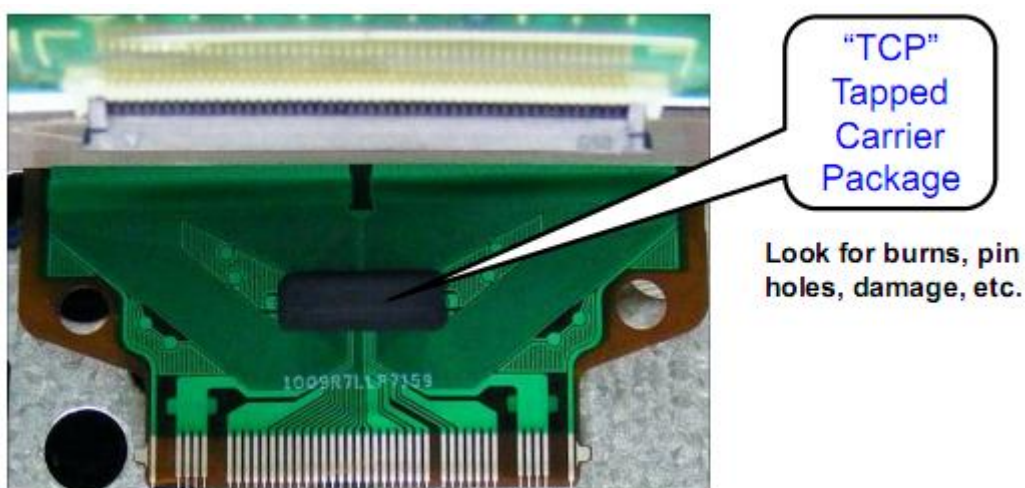
TCP Visual Observation. Damaged TCP

Warning: DO NOT attempt to run the set with the Heat Sink over the TCPs removed. After a very short time, these ICs will begin to self destruct due to overheating.

This damaged TCP can, (at the location of the TCP).

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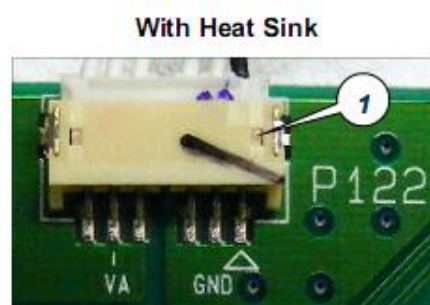
- a) Cause the Power Supply to shutdown. VA shorted, 3.3V shorted.
- b) Generate abnormal vertical bars, colored noise.
- c) Cause the entire area driven by the TCP to be “All White” or “All Black”.
- d) Cause a “Single Pixel Width Line” defect. The line can be Red, Green or Blue.
- e) A dirty contact at the connector can cause b, c and d also.



Left X Drive P122 Connector from Y-SUS P203 Information

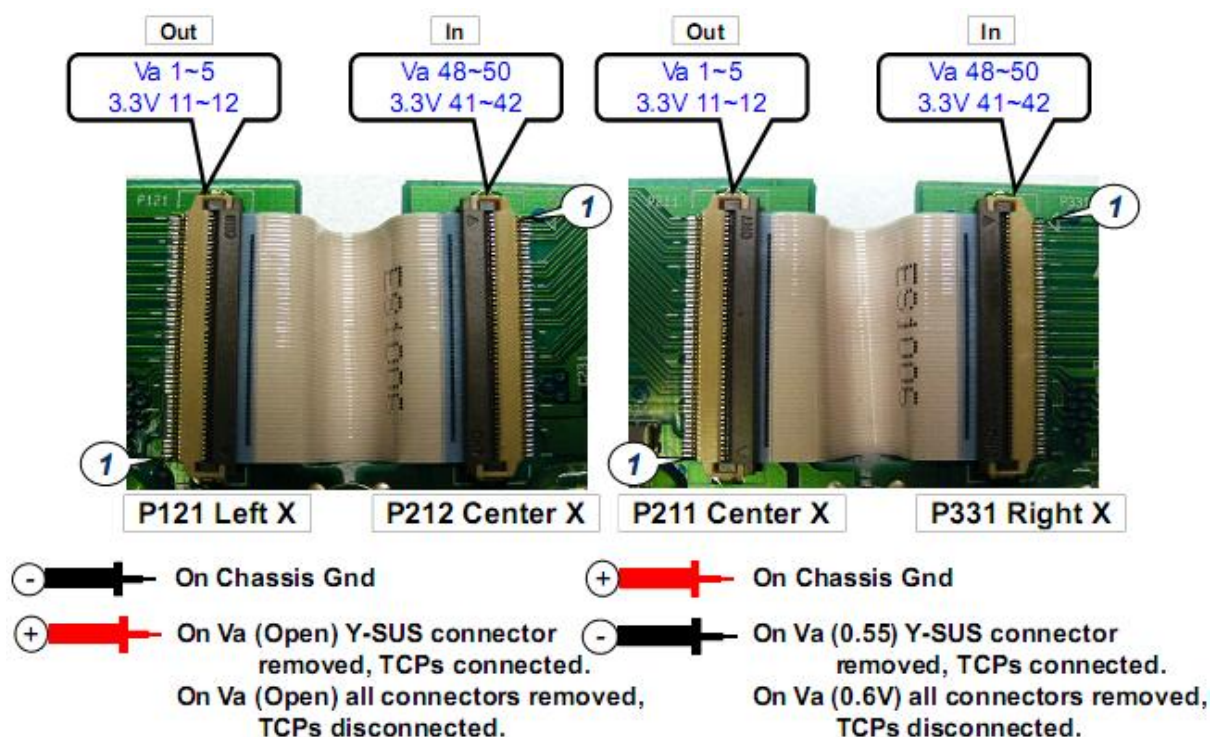
P122 "X Drive Left" to "Y-SUS" P203

Pin	Label	Run	Diode Check
1	Gnd	Gnd	Gnd
2	Gnd	Gnd	Gnd
3	Gnd	Gnd	Gnd
4	n/c	n/a	n/a
5	VA	*60V	Open
6	VA	*60V	Open
7	VA	*60V	Open



Note: This voltage will vary in accordance with the Panel Label. There are no Stand-By voltages on this connector.

P121, P212, P211 and P3311 X Board Connector (VA Diode Check)



How to Troubleshoot the COF ICs

COF is Chip On Film. If any of the tests indicate the uncton is shorted or leaking, the adjacent COF IC is defective. As a result the PDP Panel will have to be replaced. Or if you have the TAB Bonding Machine and the COF parts, so you can repair it, if this is just the COF burnt or shorted.

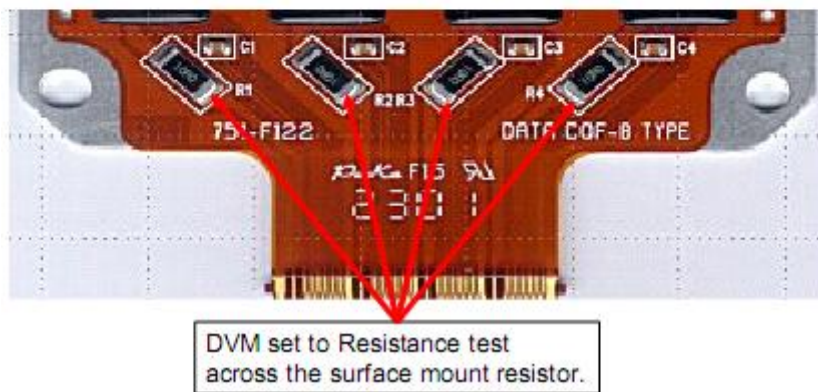
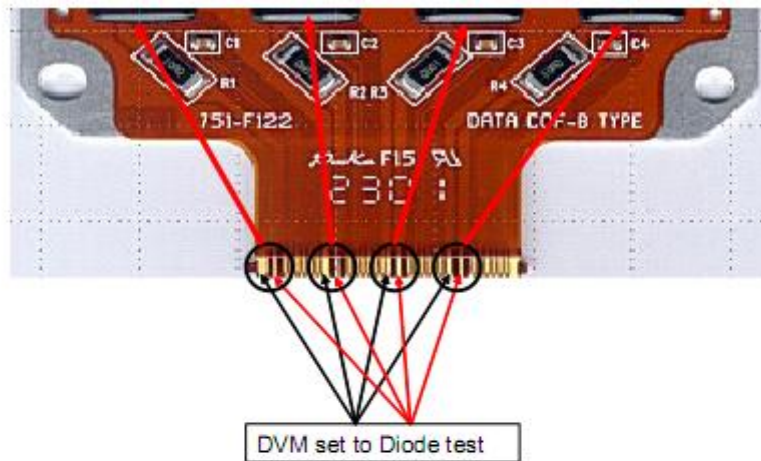
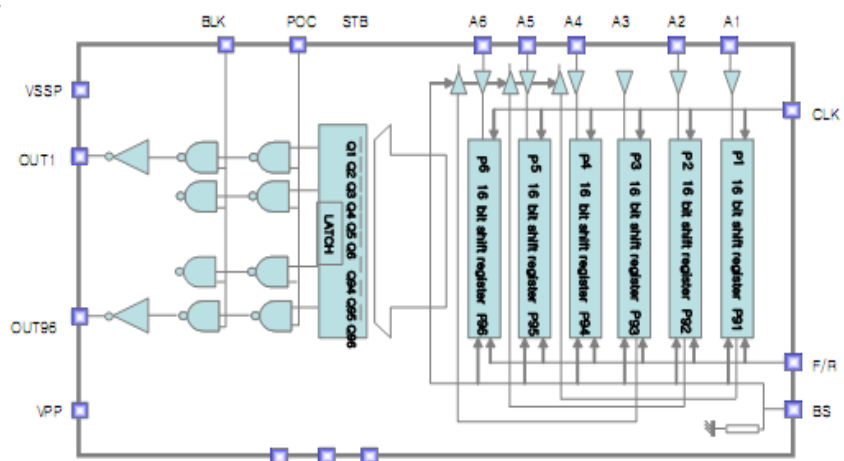


DIAGRAM OF THE COF IC



Mainboard Section

The Mainboard contains the Microprocessor, Audio section, Video section and all inputs, outputs. It also receives all input signals and processes them to be delivered to the Control board via the LVDS cable. The main Tuner (Silicon Tuner using discreet components) which provides VSB, 8VSB and QAM is located on the Mainboard. This board is also where the TV's software upgrades are accomplished through the USB input.

The Main board receives its operational voltage from the PSU:

During Stand-By: From PSU => STBY 5V

During RUN from PSU: (STBY 5V remains): => +5V for Video processing
=> 16V for Audio

Distribution: => Distributes the Turn On Commands (Signals) to the PSU.

=> Distributes LVDS Video to the Control Board.

=> Distributes Key 1 and Key 2 to the Front IR board then to the Front Key Pad.

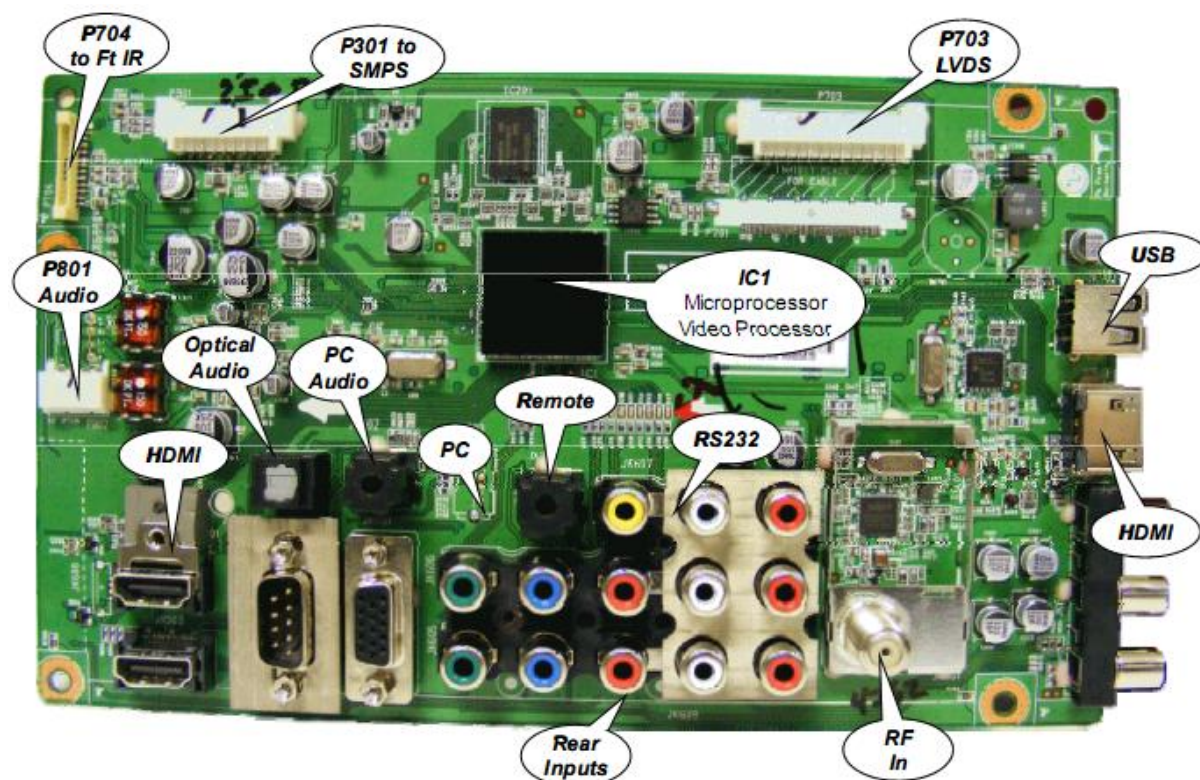
=> Receives Intelligent Sensor data from the Front IR board (via SCL/SDA).

=> Drives front Power LEDs.

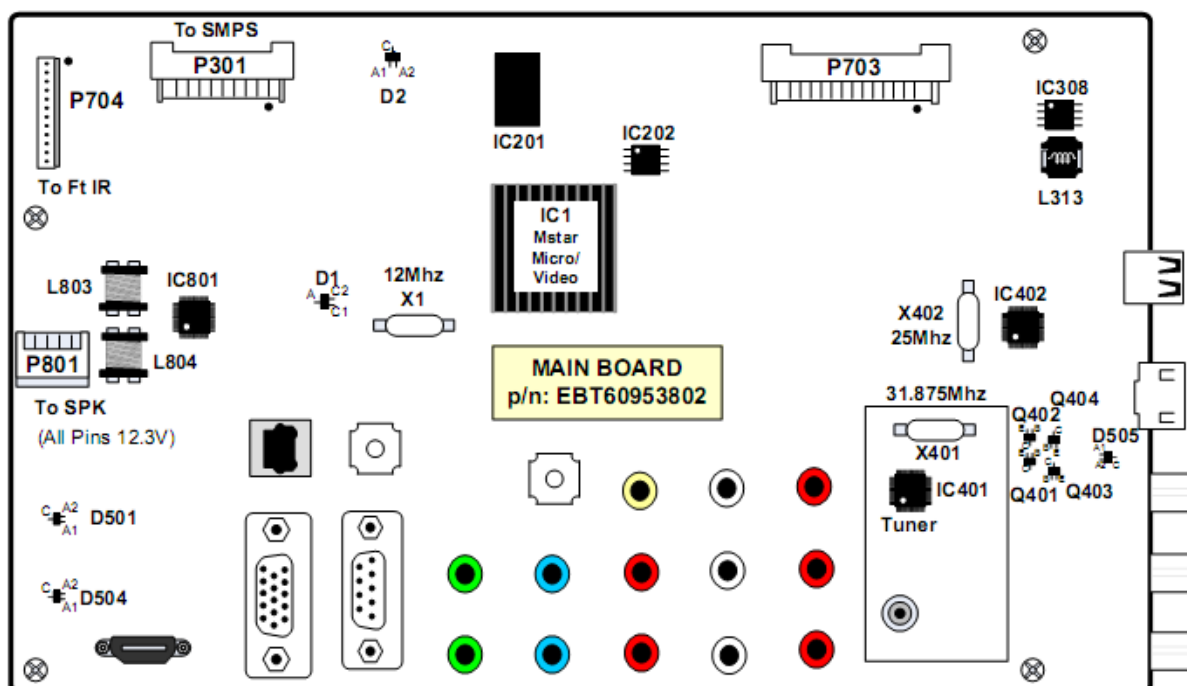
=> Distributes +3.3V_ST and +3.3V_MST to the Front IR board.

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Mainboard Layout and Identification



LG 50PJ350 Plasma TV Mainboard Front Layout Drawing



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50PJ350 Main Board (Front Side) Component Voltages

IC202 7V (to IC405)

Pin Regulator

- [1] Gnd
- [2] Gnd
- [3] Gnd
- [4] Gnd
- [5] 3.3V
- [6] 3.3V
- [7] Gnd
- [8] 3.3V

IC308 1.3V_VDDC

Pin Regulator

- [1] Do not measure
- [2] Gnd
- [3] 5.04V
- [4] 6.07V
- [5] 4.99V
- [6] 1.28V
- [7] 1.28V
- [8] 4.27V

Use scope:
Pin 1: 1.4~1.7V P/P
Using DVM, set
shuts off.

Use scope:
Pin 8: 600mV P/P
Using DVM, set
shuts off.

Q401 Tuner CVBS

Pin Buffer (Analog)

- [B] 1.19V
- [E] 1.86V
- [C] Gnd

Q402 IF_P Buffer

Pin (Digital)

- [B] 1.18V
- [E] 1.18V
- [C] Gnd

Q403 Tuner SIF

Pin Buffer (Digital)

- [B] 1.32V
- [E] 1.99V
- [C] Gnd

Q404 IF_N Buffer

Pin (Digital)

- [B] 1.32V
- [E] 1.99V
- [C] Gnd

Q502 HDMI CEC

Pin Buffer

- [1] B] Gnd
- [2] S] 3.18V
- [3] D] 3.29V
- [4] G] 3.3V

D1 Reset

Pin Speed Up

- [A1] Gnd
- [A] 0V
- [A2] Gnd

D2 LED-R

Pin Routing

- [A1] 0V
- [C] 0.13V
- [A2] 0.28V

D501 B+ Routing

Pin to IC502

- [A1] 0V
- [A] 4.54V
- [A2] 5.0V

D504 B+ Routing

Pin to IC504

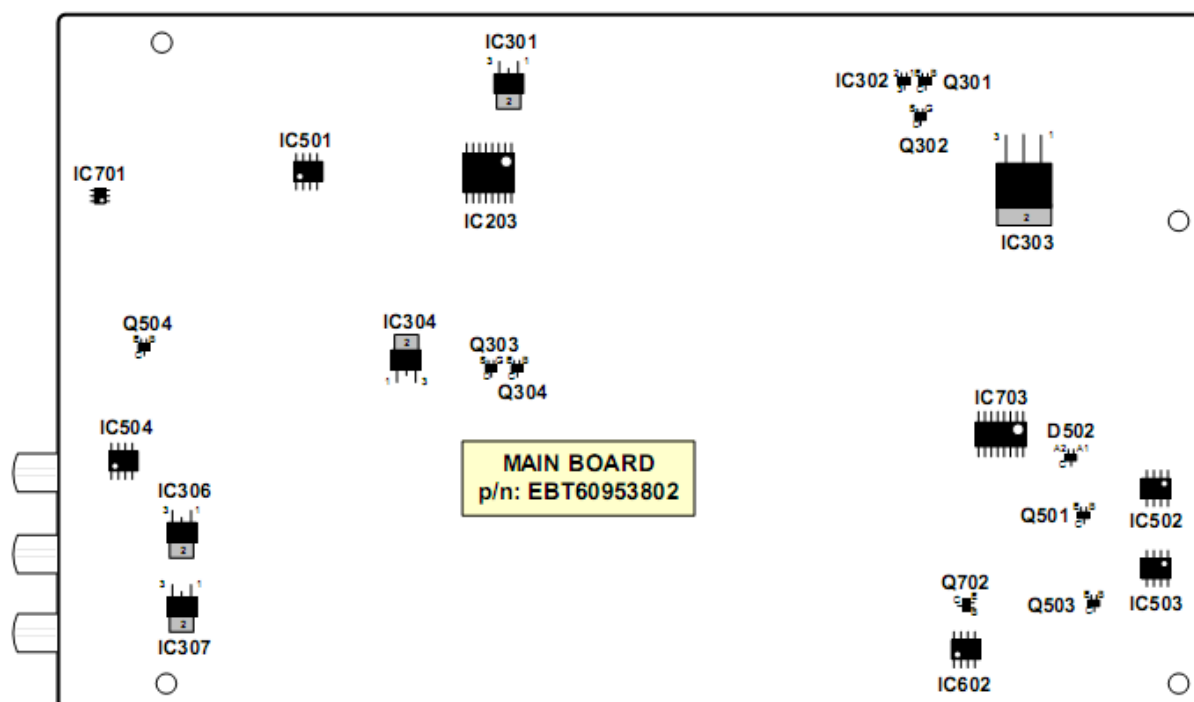
- [A1] 0V
- [A] 4.54V
- [A2] 5.0V

D505 B+ Routing

Pin to IC503

- [A1] 0V
- [A] 4.54V
- [A2] 5.0V

LG 50PJ350 Plasma TV Mainboard Back Layout Drawing



PV1- Collection of Plasma TV Repair Tips

LG 50PJ350 Mainboard (Back Side) Components Voltages

IC203 Winbond Serial Pin Flash [1] 0V [2] 3.30V [3] n/c [4] n/c [5] n/c [6] n/c [7] 0V [8] 3.3V [9] 0V [10] Gnd [11] n/c [12] n/c [13] n/c [14] n/c [15] 0V [16] 0V	IC303 3.3V_MST Pin Regulator [1] Gnd [2] 3.3V (Out) [3] 5.04V (In)	IC501 HDCP Data Pin EEPROM [1] Gnd [2] Gnd [3] 3.3V [4] Gnd [5] 3.3V [6] 3.3V [7] 3.3V [8] 3.3V	IC701 USB 5V Pin Limiter [1] 4.97V (In) [2] Gnd [3] 3.3V (Enable) [4] 0V [5] 0V [6] 4.97V (Out)	Q301 Driver for 5V_MST Pin Switch Q302 [B] 0.6V [C] 0V [E] Gnd	Q702 RS232 Pin Tx Buffer [B] 0.6V [C] 0V [E] Gnd
IC301 1.8V_MST Pin Regulator [1] 0.6V [2] 1.85V (Out) [3] 3.3V (In)	IC304 1.2V_DVDD Reg Pin Dig Ch Only [1] Gnd [2] 1.2V (Out) [3] 3.3V (In)	IC502 IC503, IC504 EDID Data Pin For HDMI [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 4.52V [6] 4.52V [7] 3.33V [8] 4.53V	IC703 RS232 Tx/Rx Pin [1] 3.3V [2] 5.45V [3] 0V [4] 0V [5] (-5.37V) [6] (-5.4V) [7] (-5.4V) [8] 0V [9] 3.3V [10] 3.3V [11] n/c [12] n/c [13] 0V [14] 5.45V [15] Gnd [16] 3.3V (B+)	Q302 5V_MST Pin Switch [G] 0V [S] 5.09V [D] 5.04V	D502 HDMI CEC Limite Pin [A1] 0V [A2] 3.28V [C] 3.1V
IC302 3.3V_VST Pin Regulator [1] Gnd [2] 3.3V (Out) [3] 5.09V (In)	IC306 3.3V_TU Pin Regulator [1] Gnd [2] 3.3V (Out) [3] 4.97V (In)	IC602 RGB Pin EEPROM [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 5.09V [6] 5.09V [7] 3.33V [8] 5.09V	Q303 3.3V_PVSB Sw Pin Dig Ch Only [G] 0V [S] 3.3V [D] 3.3V	Q304 Driver for 3.3V_PVSB Pin Switch Q303 [B] 0.64V [C] 0V [E] Gnd	Q501, Q503 Q504 Hot Swap Pin Switch for HDMI [B] 0V [C] 0V [E] Gnd

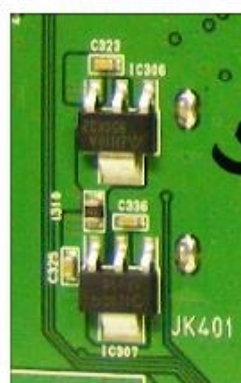
Mainboard Tuner Explained

The tuner in this set is discreet components (Silicon Tuner).



Front bottom right hand side

Check for Tuner B+:
3.3V on IC306 and 1.8V on IC307

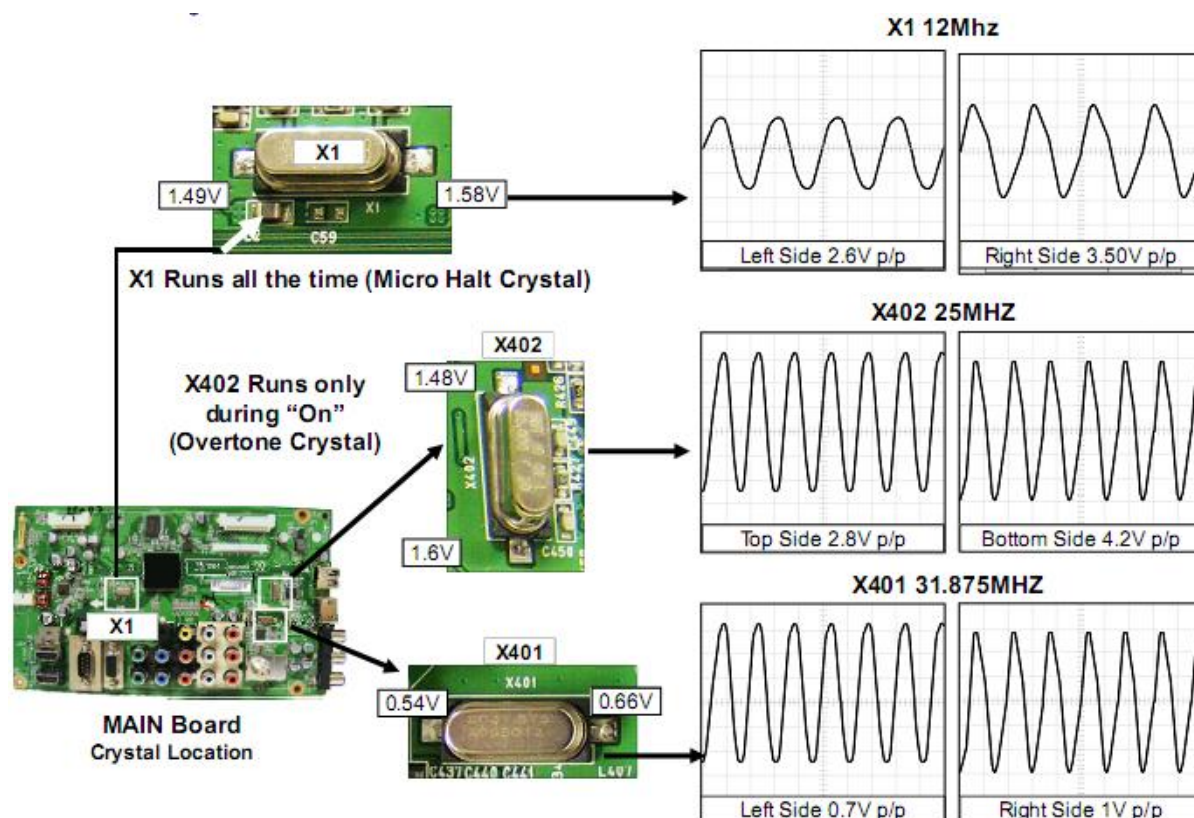


IC306 3.3V_TU Pin Regulator [1] Gnd [2] 3.3V (Out) [3] 4.97V (In)	IC307 1.8V_TU Pin Regulator [1] Gnd [2] 1.8V (Out) [3] 3.3V (In)
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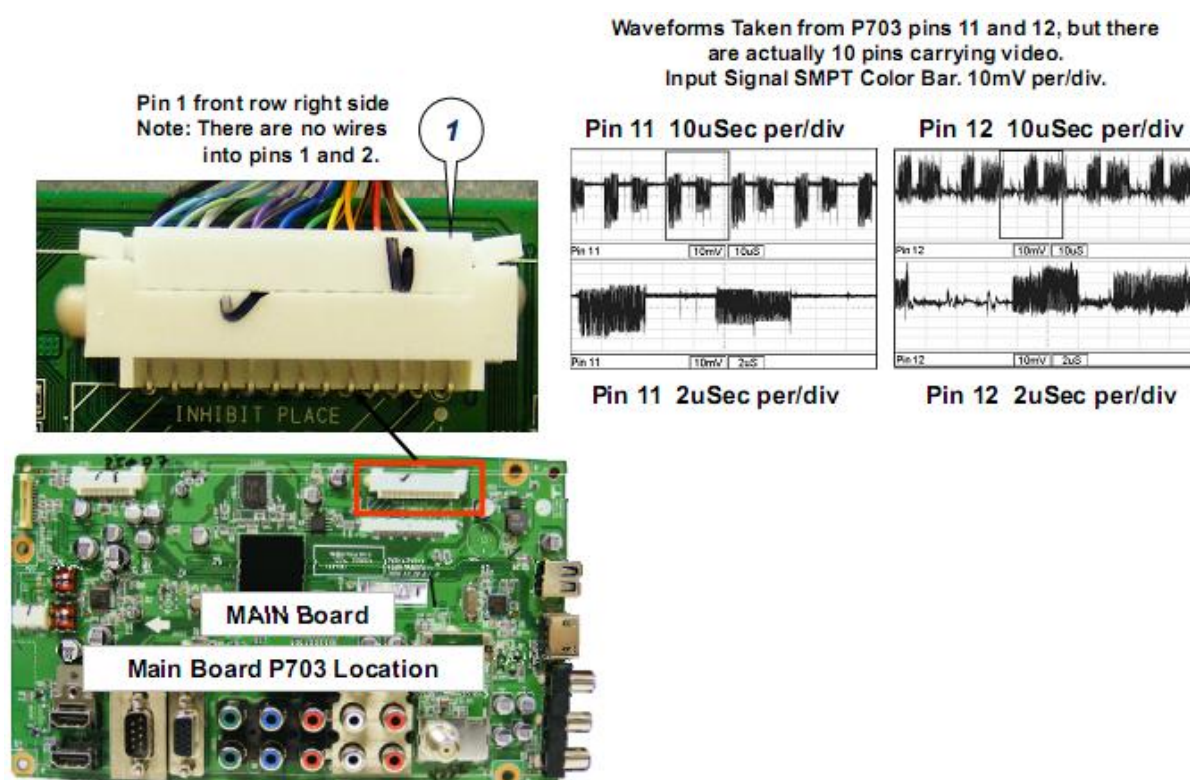
Back Side bottom left hand side

PV1- Collection of Plasma TV Repair Tips

Mainboard Crystal X1, X401 and X402 Check



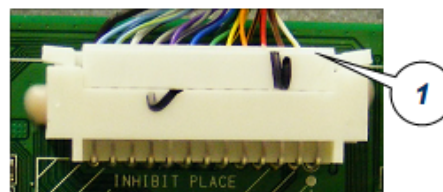
Mainboard P703 LVDS Signal Test Points



PV1- Collection of Plasma TV Repair Tips

Mainboard Plug P703 "LVDS" Voltages

Voltage and Diode Test for the Main Board



P703 "Main Board" Connector to P121 "Control Board"

Pin	Label	Run	Diode Check	Pin	Label	Run	Diode Check
1	n/c	n/c	Open	2	n/c	n/c	Open
3	ROM_RX	3.29V	2.6V	4	ROM_TX	3.3V	2.6V
5	Gnd	Gnd	Gnd	6	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	8	Gnd	Gnd	Gnd
9	Module_SCL1	3.3V	2.6V	10	Module_SDA1	3.3V	2.6V
11	RE2+	1.25V	0.77V	12	RE2-	1.23V	1.09V
13	RD2+	1.26V	0.77V	14	RD2-	1.21V	1.09V
15	RCLK2+	1.23V	0.77V	16	RCLK2-	1.23V	0.77V
17	RC2+	1.22V	0.77V	18	RC2-	1.26V	0.77V
19	RB2+	1.27V	0.77V	20	RB2-	1.21V	0.77V
21	RA2+	1.35V	0.76V	22	RA2-	1.13V	0.77V
23	PC_SER_CLK	0.59V	1.03V	24	PC_SER_DATA	3.3V	1.49V
25	DISP_EN	2.87V	0.49V	26	Gnd	Gnd	Gnd

Pin 1 front row right side
Note: There are no wires into pins 1 and 2.

Blue Pins indicate 10 bit differential video signal

Note:
There are no voltages in Stand-By mode.

Diode Mode Check with the Board Disconnected.

Mainboard Plug P704 to Ft IR

Voltage and Diode Mode Measurements for the Main Board

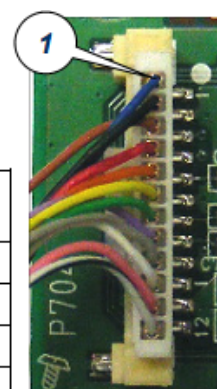
P704 Connector "Main Board" to P100 "Front Keys"

Pin	Label	STBY	Run	Diode Check
1	IR	3.3V	3.76V	3.12V
2	Gnd	Gnd	Gnd	Gnd
3	Key_CTL_0	3.3V	3.29V	1.53V
4	Key_CTL_1	3.3V	3.29V	1.53V
5	LED_RED	2.7V	0.21V	Open
6	Gnd	Gnd	Gnd	Gnd
7	EYE_SCL	0V	3.27V	2.64V
8	EYE_SDA	0.25V	3.27V	2.64V
9	Gnd	Gnd	Gnd	Gnd
10	3.3VST	3.3V	3.29V	0.85V
11	3.3V_MST	0V	3.31V	0.50V
12	LED_BLUE	0V	0V	Open

3 & 4
Soft Touch
Key Board

7 & 8
Intelligent
Sensor

Stand-By
3.3V

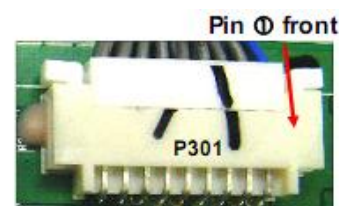


Mainboard P301 to Power Supply Voltages and Diode Check

Diode Mode Check with the Board Disconnected. DVM in the Diode mode.

P301 Connector "Main" to "SMPS Board" P813

Pin	Label	STBY	Run	Diode
1~2	^a 16V	0V	17V	Open
3~4	Gnd	Gnd	Gnd	Gnd
5~7	^a 5V	0.46V	5.17V	0.94V
8	^{ac} Error_Det	2.85V	4.9V	3.04V
9~12	Gnd	Gnd	Gnd	Gnd
13~14	STBY_5V	3.46V	5.14V	1.07V
15	^a RL_ON	0V	2.43V	2.62V
16	^{ad} AC Det	0V	4.44V	3.1V
17	^b M_ON	0V	3.29V	Open
18	^e Auto_Gnd	Gnd	Gnd	Gnd



Front pins are odd
Back pins are even

Note-a: The RL_On turns on +5V, 17V Error Det and AC_DET

Note-b: The M5_On command turns on M5V, VA and VS.

Note-c: The Error Det line is not used in this model.

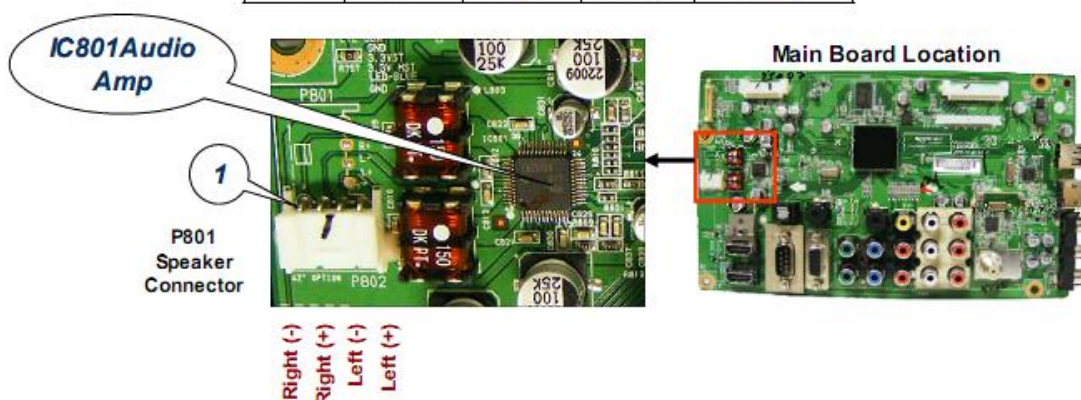
Note-d: If the AC Det line is missing, the TV will turn off in 10 seconds.

Note-e: Pin 18 is grounded on the Mainboard. If opened, the power supply turns on automatically.

Mainboard Speaker Plug P801 Voltage and Diode Check

P8010 Connector "Main" to "Speakers"

Pin	Label	SBY	Run	Diode Mode
1	R-	0V	8.51V	Open
2	R+	0V	8.51V	Open
3	L-	0V	8.51V	Open
4	L+	0V	8.51V	Open



Front IR, Power LED and Soft Touch Key Pad Section

These boards contain the Infrared Receiver (IR), Intelligent Sensor and Power LEDs section. The Soft Touch Function Keys is actually a thin pad adhered to the front protective shield.

The Power LED Driver and Intelligent Sensor IC communicate with the Mainboard Microprocessor (IC1) via Clock and Data lines. These boards have no adjustments.

The Front Control Board (IR and Intelligent Sensor) receives its operational B+ from Mainboard:

3.3V_ST: Is from the Mainboard. This voltage is generated on the Mainboard (IC302).

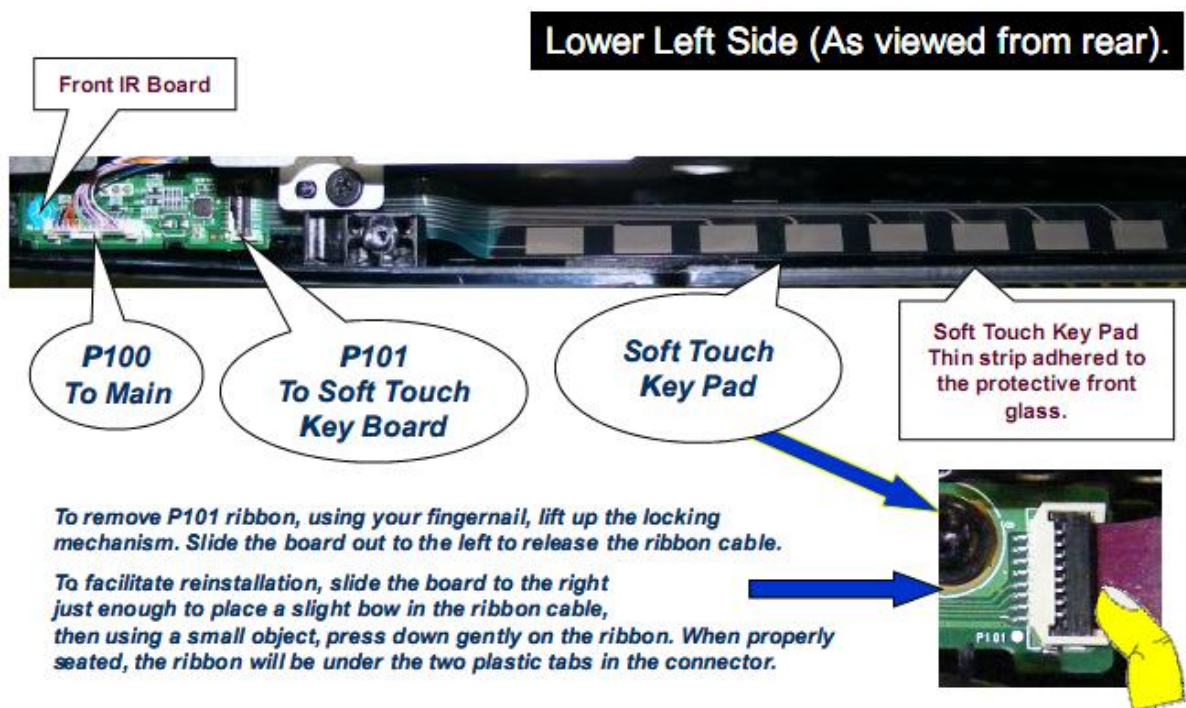
3.3V_MST: This voltage is generated on the Mainboard (IC303).

The Front Power LEDs are driven by 2 separate pins from the Mainboard SCL/SDA pins 7 and 8.

The IR signal is routed back to the Mainboard via pin 1.

Also the Soft Touch Key Pad is routed through Front IR board and out P100 to P704 pins 3 and 4.

Front Control (IR and Intelligent Sensor) Board and Power LED Board



Front Control Board Connector P100 Voltage and Pin Identification

P100 Connector "Front Keys" to P704 "Main Board"

Pin	Label	STBY	Run	Diode Check
1	IR	3.3V	3.76V	2.75V
2	Gnd	Gnd	Gnd	Gnd
3	Key_CTL_0	3.3V	3.29V	2.58V
4	Key_CTL_1	3.3V	3.29V	2.58V
5	LED_RED	2.7V	0.21V	3.13V
6	Gnd	Gnd	Gnd	Gnd
7	EYE_SCL	0V	3.27V	2.53V
8	EYE_SDA	0.25V	3.27V	2.54V
9	Gnd	Gnd	Gnd	Gnd
10	3.3VST	3.3V	3.29V	2.28V
11	3.3V_MST	0V	3.31V	2.85V
12	LED_BLUE	0V	0V	Open

For the Soft Touch Key Pad section.

7 & 8 Front LEDs and Intelligent Sensor

Stand-By 3.3V

For Readings when any Key is touched, see Soft Key Pad Section For Key 1 and Key 2.

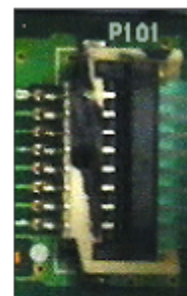


PV1- Collection of Plasma TV Repair Tips

Front IR Board Plur P101 to Soft Touch Keys (Voltages and pin Identification)

P101 CONNECTOR "Ft IR Board" to "Ft Key Pad"

Pin	STBY	Run	Diode Check
1	0.07	0.16	2.4V
2	0.07	0.16	2.4V
3	0.07	0.16	2.4V
4	0.07	0.16	2.4V
5	0.07	0.16	2.4V
6	0.07	0.16	2.4V
7	0.07	0.16	2.4V
8	0.07	0.16	2.4V

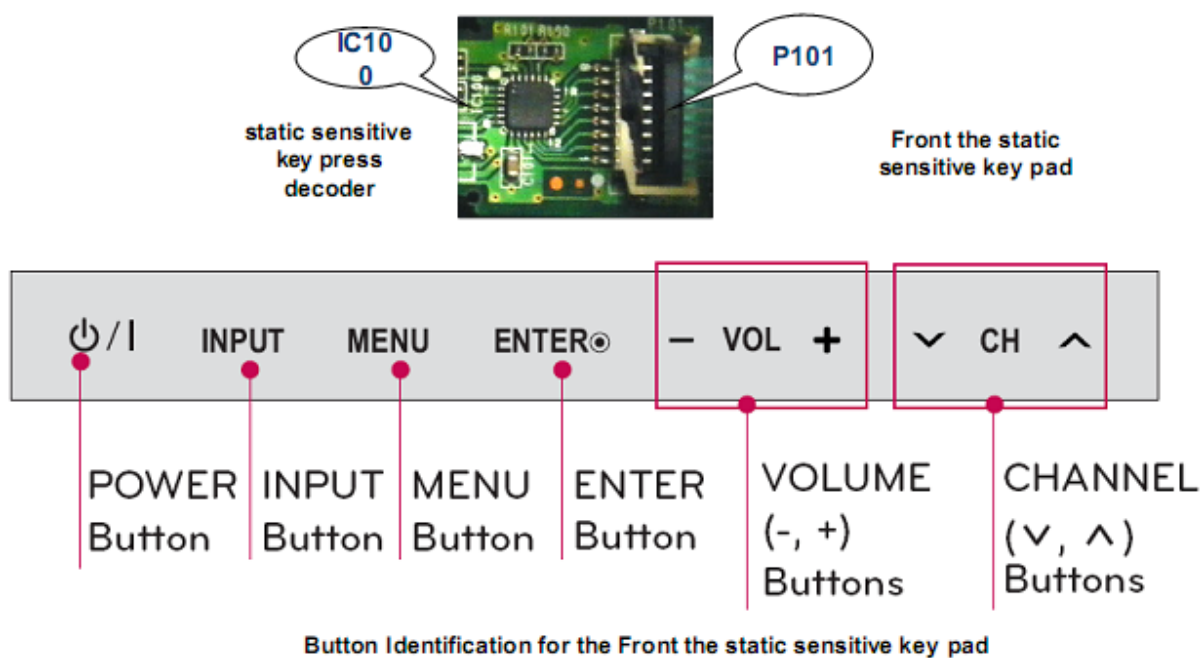


Voltage Measured with a Scope

Measuring Voltage on Pin 1 with DVM turns the TV on. If TV is on, Input Menu pops up.

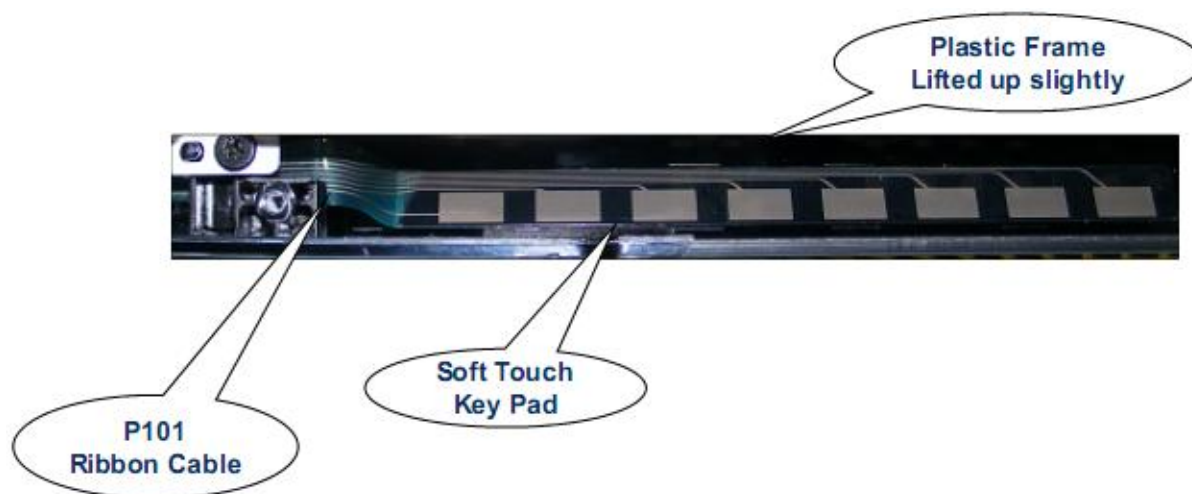
Soft Touch Key Pad Section (board Layout and Identification)

The Soft Touch Key Pad is a thin "Static" sensitive pad that is adhered to the front protective shield. The Soft Touch Key Pad requires a static sensitive key press decoder IC to change the key press data into R2 Ladder (Resistive data) which the Microprocessor can understand. This IC is on the Front IR board IC100 which received key press data from P101. The output from this IC simply selects the appropriate resistor to inject into the Key 1 or Key 2 line which is then interpreted by the Microprocessor in the Mainboard IC1.



Soft Touch Key pad

The Soft Touch Key Pad is a thin “Static” sensitive pad that is adhered to the inside of the front protective shield.



Soft Touch Key Pad Resistance and Diode Mode Checks

IC100 on the Front IR Board is generating these Resistance changes when a Soft Touch Key is touched. This in turn pulls down the Key 1 and Key 2 lines to be interpreted by the Microprocessor.

P100 (Key 1, Key 2) Resistance Reading with Soft Touch Key pressed.

KEY	Pin 3 measured from Gnd	KEY	Pin 4 measured from Gnd
CH (Up)	0.61K Ohms	Volume (+)	3.6K Ohms
CH (Dn)	9K Ohms	Volume (-)	0.62K Ohms
Input	3.66K Ohms	Enter	22K Ohms
		Menu	9K Ohms

P100 Voltage Measurements with Soft Touch Key pressed.

KEY	Pin 3 measured from Gnd	KEY	Pin 4 measured from Gnd
CH (Up)	2.1V	Volume (+)	0.89V
CH (Dn)	1.619V	Volume (-)	0.214V
Input	0.88V	Enter	2.42V
		Menu	1.667V

P100 Connector "IR/LED Control Board" to P703 "Main" (No Key Pressed)

Pin	Label	STBY	Run	Diode Mode
3	KEY 1	3.3V	3.29V	2.58V
4	KEY 2	3.3V	3.29V	1.58V

Diode Mode readings taken with all connectors disconnected. Black Lead on GND and the DVM is in Diode range.

PANASONIC

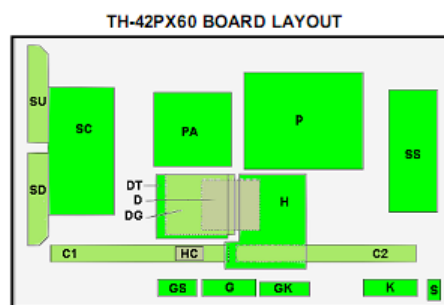
Plasma TV

5.1- Panasonic Plasma Modules

2006 Plasma TV

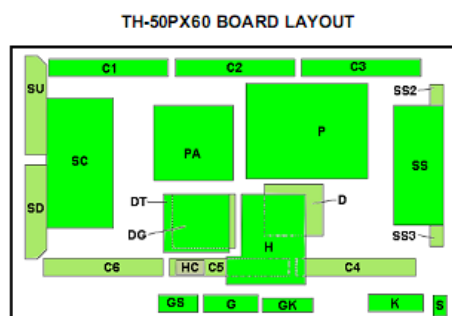
1) Panasonic TH-42PX60U Plasma TV

BOARD NAME	PART NUMBER	BOARD DESCRIPTION
DT	TNAG167S	ATSC Interface
H	TNPA3769S	AV Terminal, AV Switch
HC	TNPA3855S	Jig Connection
DG	TNPA3903BBS	Digital Signal Processor, Micom, HDMI Interface
PA	TXNPA1BJTUJ	DC-DC Converter, Speaker out, Audio AMP, Fan Control
C1	TXNC11BJTUJ	Data Driver (Lower Right)
C2	TXNC21BJTUJ	Data Driver (Lower Left)
D	TNPA3810AHS	Format Converter, Plasma AI, Sub-Field Processor
P	TXN/P1BJTUJ	Power Supply
SC	TXNSC1BJTUJ	Scan Drive
SU	TXNSU1BJTUJ	Scan out (Upper)
SD	TXNSD1BJTUJ	Scan out (Lower)
SS	TXNSS1BJTUJ	Sustain Drive
K	TNPA3762AG	Remote receiver, Power LED
S	TNPA3964AB	Power Switch
G	TNPA3764AD	Front Terminal
GK	TNPA3965AC	Key Switch
GS	TNPA3853AB	SD Card Slot



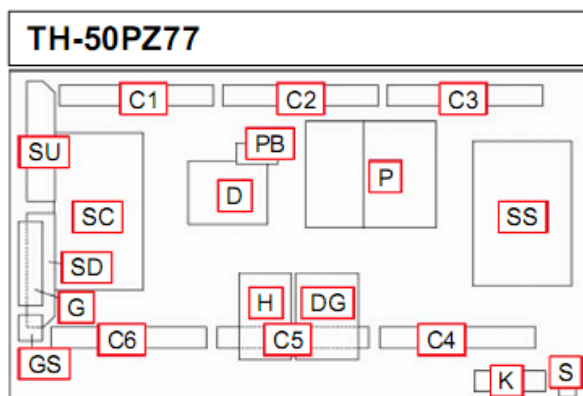
2) Panasonic TH-50X60U Plasma TV

BOARD NAME	PART NUMBER	BOARD DESCRIPTION
DT	TNAG167S	ATSC Interface
H	TNPA3769S	AV Terminal, AV Switch
HC	TNPA3855S	Jig Connection
DG	TNPA3903BCS	Digital Signal Processor, Micom, HDMI Interface
PA	TXNPA1BJTUJ	DC-DC Converter, Speaker out, Audio AMP, Fan Control
P	ETXMM610MEF	Power Supply
C1	TXNC11BHTUJ	Data Driver (Upper Right)
C2	TXNC21BHTUJ	Data Driver (Upper Center)
C3	TXNC31BHTUJ	Data Driver (Upper Left)
C4	TXNC41BHTUJ	Data Driver (Lower Left)
C5	TXNC51BHTUJ	Data Driver (Lower Center)
C6	TXNC61BHTUJ	Driver (Lower Right)
D	TNPA3820ACS	Format Converter, Plasma AI, Sub-Field Processor
SC	TXNSC1BHTUJ	Scan Drive
SD	TXNSD1BHTUJ	Scan Out (Lower)
SS2	TNPA3829S	Sustain Connector (Upper)
SS	TXNSS1BHTUJ	Sustain Drive
SS3	TNPA3830S	Sustain Connector (Lower)
SU	TXNSU1BHTUS	Scan Out (Upper)
G	TNPA3764ADS	Front Terminal
GK	TNPA3965ACS	Key Switch
GS	TNPA3853ABS	SD Card Slot
K	TNPA3762AGS	Remote receiver, Power LED
S	TNPA3964ABS	Power Switch

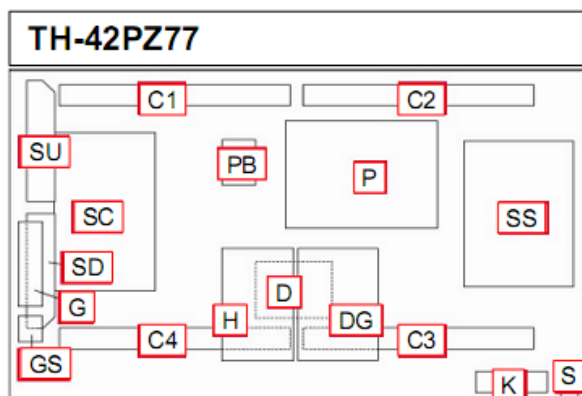


2007 Plasma TV

1) Panasonic TH-42PZ77 & TH-50PZ77



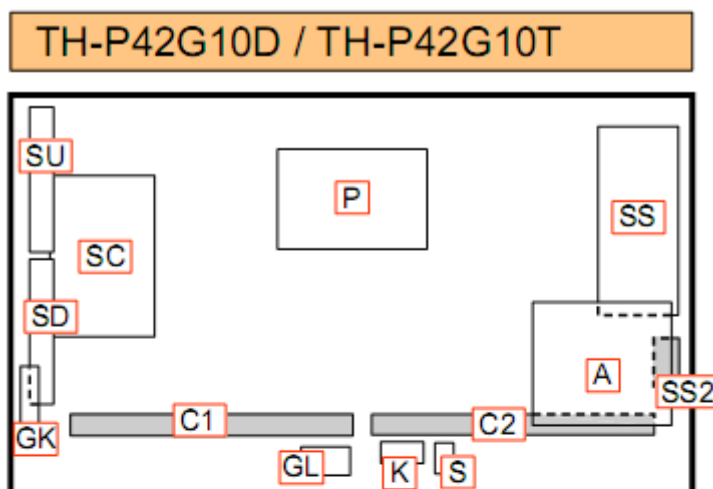
Board	Function
P	Power Supply
PB	Fan control
H	Speaker out, Sound Processor, AV Terminal, AV Switch
DG	DC-DC Converter, Digital Signal Processor, Microcomputer
G	Front terminal, Key Switch
K	Remote receiver, Power LED
S	Power Switch
GS	SD Card Slot
D	Format Converter, Plasma AI, Sub-Field Processor
C1	Data Driver (Upper Right)
C2	Data Driver (Upper Center)
C3	Data Driver (Upper Left)
C4	Data Driver (Lower Left)
C5	Data Driver (Lower Center)
C6	Data Driver (Lower Right)
SC	Scan Drive
SU	Scan out (Upper)
SD	Scan out (Lower)
SS	Sustain Drive



Board	Function
P	Power Supply
PB	Fan control
H	Speaker out, Sound Processor, AV Terminal, AV Switch
DG	DC-DC Converter, Digital Signal Processor, Microcomputer
G	Front terminal, Key Switch
K	Remote receiver, Power LED
S	Power Switch
GS	SD Card Slot
D	Format Converter, Plasma AI, Sub-Field Processor
C1	Data Driver (Upper Right)
C2	Data Driver (Upper Left)
C3	Data Driver (Lower Left)
C4	Data Driver (Lower Right)
SC	Scan Drive
SU	Scan out (Upper)
SD	Scan out (Lower)
SS	Sustain Drive

2009 Plasma TV

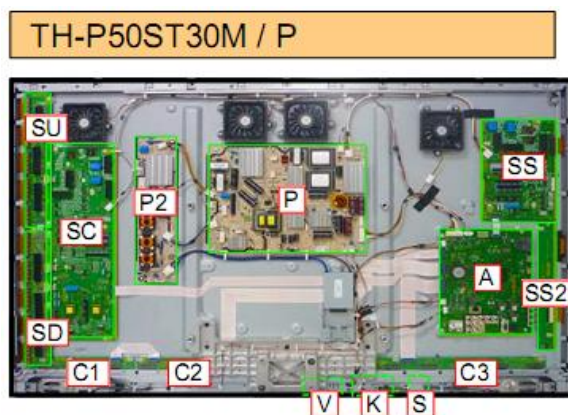
1) Panasonic TH-42G10 Plasma TV



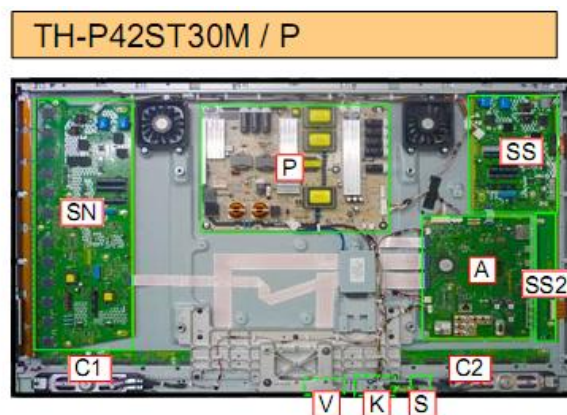
Board Name	Function	Parts Number
P	Power Supply	ETX2MM747MFF
A	DC-DC Converter, Tuner, Speaker out, AV Terminal, AV Switch, PC, Digital Signal Processor, SYSTEM MPU, HDMI Switch, Peaks-AVC, Format Converter, Plasma AI, Sub-Field Processor	TZTNP01HMUM
K	Remote receiver, Power LED, C.A.T.S sensor	TXN/K1EQUM
GL	SD LED	TXNGL1HMUM
S	Power Switch	TXN/S1EQUM
GK	Key Switch	TXNGK1EQUM
C1	Data Driver (Lower Right)	TXNC11HMUM
C2	Data Driver (Lower Left)	TXNC21HMUM
SC	Scan Drive	TXNSC1HMUM
SS	Sustain Drive	TXNSS1HMUM
SS2	Sustain out (Lower)	TXNSS21HMUM
SU	Scan out (Upper), Not repairable. SU-Board should be exchanged for service.	TXNSU1HMUM
SD	Scan out (Lower), Not repairable. SD-Board should be exchanged for service.	TXNSD1HMUM

2011 Plasma TV

1) Panasonic TH-P50ST30 & TH-P42ST30 Plasma TV



Board Name	Function	Parts Number
P	Power Supply	TXNP11QJUE
P2	Power Supply	TXNP21PNUB50
A	Main AV input, processing	TZTNP01MNUM (for TH-P50ST30M) TZTNP01MRUP (for TH-P50ST30P)
K	Remote receiver, Power LED, C.A.T.S sensor	TXN/K1NCUA42
S	Power Switch	TNPA5394
V	3D Eyewear transmitter	TNPA5396
C1	Data Driver (Lower Right)	TNPA5318
C2	Data Driver (Lower Center)	TXNC211GGK50
C3	Data Driver (Lower Left)	TXNC311GGK50
SC	Scan Drive	TXNSC11GGK50
SS	Sustain Drive	TXNSS11GGK50
SS2	Sustain out (Lower)	TXNSS211GGK50
SU	Scan out (Upper) Non serviceable. SU-Board should be exchanged for service.	TXNSU1MUUA50
SD	Scan out (Lower) Non serviceable. SD-Board should be exchanged for service.	TNPA5337
—	—	—



Board Name	Function	Parts Number
P	Power Supply	TXN/P1QKUE42
—	—	—
A	Main AV input, processing	TZTNP01MQUM (for TH-P42ST30M) TZTNP01MTUP (for TH-P42ST30P)
K	Remote receiver, Power LED, C.A.T.S sensor	TXN/K1NCUA42
S	Power Switch	TNPA5394
V	3D Eyewear transmitter	TNPA5396
C1	Data Driver (Lower Right)	TNPA5314
C2	Data Driver (Lower Left)	TXNC211DHK42
—	—	—
SS	Sustain Drive	TXNSS11DHK42
SS2	Sustain out (Lower)	TXNSS211DHK
—	—	—
—	—	—
SN	Scan Drive	TXNSN11DHK42

For more Plasma Module PCB Location and Structure information, please refer to the **Bonus-B Section: Panasonic Plasma TV Training**

Bonus-B Section is not in this eBook, but inside the download page. It is included lots of the Panasonic Plasma TV repair information there.

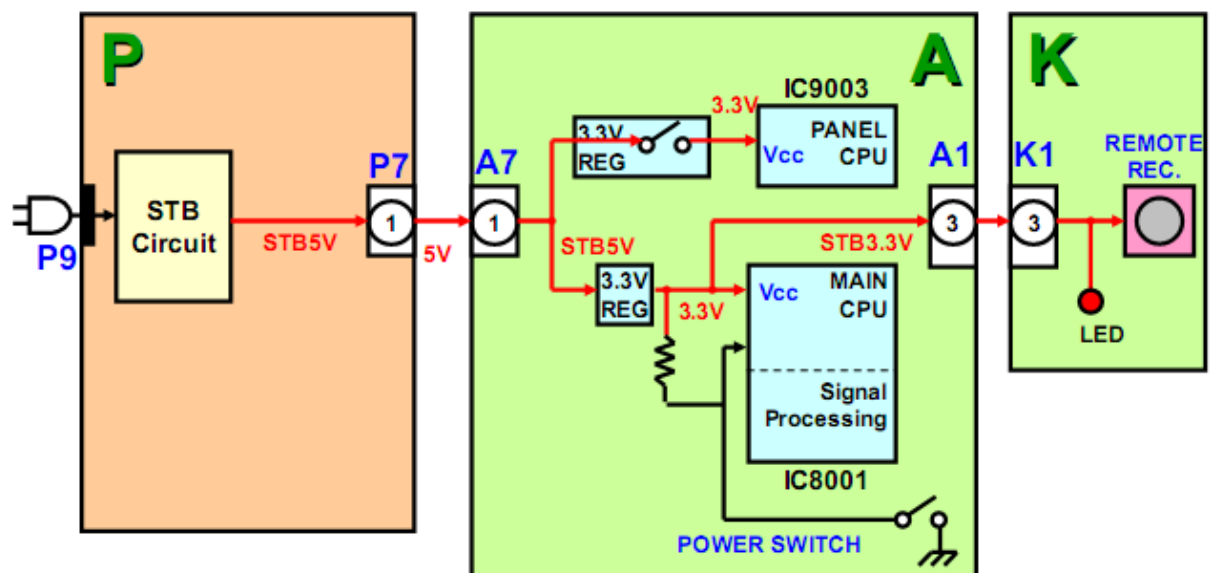
5.2- Panasonic Plasma TV Power Startup Sequence

Model: Panasonic TC-P42S2 Plasma TV (2010 PDP, S2 Series, 13th Generation)

The power switch is located on the A board (G20, S2 and X28K models). The U2, X2 and C2 models still have the power switch on the S board.

The P5V is produced in the A board (Not in the P board). The Main CPU and the Front end processor circuit are built into the IC. (Nile-TCON IC8001). IC8001 uses STB3.3V and STB1.2V as Vcc.

Standby Operation:



Standby Circuit Explanation:

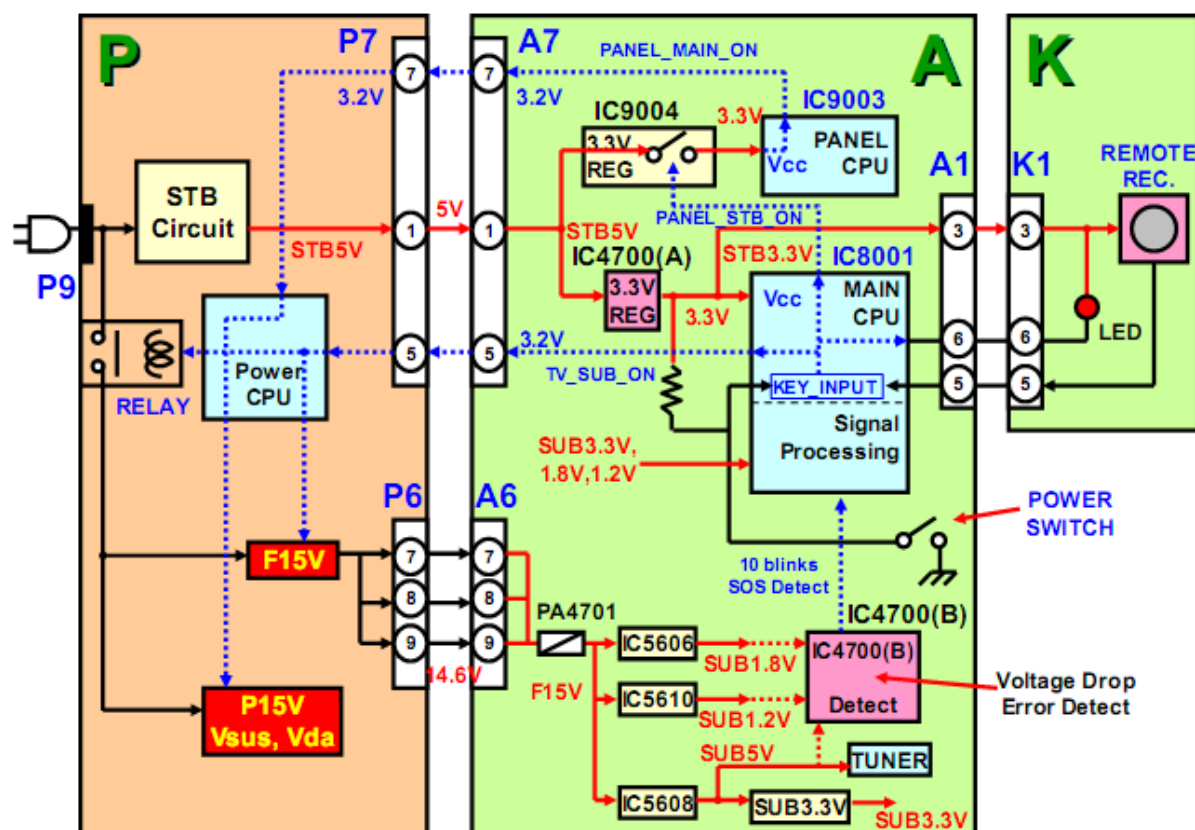
When the TV is plugged in:

AC is supplied to the standby circuit in the power supply to produce STB5V. The STB5V is provided to the A board via connector P7 (pin-1).

The STB5V from pin-1 of connector P7 is applied to a 3.3V regulator to power the Main CPU (IC8001) on the A board. This energizes and prepares the microprocessor (CPU) for program execution.

The 3.3V from the voltage regulator besides applied to the CPU, is also applied to the remote control receiver and the power LED on the K board through connector A1/K1 (pin-3). If the STB5V is missing, the TV is dead (No power).

Power On Operation:



Power On Circuit Explanation:

The power command from the power switch on the A board or the remote control receiver on the K board is provided to the Main CPU on the A board (IC8001). The CPU on the A board outputs the “TV_SUB_ON” command/signal (3.2V) and the PANEL_STB_ON command (3.2V).

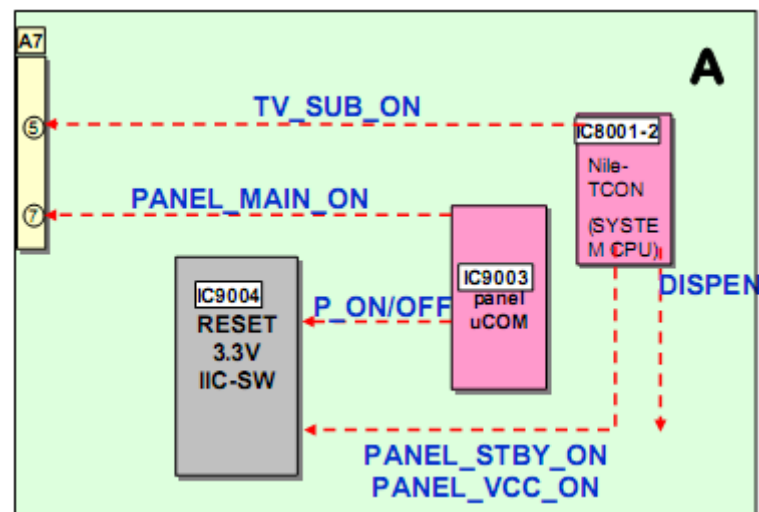
The “TV_SUB_ON” command is provided to pin 5 of connector P7 of the power supply to develop the F+15V. At this time, the relays on the power supply are triggered and a “click” sound can be heard.

The F+15V from the P board is applied to several voltage regulator (IC5608-IC5610 and IC5606) on the A board. The voltage outputs from these ICs are SUB5V, SUB1.8V and SUB1.2V respectively. They are used by various

circuits on the A board. To avoid catastrophic failures, they are monitored by an SOS Detect circuit (IC4700) for over-voltage and over-current conditions. Any abnormalities of the SUB5V, SUB1.8V or SUB1.2V trigger the SOS circuits. The TV shut down and the power LED blinks 10 times.

The “Panel_STB_ON” is used to turn on the 3.3V regulator (IC9004) on the A board. The output voltage is applied to the “Panel CPU” on the A board. The Panel CPU on the A board outputs the “Panel_Main_ON” command (3.2V) to pin-7 of connector P7 on the P board. The “Panel Main ON” command turns on the power supply circuit that outputs the Vsus, Vda and 15V.

CPU Commands Explanation



TV SUB ON (F_STBY_ON), PANEL_STB_ON, PANEL_MAIN_ON and DISPEN

The “TV Sub On”. The CPU on the A board outputs the “TV_SUB_ON” command (3.2V) when the power is turned on. This command is used to turn on the circuit in the power supply that generated the F+15V.

The F+15V is provided to the A to generate the Sub-voltages used by the signal process circuit.

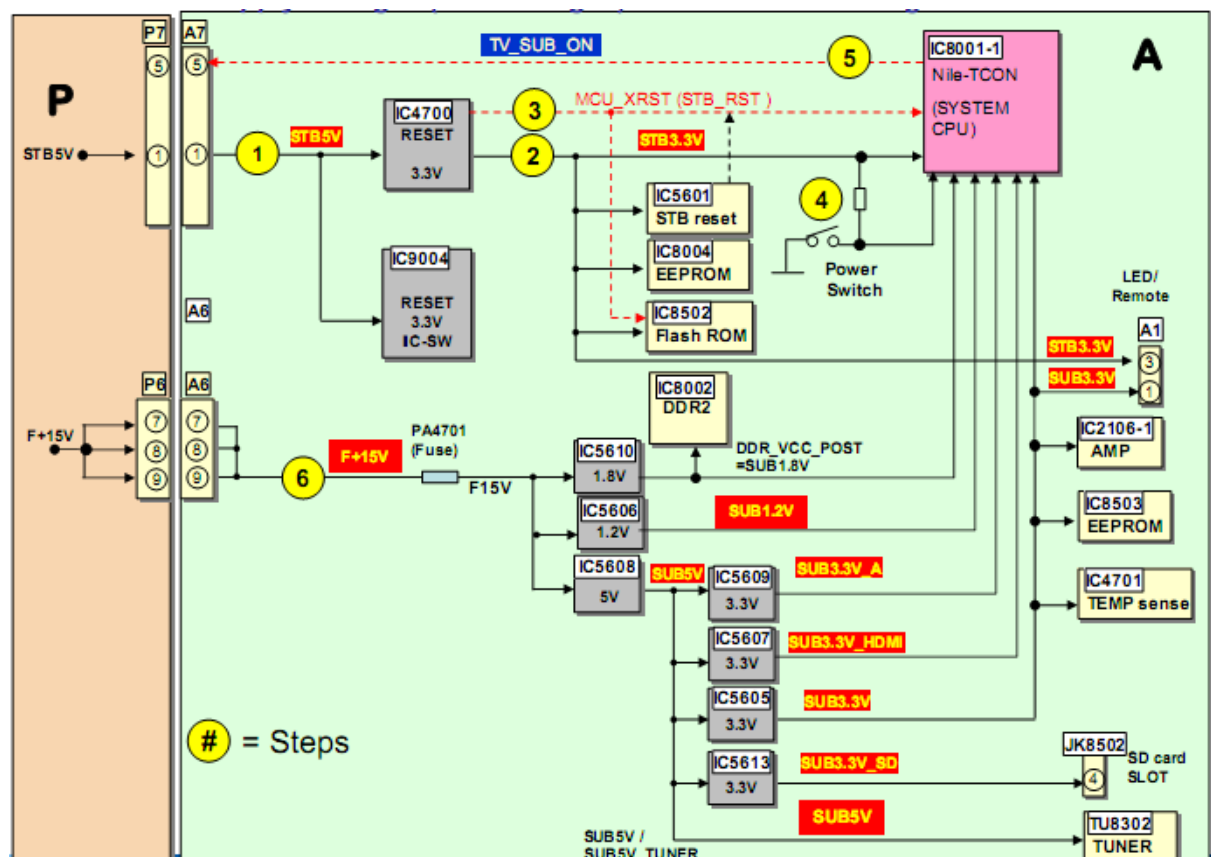
When the output of the Sub-voltages is confirmed by the system MPU, it outputs the “Panel STB On” command.

The **“Panel STB On”** (3.2V) command is used to energized the panel MPU IC. When the panel MPU is energized, it outputs the **“Panel Main On”** command.

The **“Panel Main On”** (3.2V) command is applied to the power supply to turn on the circuits that generate the Vsus, Vda and P15V.

The **“Dispen”** (Display Enable) command is applied to the Discharge Control/Sub-field Conversion IC (IC9300) to begin panel drive operation and video display.

Supply Voltage (Sub Voltages) For Video Processing Circuit

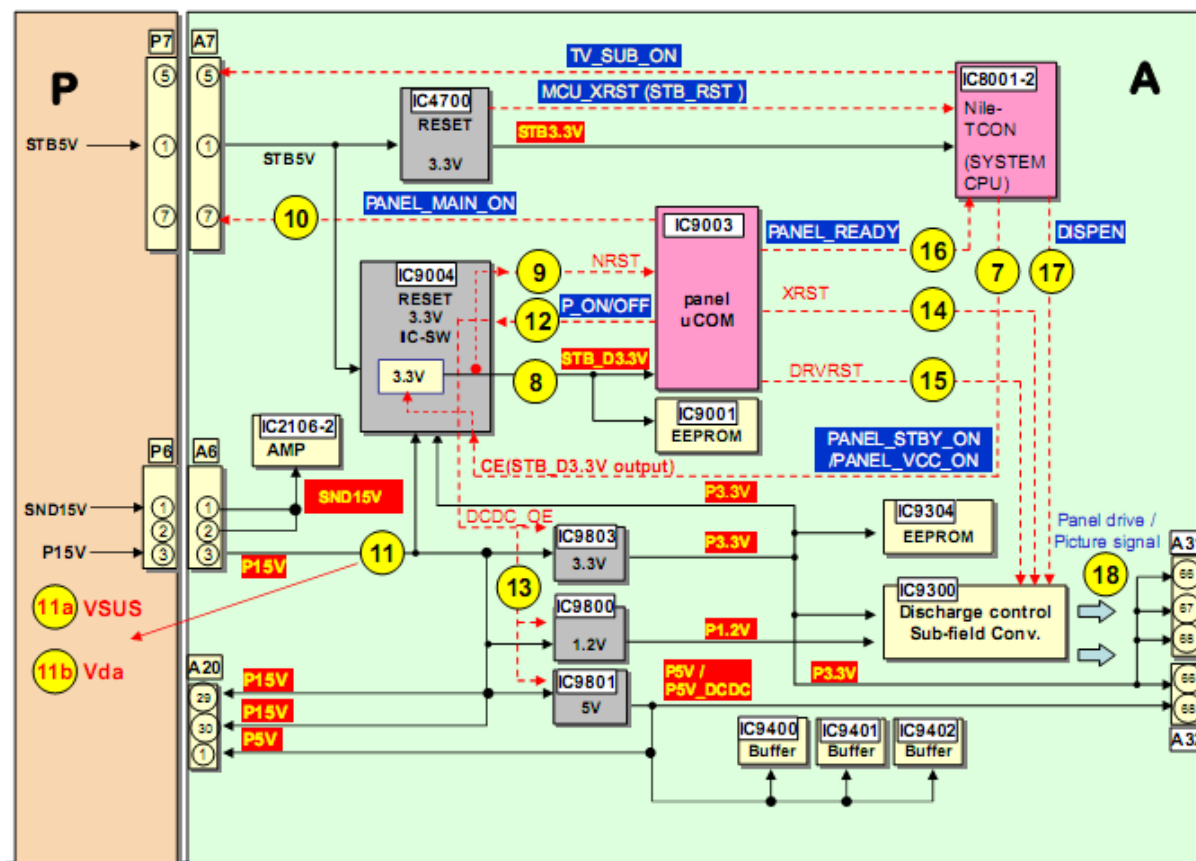


Sub-Voltage Distribution Explanation

AC is applied to the standby circuit in the power supply to produce STB5V when the TV is plugged in. The STB5V is provided to the A board via connectors P7 (Pin 1).

1	The STB5V from pin1 of connector P7 is applied to a 3.3V regulator to power the Main CPU (IC8001) on the A board. This energizes and prepare the microprocessor (CPU) for program execution.
2	The 3.3V from the voltage regulator besides being applied to the CPU, is also applied to the remote control receiver and the power LED on the K board through connector A1/K1 (pin 3).
3	The reset pulse from IC4700 is applied to the Main CPU (IC8001) for program execution.
4	The power command from the power switch on the A board or the remote control receiver on the K board (Not shown on the schematic) is provided to the Main CPU on the A board (IC8001).
5	The CPU on the A board outputs the "TV_SUB_ON" Command (3.2V) The "TV_SUB_ON" command is provided to pin 5 of connector P7 of the power supply to develop the F+15V. At this time, the relays on the power supply are triggered and a "click" sound can be heard.
6	The F+15V from the P board is applied to several voltage regulator (IC5608- IC5610, and IC5606) on the A board. The voltage output from these ICs are SUB5V, SUB1.8V, and SUB1.2V respectively. These voltages are used by the signal processing circuit in the A board.

Supply Voltage (P15V) for 1st Stage of Panel Drive Circuit

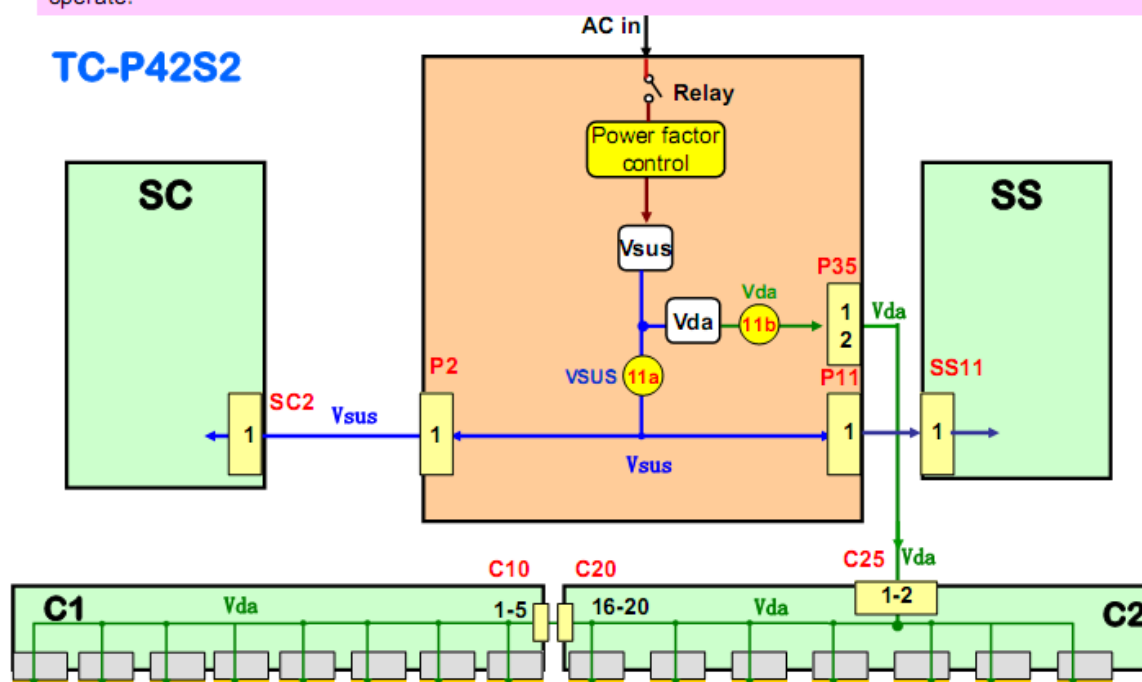


Panel Drive Circuit Supply Voltages

7	When the output of the Sub-voltages is confirmed by the system MPU, The System CPU outputs the "Panel STB On/Panel VCC On" command to IC9004.
8	When Panel STB On command is applied to IC9004, STB3.3V is developed.
9	Reset (NRST) is also generated by IC9004
10	When STB3.3V and Reset are applied to the Panel CPU (IC9003), the PANEL MAIN ON command is output to the power supply.
11	P15V is output from the power supply when it receives the PANEL MAIN ON command. 11a V _{ss} and 11b V _{da} are also output at this point.
12	Right after the PANEL MAIN ON command is output from IC9003, the P_ON/OFF command is also output to IC9004.
13	IC9004 outputs the ENABLE command to the voltage regulators IC9800, 9801, 9803 to output 3.3V, 1.2V, and 5V respectively.
14	IC9003 also outputs XRST
15	IC9003 outputs DRVRST (Drive Reset) to reset the drive section of IC9300 and begin panel drive operation.
16	PANEL READY from the Panel CPU is output to the System CPU to signal the beginning of panel drive operation.
17	IC8001 outputs the DISPEN (Display Enable) command to IC9300 to begin panel drive and picture drive operation.
18	IC9300 outputs the pulses and data necessary to drive the panel and generate video.

Supply Voltages (V_{sus} and V_{da}) for 2nd Stage of Panel Drive Circuit

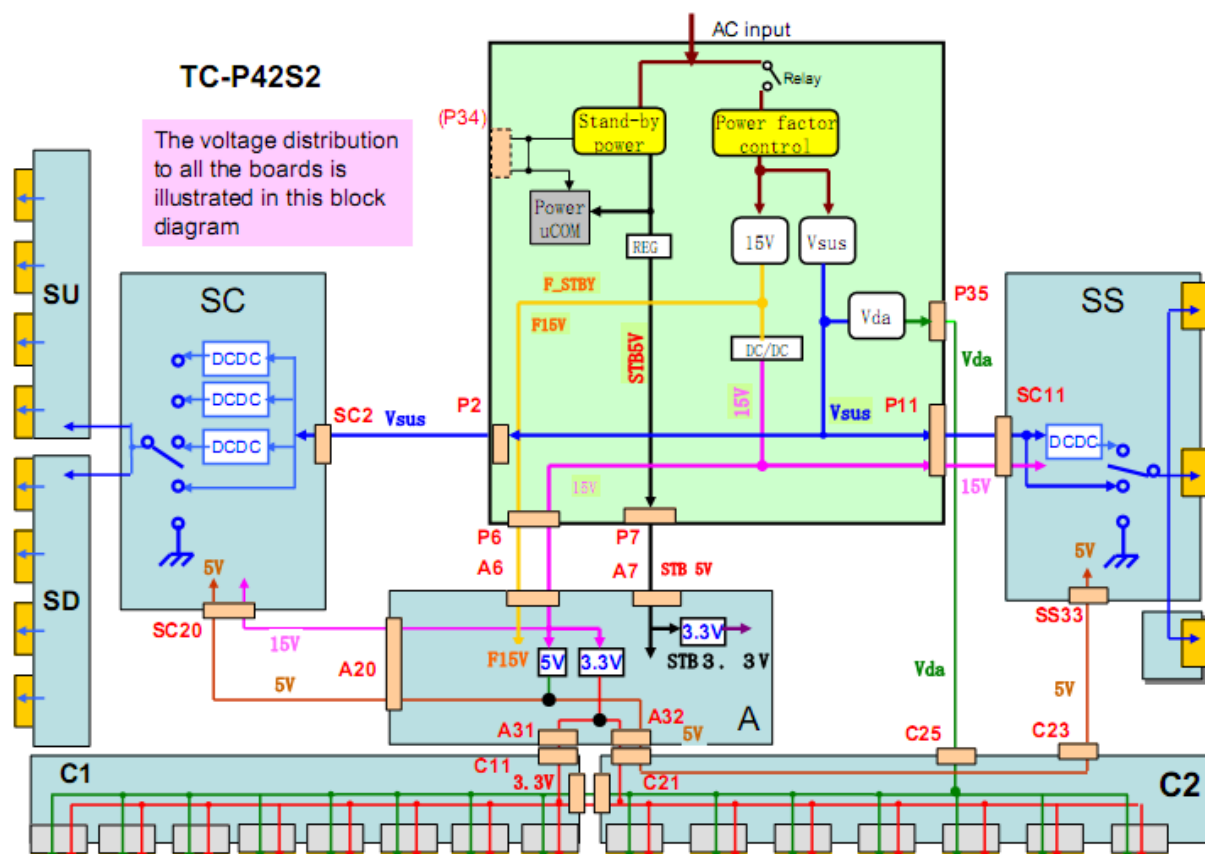
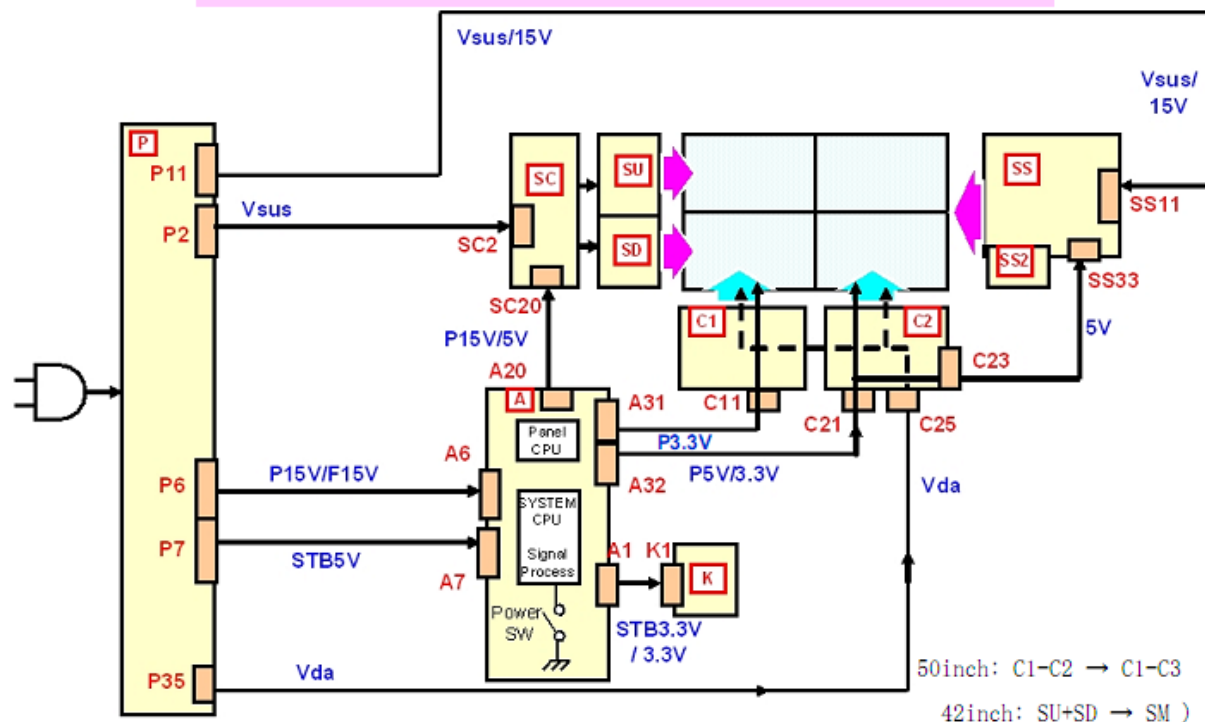
When the Vsus, Vda, and P15V and all its derivatives voltages are present, the panel drive circuit starts to operate.

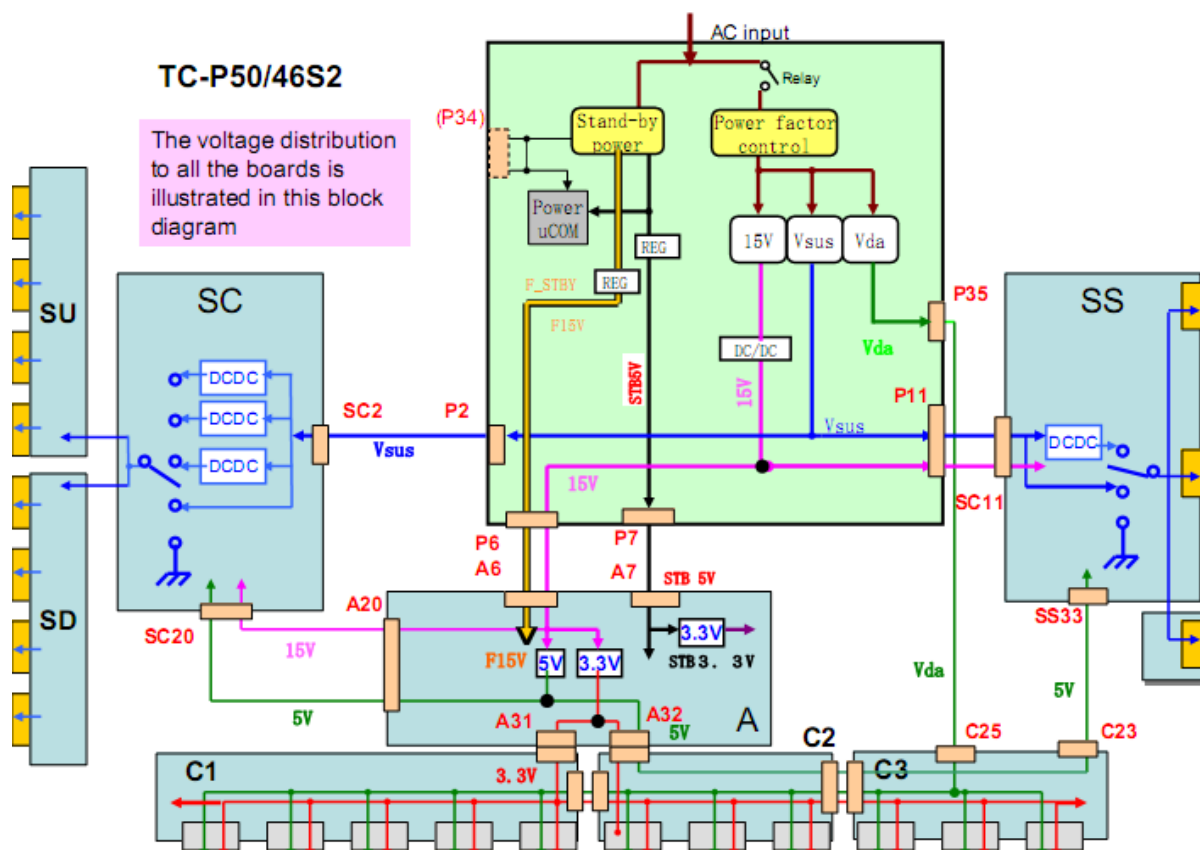


<http://www.lcdrepairguide.com/plasma/>

Overview of Voltage Distribution

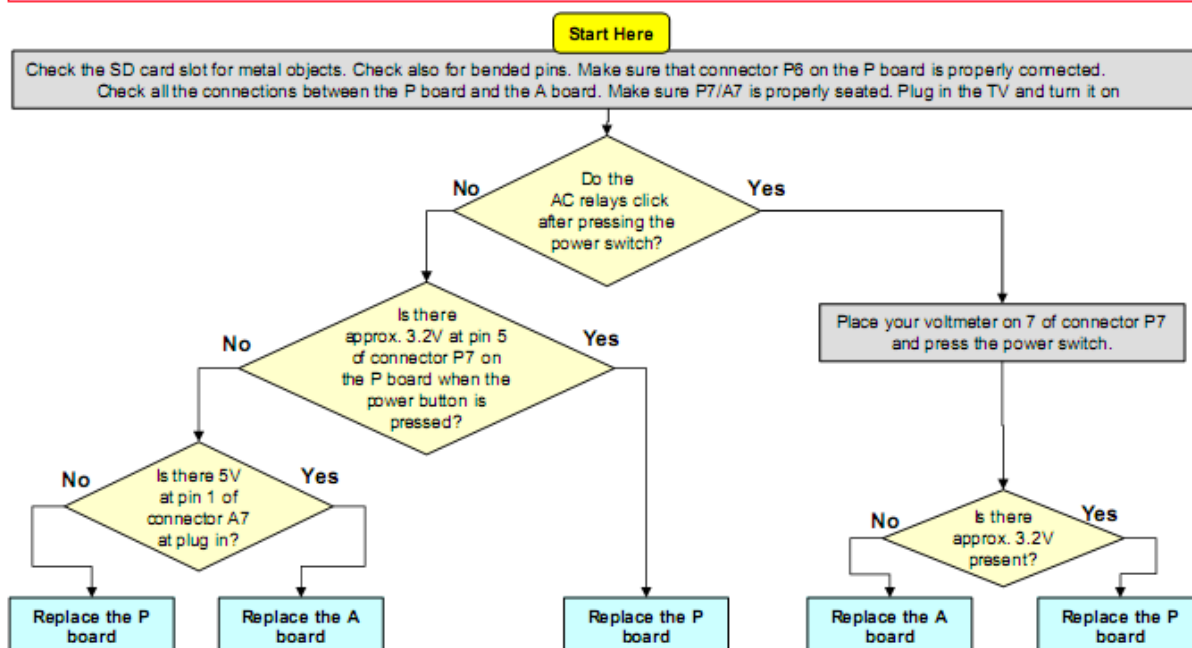
The voltage distribution to all the boards is illustrated in this block diagram





Troubleshooting No Power Symptom

Cautions: Disconnect the AC Power prior to making any disconnection or connection. When taking voltage reading, place the voltmeter probe at the test point, component, or connector's pin indicated before connecting the TV to the AC line. This will ensure voltage reading accuracy before the TV shuts down. (Since the TV is shutting down, expect the voltage to only come up a couple of seconds.)



5.3- Panasonic Plasma TV Power Supply Self Test Method

The latest model of Panasonic Plasma TV PSU board, without load it can generate the output voltages. But recommend to connect the Light Bulbs tool to their Vsus output voltage pin and chassis ground.

If the above method didn't work, so that you need to connect their signal pin to start-up the PSU board. After tried the self test method PSU board also not output any voltage except the Stand-By 5V, which means the problem was inside the PSU board. Or the Stand-By 5V not generated by the PSU board, it also causing by the PSU itself.

Example of Panasonic PSU Board Self Test:

Panasonic TH-P42X28K & TH-P42C20C Plasma TV

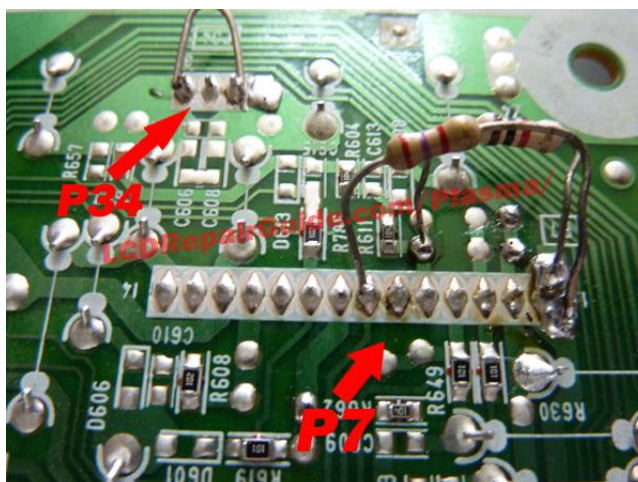
(PSU p/n: LSEP1287LT)

Step 1: Disconnected all the connector to PSU board, except the AC input connector.

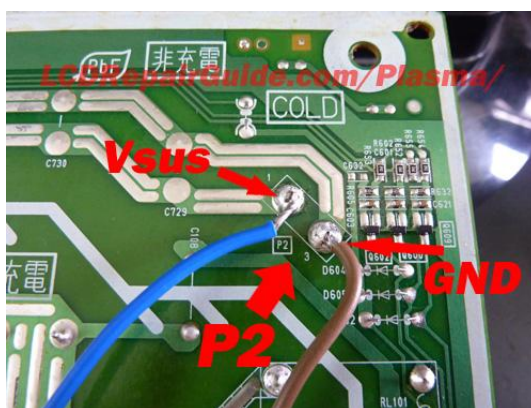
Step 2: Use a Resistor (1K or 10K ohm 1/4w), on connector P7 connect pin 1 (STBY5V, Standby 5V) to pin 5 (F_STBY_ON) and connect another Resistor from P7 pin 1 to pin 7 (Panel_Main_On).



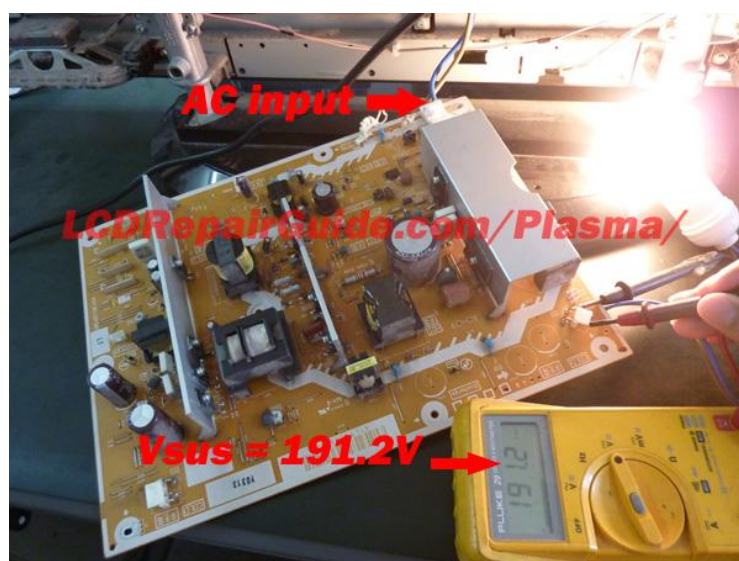
Step 3: Use a wire solder connector P34 pin 1 and pin 3 as pictures below:



Step 4: Connect the Light Bulb to their connector P2 Vsus voltage output pin and the chassis GND.



Step5: Power on the AC supply to PSU board, all the voltages output normally. The Light Bulb is lit as below picture:



Panasonic Plasma TV PSU Self Test Tips:

For the Panasonic Plasma TV, if their TV power ON/OFF switch is built-in the A board (Mainboard), when do the PSU self test, the connector P34 pin 1 and 3 must shorted. Because it will function like the PSU board is press power button on.

Another tips is, no matter what model Panasonic Plasma TV PSU boards, the above two signals (F_STBY_ON & Panel_Main_On) must connected to their Stand-by 5V. In this PSU board, their connector P25 is not use in this Plasma TV.

5.4- Panasonic Old Models PDP PSU

Board Self Test Method

- Please refer to the “Panasonic Plasma TV PSU Self Test Tips” for more details.

No	Panasonic Plasma Panel Models	Procedures
1.	MD-37H11	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-8 & pin-10. c) Using a wire connect the connector P25 pin-9 & pin-11. d) Connect the Light Bulbs (150~200W) to the connector P2 Vsus output & GND or the P11 (2 of the 3 pins are Vsus and GND pin). e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
2.	MD-42M7	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P27 pin-2 & pin-4. c) Using a wire connect the connector P12 pin-4 & pin-5. d) Connect the Light Bulbs (150~200W) to the Vsus output GND pin. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
3.	MD-42M8	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-4 & pin-5. c) Using a wire connect the connector P25 pin-10 & pin-17. d) Connect the Light Bulbs (150~200W) to the Vsus output GND pin.

		e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
4.	MD-42S9NJ (C)B PSU: TMP7434	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-12 short to chassis GND. c) Using a wire connect the connector P25 pin-10 & pin-17. d) Connect the Light Bulbs (150~200W) to the Vsus output GND pin. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
5.	MD-42W10CCB PSU: TMP7447	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P25 pin-9 & pin-11. c) Connect the Light Bulbs (150~200W) to the Vsus output GND pin. d) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
6.	MD-50H10CJB PSU: TMP7733	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P25 pin-9 & pin-11. c) Connect the Light Bulbs (150~200W) to the Vsus output GND pin. d) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
7.	MD-50H11CJB (MD-37H11CJB)	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-8 & pin-10. c) Using a wire connect the connector P25 pin-9 & pin-11. d) Connect the Light Bulbs (150~200W) to

		the Vsus output GND pin. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
8.	MD-50H11	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-8 & pin-10. c) Using a wire connect the connector P25 pin-9 & pin-11. d) Connect the Light Bulbs (150~200W) to the connector P2 Vsus output & GND or the P11 (2 of the 3 pins are Vsus and GND pin). e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
9.	MD-50F11 Note: The Module has a Sub PSU board. When doing PSU Self Test, must connected with the Main PSU (NPX704MG-1) and SUB PSU (NPX704MG-1).	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-8 & pin-10. c) Using a wire connect the connector P25 pin-9 & pin-11. d) Connect the Light Bulbs (150~200W) to the connector P2 Vsus output & GND or the P11 (2 of the 3 pins are Vsus and GND pin). e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
10.	MD-50H12	a) PSU board connected AC input. (Other connectors are removed) b) Using a wire connect the connector P34 pin-1 & pin-3. c) Using a wire connect the connector P25 pin-9 & pin-11. d) Connect the Light Bulbs (100W) to the connector P2 Vsus output & GND. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.

11.	MD-6SF9NJA Note: This Module PSU have Main and SUB boards. When PSU Self Test must connected both PSU boards.	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-8 & pin-10. c) Using a wire connect the connector P25 pin-10 & pin-13, pin-10 & pin-17. d) Connect the Light Bulbs (150~200W) to the connector P2 Vsus output & GND or the P11 (2 of the 3 pins are Vsus and GND pin). e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
12.	42H10	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P25 pin-9 & pin-11. c) Connect the Light Bulbs (150~200W) to the connector P2 Vsus output & GND. d) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
13.	S9	a) PSU board connected P9 AC input. (Other connectors are removed) b) Using a wire connect the connector P12 pin-10 short to GND. c) Using a wire connect the connector P15 pin-10 & pin-17. d) Connect the Light Bulbs (150~200W) to the connector VS (Vsus) output & chassis GND. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.

5.5- Troubleshooting Panasonic PDP Shutdown Problem

The Panasonic Plasma TV has lots of the Protection Circuit in their TV than other brands of Plasma TV. When an abnormality occurs in the unit, the “SOS Detect” circuit is triggered and the TV shuts down. The power LED on the front panel will flash a pattern indicating the circuit that has failed.

If the power LED continues to blink even after the TV is unplugged, press and hold the power switch on the TV for a few seconds until the LED turns off.

Some steps require removal of connectors and sometimes PC boards' removal. Do not allow the TV to run for more than 30 seconds while connectors or boards are disconnected.

NOTE: When taking voltage reading, place your meter's probe on the test point or pin indicated before connecting the TV to the AC line. The voltage you intent to measure may only appear for a brief moment.

WARNING: The Vsus (VS) line has large capacitors that hold the charge for some time even after the TV has been turned off and unplugged. When disconnecting P2/SC2 or P11/SS1, bleed the remaining charge of the Vsus before reconnecting the cable. Use a 500 ohm/ 5W resistor to discharge the Vsus line before reconnecting P2/SC2 or P11/SS11.

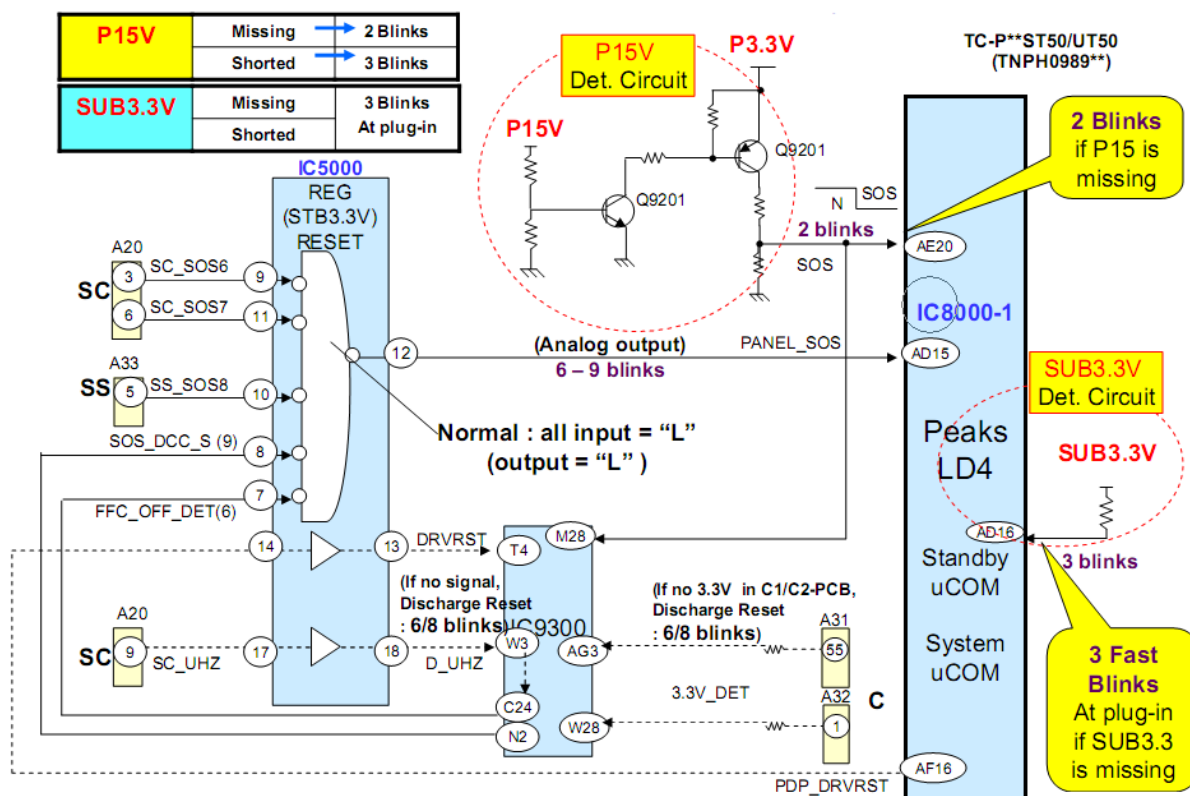
5.51- Power LED Error Code Definition

Example: 2012 PDP Plasma TV (TC-P50ST50, TC-P50UT50)

POWER LED ERROR CODE	CIRCUIT MONITORED	CONDITIONS TRIGGERING THE SHUTDOWN	LIST OF BOARDS POSSIBLY CASUSING THE FAILURE			
			#1 Suspect	#2	#3 Occasionally	#4 Not Often
1 BLINK	Panel Information SOS	Communication problem	A			
2 BLINKS	P15V form the P board	Missing P15V P15V is not been generated by the P board. Wrong diagnostic by the A board	P	A		
3 BLINKS	Incomplete or interrupted Boot Program execution of PEAKS IC (IC8000).	Shorted P15V Missing F15V Wrong diagnostic by the A board	A	P		
4 BLINKS	Power Supply output voltages	Vsus Over Voltage Condition. P15V Shorted while in operation. Wrong diagnostic by the A board	P	A		
6 BLINKS	SC Energy Recovery Circuit	An increase or reduction of the Energy Recovery Circuit output (MID). Shorted SUB5V. Wrong diagnostic by the A board.	SC	A		C
7 BLINKS	Scan Drive Circuit and Connection between the SC board and the SC board.	Missing or shorted Vsus. Abnormality of the scan circuit output, the 15V_F, the son_pro, and Vson circuit. Loose or open Connection between the SC board and the SC board (SC41, SC42, SC46). Open or loose connection between connectors SC2/P2 Wrong diagnostic by the A board Defective panel	SU/SD	SC	SS	A/Panel
8 BLINKS	Sustain Drive Circuit and Connection between the SS board and the Panel.	Abnormality of the sustain drive circuit. Open or loose connection between the SS/SS2 Boards. and FPCs from the panel (SS52 – SS54 – SS55 – SS57). Open or loose connection between connectors C10/C20 or C26/C36. Wrong diagnostic by the A board	SS	A	C3	Panel

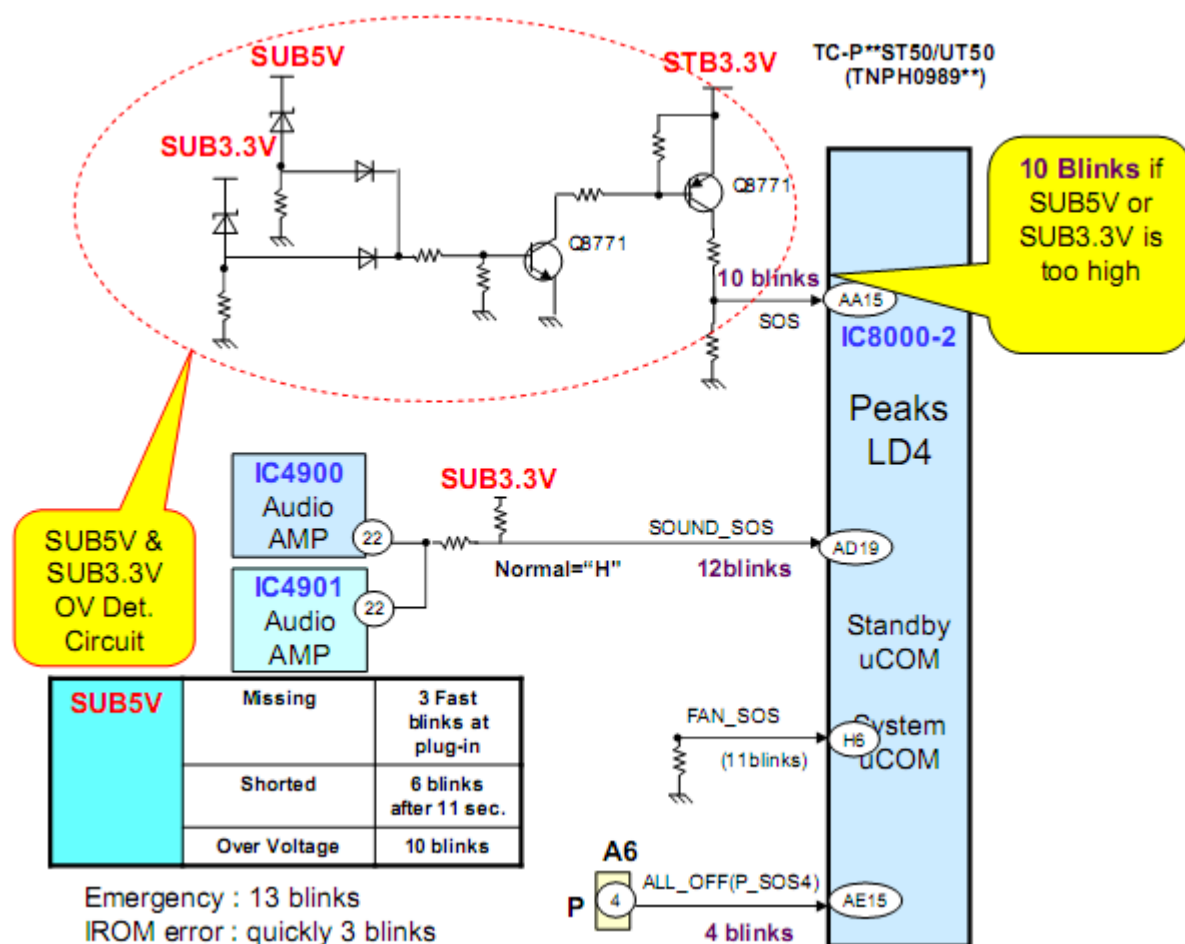
POWER LED ERROR CODE	CIRCUIT MONITORED	CONDITIONS TRIGGERING THE SHUTDOWN	LIST OF BOARDS POSSIBLY CASUSING THE FAILURE			
			#1 Suspect	#2	#3 Occasionally	#4 Not Often
9 BLINKS	Discharge Control Circuit DDC (IC9300)	Failure of IC9300 Wrong diagnostic by the A board	A			
10 BLINKS	SUB3.3V_Sense (OVP)	Over Voltage Condition of SUB5V or SUB3.3V Wrong diagnostic by the A board.	A			
12 BLINKS	Audio Amp. Circuit	Defective Speaker/Subwoofer Pinched Speaker Wire Wrong diagnostic by the A board	A	Speakers/ Subwoofer		
13 BLINKS	IC8000 Internal Communication	Defective A board	A			

Protection Circuit Block Diagram 1of 2 (TC-P50ST50)



Blink Code/Voltage Condition (TC-P50ST50, TC-P50UT50)

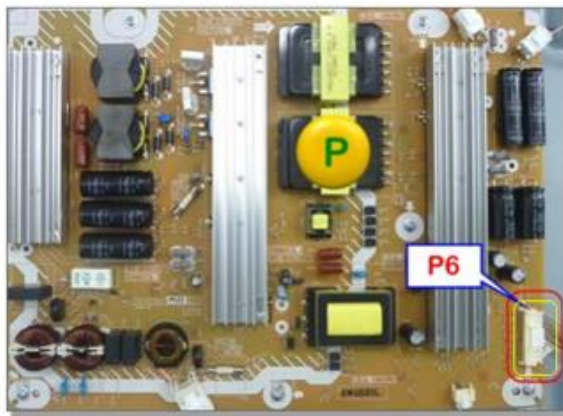
Voltage	Condition	No. of Blinks	
		TC-P50UT50	TC-P50ST50
P15V	Missing	2 Blinks	2 Blinks
	Shorted	No power. The LED turns on briefly and then it goes off immediately	3 Fast Blinks
SUB3.3V	Missing	3 Fast Blinks at Plug-in	3 Fast Blinks at Plug-in
	Shorted	3 Fast Blinks at Plug-in	3 Fast Blinks at Plug-in
	Over Voltage	Dead. Power LED never turns on	10 Blinks
SUB5V	Missing	3 Fast Blinks at Plug-in	3 Fast Blinks at Plug-in
	Shorted	6 Blinks After 11sec.	6 Blinks After 11sec.
	Over Voltage	Dead. Power LED never turns on	10 Blinks

Protection Circuit Block Diagram 2 of 2 (TC-P50ST50)Troubleshooting 1, 9, 10, 13 Blinks Failure

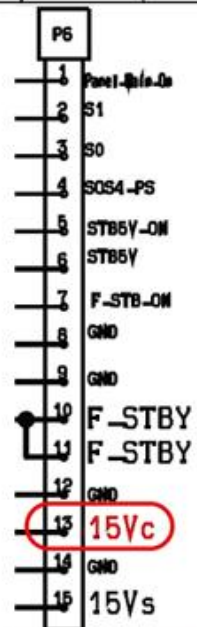
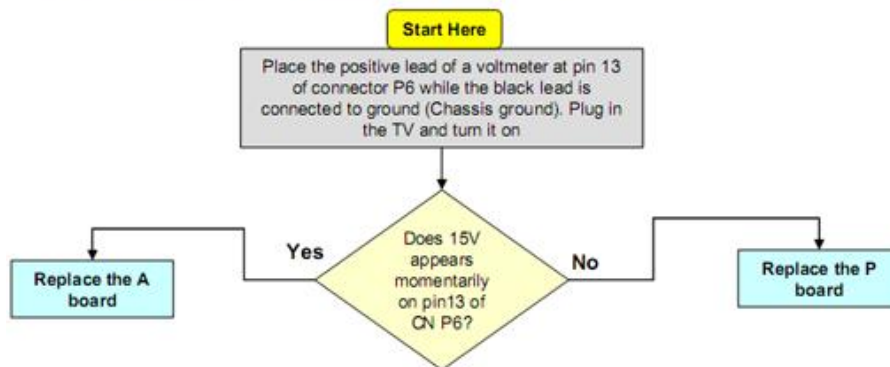
Blink Code	List of boards likely to cause this symptom			
	No.1	No.2	No.3	No.4
1	A Board			
9 Blinks	A Board			
10 Blinks	A Board			
13 Blinks	A Board			

* When 1,9,10,13 power LED blinks occur, replace the A Board (Mainboard).

Troubleshooting 2 Blinks Failure (TC-P50ST50)

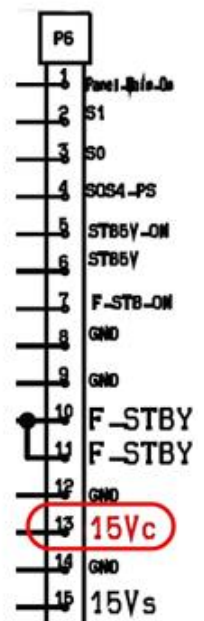
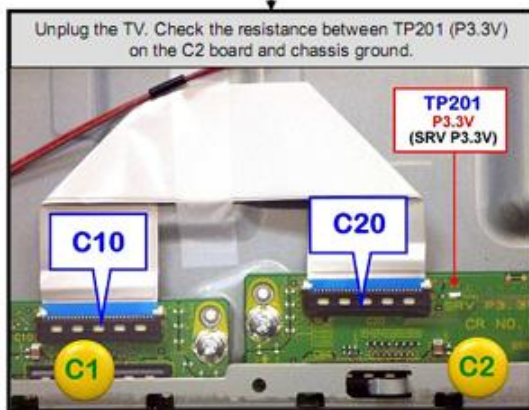
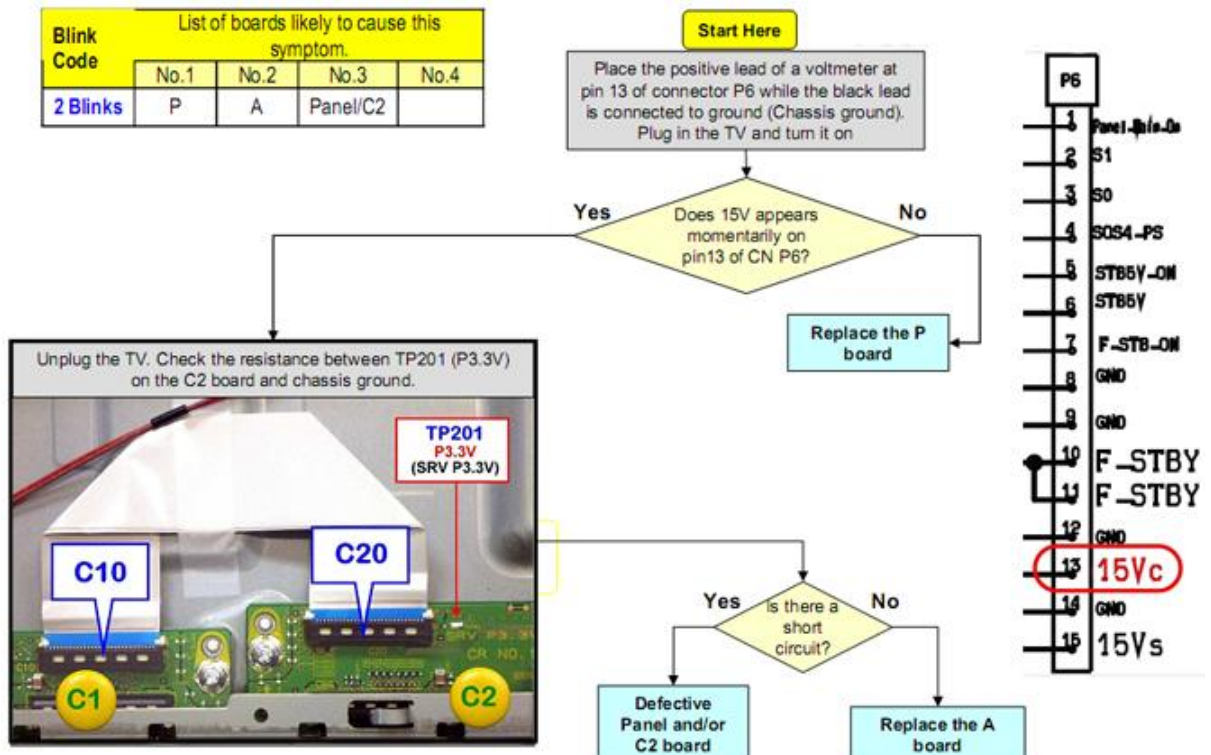


Blink Code	List of boards likely to cause this symptom.			
	No.1	No.2	No.3	No.4
2 Blinks	P	A		

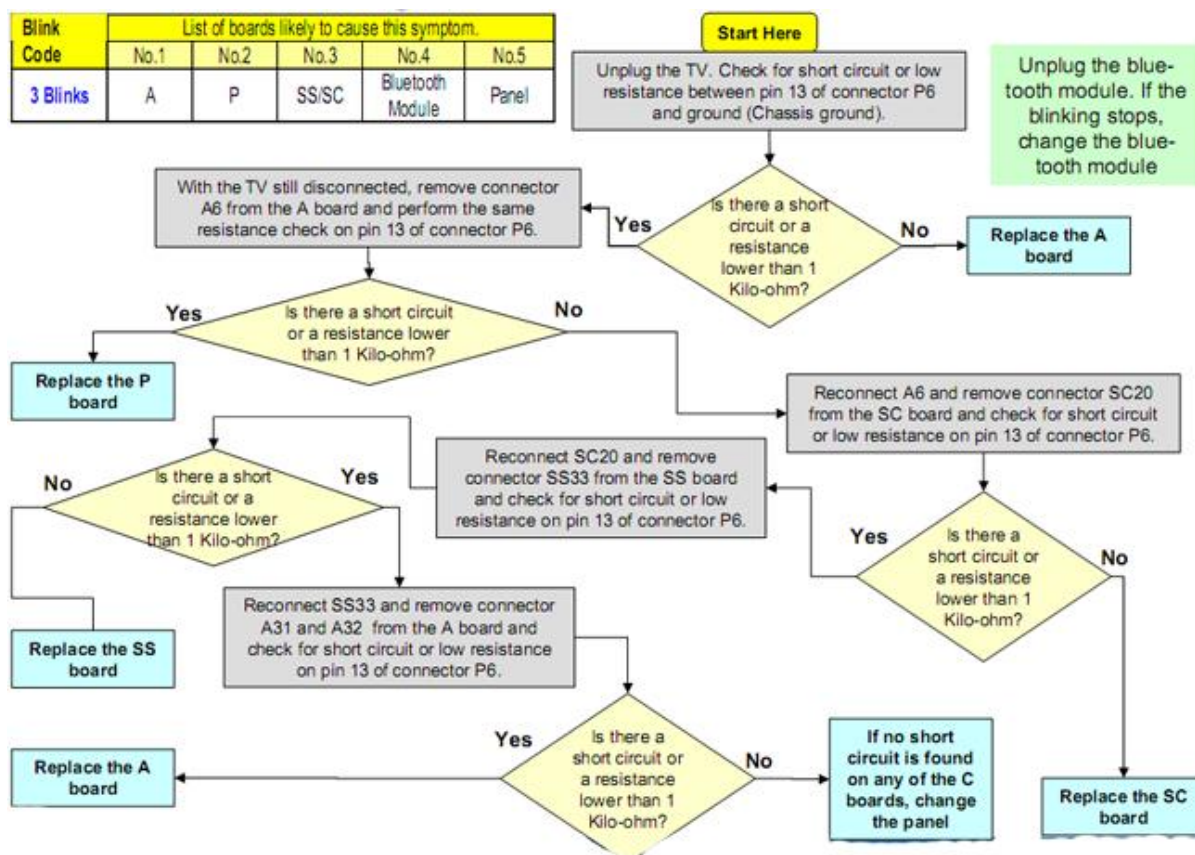


Troubleshooting 2 Blinks Failure (TC-P50UT50)

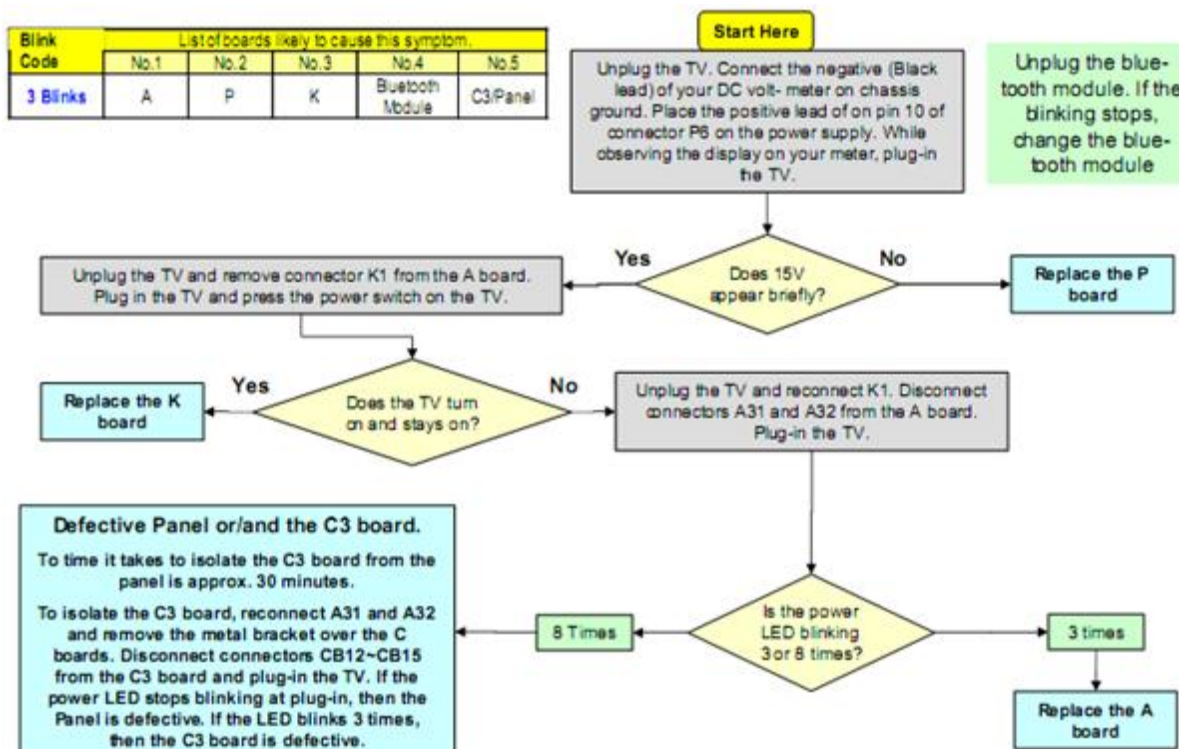
Blink Code	List of boards likely to cause this symptom.			
	No.1	No.2	No.3	No.4
2 Blinks	P	A	Panel/C2	



Troubleshooting 3 Fast Blinks Failure (TC-P50ST50)



Troubleshooting 3 Fast Blinks Failure at Plugin (TC-P50UT50)

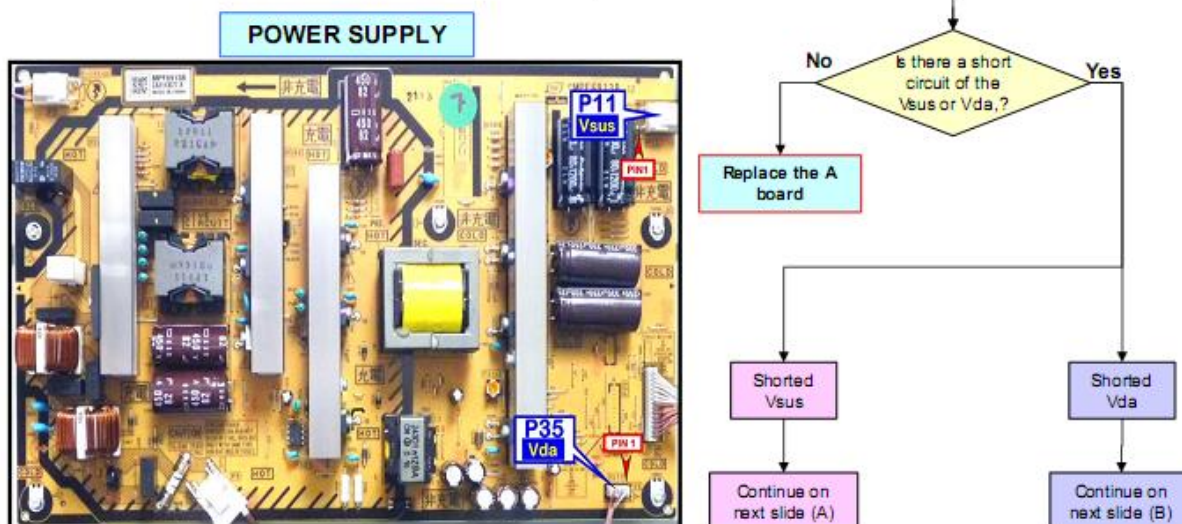


Troubleshooting 3 Fast Blinks Failure at Power-On (TC-P50UT50)

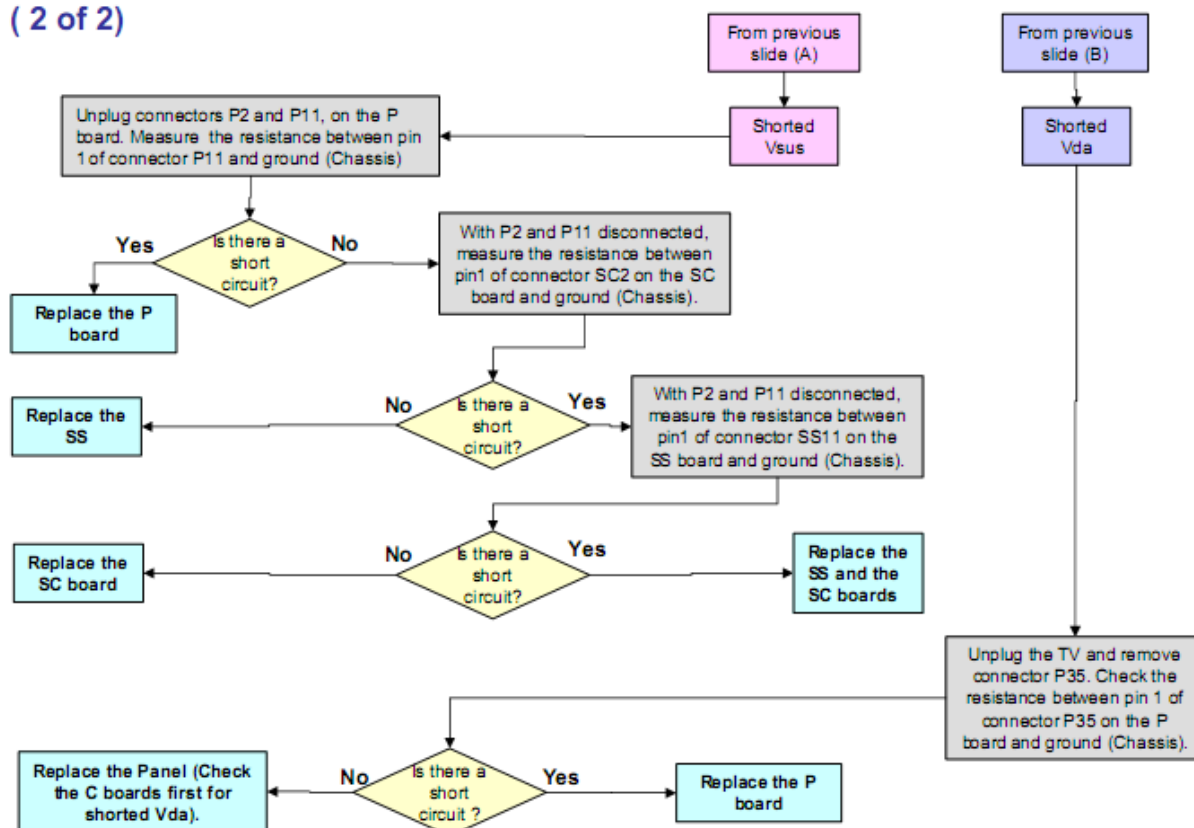
(1 of 2)

Start Here

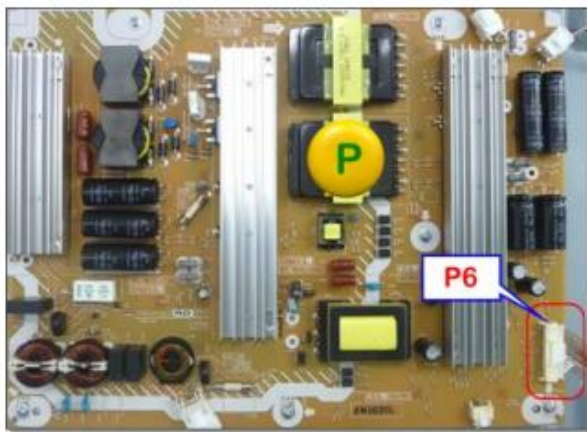
1. Unplug the TV.
2. Remove any residual charge from the Vsus and Vda lines. Use a 5W 500ohms resistor.
3. Measure the resistance between chassis ground and pin 1 of connector P11 on the P board. Also measure the resistance between chassis ground and pin 1 of connector P35 on the P board. (See the picture below for connectors' location.) **Note:** A dead short or a reading lower than 1K indicates a shorted or partially shorted line.



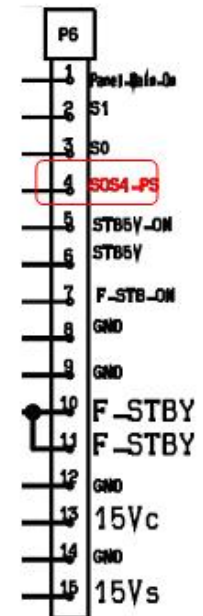
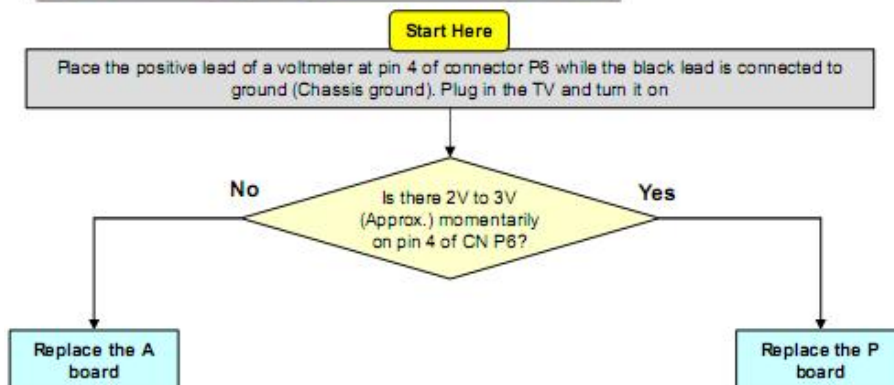
(2 of 2)



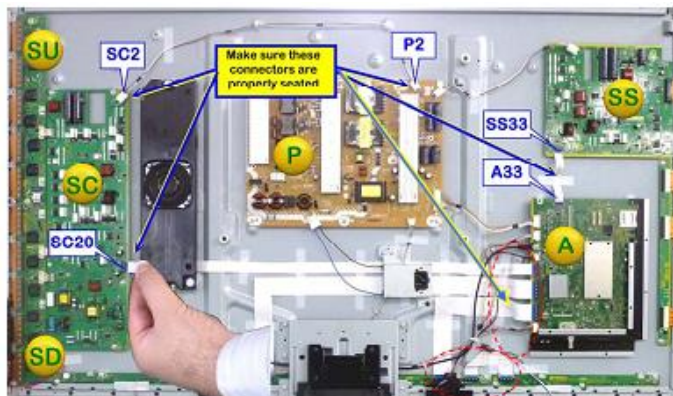
Troubleshooting 4 Blinks Failure



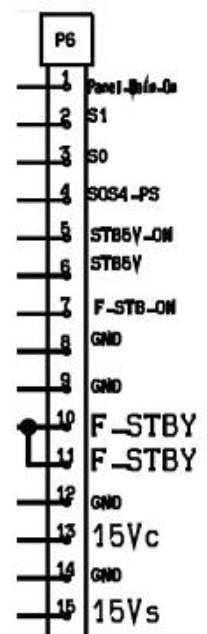
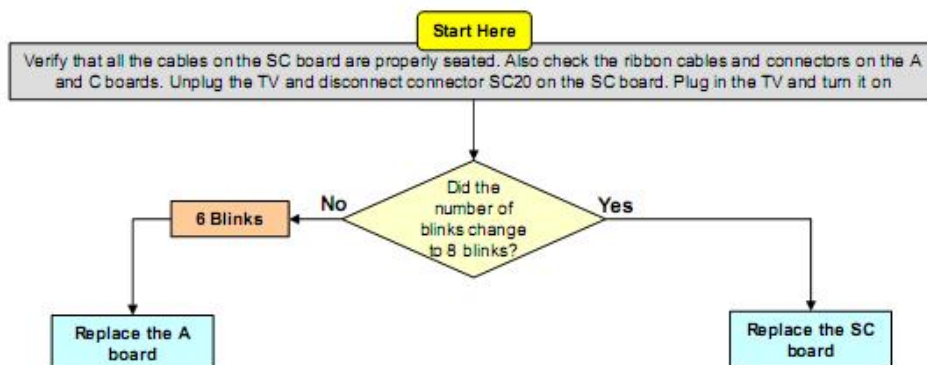
Blink Code	List of boards likely to cause this symptom.			
	No.1	No.2	No.3	No.4
4 Blinks	P	A		



Troubleshooting 6 Blinks Failure

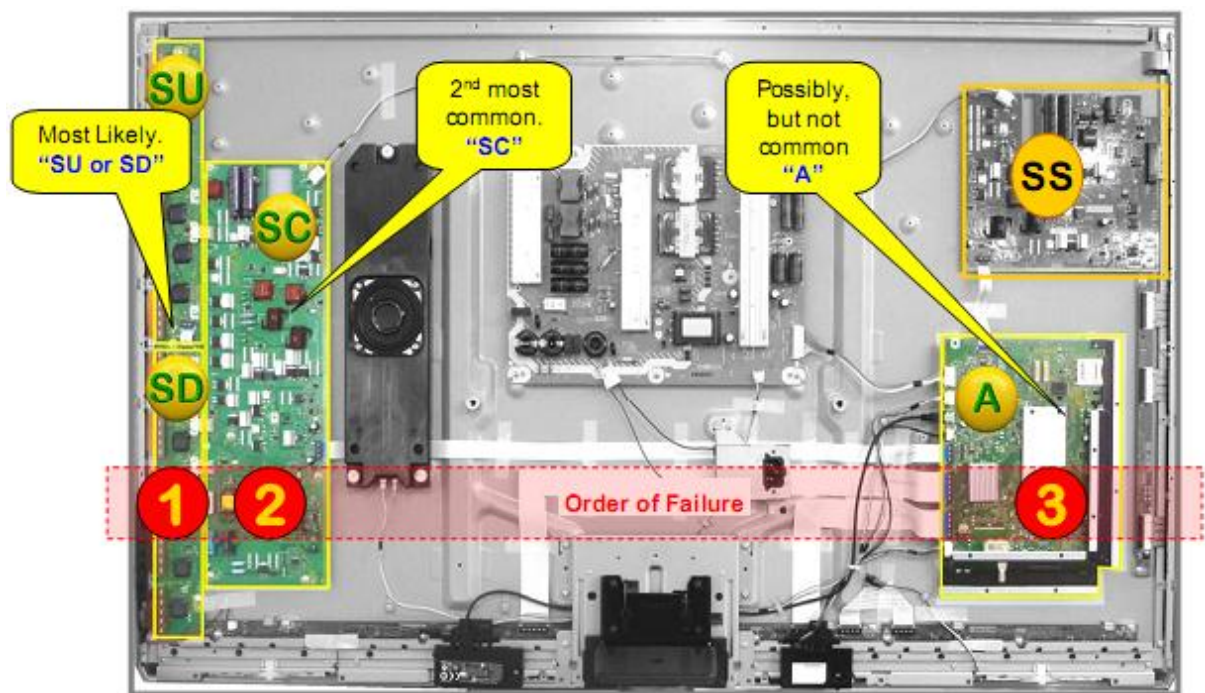


Blink Code	List of boards likely to cause this symptom.			
	No.1	No.2	No.3	No.4
6 Blinks	SC	A		



Troubleshooting 7 Blinks Failure (SOS 7)

A 7 blinks shutdown can be caused by a failure of any or a combination of the following boards: SU/SD, SC, A board or the Panel. It is also possible for the SS board to caused 7 blinks shutdown on the model.

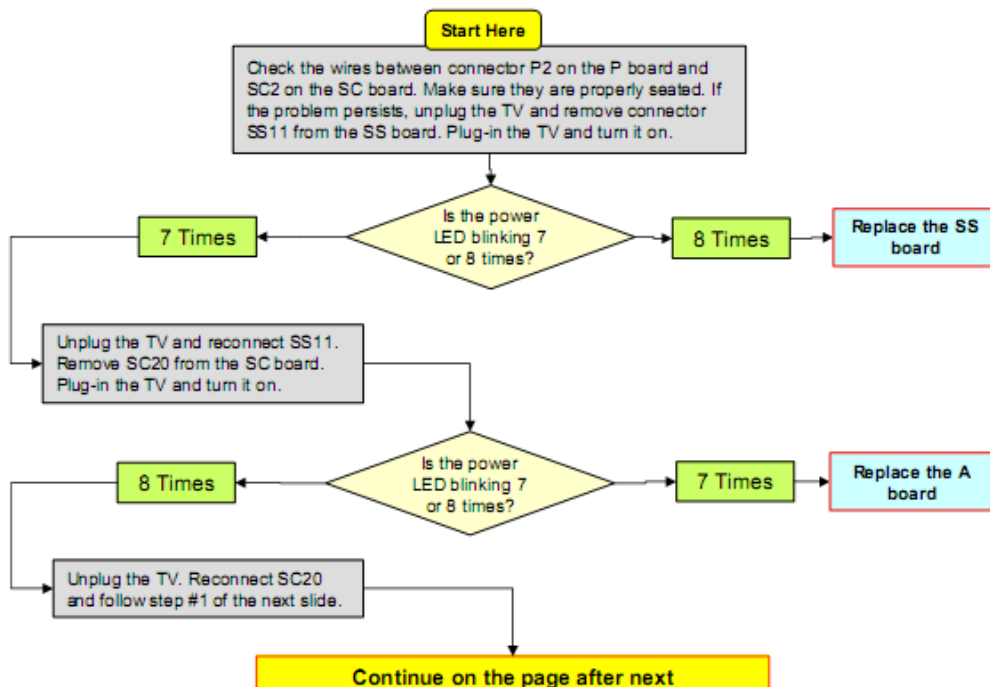


Note: This page indicates the order in which these boards are likely to fail. This information alone is not enough to diagnose which board is defective. To determine the cause of a 7 blinks failure, follow the troubleshooting procedure on the following pages.

Troubleshooting 7 Blinks Failure (TC-P50ST50)

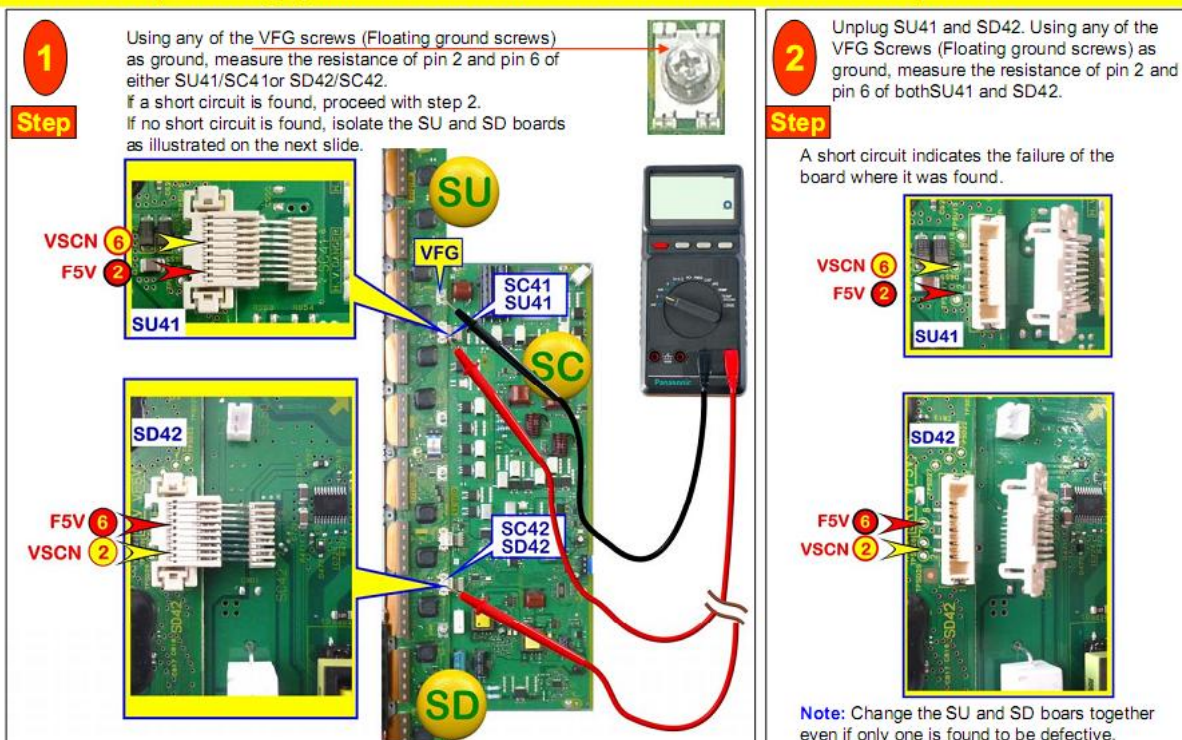
Blink Code	List of boards likely to cause this symptom.					
	No.1	No.2	No.3	No.4	No. 5	No. 6
7 Blinks	SU	SC	SS	A	Panel	
	SD					

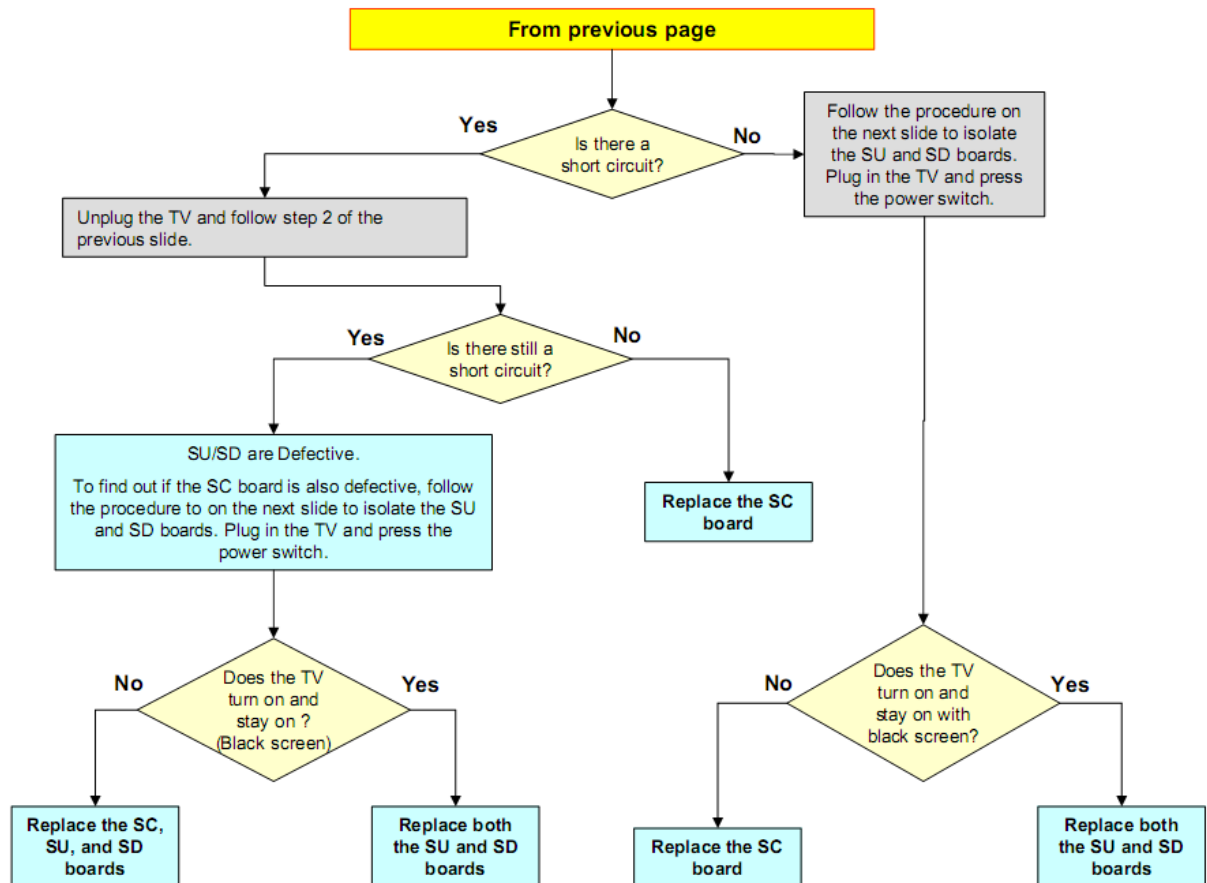
Find information for TC-P50UT50 on slides 23~26



Troubleshooting 7 Blinks Failure (F5V/TPSC Resistance Check)

Disconnect the AC prior to making any disconnection or connection. Wait at least 2 minutes before the removal of any connector.





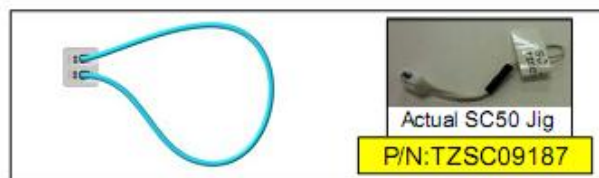
Troubleshooting 7 Blinks Failure (SU/SD Boards Isolation Procedure)

Warning:

When performing this procedure, isolate the SU and SD boards together at the same time. Do not attempt to isolate the SU or the SD boards individually. This could cause further damages to the TV

Procedure:

1. Remove the 4 VFG screws from the SU and SD boards. (See picture on the left side.)
2. Remove SC41, SC42, and SC46 from the SC board.
3. Install the SC50 Jig or just jump pins 1 and 2 of connector SC50 on the SC board.



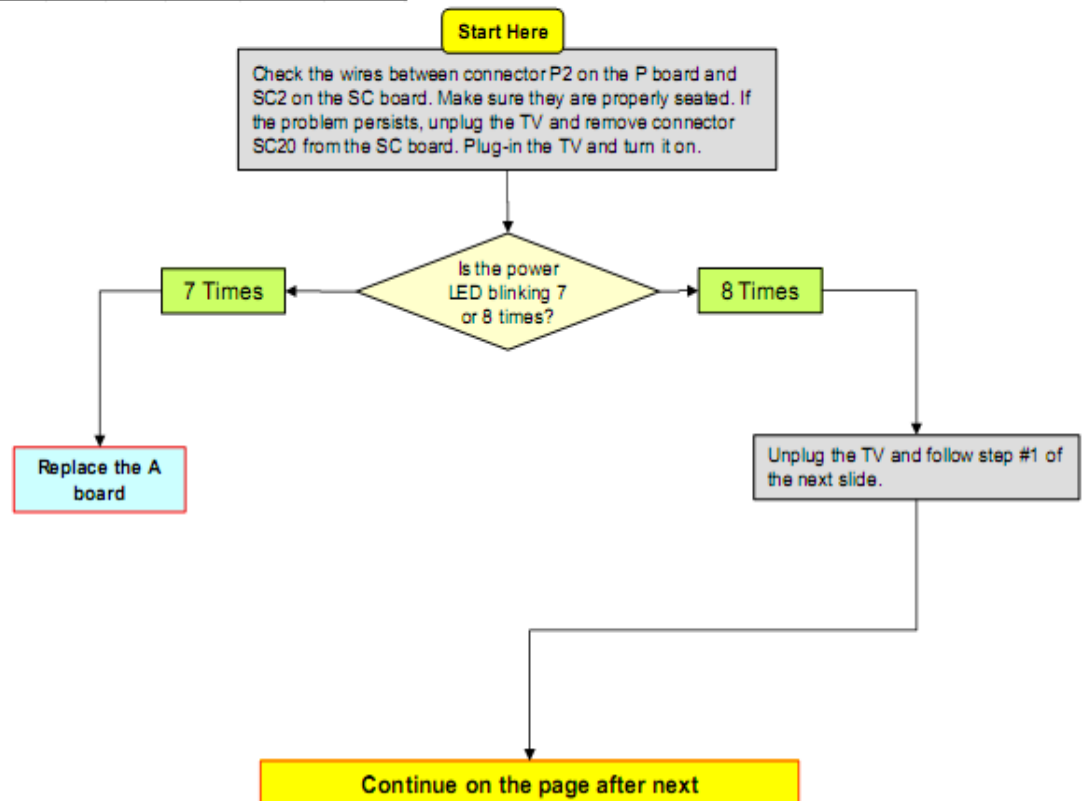
4. Plug-in the TV and turn it on.

Note: Remove the jig or the jumper after completing the isolation procedure.



Troubleshooting 7 Blinks Failure (TC-P50UT50)

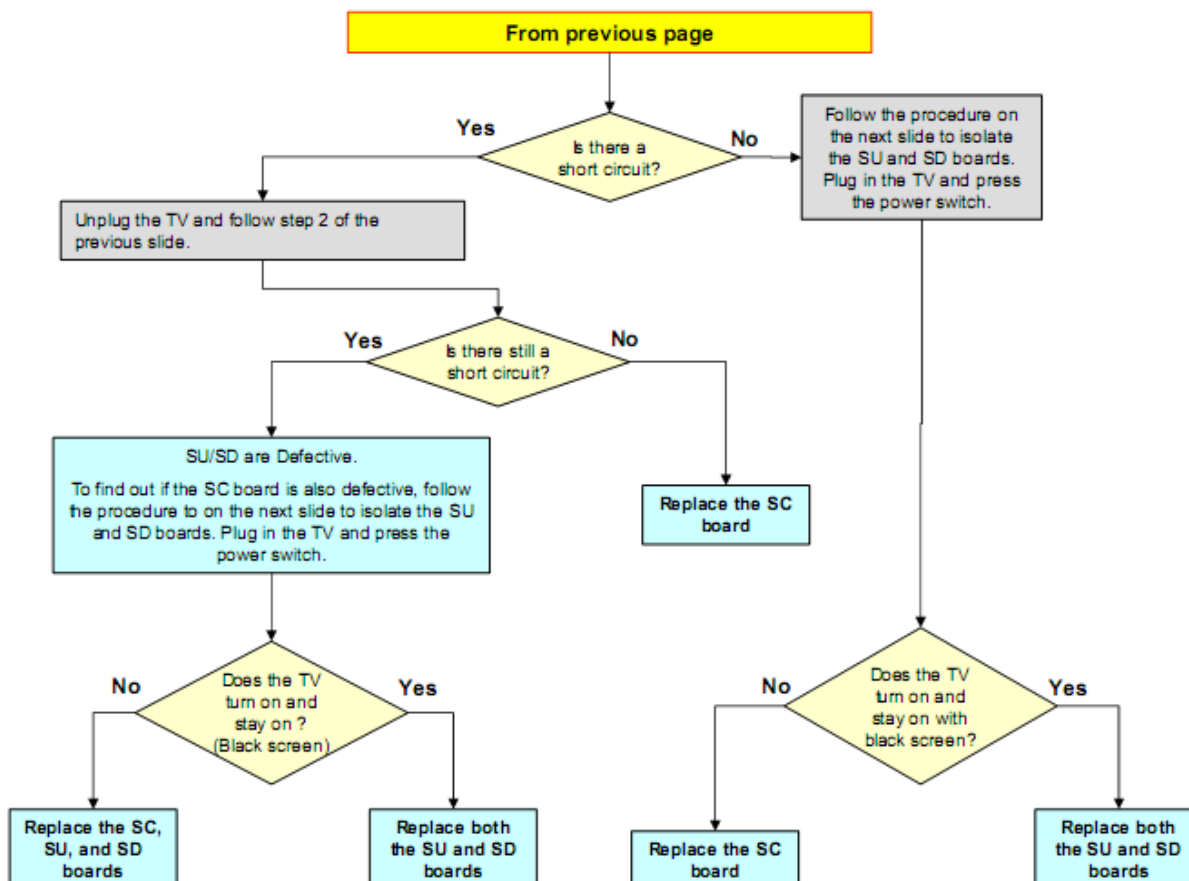
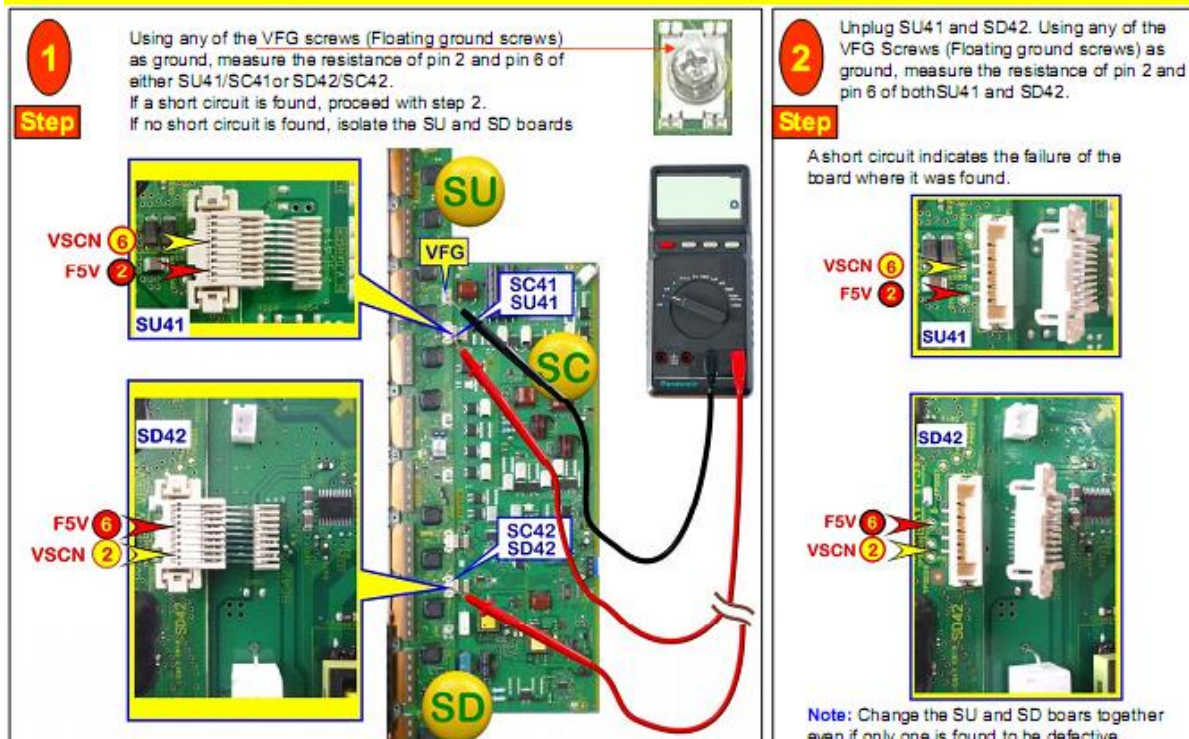
Blink Code	List of boards likely to cause this symptom.					
	No.1	No.2	No.3	No.4	No. 5	No. 6
7 Blinks	SU	SC	A	Panel		
	SD					



Troubleshooting 7 Blinks Failure (F5V/TPSC Resistance Check)

(TC-P50UT50)

Disconnect the AC prior to making any disconnection or connection. Wait at least 2 minutes before the removal of any connector.



Troubleshooting 7 Blinks Failure (SU/SD Boards Isolation Procedure)

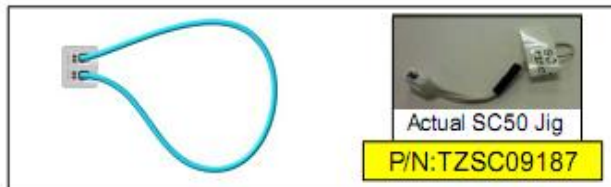
(TC-P50UT50)

Warning:

When performing this procedure, isolate the SU and SD boards together at the same time. Do not attempt to isolate the SU or the SD boards individually. This could cause further damages to the TV

Procedure:

1. Remove the 4 VFG screws from the SU and SD boards. (See picture on the left side.)
2. Remove SC41, SC42, and SC46 from the SC board.
3. Install the SC50 Jig or just jump pins 1 and 2 of connector SC50 on the SC board.



4. Plug-in the TV and turn it on.

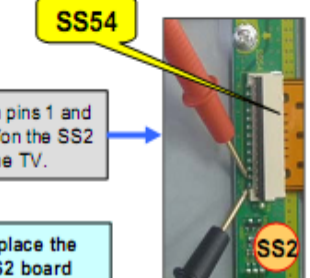
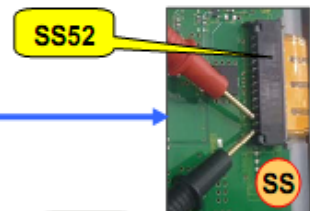
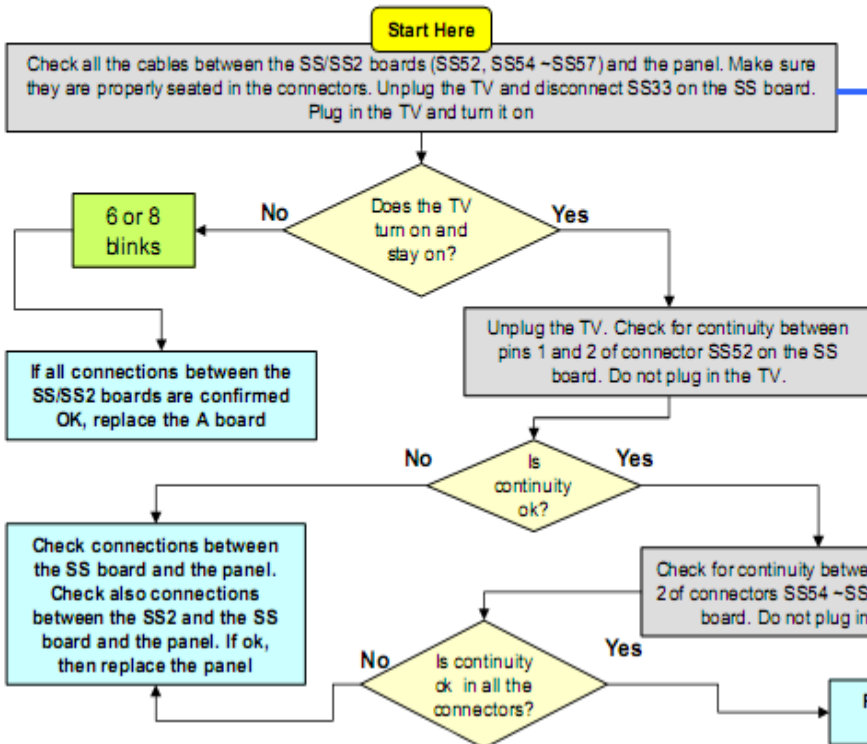
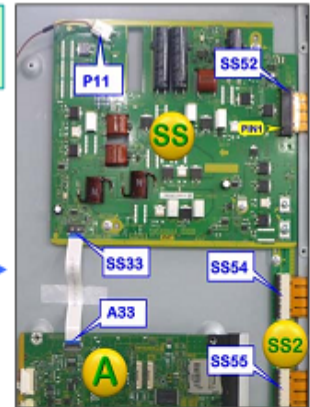
Note: Remove the jig or the jumper after completing the isolation procedure.



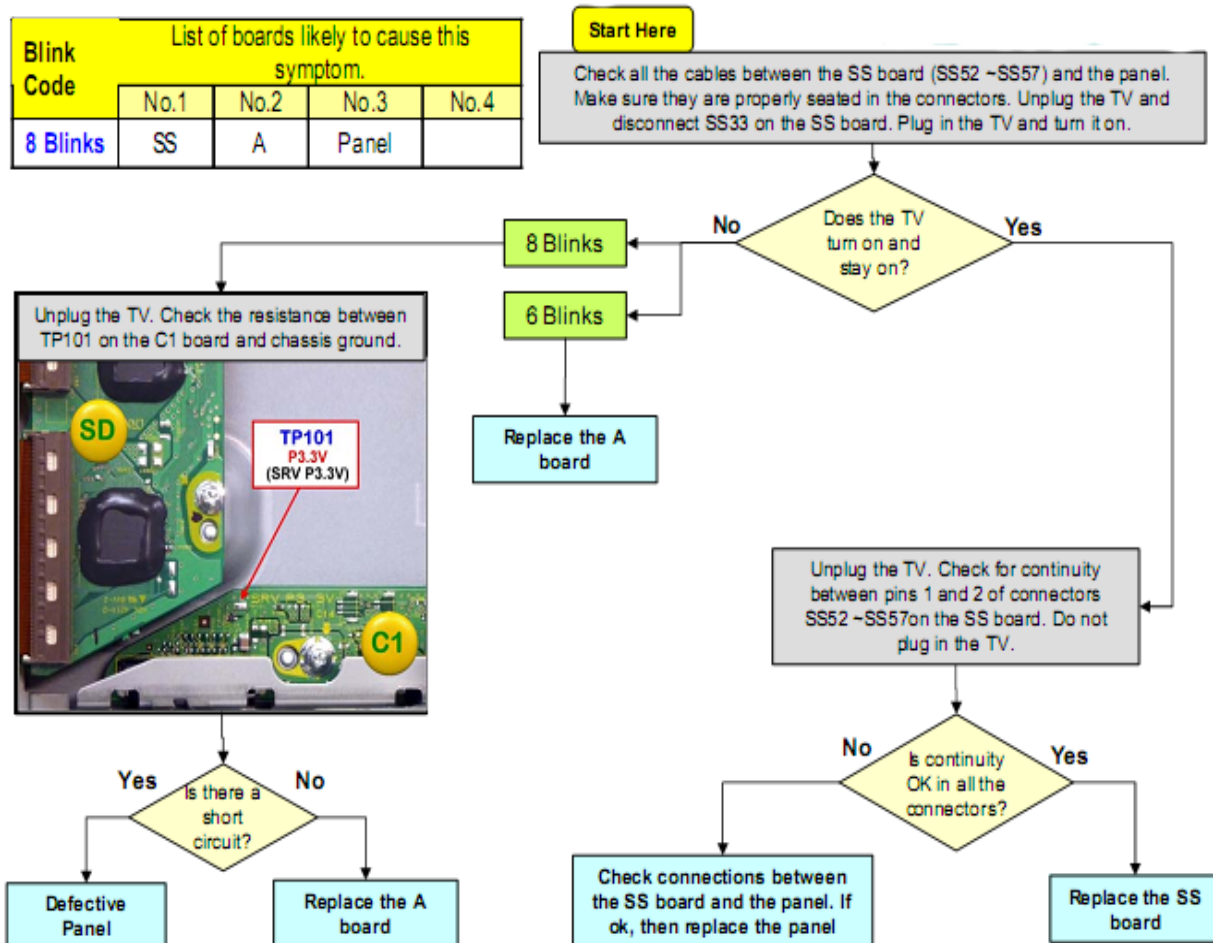
Troubleshooting 8 Blinks Failure (TC-P50ST50)

Blink Code	List of boards likely to cause this symptom.			
	No.1	No.2	No.3	No.4
8 Blinks	SS	A	SS2	Panel

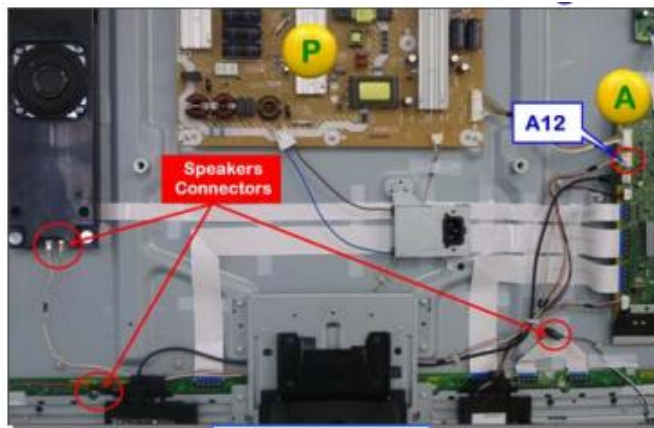
Find information for TC-P50UT50 on the next slide)



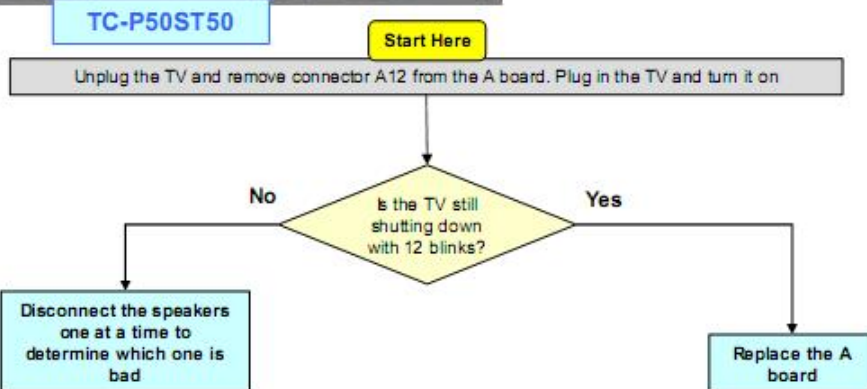
Troubleshooting 8 Blinks Failure (TC-P50UT50)



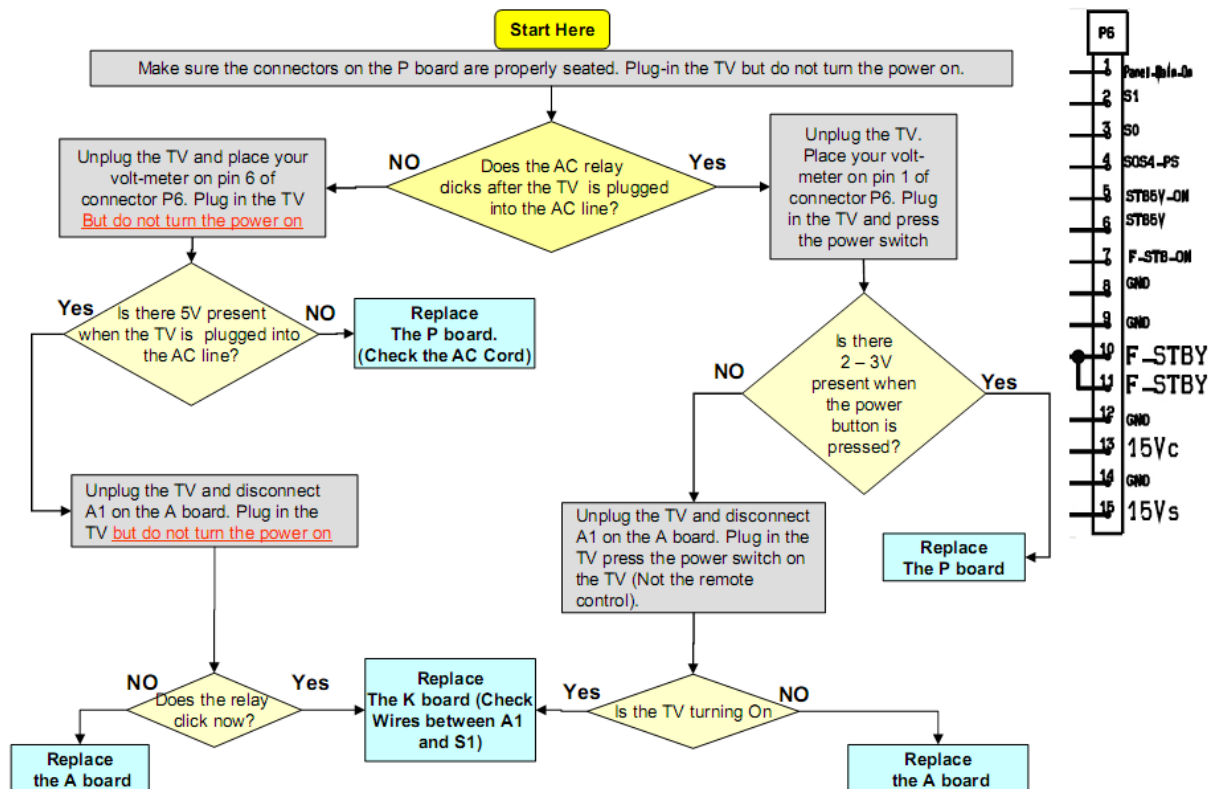
Troubleshooting 12 Blinks Failure



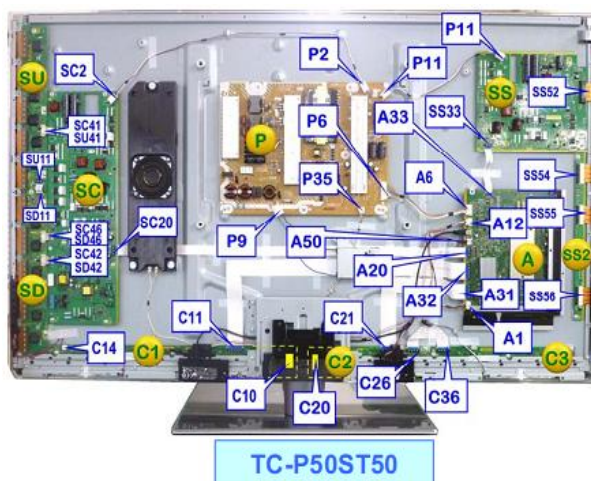
Blink Code	List of boards likely to cause this symptom.			
	No.1	No.2	No.3	No.4
12 Blinks	A	Speaker/ Subwoofer		



Troubleshooting No Power /Dead Unit (Power LED is Off)



2012 Plasma TV's Behavior After Connectors Removal



TV Behavior When Connectors are Removed on the SC and SS boards					
Connector on The SC Board	Connector on The SS Board		TC-P50ST50	TC-P50UT50	
SC2			7 Blinks	7 Blinks	
SC20			8 Blinks	8 Blinks	
	SS11		8 Blinks	8 Blinks	
		SS33	The TV stays on with black screen.	The TV stays on with black screen.	
SC2	SC20		8 Blinks	8 Blinks	
SC2		SS11	3 Fast Blinks	7 Blinks	
SC2		SS33	3 Fast Blinks	7 Blinks	
	SC20	SS11	8 Blinks	8 Blinks	
	SC20		SS33	6 Blinks After 11 Sec. of Being on.	6 Blinks After 11 Sec. of Being on.
		SS11	SS33	The TV Stays on With Black Screen	The TV Stays on With Black Screen
SC2	SC20	SS11	3 Fast Blinks	8 Blinks	
SC2	SC20		SS33	6 Blinks After 11 Sec. of Being on.	6 Blinks After 11 Sec. of Being on.
SC2	SC20	SS11	SS33	3 Fast Blinks	6 Blinks After 11 Sec. of Being on.
	SC20	SS11	SS33	6 Blinks After 11 Sec. of Being on.	6 Blinks After 11 Sec. of Being on.
SC2		SS11	SS33	3 Fast Blinks	7 Blinks

Any Combination of A20 – A31 and A32
8 Blinks

Behavior Comparison Between 2010 and 2011 Models When the TV Fail with Shorted Vsus (VS), Vda (VA) or P15V

Behavior Comparison Between 2011 and 2012 Models When The TV Fails With Shorted Vsus, Vda, or P15V					
Year →		2011		2012	
Series →		X – S – ST	GT - VT30	TC-P50UT50	TC-P50ST50
Shorted	Vsus	Locked Solid Red LED	7 Blinks	3 Fast Blinks	7 Blinks
	Vda				No SOS. The TV stays on with black screen.
	P15	Locked Solid Red LED (14 Blinks, If TV is Turned On After the 2 nd Relay Click)	The TV does not turn on. The TV does not shut down. It tries to turn on (the LED briefly turns on), then it goes off.	The TV does not turn on. The TV does not shut down. It tries to turn on (the LED briefly turns on), then it goes off.	3 Fast Blinks

5.6- How to Troubleshooting Panasonic PDP for Picture Problems

1. There are two kinds of picture problem:
 - a) Abnormal display/picture.
 - b) No display
2. Basic concept of determining the defective board:
 - a) Which area is the symptom displayed on the screen?
 - i) Part of the screen
 - ii) All over the screen
3. Adjustment after PCBs exchange
 - a) After replaced the following boards, voltage adjustment is required.
P board, SC board, SS board => Please refer to their “Service Manual”

For more information, login to the Plasma TV Repair membership to find their service manuals (<http://www.Plasma-Television-Repair.com>).

5.61- Diagnosis by Test Pattern When OSD is Available

All the Panasonic Plasma TV must need to login to the Service Mode to run their Test Pattern Mode to testing the TV. With this Test Pattern, you can isolate the display problem is in the D Board or DG Board (for old models), A board or the Panel/Module (for latest model).

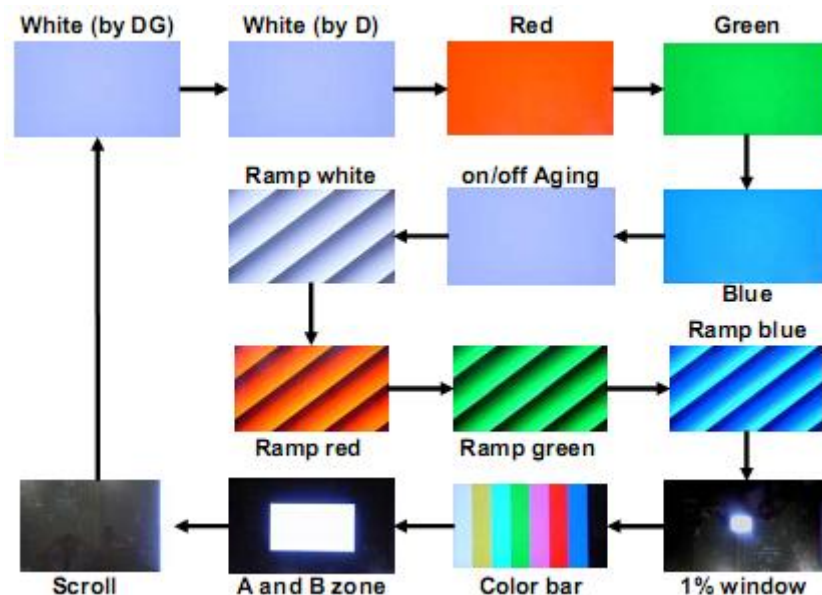
For example the 9th Generation Plasma Panel TV TH-42PX60 Plasma Tv. Picture problem such as “Picture Noise or Vertical Line” display all over the screen is mainly caused by a defective D or DG board. The “internal Test Pattern Generator” can help determine whether to replace the D or DG board. The test patterns are created by the D board. For latest models Plasma TV,

<http://www.lcdrepairguide.com/plasma/>

1) Model: All 9th Generation Models (TH-37PX60, TH-42PX60 & TH-42PX600, TH-50PX60 & PX600, 58PX60 & PX600, TH-65PX600 & TH-42PD60U)

How to enter the Test Pattern:

- ### Test Pattern (Normal)



Test Pattern (Abnormal)**Diagnosis:**

Test Pattern	Defective Board
Abnormal	D Board
Normal	DG Board (or D board)

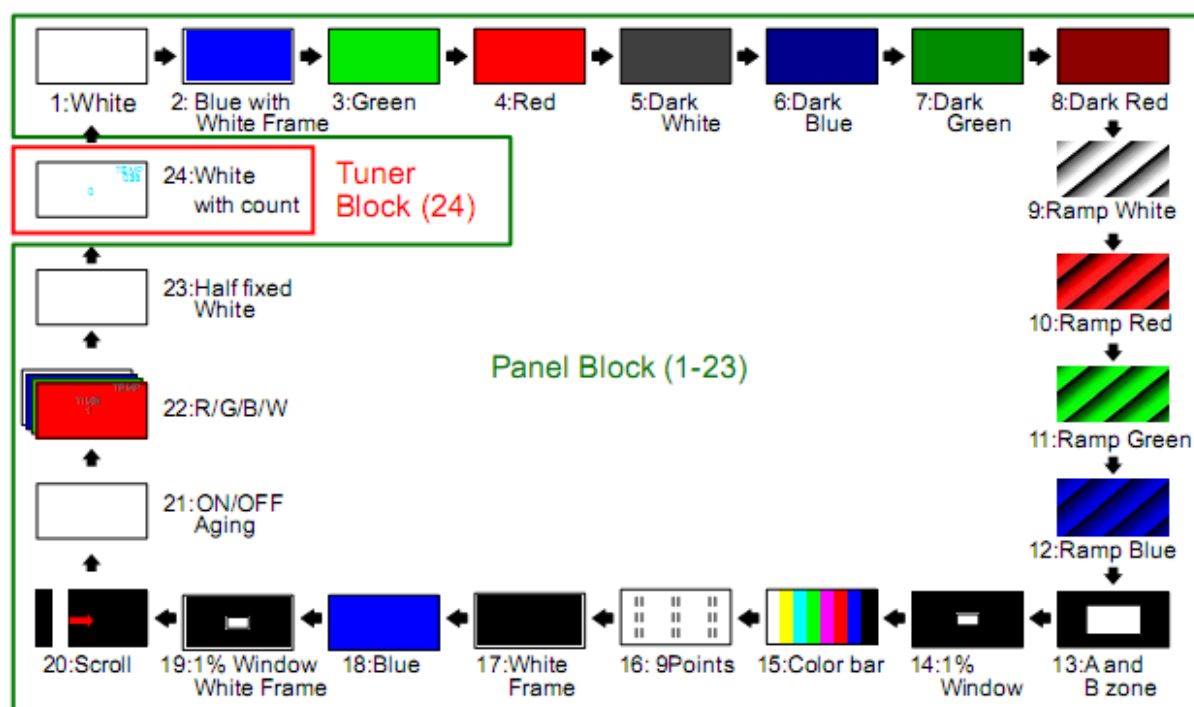
2) Model: All PDP2011 Plasma TV Models (TH-P42U30V & D, TH-P46U30V & D, TH-P50U30V & D, TH-P42X30V & D, TH-P50X30V & D)

Symptom: Picture Noise, Full Vertical Lines, Abnormal Color

How to Enter the Test Pattern

- Press “i” button of remote control 3 times at the same time.
- After this procedure, you can enter “Service Mode” and select “AGING”, then “Test Pattern” will appear.
- Push “3” button of remote control to select the test pattern mode to forward.
- Push “4” button of remote control to select the test pattern mode to reverse.

Test Pattern (Normal)



Diagnosis:

Abnormal picture (Picture Noise, Full Vertical Line, Abnormal color)	
Test pattern (1-23)	Defective Block (Board)
Abnormal	Panel Block (A Board or Panel)
Normal	Tuner Block (A Board)

No picture	
Test pattern	Defective Block (Board)
No picture	Panel Block (A Board or Panel)
O.K	Tuner Block (A Board)

3) Model: All 15th Generation 2012 Plasma TV Models (TC-P50ST50, TC-P50UT50 & etc).

Symptom: Picture Noise, Full Vertical Line, Abnormal Color

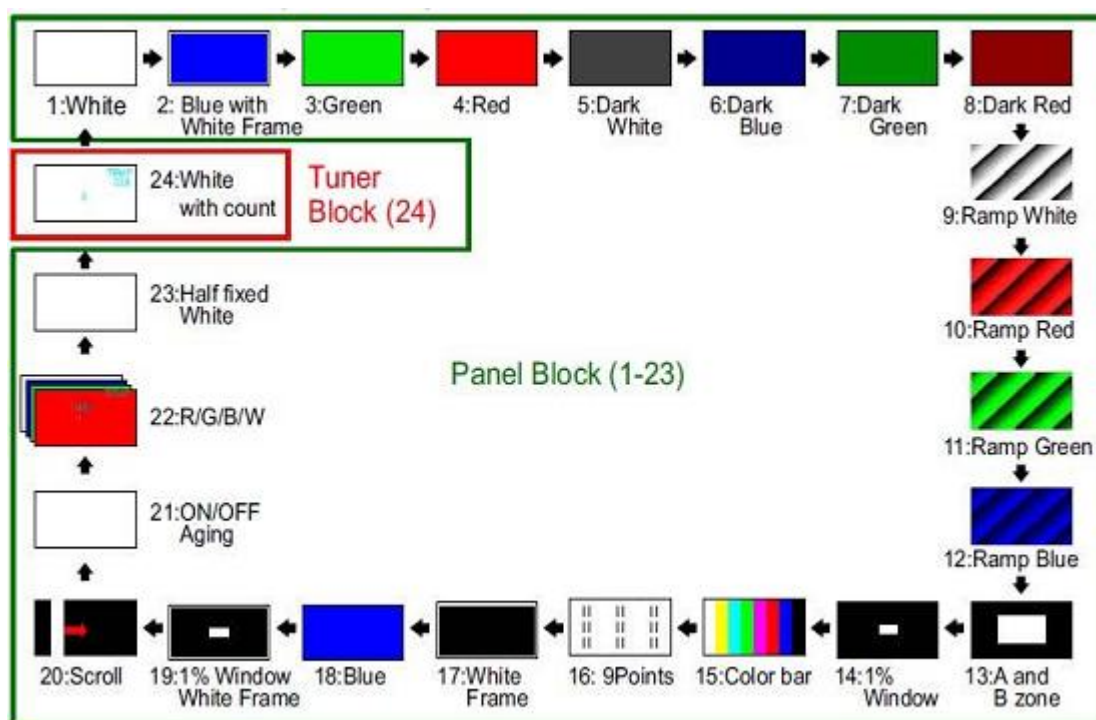
How to Enter the Test Pattern

- Press the “VOLUME –” on the TV set and push “INFO” button of remote controller 3 times at the same time.
- After this procedure, you can enter “Service Mode” and select “AGING”, then “Test Pattern” will appear.

c) Push “3” button of Remote Control to select the test pattern mode to forward.

d) Push “4” button of Remote Control to select the test pattern mode to reverse.

Test Pattern (Normal)



Diagnosis:

Diagnose by using Test Pattern above:

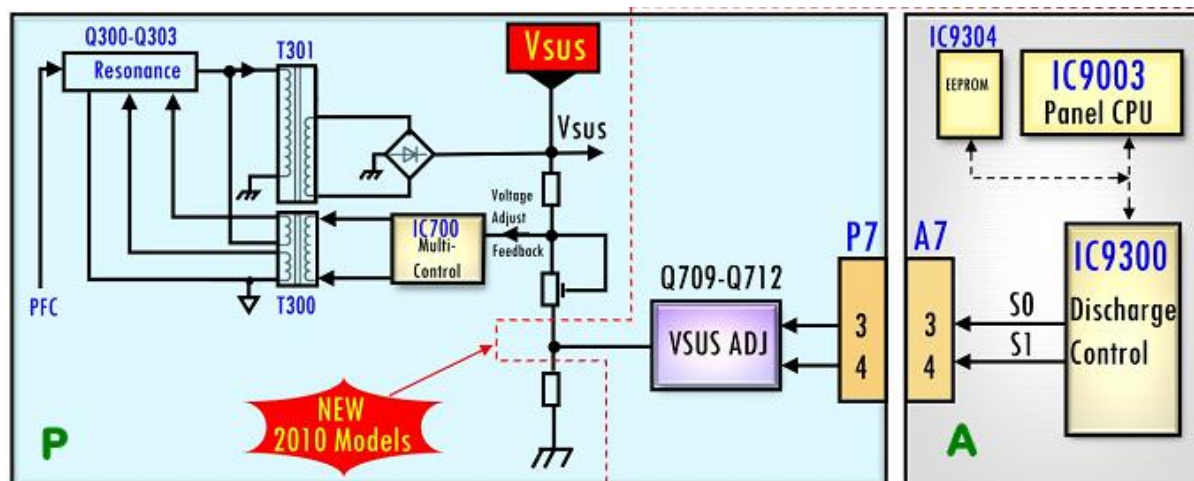
Abnormal picture
(Picture Noise, Full Vertical Line, Abnormal color)

Test pattern (1-23)	Defective Block (Board)
Abnormal	Panel Block (A Board or Panel)
Normal	Tuner Block (A Board)

No picture

Test pattern	Defective Block (Board)
No picture	Panel Block (A Board or Panel)
O.K	Tuner Block (A Board)

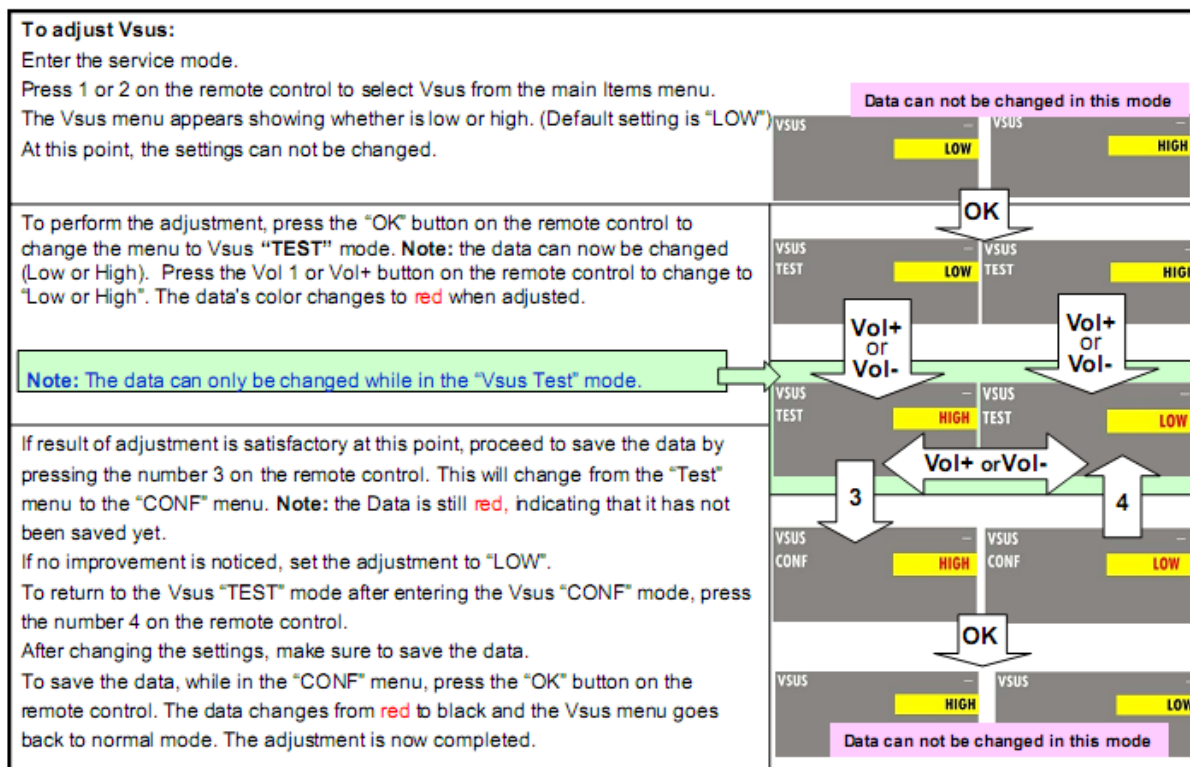
5.7- VS (Vsus) Adjustment with Remote Control



The new 2010 Plasma TV models do not require Vsus adjustment using the control in the power supply (PSU). The Vsus can now be adjusted to 2 different levels (High or Low) using the remote control from within the service mode menu. Perform this adjustment when the A board (Mainboard) or the Panel is replaced and to correct conditions of uneven illumination level of pixels noticeable when a white signal is displayed.

To correct illumination unevenness, display a white screen and then change the settings between high and low. If there is no change, set the adjustment to low. If an improvement is shown when setting the adjustment to high, then keep the settings at high level.

If the picture seems normal with both high and low settings, then set the Vsus to “LOW”, even if the picture looks brighter when set to “HIGH”. LOW is the default setting.



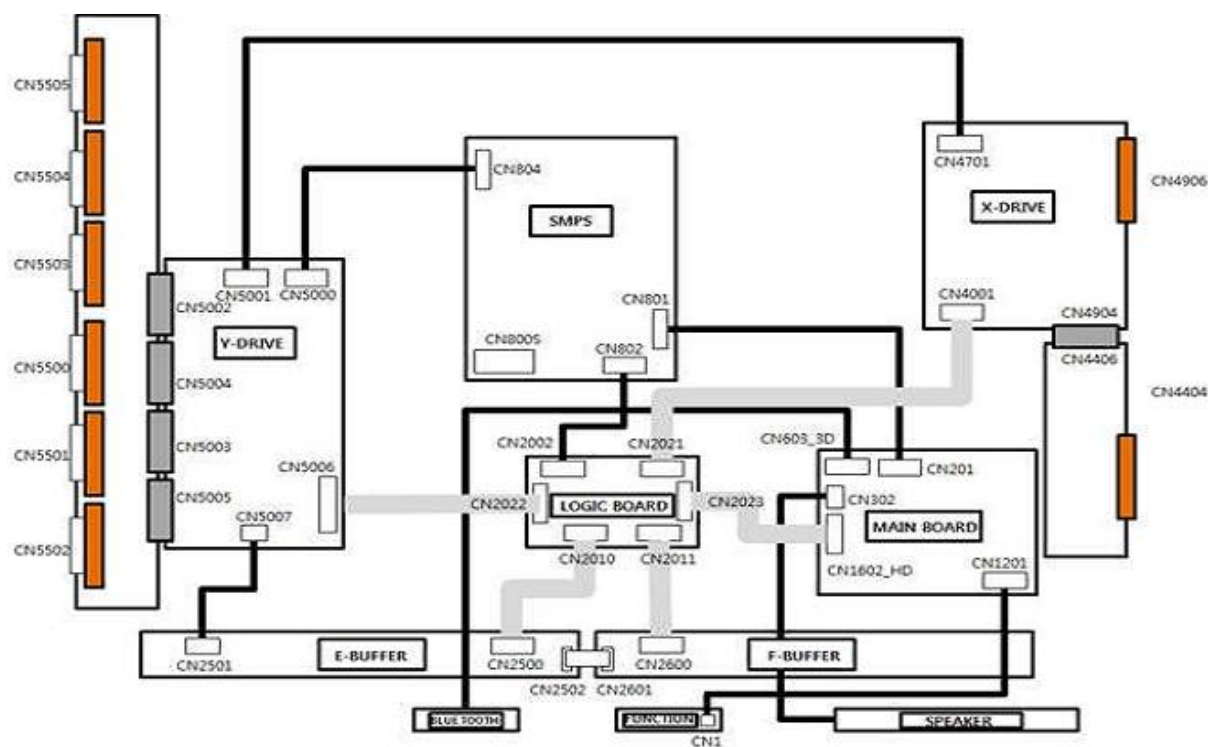
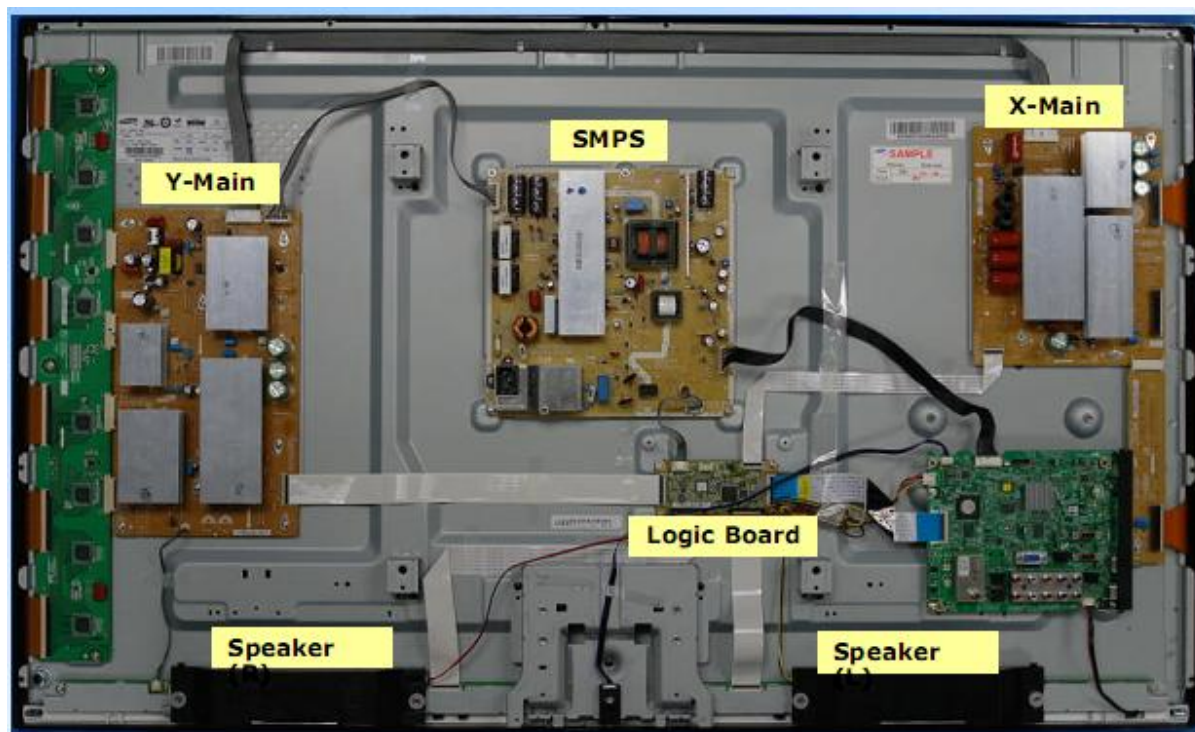
For more Plasma TV Display Fault, please refer to the chapter “Panasonic Pictures of Symptoms” manual and it is inside the **Bonus-B Section** on **Panasonic Training Download Page**.

SAMSUNG

Plasma TV

6.1-Samsung Plasma Modules

1) Samsung Px43D490xxxx and Px51D490xxxx Plasma Module/Panel



For more Plasma Module PCB Location and Structure information, please refer to: “Samsung Plasma TV Training” inside the Bonus-B downloads page section.

6.2- Samsung Plasma TV Power Startup Sequence

Samsung 2009 PDP Models SMPS Power Supply



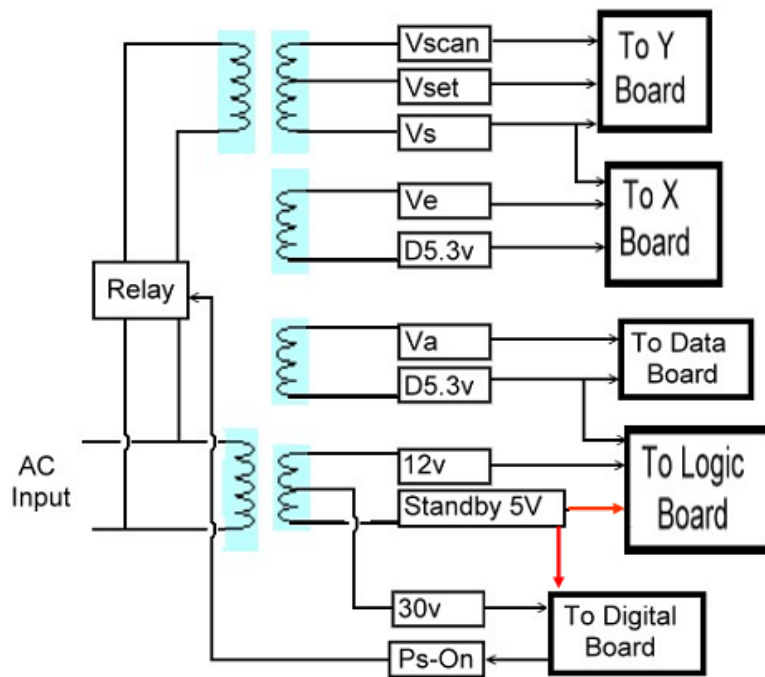
50" Models

Pin No.	Signal	Pin No.	Signal
1	PS_ON	13	D5.3V
2		14	D5.3V
3	STBY	15	D5.3V
4	GND_STBY	16	D5.3V
5	GND_18Vamp	17	GND_15V
6	GND_18Vamp	18	GND_15V
7	18Vamp	19	D15V
8	18Vamp	20	GND_15V
9	GND_5.3V	21	D15V
10	GND_5.3V	22	D15V
11	GND_5.3V	23	AC_DET
12	GND_5.3V	24	N.C [Vt]



56" & 58" Models

Pin No.	Signal	Pin No.	Signal
1	PS_ON	13	D5.3V
2		14	D5.3V
3	STBY	15	D5.3V
4	GND_STBY	16	D5.3V
5	GND_15Vamp	17	GND_15V
6	GND_15Vamp	18	GND_15V
7	15Vamp	19	GND_15V
8	15Vamp	20	D15V
9	GND_5.3V	21	D15V
10	GND_5.3V	22	D15V
11	GND_5.3V	23	AC_DET
12	GND_5.3V	24	N.C [Vt]



The switch mode power supply provides 8 different voltages. The 5V 30V and 12V supplies are un-switched

The rest of the supplies are turned on by the PS-On (active low) signal from the CPU on the Digital board.

Multi-tap supplies are used because of the current requirements for the X and Y boards.

The power supply provides switched and unswitched voltage for operation. The unswitched voltages are present as long as the unit is plugged into the wall. The +5VDC supply operates the main CPU on the digital board. The +33VDC supply is used by the tuner.

The other voltages are used by the panel drive circuits creating the Va, Vs, Vset and Ve voltages.

The Power Factor Control (PFC) circuit is used to save energy. Taking advantage of the capacitive effect of the pixel elements allows the power supply to operate at a reduced duty cycle. Using a large inductor and the capacitive effect of the panel allows energy to be stored and accessed as needed.

A separate transformer supplies the +5VDC Stand-by B+ to the Digital board. This voltage powers the Microprocessor (IC201) and enables the Key Matrix and the Remote IR Sensor. This turns on the relay activating the rest of the Power Supply board. If this supply is missing or low, the unit will not turn on. If this signal is not present check the supply voltage for the microprocessor.

6.3- Samsung Plasma TV Power Supply Self Test Method

Samsung PS50A457P1D Plasma TV (S50HW-YB03 Panel)

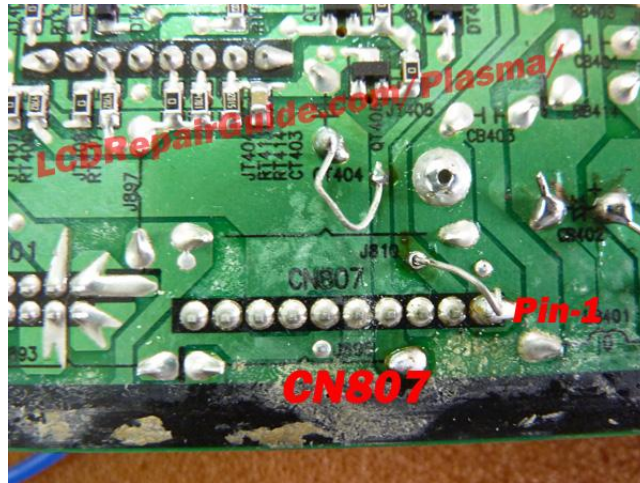
PSU p/n: BN44-000205A, DYP-50W3

Step 1: Disconnected all the connector to PSU board, except the AC input connector.



Step 2: Use two short wires, on connector CN807 connect pin-1 (STBY5V, Standby 5V) to pin-2 (VS_ON) and connect another wire from CN807 pin-4 (PS_ON) to pin-5 (RTN, this is GND).





Step 3: Connect the Light Bulbs to their Vs voltage output pin and the chassis GND.

Step 4: Power on the AC supply to PSU board, all the voltages output normally. The Light Bulb is lit as below picture:



* Check their output voltages is it same as their marking number voltage values. If all same voltages, that's mean this PSU board is OK.

6.4- Samsung Old Models PDP PSU

Board Self Test Method

No	Samsung Plasma Panel Models	Procedures
1.	S42AX-YD001	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8007 pin-3 (GND) & pin-4 (Relay). c) Using a wire connects the connector CN8008 pin-1 (V5B) & pin-2 (VS_ON). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
2.	S42AX-YD02	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8003 pin-8 (PS_ON)) & pin-9 (GND). c) Using a wire connects the connector CN8002 pin-1 (D5V) & pin-2 (VS_ON). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
3.	S42AX-YD03	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN803 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connects the connector CN8002 pin-4 (VS_ON) & pin-6 (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.

4.	S42AX-YD05	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8003 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the connector CN8002 pin-2 (VS_ON) & pin-9 (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
5.	S42AX-YD09	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN801 pin-3 (GND) & pin-1 (PS_ON). c) Using a wire connect the VS_ON & 5.3V. d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
6.	S42AX-YD10	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8003 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the VS_ON & NO-ALARM(5.3V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
7.	S42AX-YD11	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN801 pin-1 (PS_ON) & pin-4 (GND_5VSTB). c) Using a wire connect the connector CN802 pin-6 (VS_ON) & pin-1 (5.3V).

		d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
8.	S42AX-YD12	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the pin (GND) & pin (PS_ON). c) Using a wire connect pin (VS_ON) & pin (D5.3V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
9.	S42AX-YD13	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the pin (GND) & pin (PS_ON). c) Using a wire connect the pin (VS_ON) & pin (D5.3V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
10.	S42AX-YD15	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the pin (GND) & pin (PS_ON). c) Using a wire connect the pin (VS_ON) & pin (D5.3V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.

11.	S42SD-YD04 (V2)	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN802 pin-3 (RTN) & pin-4 (PS_ON). c) Using a wire connect the connector CN803 pin-2 (VS_ON) & pin-4 (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
12	S42SD-YD05 (V3)	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire/jumper shorted the JP8005. c) Using a wire/jumper shorted the JP8002. d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
13.	S42SD-YD07 (V4)	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8007 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the connector CN8008 pin-9 (VS_ON) & pin-10 (V5B). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
14.	S42SD-YD09 (V5)	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8003 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the connector CN8002 pin-2 (VS_ON) & pin-1 (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU

		board, the Light Bulbs will lit and all output voltages are appear.
15.	S50HW-YB03	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN807 pin-5 (RTN, is GND) & pin-4 (PS_ON). c) Using a wire connect the connector CN807 pin-2 (VS_ON) & pin-1 (STBY5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
16.	S50HW-YD01	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8003 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the pin (VS_ON) & pin (STB5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
17.	S50HW-YD02 (W2)	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8003 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the connector CN8002 pin-2 (VS_ON) & pin-1 (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.

18.	S50HW-YD09	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN8003 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the connector CN8002 pin-2 (VS_ON) & pin-1 (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
19.	S50HW-YD11	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN801 pin-4 (GND) & pin-1 (PS_ON). c) Using a wire connect the connector CN802 pin-8 (VS_ON) & pin-1 (5.3V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
20.	S50HW-YD13	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the pin (GND) & pin (VS_ON). c) Using a wire connect the pin (PS_ON) & pin (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
21.	S50HW-YD15	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the pin (GND) & pin (VS_ON). c) Using a wire connect the pin (PS_ON) & pin (D5V). d) Connect the Light Bulbs (150~200W) to

		the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
22.	S50HW-XD02	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the pin (GND) & pin (VS_ON). c) Using a wire connect the pin (PS_ON) & pin (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.
23.	S50HW-XD03	a) PSU board connected AC input cable. (Other connectors are removed) b) Using a wire connect the connector CN9004 pin-3 (GND) & pin-4 (PS_ON). c) Using a wire connect the connector CN8008 pin-2 (VS_ON) & pin-6 (D5V). d) Connect the Light Bulbs (150~200W) to the connector Vs output & GND pins. e) Applied the AC voltage input to PSU board, the Light Bulbs will lit and all output voltages are appear.

Notes:

1) If the methods above not work with your Plasma TV Power Supply (PSU), you may try to opposite their connection, for example:

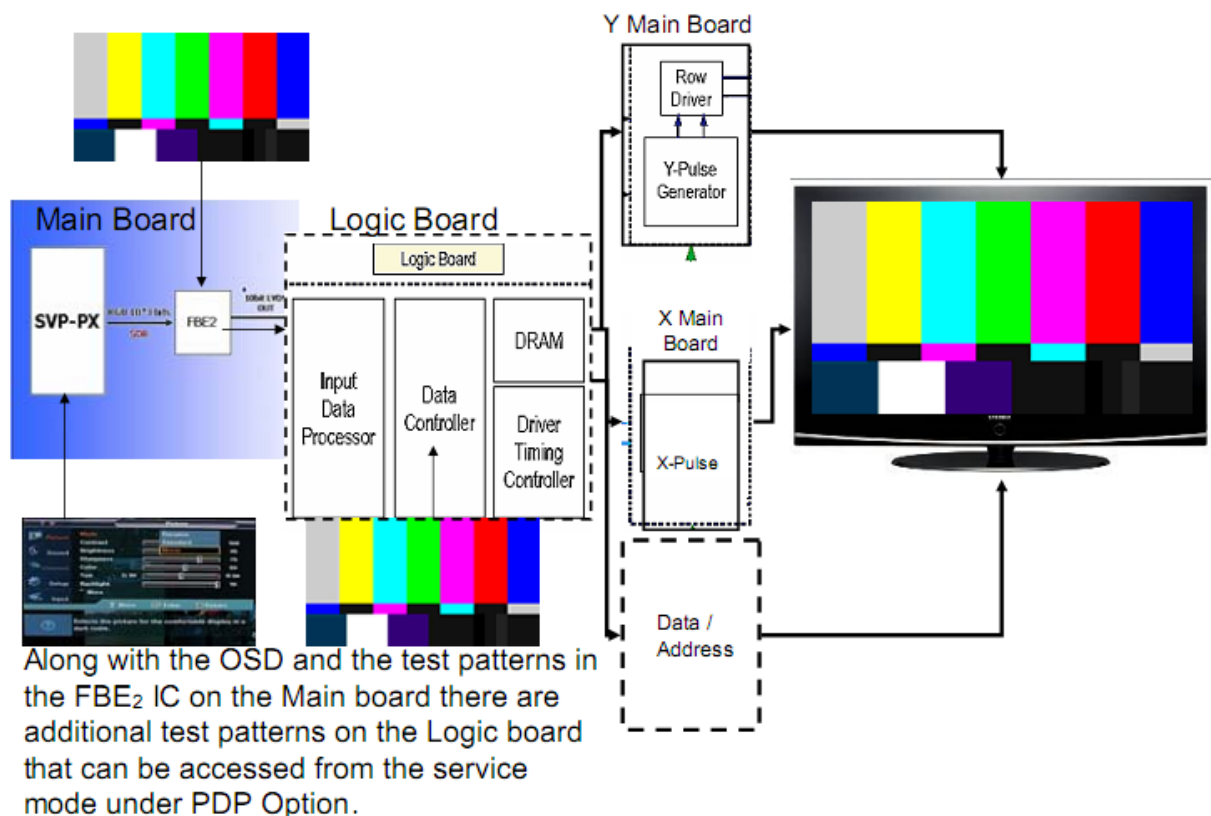
- If their original connection is PS_ON connect to standby 5V and the VS_ON is connect to ground (GND), we can opposite their connection like connect the PS_ON to GND, and the VS_ON connect to standby 5V.
- Make sure that the connection is connecting to the right pin/s!

2) If the models plasma tv you haven't seen or try before, you can use the manually method to find out their method. The manually method is try to find out their Standby Voltage (STBY5V), PS_ON signal and VS_ON signal pins. Using the above method to connect their pin/s and also connected the Light Bulb tool to testing it.

6.5- Samsung Plasma Panel Self Test Method

Samsung 2009 PDP TV Models

To troubleshooting video problems or to make sure every board after the mainboard is working properly, the internal test patterns can be accessed in the logic board then move to the mainboard test patterns. Even the customer menu's can be used as a test pattern.



6.51- Logic Board (Control Board) Self Test Method

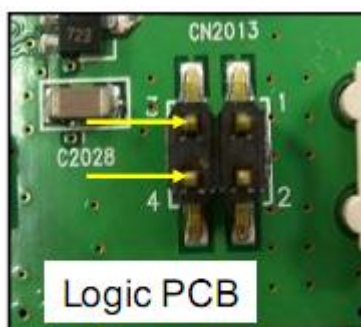
Note: This test function may not be available on all models.

Step 1: With the Mainboard removed, short pins-1& pin-5 on the 24P ribbon cable to the PSU from the Mainboard to turn the panel on. This will turn on the secondary voltages of the PSU board. Shorting the POWER ON connection to ground is the same as the power on from power switch.

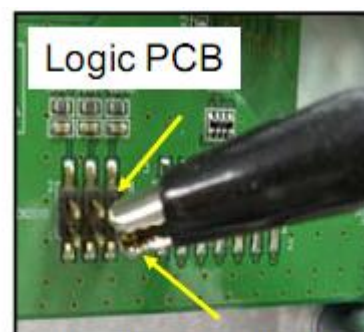


Short the PS_ON and GND pins on the ribbon cable connector from Main Board to SMPS (24P)

Step 2: Carefully short pins 3 & 4 (4 Terminal Test Points) or pins-5 & 6 (6 Terminal Test Points) of the quad connector on the Logic board together. When the panel is powered on, the PDP will automatically “Play” the internal test patterns stored on the Logic Board that would normally be accessed only through the service menu. This will force the Logic board into a loop where the internal test patterns will be displayed in sequence.



Short pins 3 & 4 on the Logic Board with a 4 pin test terminal



Short pins 5 & 6 on the Logic PCB with a 6 pin test terminal

Step 3: After proper pins are shorted, apply power to the AC input. The TV will power up by itself and if all is well with the logic, X, Y buffers and

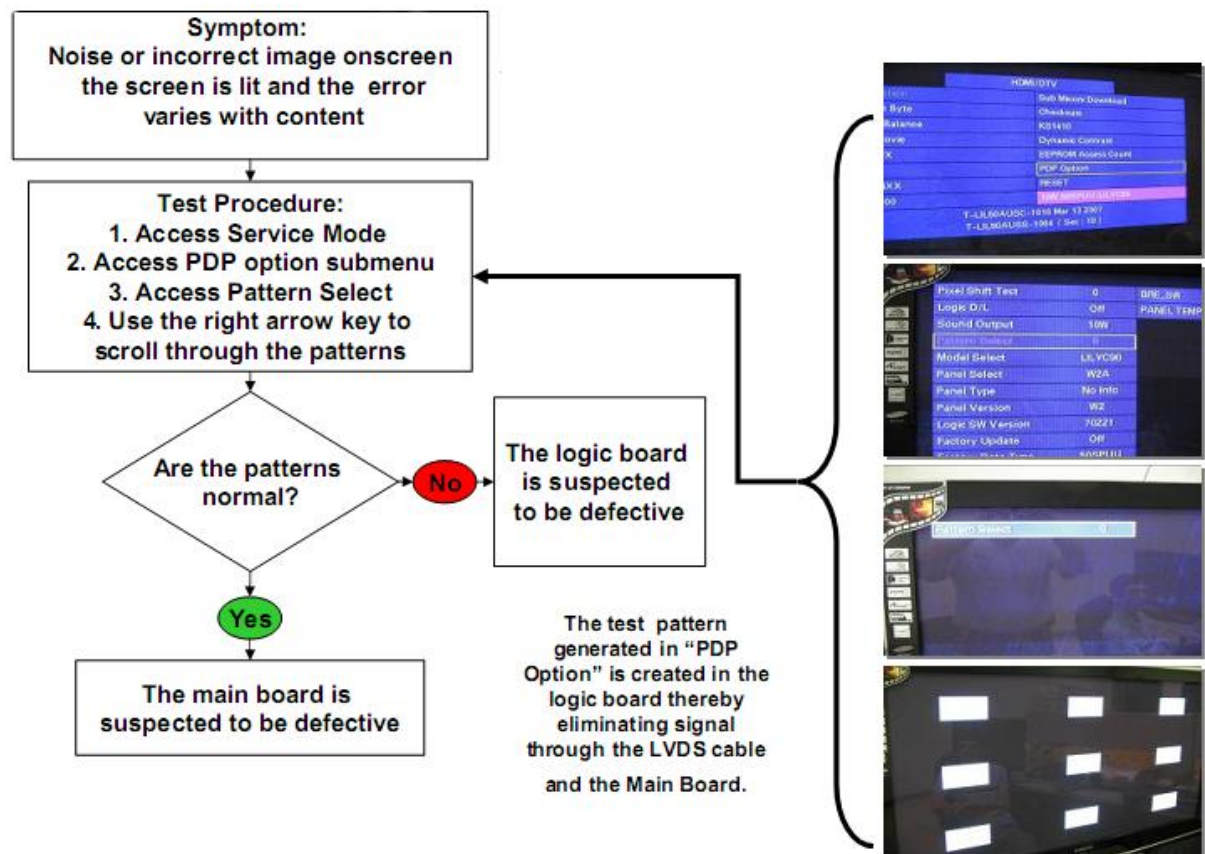
address boards, the panel will “Play” the test pattern loop. If everything looks normal the possible problem is the Mainboard which is the only thing left not in the circuit.

The SMPS (PSU) can be forced on and the test patterns that reside on the Logic Board can be displayed using this method. Before jumping the PS_ON to ground verify the connections in the service manual.

The test patterns that will be displayed from the Logic board are located after the LVDS cable. If the patterns look normal, the SMPS, Logic Board, X, Y, Buffers and Panel are all working properly. Use this method in cases where the video is so distorted that the menus cannot be seen to access the test patterns using the service menu.

Isolating the Logic Board from the Mainboard

This method is to use when the display is abnormal but still can see the OSD menu. So using this method to isolate the problem is in the mainboard (include LVDS cable) or their Module/Panel defective.



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- 1) Access the service menu by pressing Mute + 1 + 8 + 2 + Power, with the power off (or in standby mode).
- 2) Access the PDP option sub menu item.
- 3) Access the Pattern select submenu item.
- 4) Scroll through the different patterns. These test patterns are generated on the Logic board. If these patterns are displayed properly, the problem is before the logic board. This can be problem with the Logic – Mainboard LVDS interconnect cable or a problem with the Mainboard. If the patterns are not displayed properly, the problem is probably caused by a defective Logic board. Additionally a dead set may also be caused by the Logic board not sending out the relay on command. This can also be a set that cycles on or off quickly at startup.

6.6- Samsung Plasma TV Repair Made Simple

This is a basic troubleshooting and easy to understanding instruction for repair Samsung Plasma TVs.

First, Take the VITAL SIGNS: Vs, Va, Vsc and Ve (on most models)

When you walk into a doctor's office, the first thing they do is check your vital signs. You should do the same when troubleshooting Plasma TVs. You can take a Plasma TV's vital signs- the Vs, Va, Vsc and Ve voltages- in less than 5 minutes. Not only will this help you make the immediate repair diagnosis, but will also prevent failures in the future.

Look for the Voltage Label

These "vital sign" voltages are so important that their values are printed on a sticker inside the back of each panel. The values are specifically set for each panel. A label example is below:

NTSC		NTSC/PAL	
Va	Vsc	Vs	Ve
55	-190	212	100
Rev. 2.0			

Note that the new 2010 models have additional failsafe circuitry that shuts down the start-up sequence in approximately 3 seconds if there is an over voltage or an under voltage/high current condition (a short). However, you still have plenty of time to check the readings. Simply hook up your volt meter before you turn on the Tv, and be ready to take your readings.

Let's look at some of these voltages and what they do.

Vs - The Sustain Voltage

Operating at approx 200 volts (sticker example, 212V), the sustain voltage is generated by the SMPS (Switching Mode Power Supply) and is used by both the Y-Main and X-Main assemblies to help produce the sustain drive signal to the plasma cells of the panel. Without the Vs voltage, the drive signal cannot exist and the cells cannot light.

Repair Scenario-1:

Symptom: No Display, dark screen. TV shuts off after 3 seconds.

Troubleshooting: Measuring Vs voltage and reveals no voltage there.

Repair:

Remove all power and isolate the Y-Main and X-Main from the power supply Vs by removing their associated connectors and then check for a short condition with an ohm meter. (Note that the Vs is fed to the X-Main via the Y-Main in the new models). Replace the shorted Assembly. Also check the operation of Vs at the SMPS by powering the Tv on with the connectors still removed to determine if the power supply is operational. In most cases, a switching mode power supply will not be damaged even by a shorted Vs.

Repair scenario-2:

Symptom: Specks or dots appear sporadically on the screen (Diffusion).

Troubleshooting: Measuring Vs reveals a low or high voltage

Repair:

First, allow the TV to warm up for a minimum of 20 minutes. Adjust Vs to the setting listed on the label if their Vs voltage is not same as the Voltage Label there. Observe the Diffusion test pattern found in the TV's Burn In r Service Mode menu. If diffusion still occurs, adjust Vs until diffusion disappears. Check that this new setting is within plus or minus 10V of the Vs voltage value on the Voltage Label.

Va -The Address Voltage

The address voltage is generated from the SMPS and supplies approximately 60Volts (55V on the example label) to the Logic Buffer Boards, commonly known as the Address Boards, located in 2010 models on the bottom of the panel. If this voltage is missing or too low or high, the Address Boards will not operate properly.

The Address Boards are responsible for addressing each cell via control from the Logic Board and determine which cells light in vertical columns/sections. Errors such as vertical bars or missing or noisy video can occur. Most new models Plasma TV have two Address boards located at the bottom of the panel. Each Board is responsible for the left half and right half of the video respectively.

Repair Scenario-1:

Symptom: Noisy Video on full screen. Cell misfiring throughout entire video.

Troubleshooting: Measuring Va reveals a very low voltage. When you remove the Va feed from SMPS to both Lower Address Boards, the Va voltage remains low.

Repair:

Check or Replace the defective PSU/SMPS board.

Repair Scenario-2:

Symptom: Video on full screen. Cell misfiring throughout entire video

Troubleshooting: Measuring Va reveals a very low voltage. When you remove Va from the Lower Address Boards one at a time, the voltage returns to normal. Found the bottom left Address Boards was loading down Va.

Repair:

Check or replace the defective Address Boards and also testing their TCP IC. If found one of the TCP is defective, this Plasma TV needs to replace their Panel Assembly. If don't want to replace the Panel, unless you have the Bonding Machine and the new spare part of TCP IC, to replace the defective TCP IC.

Vsc - Scan Voltage

The Vsc Scan Voltage is generated at the Y-Main and is produced after the Y Board receives the Vs Supply Voltage from the SMPS. It is approximately -190 Volts (-190V in the example label) and is combined with the Scan Signal from the Logic Board by the FETs on the Y Board (Y Main).

The Scan driving signal is then fed to the Scan ICs location on the Y Buffers Board/s of the panel and is responsible for scanning left to right, across the screen, and top to bottom, in a Progressive Scan, that is, one horizontal line at a time.

Repair Scenario-1:

Symptom: The panel will not turn on. The TV shuts down after a 3 seconds interval.

Troubleshooting: Measuring the “vital signs” shows Vs is OK, but there is no Vsc Voltage or a rise in voltage.

Repair:

Check or replace the defective Y Board. Also check or replace the Y-Buffer Board/s since the Scan ICs may also have been affected.

Note: A visual inspection of the Scan ICs on the Y Buffer Boards (Scan Board/s) is important and necessary. Physical damage to any of the Scan ICs can be a quick confirmation of failure. Failures, however, can occur without any physical problems being observed. If any of the ICs fail, replace all Y Buffer Boards (usually 1 or 2 assemblies) and the Y Board.

Repair Scenario-2:

Symptom: The panel will not turn on. The TV shuts down after a 3 seconds interval.

Troubleshooting: Measuring the “vital signs” reveals no Vsc and no Vs voltages.

Repair:

Since Vsc relies on the Vs feed from the PSU board, first to troubleshoot the no Vs condition. To begin, test Vs for a short to the chassis ground. The short can come from the Y Board or X Board. Remove the PSU board Vs feed to determine which board has the short. Replace the defective Y or X board. If no short exists, test the power supply with the connectors removed.

Note: Also verify the Logic Board is sending an active high signal to the SMPS to turn on Vs.

Ve - Erase Voltage

The Ve Erase Voltage is generated at the X Board and is derived from the Vs voltage from the PSU Board. The Ve voltage, approximately 100 volts, (95V on the example label) is primarily used to assist the Y in erasing previously activated cells and neutralizing the erasure before the next scan.

Repair Scenario-1:

Symptom: The TV turns on, but the video has continuous image ghosting or retention from previous frames.

Troubleshooting: Measuring the “vital signs” reveals no Ve.

Repair:

Check/replace the defective X Board.

Repair Scenario-2:

Symptom: The TV turns on, but the picture is very dark.

Troubleshooting: All “vital signs” measure OK.

Repair:

Place the TV in service mode and activate the Logic Test Patterns. If the video is still dark, replace the defective X Drive (X board). If the video restores to normal when use the Logic Test Patterns, replace the defective Main board.

This concludes for the “Checking the Vital Signs”.

The SMPS (PSU) Switch Mode Power Supply

① CN801 (SMPS) ↔ CN2001 (Main Board)		② CN801 (SMPS) ↔ CN201 (Main Board)				CN802 (SMPS) ↔ CN2000 (Logic Board)	
Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	PS_ON	1	PS_ON	10	18V	1	D5.3V
2	STBY	2	STD9V	11	18V	2	D5.3V
3	GND	3	5.3V	12	5.3V	3	GND
4	VAMP	4	GND	13	5.3V	4	GND
5	GND	5	GND	14	GND	5	PS_ON
6	GND	6	GND	15	GND	6	VS_ON
7	D5.3V	7	GND	16	15V		
8	D5.3V	8	NC	17	15V		
9	GND	9	NC	18	15V		
10	15V						
11	15V						
12	D5.3V						

Figure 1

Figure 2

The supply first delivers the important 5V Standby Voltage (normally 5.3V on pin-2, STBY, in the Figure 1 examples) to the Main board which in turn provides the PS_ON, “Power Supply On command” to the supply. Stand-by

voltage is also providing to the Logic Board. The SMPS may also supply other un-switched voltages, and depending on the model, 33V to the tuner so the tuner remains active during stand-by and 12V to the Logic Board (older models).

Switched voltages also include Vs (approximately 210V), Va (approximately 55V), and in Figure 1 – the 9 and 12 pin configuration- connectors to the Main board: 5.3V, 15V, 18V and 6.3V.

Testing and Turning On the Supply

You can check the Standby Voltage by first observing the Red LED Power indicator on the front of the panel, to the SMPS and additionally to the Logic Board connectors. The Logic Board then provides VS_ON (pin-6 CN802 in Fig 2), a “High” activation signal (0V to 3.3V) to the SMPS to turn on Vs which starts the operation of the Panel Drive Boards.

We can test the Power Supply turn on operation without the Main Board operation by simply removing the supply connector off of the Main board side and shorting out (with a bare wire) PS-ON to circuit ground. (Pin 1 to pin-5 of Figure 1, in both connector examples). Or refer to the Chapter: PSU Board Self Test Method.

Example-1:

Symptom: The TV’s Red LED Standby indicator is off and the TV will not turn on.

Troubleshooting: 1) Measuring 5V Standby (pin-2, Figure 1) confirms the standby voltage is missing (0V).

2) Removing CN801 to the Main board and CN802 to the Logic Board (since Main and Logic get 5V stand-by) confirms neither assembly is loading down the missing 5V supply.

Repair:

Check or replace the defective PSU board.

Example-2:

Symptom: The TV's Red LED Standby Indicator is on, but the TV won't power on.

Troubleshooting: 1) Measuring 5V Standby (pin-2, in Figure 1) to the Main board confirms the LED indicator is accurate and that the Standby voltage is good.

2) Measuring PS-ON shows that PS-ON stays at 3.3V and does not go to 0V "low".

3) Removing the connector at the Main board and inserting a short from PS-ON to the circuit ground (pin-1 to pin-5 of the Figure 1 connector examples) confirms proper Power Supply On.

Repair:

Check or replace the defective Main Board.

Example-3:

Symptom: The TV's Red LED Standby indicator is on, but the TV won't power on. The panel shuts off after 3 seconds.

Troubleshooting: 1) Measuring Power Supply Va (Address Voltage) indicates that the voltage is OK (approximately 55V), however, Vs remains at 0 Volts during the 3 seconds of the activation attempt.

2) Removing AC power and testing Vs indicates a short to ground.

3) Removing SMPS Vs supply connectors, one at a time, to the X Board and Y Board indicates Vs is shorted at the X Board.

4) Connecting the AC and powering on the TV while keeping the Vs feed connector to the X Board disconnected restored the Vs voltage reading on the Power Supply during the 3 seconds of activation.

Repair:

Check or replace the defective X Drive Board.

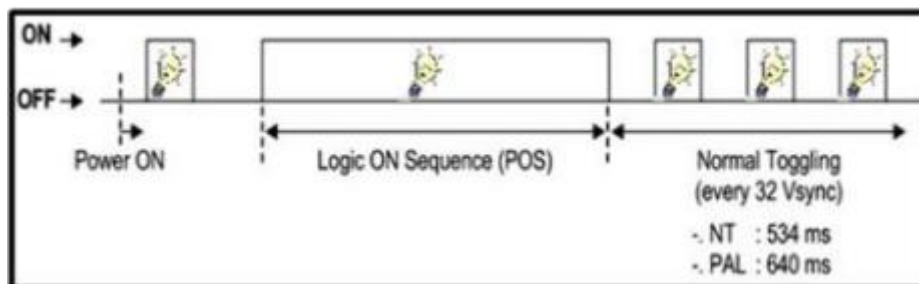
* The above basic troubleshooting will help the beginner to repair the plasma TV easily in board level repair.

6.7- New Logic Board Sequences for the PxxE490 (PNE490) Models Plasma TV



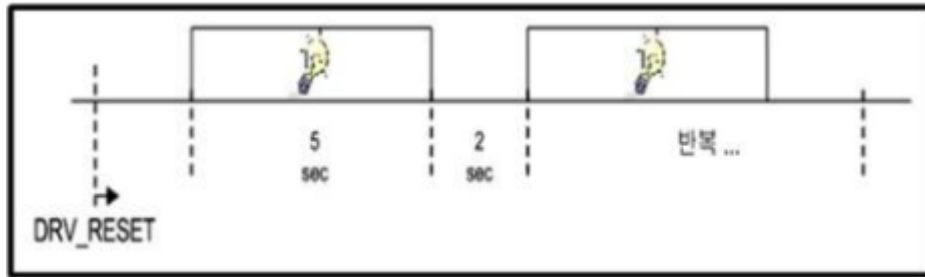
Samsung Plasma TV logic boards have built-in blinking light that alerts you if the logic board is sensing a problem with one of the other boards. (X, Y, or Logic Buffers) In all Plasma TVs built before 2012, the light would blink once every second if operations were normal and change to a series of slow, long blinks if the logic board detected a failure. This process has been modified in the new 2012 PNE490 models. For normal operation and for driving voltage problems, the speed of the blinks has changed, and a new blink sequence has been added for logic board failures. The new and modified blink sequences are described in the illustrations below:

Normal Operation: LED blinks once per 0.5 seconds (instead of once every second as in the past models).

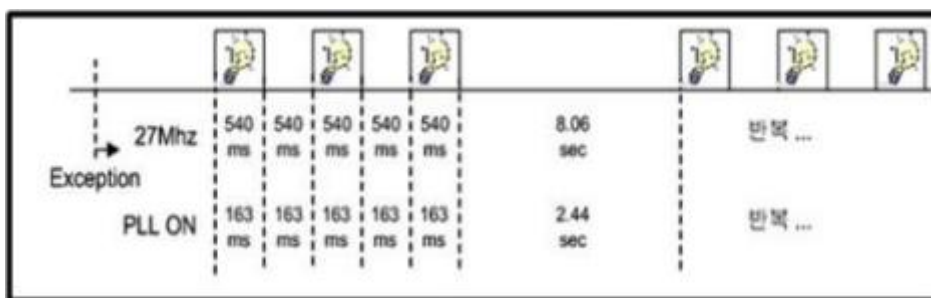


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Driving Board Problem (DRV Reset): LED ON for 5 seconds => LED Off for 2 seconds



Logic Board Problem: LED blinks once every 8 seconds.



6.8- How to Troubleshooting the Y-Buffer Board

Once they have determined that a Plasma TV shutdown problem is caused by a failed component on the Y-Main or Y-Buffer board, many repairers stop there and order both boards at great expense for the repair. This costly solution can be avoided, however, if follow a few quick troubleshooting steps to confirm that the Y-Buffer board has actually failed.

Fist, a little tip on buffer board construction:



The number of scan (buffer) IC's indicates the resolution of the panel. Since each scan IC has 90 output pins and each output pin corresponds to one horizontal scan line on the panel, the number of IC's multiplied by 90 equals the horizontal resolution of the panel. Example: 8 scan IC's equals 720 horizontal lines (8 x 90 lines = 720p Panel).



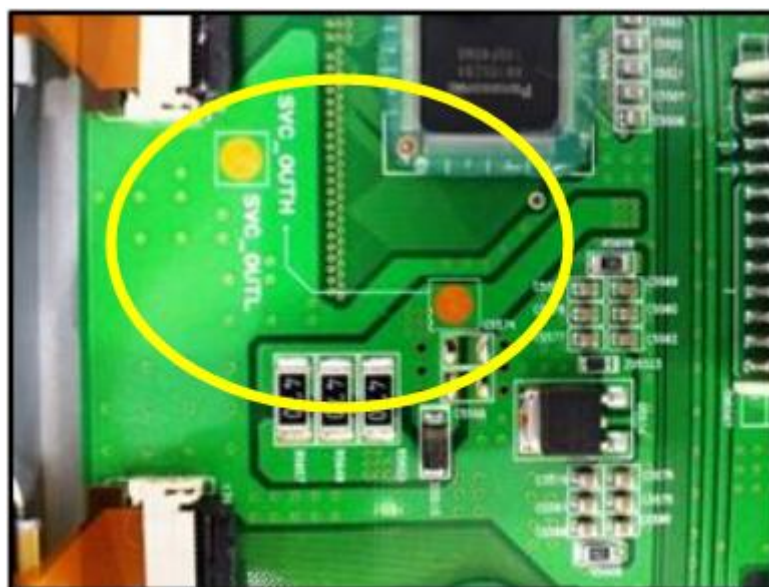
8 IC's X 90 = 720p Panel



12 IC's X 90 = 1080p Panel

The supply for the scan board is called OUT H and OUT L. They are the scan pulses developed on the Y Buffer board and have a DC difference of about 150V that is determined by the Vscan adjustment. There is no ground reference on the scan board. There is also a 5V supply for data processing. It too is referenced to OUT L. Everything on the scan board is riding on the pulses.

Now back to the troubleshooting: Located on the Y-Buffer board are two test points (TP) labeled “Out_L” and “Out_H”. Depending on the panel, they may look different, but their operation is the same. Checking these test points will help you determine the condition of the board.



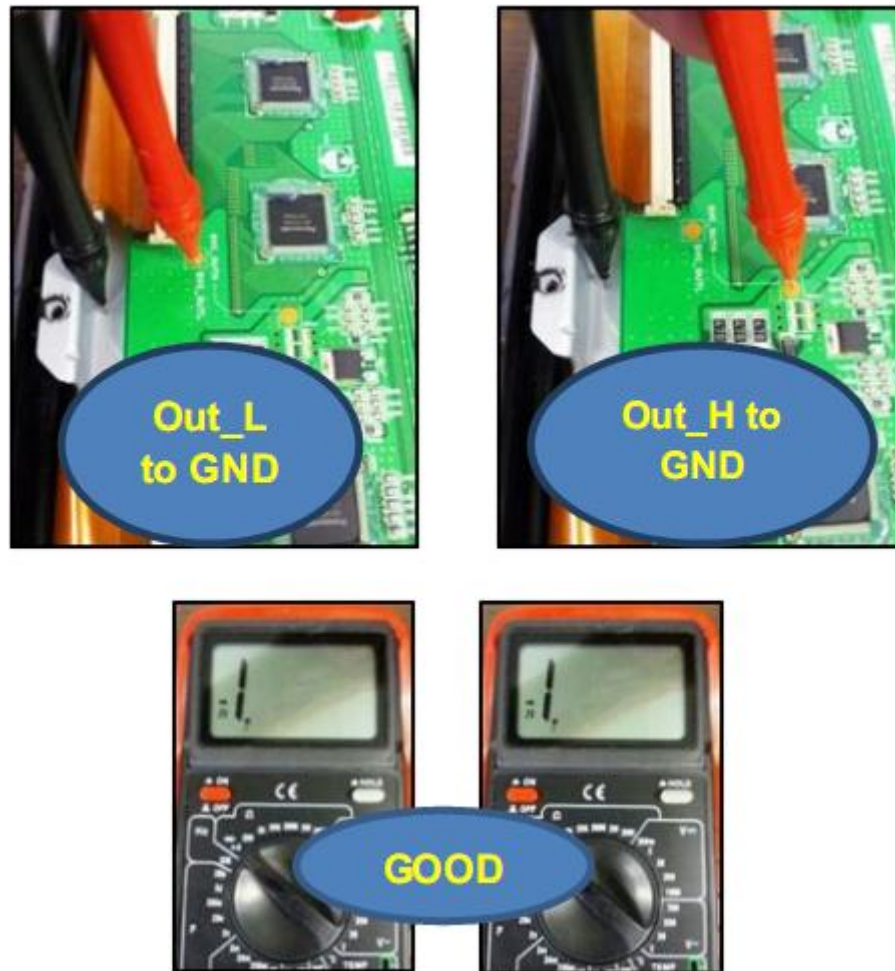
Perform a “Diode” test between the two test points, then reverse the meter leads (probe) and check again. In the forward (FWD) direction, Multi-meter should show a good voltage drop (0.6~0.7Vdc). In the reverse direction (REV), it should show “Infinite” ∞. Next, check for a short between each TP and the chassis. If each checks good, then power the unit up and check for

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proper operation voltage: ~140 to 150Vdc (depends on the panel size). See the picture below:

Good Buffer Board

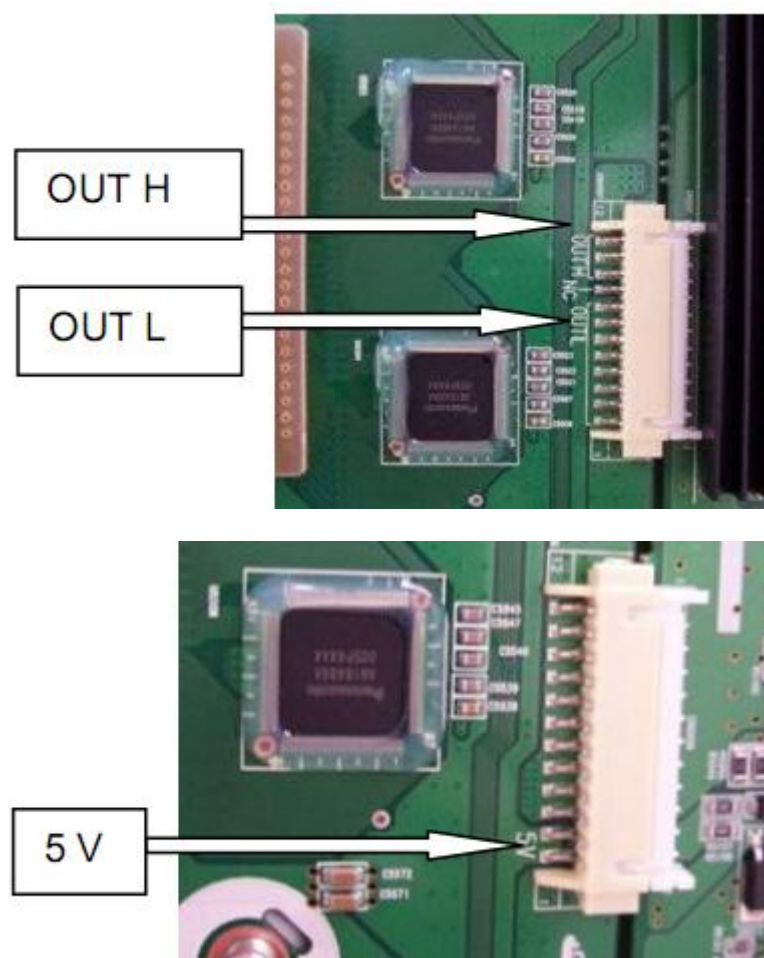




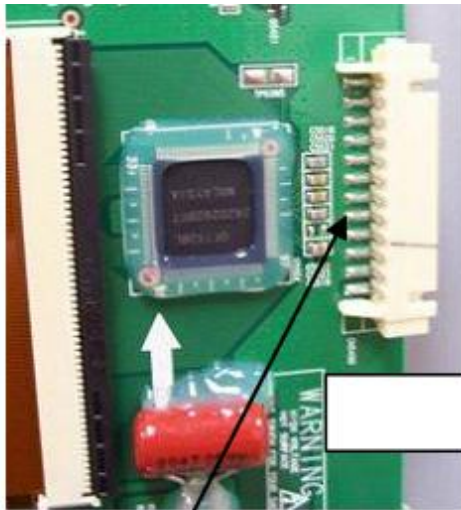
Finally, if you discover a short or the operating voltage (Out_L to Out_H) is incorrect, remove the Y-Main and panel to isolate the buffer board and redo the “Diode test” at the Out_L & Out_H test points.

Caution: When do the “Diode test”, MUST **power off** the TV first! **DO NOT** power up the unit and allow Vs voltage to the Y-Main while Y-Buffer board is removed. If not, you will damage the Y-Main board.

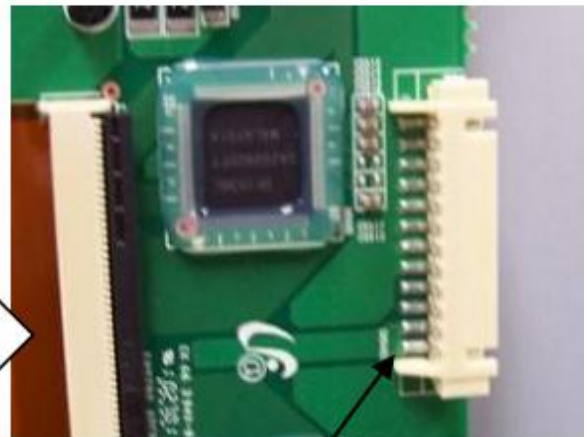
Note: Another method to test scan boards for shorts using Multi-meter “Diode test” setting. Measure from OUT L to OUT H and 5V to OUT L use both polarities. There will usually be a dead short if defective.



The boards on some models may not be marked. Using the PN42C450 as an example, if you see many traces of the connectors tied together; you are looking at the OUT L. The OUT H will have 2 or 3 pins connected. The 5V has a large trace with 1 or 2 pins.



OUT L. All but the outer two pins are connected together.



OUT H. 2 pins with a large trace.



5V. Single large trace.

For more **Samsung Plasma TV Training information** please refers to the **Bonus-B Download Page section**: Some information like:

1) Samsung 2008 Plasma Display Panel Guide

* Circuit Explanation, Troubleshooting and Repair Procedure:

- | | |
|---|---|
| 1. PDP specifications | 19. HDMI/DVI Signal Path |
| 2. PDP Feature List | 20. PC Video Signal Path |
| 3. 3D ready | 21. Video Circuit Troubleshooting |
| 4. Touch Of Color Display | 22. Audio Signal Path |
| 5. RSS Web Connection | 23. Audio Circuit Troubleshooting |
| 6. DLNA Connection | 24. SMPS Circuit Explanation |
| 7. Block Diagram Explanation | 25. SMPS Troubleshooting |
| 8. Main Board Operation | 26. Logic Board Explanation |
| 9. Logic Board Operation | 27. Logic Board Troubleshooting |
| 10. SMPS Board Operation | 28. Y Board Explanation |
| 11. Y Board Operation | 29. Y Board Troubleshooting |
| 12. X Board Operation | 30. X Board Explanation |
| 13. Panel Operation | 31. X Board Troubleshooting |
| 14. Video Block Diagram Explanation | 32. Buffer Board Explanation |
| 15. Video Process Overview | 33. Buffer Board Troubleshooting |
| 16. Analog Video Signal Path | 34. Alignments and Adjustments |
| 17. Component Video Signal Path | 35. Panel Diffusion |
| 18. ATSC ClearQAM Signal Path | 36. Board Replacement Procedures |
| | 37. Panel Replacement Procedures |

2) Samsung Old Models (Alexander) Plasma TV Training Manual

3) Samsung 2012 Plasma TV Training Course

4) Samsung Plasma TV Fast Track Troubleshooting Guide x 26 Various Models.

5) And etc...

7. Conclusion for Plasma TV Repair

After read the above top 3 brands manufacturer of Plasma TV Module/Panels, we know that:

- 1) Other brands of Plasma TV beside the LG, Panasonic & Samsung, where they using these top 3 plasma modules to build their Plasma TV can use this eBook repair information to troubleshooting and repairing their TV too!
- 2) Their repair information can be exchange use. For example: Their plasma tv display faults symptom and solution. When a LG display fault is Display Abnormal, we can refer to the Panasonic plasma tv display fault and their solution to troubleshoot it. Of course not all follow the same, just from there to get some idea to repair the TV. Another example: When a Samsung Plasma TV their VS voltage line shorted and can't find out what's wrong, so we can get some repair tips from LG or Panasonic Plasma TV repair information to repair the TV and so on.
- 3) When checking their Y-DRIVE (Buffer) boards you must use their own Floating Ground (FG) to testing their signal and voltage. Lots of the repairer when they repair Plasma TV, always shorted or burnt their Y-Drive (Up or Bottom) boards or the Y-SUS/Main board. Because of they forgot to screw back the FG points or wrong use this point as a normal chassis Ground (GND) and etc.
- 4) They have their own methods to isolate the Mainboard problem with Panels/Module.
- 5) No matter what brands of the Plasma TV Module, their PSU board can run with AC voltage inputs. BUT highly recommend connecting the Light Bulbs for their VS (Vsus) voltage output line. To confirm that the PSU board surely can run with a load and to “discharge” their VS voltage! What is the meaning of “discharge” VS voltage? IF the PSU board AC voltage applied into it without a load, their VS circuit capacitor/s will store energy (voltage) inside the cap. If the Capacitor not discharge and we just connect the PSU board back to their Y-Main or SC board, it may damage the board! So highly recommend connecting the Light Bulbs to their PSU board VS voltage output pin to testing the PSU board and “discharge” their VS voltage when power off.

6) After replace their PSU board, Y-SUS board, Z-SUS board it is highly recommend to checking their voltages same as Voltage Label on their rear Panel. If not, even after replaced these boards, this plasma TV may not use long lasting. Sometime it can damage again the same board too.

7) When the TV is display abnormal, we need to know how to isolate their problem is in Mainboard or Panel/Module. If that's the Module problem, we need to checking their Module voltages same as the Voltage Label!

Sometime we need to fine tune their VR to reach the voltage same as Voltage Label sticker. If after adjust the VR still can't reach the correct voltage, that's mean the PCB board is defective and need to repair or replace it.

8) When replace their PCB board, make sure that to purchase the same part number and version of the boards. Especially their CTRL board, even the part number is same, but their firmware (ROM) version is different or older than the original CTRL board, it will causing the strange problem and we will think that the TV has another problem in it! So be careful and don't do this mistake, especially for the used parts.

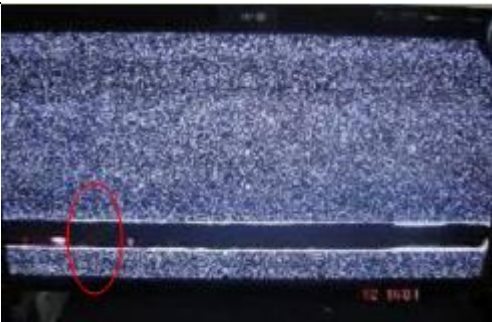
9) If the methods above not work with your Plasma TV Power Supply (PSU), you may try to opposite their connection, for example:

- If their original connection is PS_ON connect to standby 5V and the VS_ON is connect to ground (GND), we can opposite their connection like connect the PS_ON to GND, and the VS_ON connect to standby 5V.
- Make sure that the connection is connecting to the right pin/s! Also connect the Light Bulbs as a loading for their VS (Vsus) voltage output pin.

10) Some of the repair/solutions for the symptom, for example is replace Panel only, but I will recommend the repairer to do more troubleshoot on it. Because even the solution is replace Panel, try to check their TCP contacts point/golden finger and using the "eraser" tool to clean up their pins. Some time it will solve the problem, especially the vertical lines problem. Also for other parts too!

8. Collection of Plasma TV Display Faults and Their Repair Solution

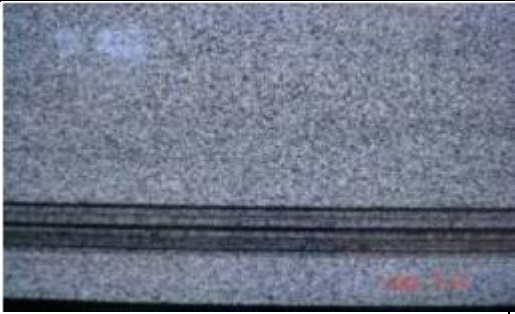
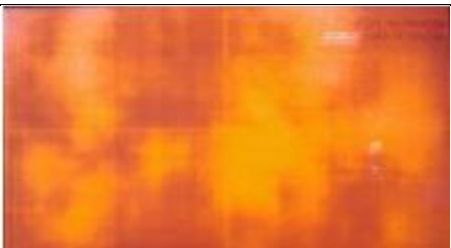
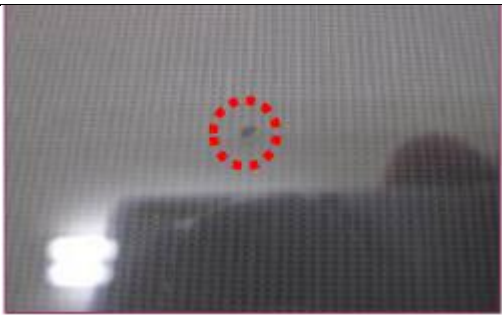
8.1- LG Plasma TV Display Fault

Part	Example	Issue	Solution
FFC Cable		Vertical Lines	Issue: Color Vertical lines Cause: P331 connector FFC cable Solution: Use Eraser to clean their FFC cable contact point.
Z-SUS		Display Abnormal	Issue: Image issue Cause: Z-SUS Q2 Fail Solution: Repair/ Replace Z-SUS Board
Y-Drive		Horizontal Line/Bar	Issue: 96 Horizontal Line/Bar Cause: Y-Drive IC Fail Solution: Y-Drive Board change.

Panel		Image Issue	Issue: Image Issue Cause: No Panel Vacuum Solution: Panel/Module change.
Z-SUS		Abnormal Display	Issue: Image Issue Cause: Z-SUS FET Q200 shorted. Solution: Z-SUS repair or change.
Panel		Vertical Line	Issue: Vertical Line Cause: TCP IC Fail. Solution: Panel change.
Y-Driver Contact		Horizontal Line	Issue: Horizontal Line Cause: No Y-Drive Contact Solution: Y-Drive Board change.

Z-SUS		Abnormal Display	Issue: Image Issue Cause: Z-SUS Q2 FET Fail Solution: Z-SUS board repair/change.
Y-SUS		Abnormal Display	Issue: Image Issue Cause: Y-SUS R607 Fail. Solution: Y-SUS board repair or change.
TCP Connect or		Image Issue	Issue: Image Issue Cause: No TCP Connector Connect. Solution: Re-connect it properly.
Panel		Vertical Block	Issue: Vertical Block Cause: TCP IC Fail Solution: Panel change.
Z-SUS		Abnormal Display	Issue: Image Issue Cause: Z-SUS board IC103 shorted. Solution: Z-SUS board repair/change

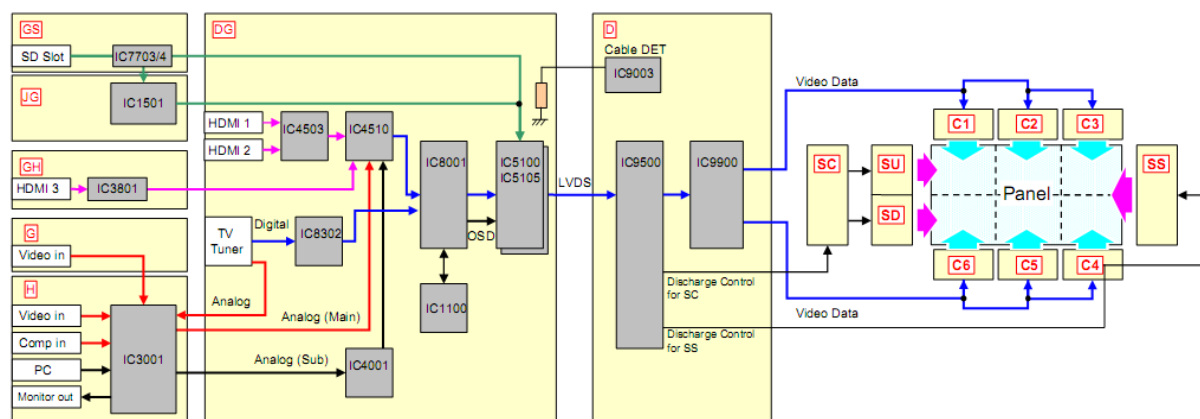
Y-SUS Z-SUS		Image Issue * 1-2 times a day	Issue: Image Issue Cause: Y & Z-SUS boards. Solution: Y & Z-SUS boards try to do voltage adjustment, if not change boards.
Y-Drive		Horizontal Bar	Issue: Horizontal Bar. Cause: Y-Drive IC Fail Solution: Y-Drive Board change.
Z-SUS		Abnormal Display	Issue: Image Issue Cause: Z-SUS board Solution: Z-SUS board change.
Panel		Vertical Line	Issue: Vertical Line Cause: TCP IC Film Solution: Panel Change or use the bonding machine to “re-solder” the TAB.
CTRL Board		Vertical Lines	Issue: Vertical Lines Cause: ASIC Fail Solution: CTRL Board change.

Panel		Horizontal Lines	Issue: Horizontal Lines Cause: FPC Align Fail Solution: Panel change.
X Board		No Power	Issue: MLC Contamination – Damage. Solution: Panel change.
50R1 Panel		Broken Image	Issue: Broken Image Solution: Z-SUS board change.
50R1 Panel		Mal-Discharge	Issue: Mal-Discharge Solution: Y-SUS change.
42T1 Panel		Excessive Mal-Discharge	Issue: Excessive Mal-Discharge Solution: Y-SUS board change.
Panel		Dust Inside the Glass	Issue: Dust Inside Glass Solution: Open side of frame and remove it with cloth. Re-assemble and test.

8.2- Panasonic Plasma TV Display Fault

1) PDP 2007 Models Plasma TV

TH-50PZ750 Plasma TV Signal Processing Circuit: (This Plasma Module is using the Dual Scan Panel)



IC7703/4 (GS Board)

: Switch IC

IC1501 (JG Board)

: Peaks PRO IC

IC3801 (GH Board)

: HDMI EQ

IC3001 (H Board)

: Video Switch

IC4503 (DG Board)

: Switch IC

IC4510 (DG Board)

: HDMI/ IF, A/D IC

IC8302 (DG Board)

: Front End Processor IC

IC4001 (DG Board)

: GC3FS (Video Processing for Sub Window)

IC8001 (DG Board)

: Peaks Lite2 (Digital Video Processor)

IC5100 (DG Board)

: Video Processor IC (Format Converter)

IC5105 (DG Board)

: LVDS Transmitter

IC1100 (DG Board)

: Micom

IC9500 (D Board)

: FPGA (LVDS Receiver, Discharge Control)

IC9900 (D Board)

: PD1-M (Sub Field Processor, Data Driver Processor)

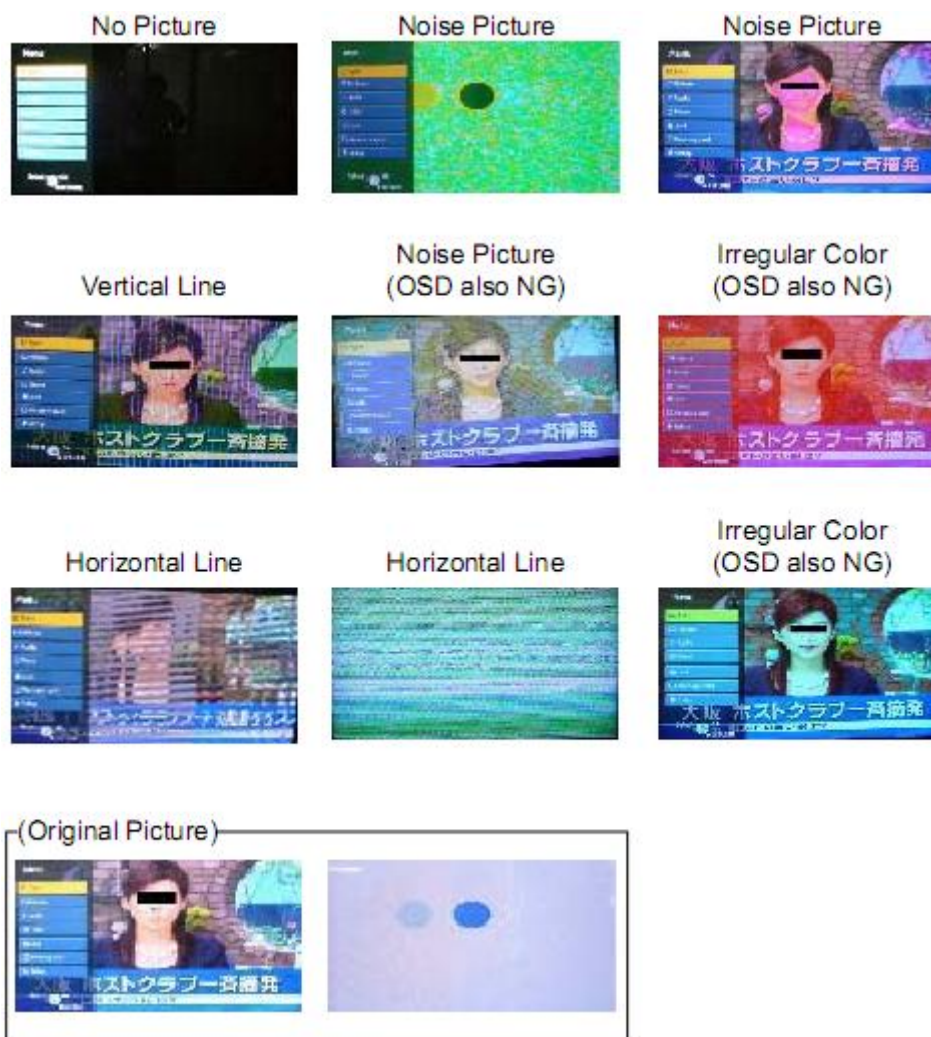
IC9003 (D Board)

: Micom

Picture Problem (1-1)

Symptom: Abnormal Picture (All over the screen)

Problem Picture Example:



Caused Possibility:

D board, DG board

Diagnosis Procedure:

1. Disconnect D5 connector
2. Enter to the Test Pattern

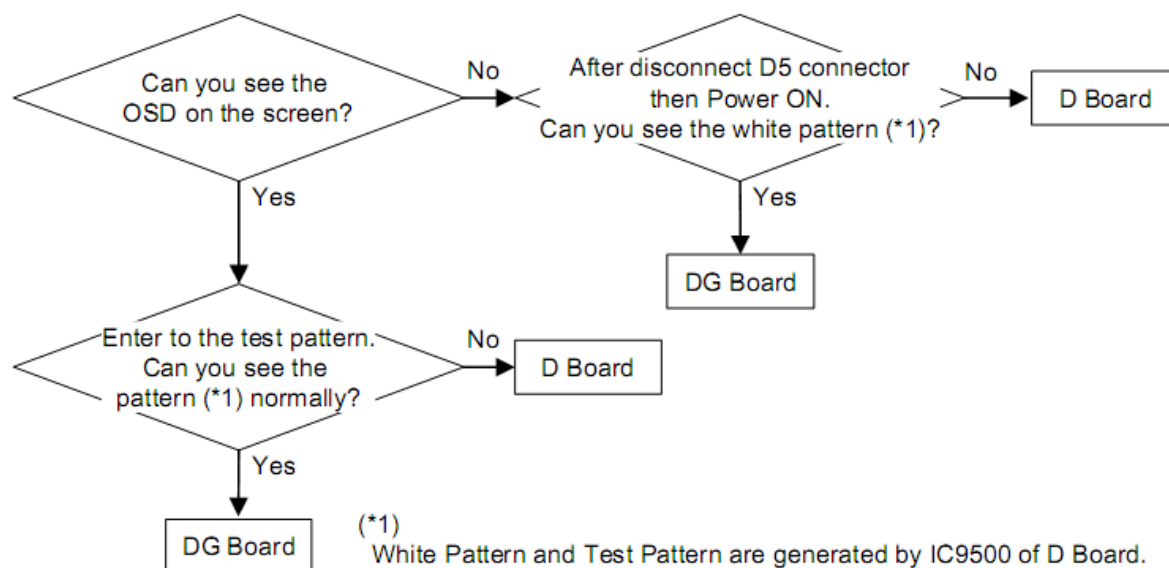
=> How to Enter the Test Pattern

a) While pressing “VOLUME – ” button of the TV set, press “RECALL” button of the remote control three times within 2 seconds.

b) Push button “1” of remote control several times, and select “OPTION” setting.

c) Press “OK” button of remote control for three seconds or more to place the unit in the test pattern.

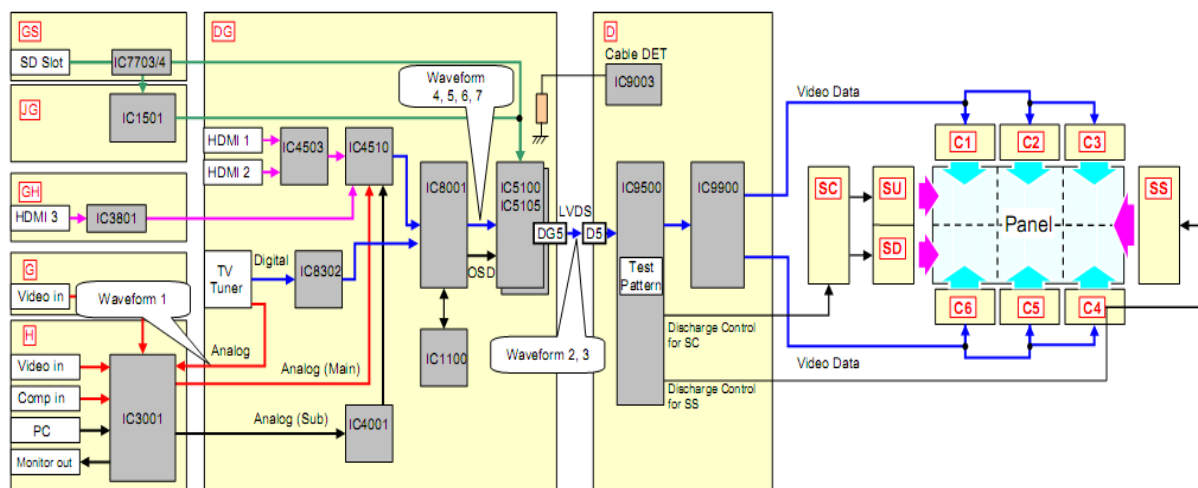
Counter Measure:



(*1)
White Pattern and Test Pattern are generated by IC9500 of D Board.
When these patterns are normally displayed on the screen, It can be seen good processing circuit between the D board and panel drive circuit.

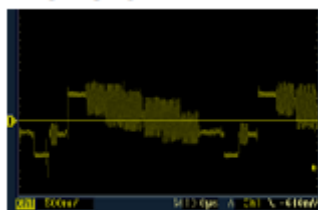
Notice:
Regarding information for test pattern in detail,
Please refer to Page 22, 23.

Picture Problem (1-2)



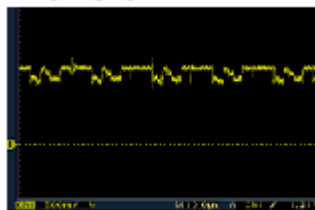
Reference:

Waveform 1



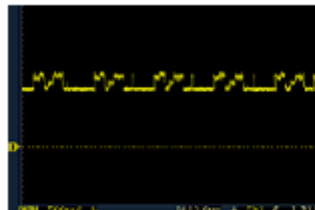
Video Signal
(Check at C4552)

Waveform 2



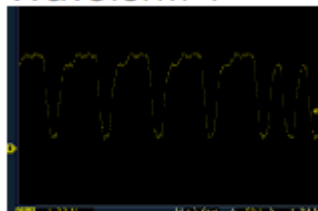
LVDS Signal
(Check at FL5015)

Waveform 3



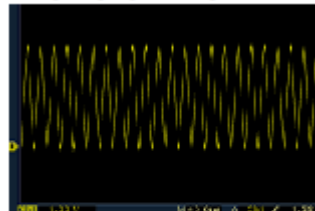
LVDS Signal
(Check at FL5015)

Waveform 4



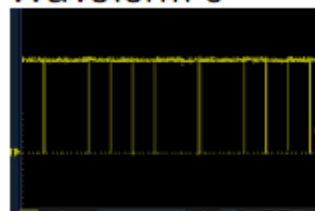
U Signal
(Check at R4639)

Waveform 5



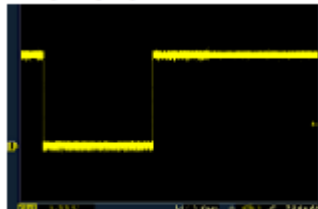
Clock Signal
(Check at R4636)

Waveform 6



Clock Signal
(Check at R4646)

Waveform 7



Clock Signal
(Check at R4645)

Picture Problem (2)

Symptom: Electronic Abnormal Discharge Picture (All over the screen)

Problem Picture Example:



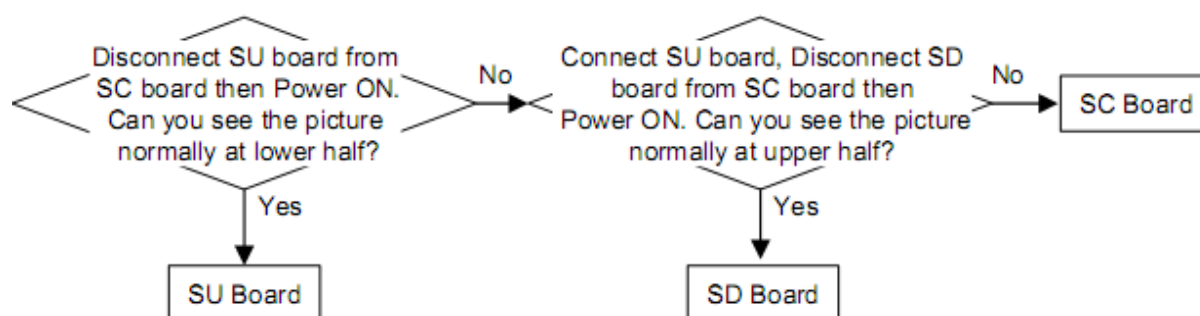
Caused Possibility:

SC, SU, SD board

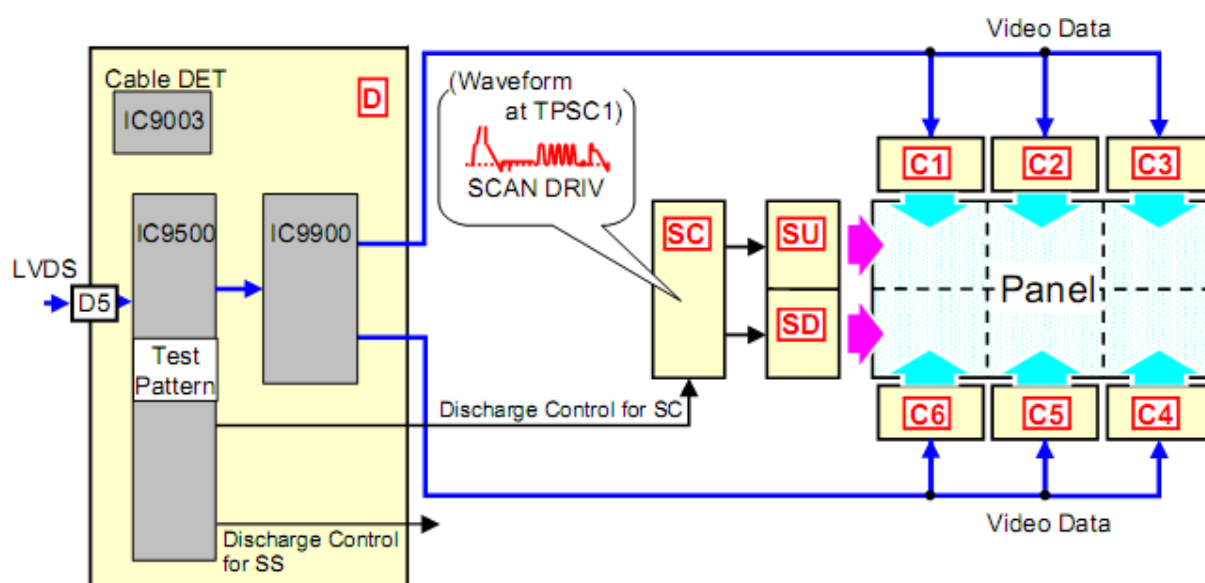
Diagnosis Procedure:

Disconnect SU or SD Board

Counter Measure:



Notice: You can also diagnose which board is wrong by measuring waveform at TPSC1. Diagnosis procedure is as follows:



Situation	Condition	Cause
Disconnect SU Board (Connect SD)	Waveform <u>OK</u>	SU Board
Disconnect SD Board (Connect SU)	Waveform <u>OK</u>	SD Board
Disconnect Both Boards	Waveform <u>OK</u>	SC Board (D Board)

Picture Problem (3-1)

Symptom: Abnormal Picture, Vertical Line (Corner Area, Some part of the screen)

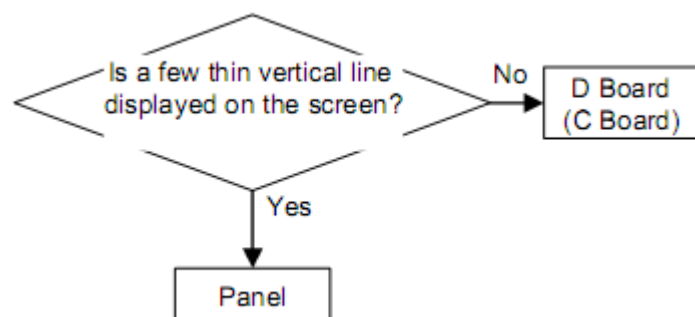
Problem Picture Example:



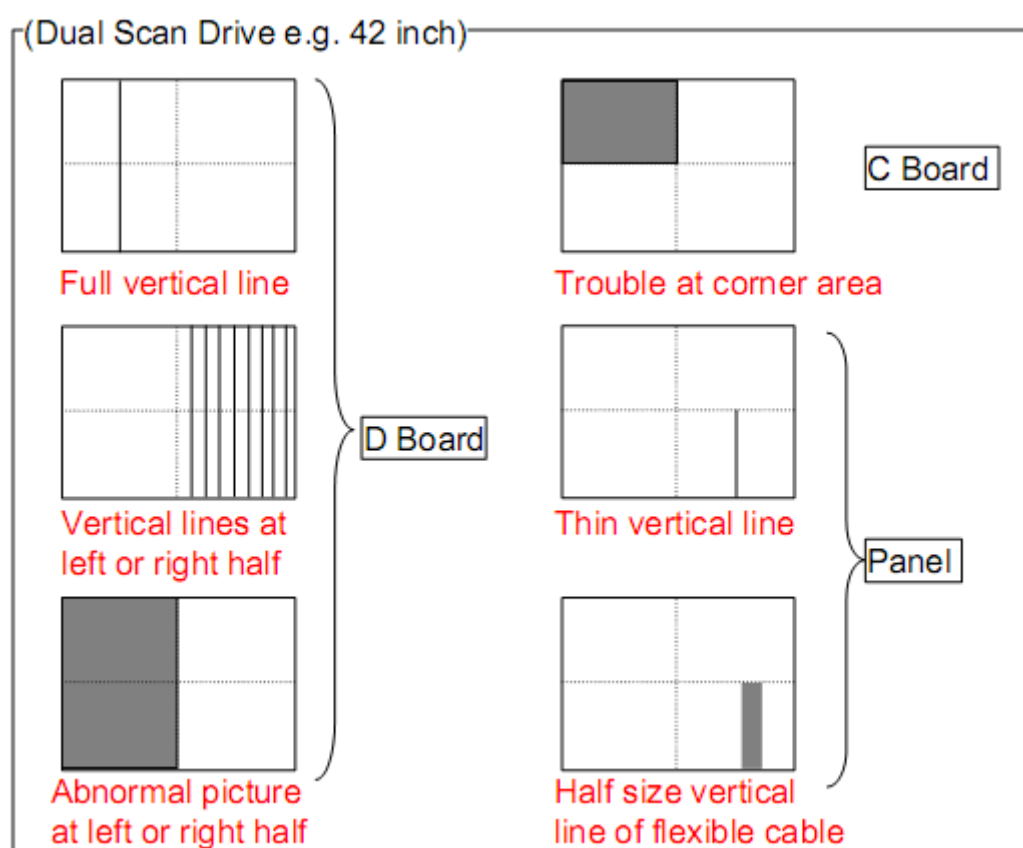
Caused Possibility:

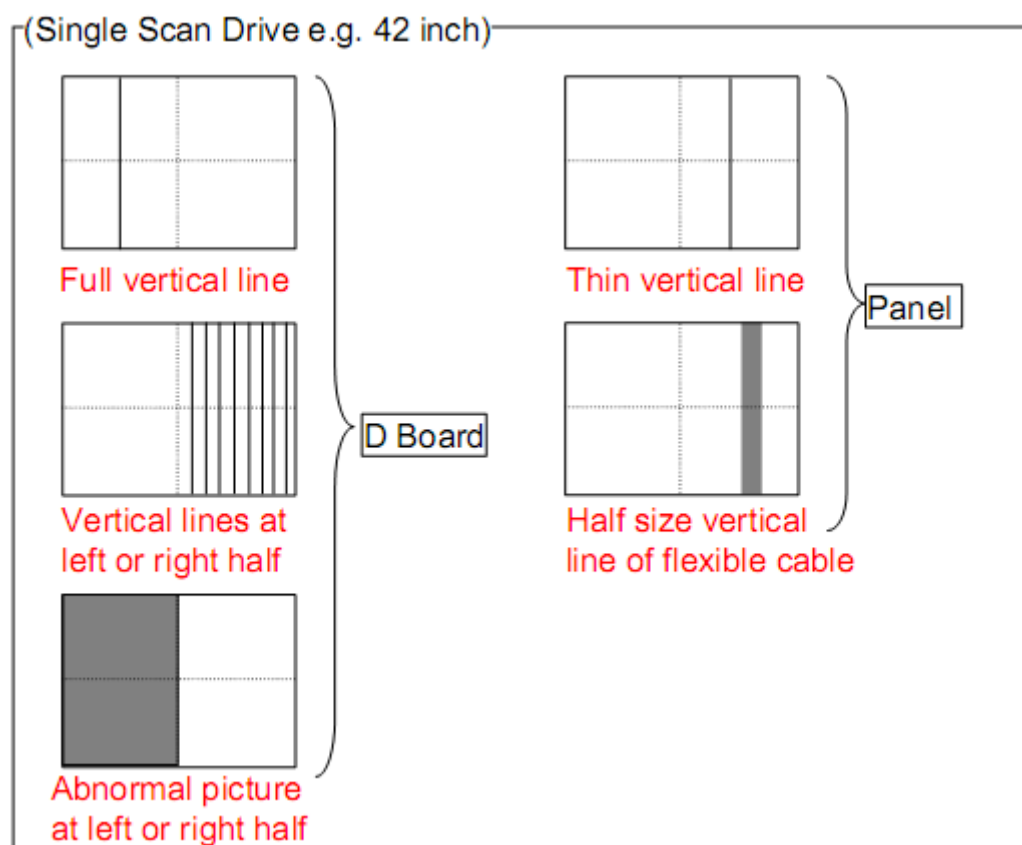
D Board, C Board, Plasma Panel

Counter Measured:

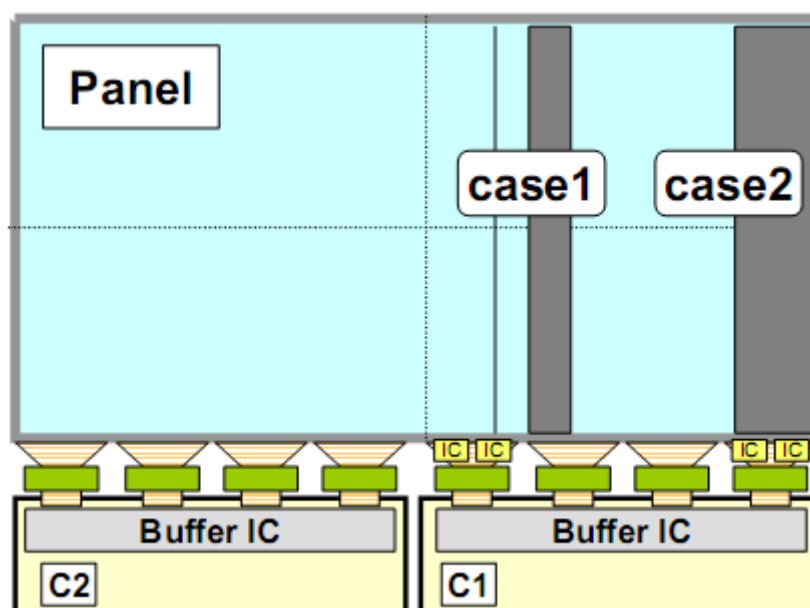


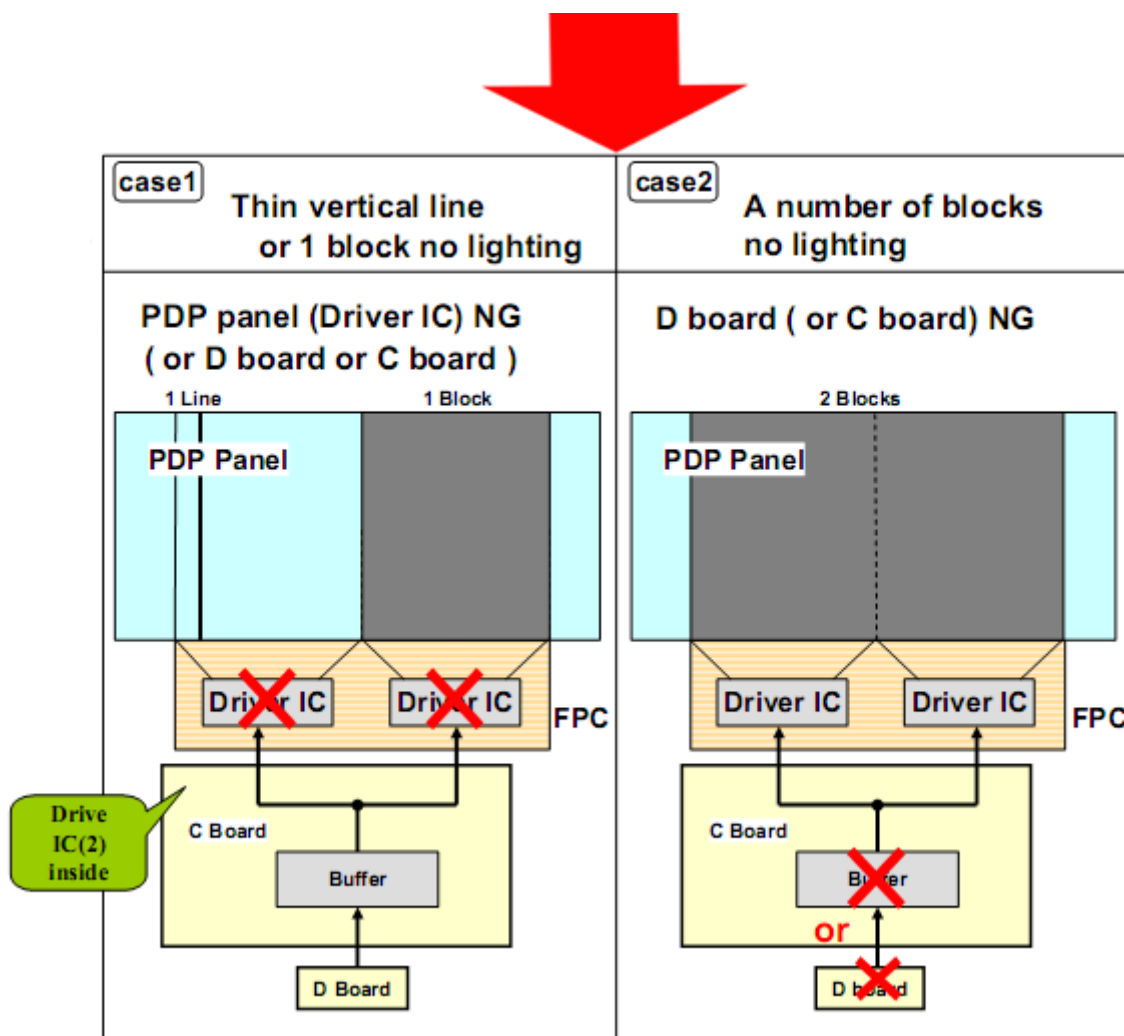
Idea of Diagnosis:





Idea of Diagnosis for Vertical Line

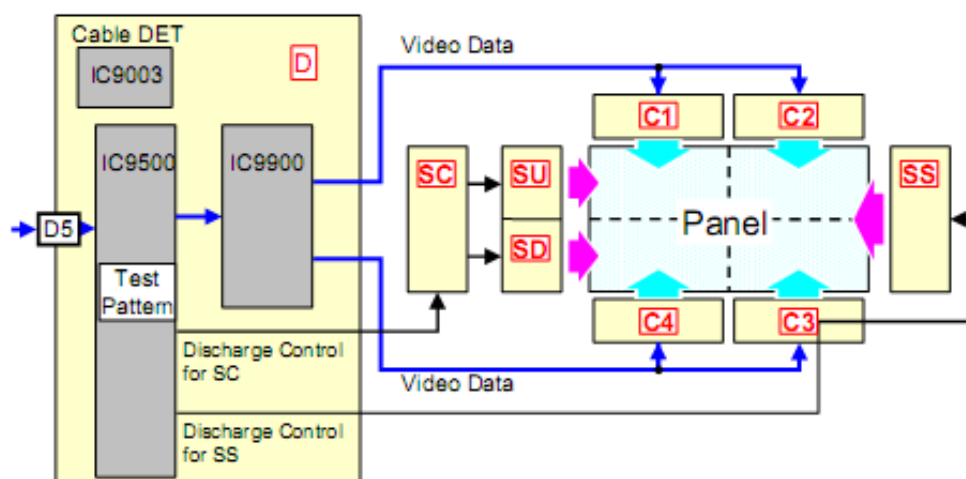




Picture Problem (3-2): Block Diagrams

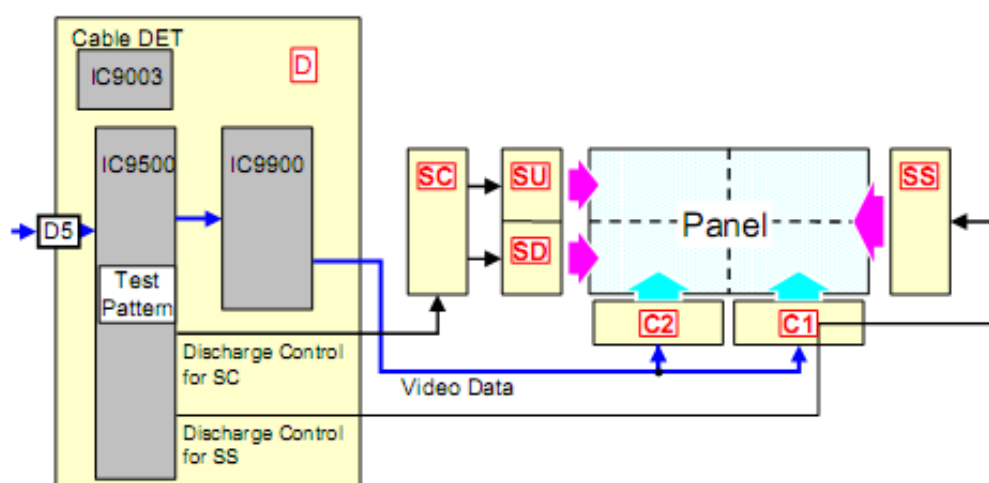
Model No: TH-42PZ700, TH-42PZ77

Panel Type: 1080p resolution panel **Scan System:** Dual Scan Drive



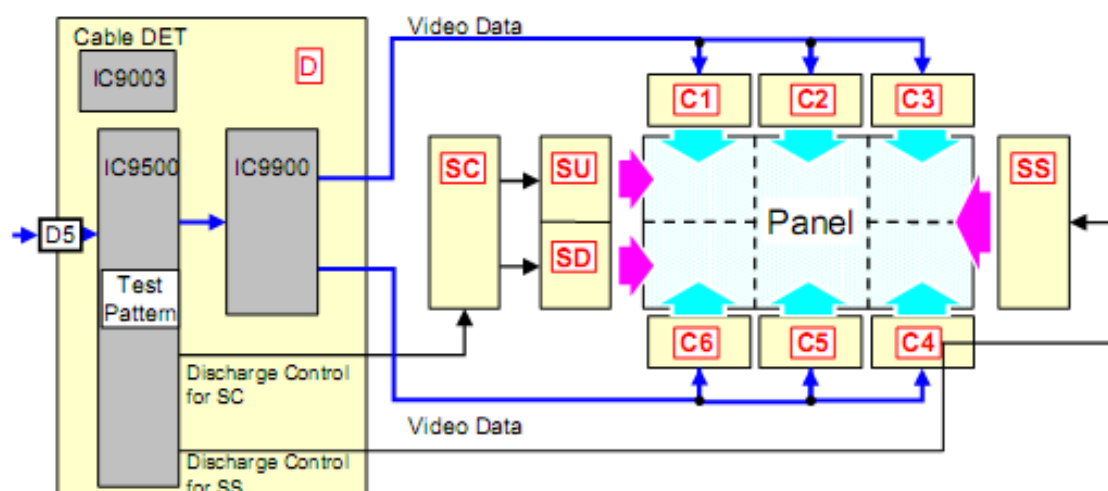
Model No: TH-42PX77, TH-42PX75

Panel Type: HD Panel **Scan System:** Single Scan Drive



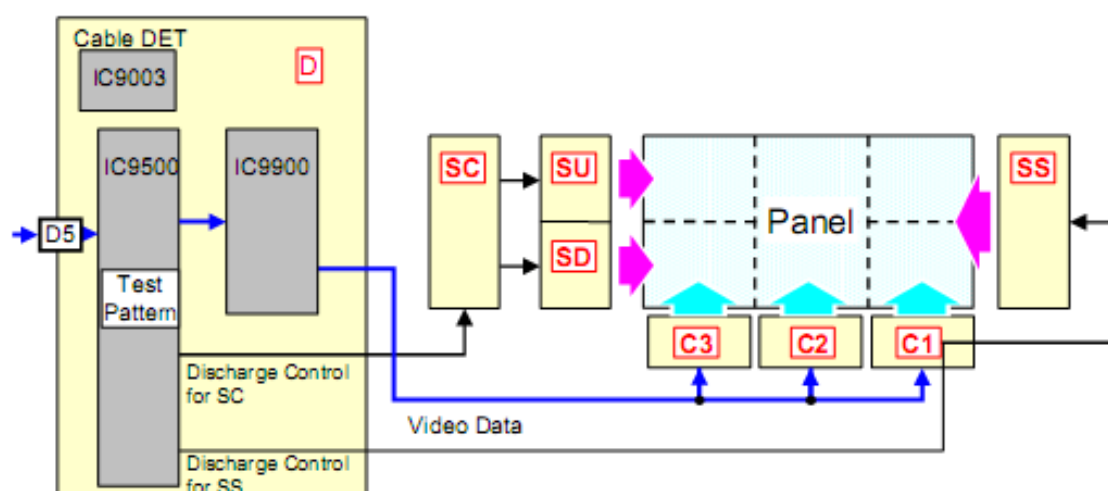
Model No: TH-65/ 58/ 50PZ750, TH-58/ 50PZ700, TH-50PZ77

Panel Type: 1080p resolution panel **Scan System:** Dual Scan Drive



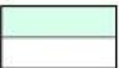
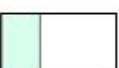
Model No: TH-50PX77, TH-50PX75

Panel Type: HD Panel **Scan System:** Single Scan Drive

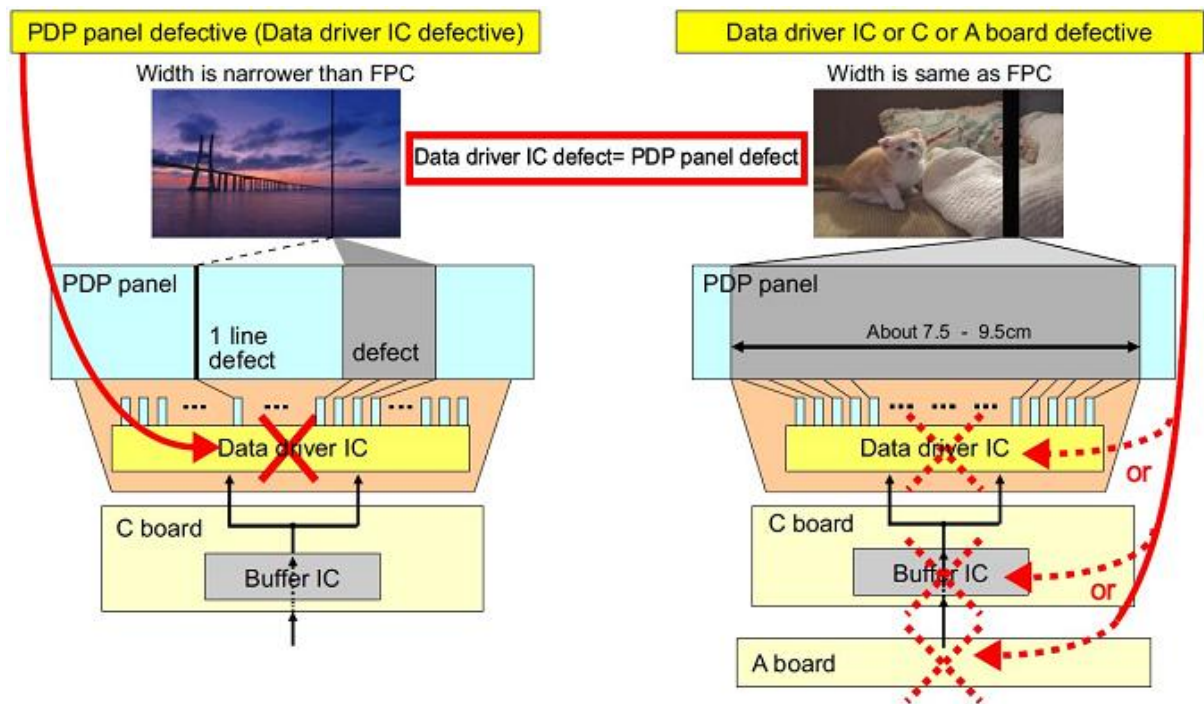


2) PDP 2012 Models, 15th Generation Models Display Faults

Symptom	Actual symptom	Defective board
Irregular Color		A board
All vertical line		A board
Abnormal electric discharge		SC / SS board in case of 42inch SN / SS board

Symptom	Actual symptom	Defective board
Trouble at Upper or Lower half 		Over 46inch : SU / SD 42inch : SN
Horizontal line (Upper or Lower side) 		Over 46inch : SU / SD 42inch : SN or panel
Trouble at Left or Center or Right part (46,42inch : Left or Right half) 	Over 50inch  46/42 inch 	Over 50inch : C1-C3 46/42inch : C1,C2
Vertical line (Width is same as FPC) 		C or A or PDP panel
Vertical line (Width is narrower than FPC) 		PDP panel
Regular bar 		A

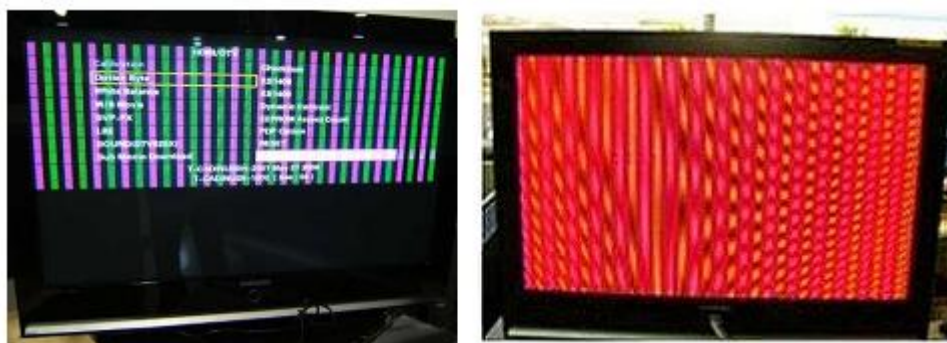
Defective Panel Drive IC



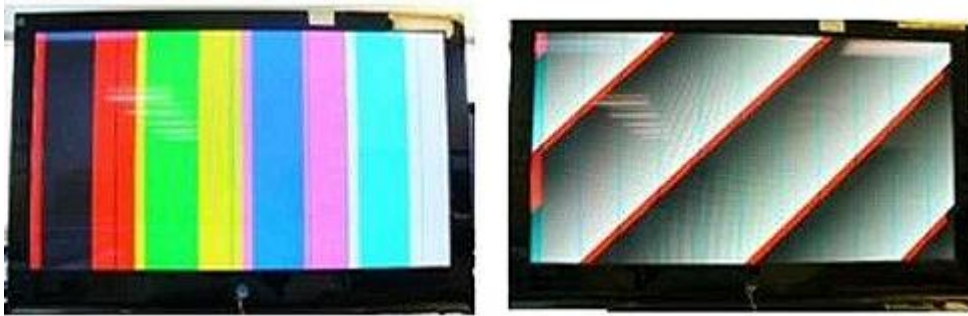
8.3- Samsung Plasma TV Display Fault

Samsung 2009 Models Plasma TV/ Module

Logic Board Failure Examples:



- As you can see each of the example shows the panel illuminated but displays incorrect video.



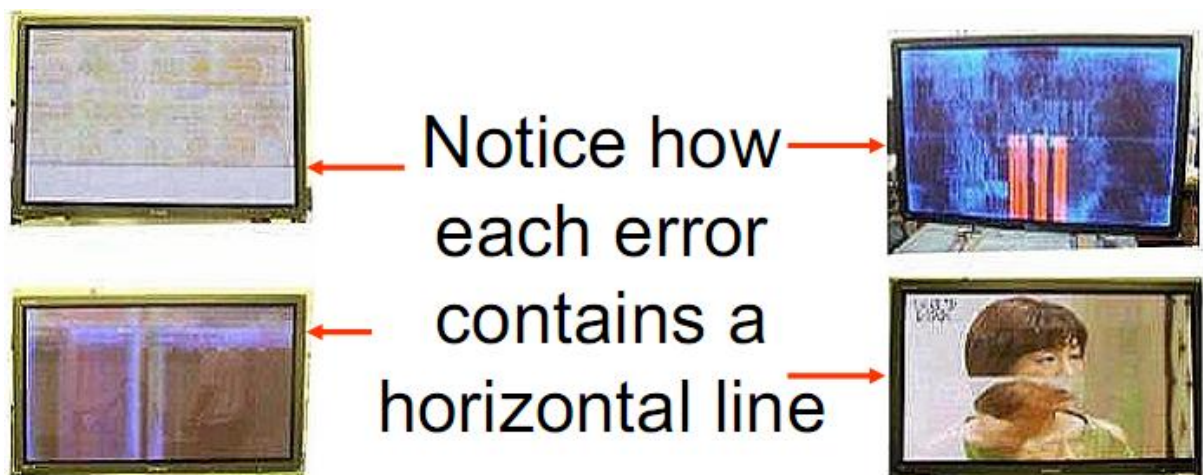
- The error can be incorrect color or noise mixed into the active video.



- In these examples the error is not stationary and changes with content.

All the above photos are Logic board failures. The test patterns located on the Logic board are being displayed along with the incoming video.

Y Board Failure Examples:



- These examples show Y board errors, because the Y electrodes run horizontally, errors can often be seen across the screen and have a horizontal line.
- Another Y Board error can be an entirely black screen.

Y-Buffer Board Failure Examples

**Upper Y
Buffer
Error**



**Lower Y
Buffer
Error**

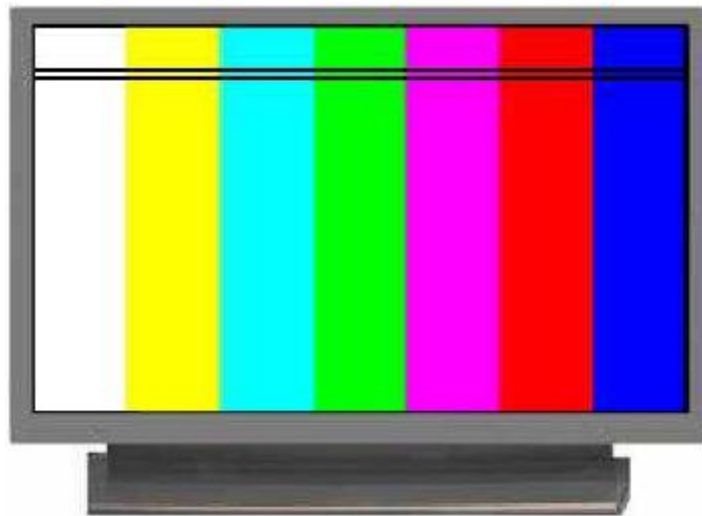


Note 1: Some models merge the upper and lower Y buffers to single board.

Note 2: Some 2008 models merge the Y board and the Y buffers into a single board.

On older style Plasma TV's the upper and lower buffer can be replaced separately. With the introduction of a one piece buffer both upper and lower are replaced as an assembly. In the case of the Y Main (Y board) with built in buffer circuits, the entire Y Main is replaced.

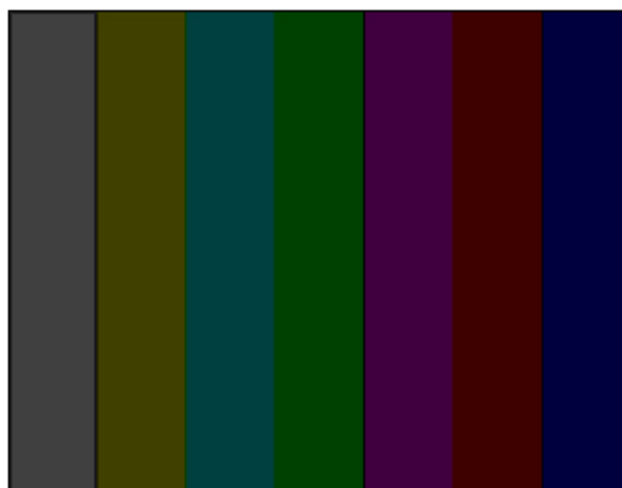
Y-Buffer Connection Errors



If the connection from the Y Buffer board to the panel is not installed properly the panel might show thin parallel lines. This is NOT a panel or a board error.

The connection between the buffer and panel can cause these types of problems. The connections can be cleaned and reseated but make sure the power is removed before attempting.

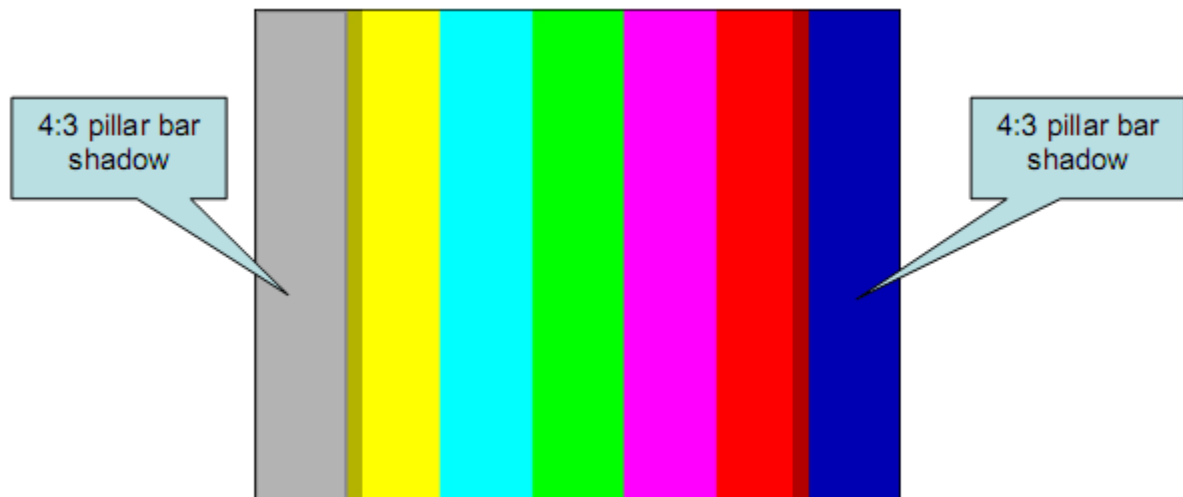
X Board Failure Example-1



- In this example the sustain signal from the X board is low or missing.
- Verify operation of the X board by disconnecting the power supply cable to the X board. If the other boards are working the picture will be dark.

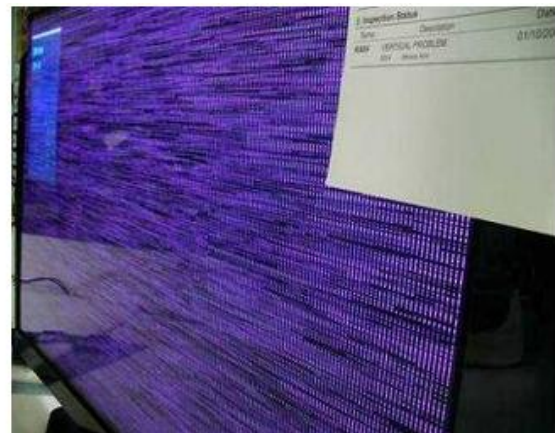
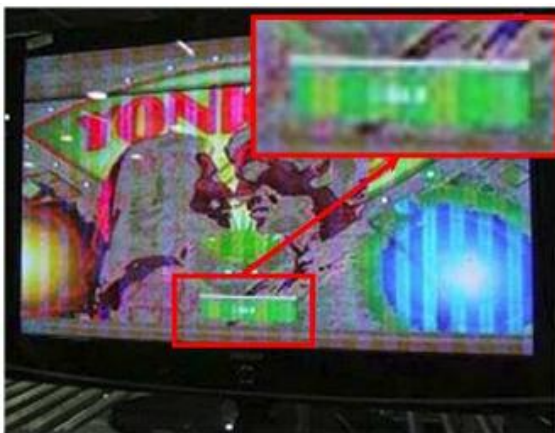
- If the symptom changes with X power supply unplugged the problem is NOT the X board.

X Board Failure Example-2



- In this example the initialize signal is low or missing creating image retention.
- Troubleshoot the X Board by verifying the Plus and Minus Vs voltage levels match the values printed on the panel label.

Mainboard Failure Symptoms-1



- Mainboard errors are similar to logic errors but the problem can be on a single video source input such as the Tuner.
- If the OSD Menu also shows the defect the Mainboard is suspected.

Mainboard Failure Symptoms-2



Original Image

Image on Screen

- Green lines or green screen can be a defective mainboard but can also be caused by a defective LVDS cable to the logic board.
- Pixelization can be caused by the Mainboard but is more commonly a source error.

The Mainboard also provide the operating system. This means all operation function is controlled by this board.

Mainboard failures can be specific to a single input or all sources. Access the Onscreen display to generate a reference picture that can be used to verify the operation of the Video processor. If the OSD image is correct in all aspects the source video is suspected. Mainboard problems can often be disguised by a defective or improperly connected LVDS cable. This cable transfers the video in digital format to the T-CON board (Logic board). Improper connections here can cause missing data bits which will show a wide range of symptoms. Use the logic board test patterns to verify the problem is after the mainboard or before.

9. Plasma TV Repair Tips

9.1- LG Plasma TV or Module Repair Tips

1) Model: LG 2012 Models, 50PA & 50PM Plasma TV

(PSU p/n: EAY62609701)

Symptom: Power protect shutdown after power on. No power, only STBY 5V.

Repair/Solution:

Detect the Film capacitor fail, C802 (22nF, 1250V). Replace it and the problem solved.

	Capacitor Maker	Spec & Picture
		50" PSU P/n : EAY62609701 C802 : 22nF, 1250V
OK	PILKOR -Blue color	
NG	SUNGHO -Black color	

PV1- Collection of Plasma TV Repair Tips

2) Model: LG 50PJxxx-xx & 50PKxxx-xx Plasma TV

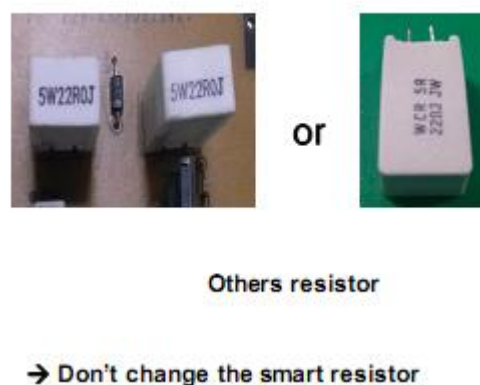
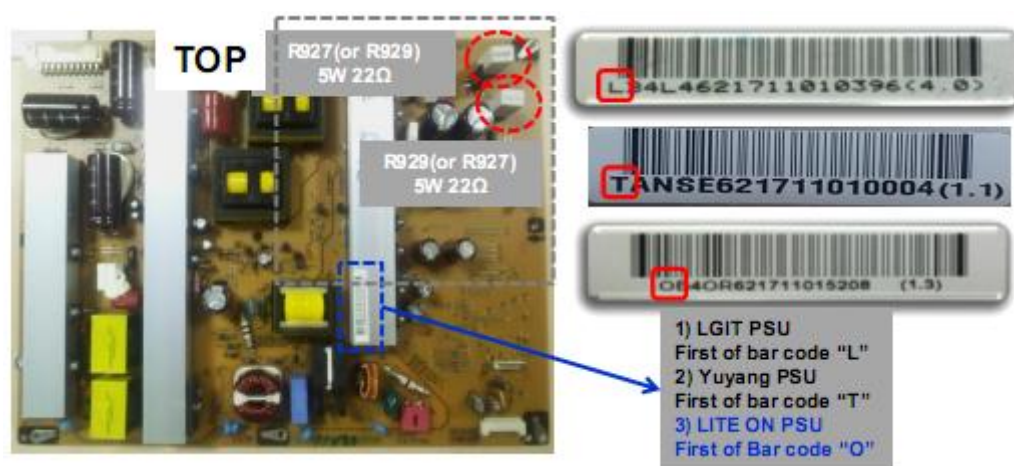
PSU p/n: EAY609687011 (50PJ models) & EAY60968801 (50PK models)

Symptom: No Power

Caused: Causing by the weak resistance in the LITEON PSU, their R929 & R927 should be upgraded.

Repair/Solution:

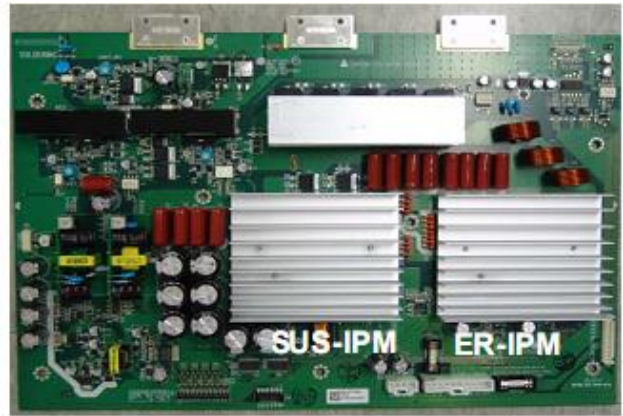
Replace R927 & R929 (both 22 ohm/ 5W).



3) **Model:** LG PDP42V7, 42V8, 42X3, 42X4 & 50X3 Plasma Modules



42X3 Y-SUS

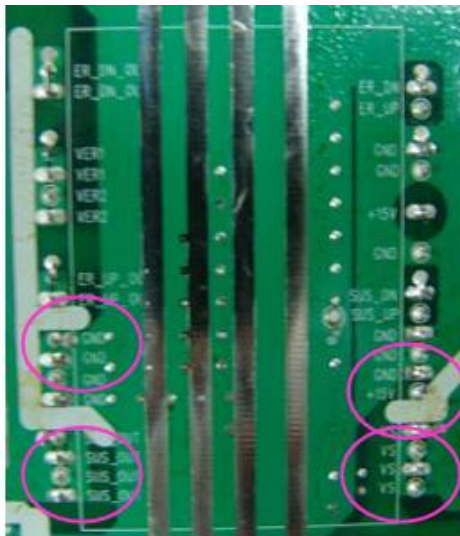


50X3 Y-SUS

Symptom: No Display. Power on and sound OK.

Repair/Solution:

Check the Y-SUS and Z-SUS board Fuse, like FS2 & FS3. If the Fuse opened, check the IPM module.



Forward

- Test. 1. GND(+), Sus-out(-)
2. Sus-out(+), Vs(-)

In each test, the Diode value are over 0.4V → OK

Reverse

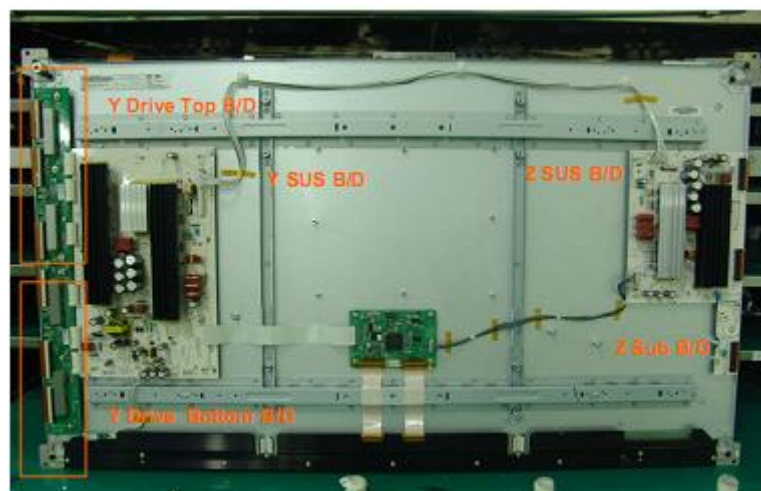
- Test 1. GND(-), Sus-out(+)
2. Sus-out(-), Vs(+)

In each test, the diode value comes infinity(∞) → OK

If the checking values not same as the above, that's mean the IPM is defective and need to change.

PV1- Collection of Plasma TV Repair Tips

4) Model: LG 50PQ series Plasma TV with PDP50G2 Panel

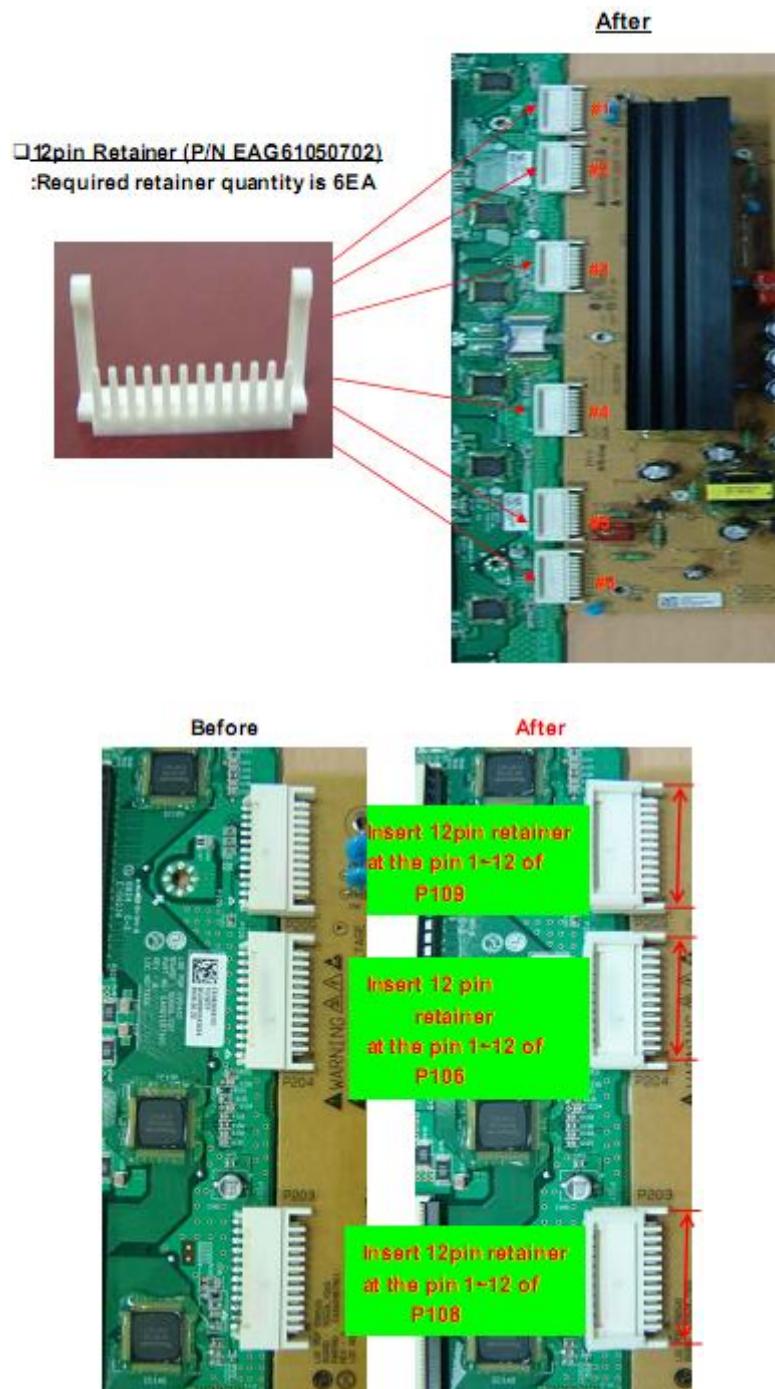


Symptom: Dark bottom half of picture, bottom half unclear picture or bottom half no display.



Repair/Solution:

The Y-SUS board and Y-Drive (Top & Bottom) boards in between connectors contact problem. Try to clean and re-insert it properly. Or add a retainer (clips) to improve their sockets.



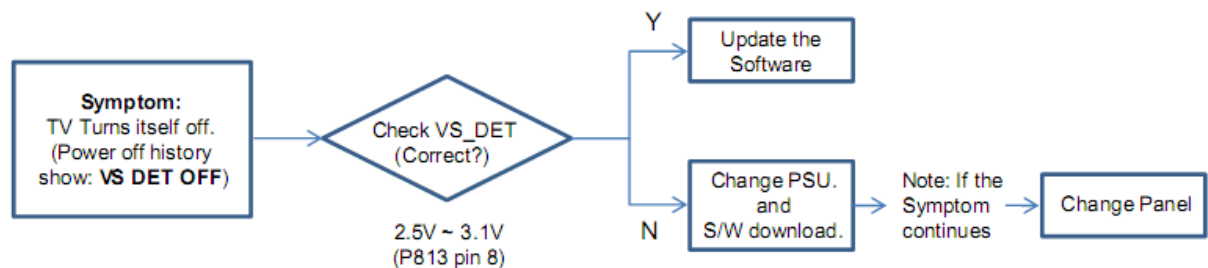
5) Model: LG 50PN4500, 50PN5300, 50PN6500, 60PN5000, 60PN6300, 60PN6500 & 60PN6550 Plasma TV

Symptom: TV Turned Off by Itself Automatically & Randomly.

Repair/Solution:

Regarding this type of symptom are very hard to the repairer to find out what's wrong about the Tv. Actually you can login to their service mode to the "Power Off History". Regarding the above models TV turns of automatically, after check their Power Off history shows that the "VS_Det Off". That's mean their VS_Det signal was causing the system shuts down the TV due to the abnormal voltage detection in VS voltage line.

TV system executes auto turn off by S/W (software or firmware) control when abnormal VS voltage is detected to protect PDP panel. But in this case, S/W algorithm of VS detecting timing is designed very sensitive to noise. It means that momentary signal (or noise) can cause this problem occur. So follow the below flow chart for the solution:



Note:

This tips can helps the plasma tv shuts down automatically without any signs. So follow the steps above to solve it. For example the AC_DET is another issue too. But most of the time is to repair the PSU board to solve the problem.

6) Model: LG PDP42G2 & 50G2 Panels (LG 42PQxx & LG 50PQxx series Plasma TV)

Symptom: Vertical Line/s Issue

- Vertical lines with same interval
- Vertical lines without same interval

1. Vertical line with same interval (16pixels)



2. Vertical line without same interval (8pixels, 16pixels or 32pixels)



Repair/Solution:

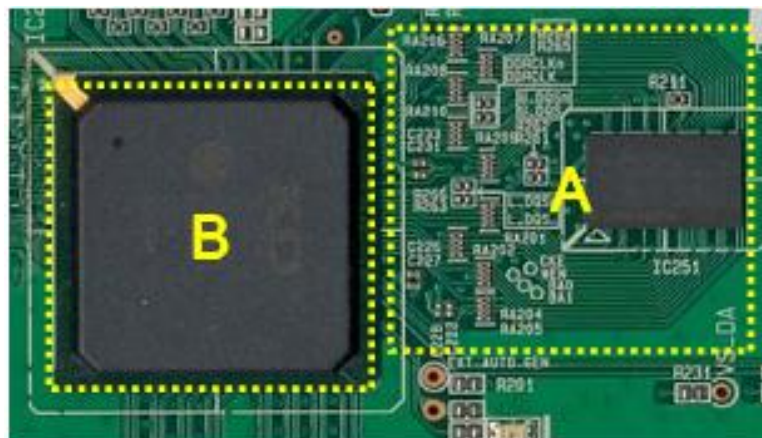
1) Vertical line with same interval



Check Procedure:

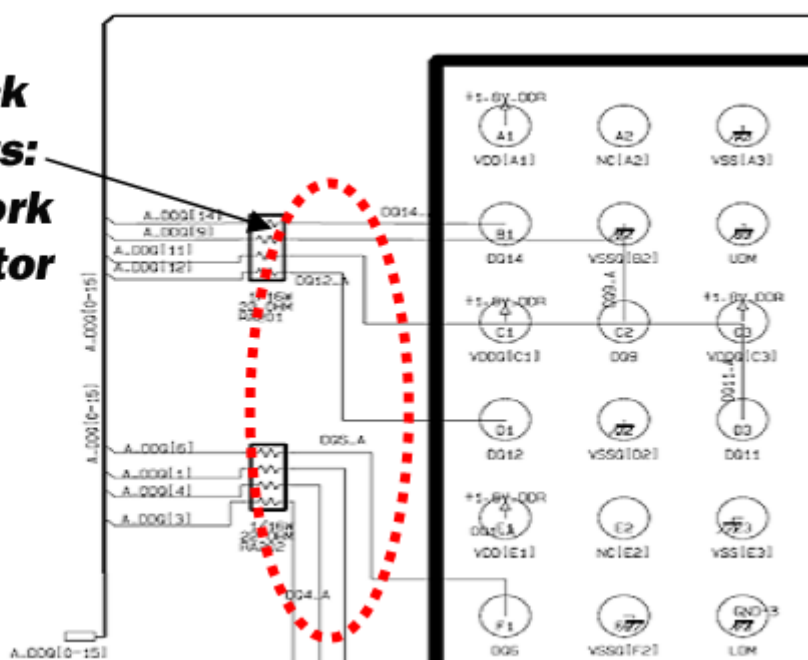
This problem is mostly related to failure in DQ signal paths from DDR2 memory IC251 to BGA IC201.

- Check the components solder quality, foils and via holes integrity.
- Press BGA IC firmly to check for bad solder. (Refer to A1 picture). The location of BGA IC and DDR2 memory as picture below:



- Check Diode value (use Diode Range) of the 16 DQ lines using multi-meter, GND (+) to DQ line (-). (Refer to A2 picture). Normal diode value voltage drop is (0.4 to 0.5V). Refer to the picture below for the check points:

**Check
Points:
Network
Resistor**



If their Diode voltage is abnormal, for example 0.0x or nearly 0, that's mean the BGA IC shorted internally. If the diode voltage is O.L it could be their network resistor one of the resistor is opened or their PCB "via holes" is crack.

If everything is OK and failure persists, change the control board.

2) Vertical line without same interval (8 pixels, 16 pixels or 32 pixels).

8pixel



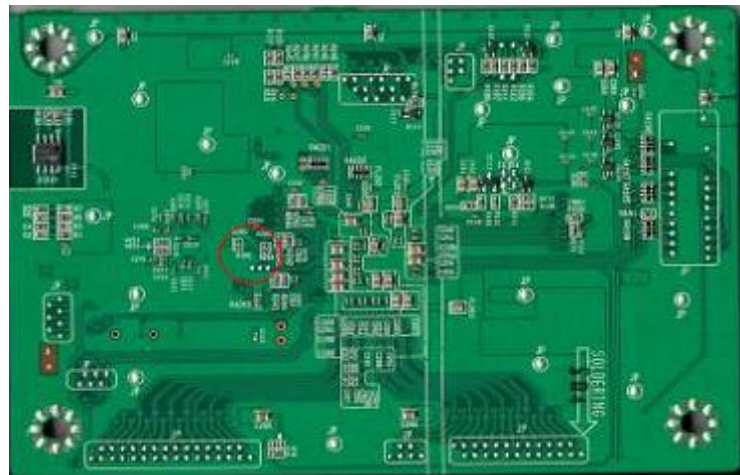
Check Procedure:

a) Check the Control board DQS Resistor (Network Resistor) coming out from DDR memory to BGA IC (backside R282, R283, R284 & R285).

- DQS (local clock function) resistor value must be 470 ohm. If 1 K Ω resistor value is found, change to 470 Ω (1K Ω => 470 Ω).

- 1 K Ω has some potential probability to cause vertical lane when repeatedly connected and disconnect of LVDS cable.

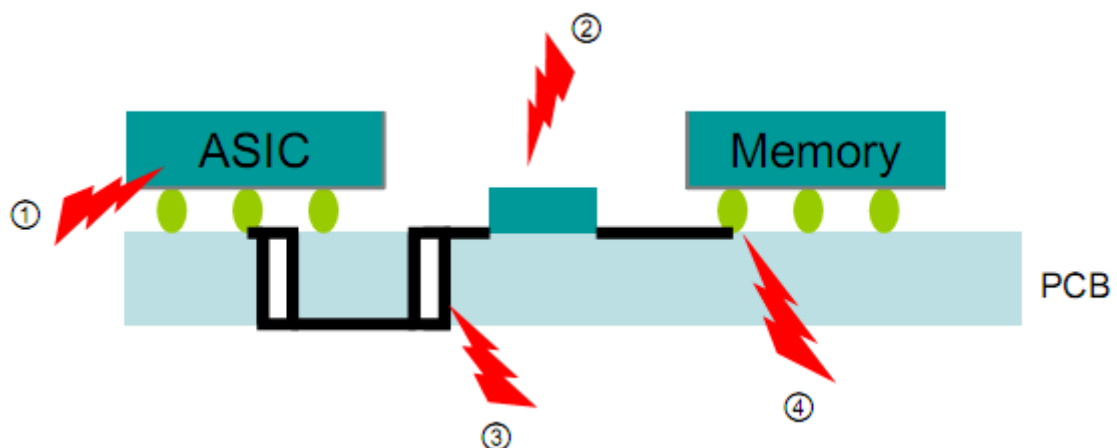
b) Check diode value of the 4 DQS lines. (Refer to A2 picture). Normal diode value voltage drop is (0.4 to 0.5V). The location of these 4 DQS lines refers to picture below:



If everything is OK and failure persists, change the Control board.

A1 picture: Vertical Noise Failure Cause

Possible Failure Cause of Picture (Vertical) Noise upon DDR Memory



Failure cause:

(1) Pin fail: Diode check with multi-meter.

(2) Resistor crack, opened and soldering problem: visual inspection.

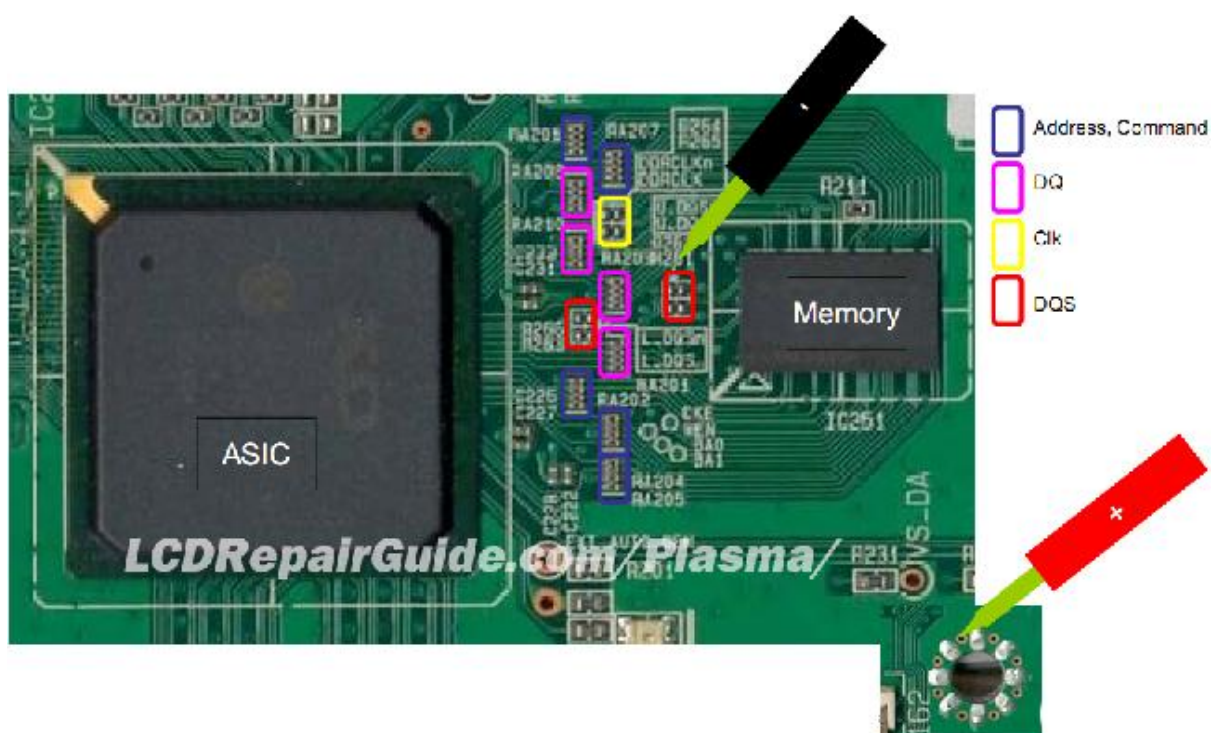
PV1- Collection of Plasma TV Repair Tips

(3) Via hole crack: Diode check, resistor check visually and using multi-meter.

(4) Ball crack and soldering problem in BGA IC's: Press devices toward PCB.

A2 picture: Measuring Diode value of DQ & DQS

Diode check using the Multi-meter



7) Model: LG 42/50/60 PJ & PK Series Plasma TV

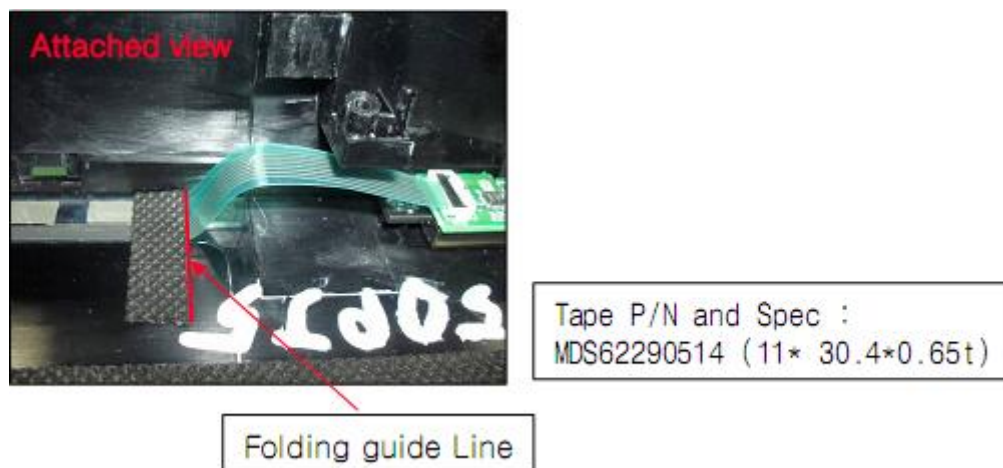
Symptom: No Operation of Touch Buttons

Caused: In complete attachment of Touch Film causing no operation of touch buttons.



Repair/Solution:

If a loose edge of touch film is found as shown (photo above on right), please attach adhesive cloth tape (shown below) along guide line in folding line of touch film. Please recheck operation of touch button after the adhesive cloth tape applied.



8) Model: LG 50PJ350 Plasma TV

Symptom: TV Turning Off Randomly.

Caused: The TV turning off occurred in 50PJ350's when VS voltage is above than nominal (around 210Vdc)

Repair/Solution:

Readjust their VS and VA voltages in PDP module. These two voltages are developed in PSU board and are distributed to module boards therefore adjustment points are in the PSU board. Please refer to the LG PDP Panel Alignment Guide for their procedure to do the adjustment.

The adjustment values are located in the "Voltage Settings" part of the label and tolerance is +/- 1.0 Volt. Do NOT use the maximum values for adjustment criteria.



9.2- Panasonic Plasma TV or Module/Panel Repair Tips

1) Model: Panasonic TH-42PX60 Plasma TV

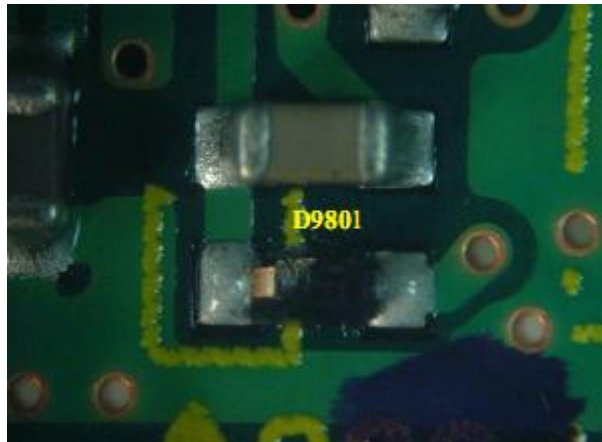
Symptom: Picture Disappear after Few Minutes but Sound is Remain OK.

Cause:

Low LDO 5V supply to IC9800 (DC to DC Converter) due to leaky D9801.

Repair Solution:

Replace D9801 on the D board (TNPA3810AHS). D9801 p/n: BOJCDD000002.



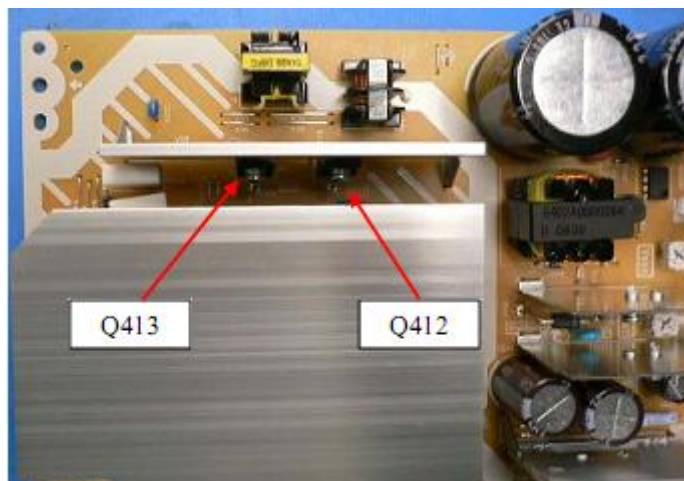
2) Model: Panasonic TH-42PX60 & TH-42PX600 Plasma TV

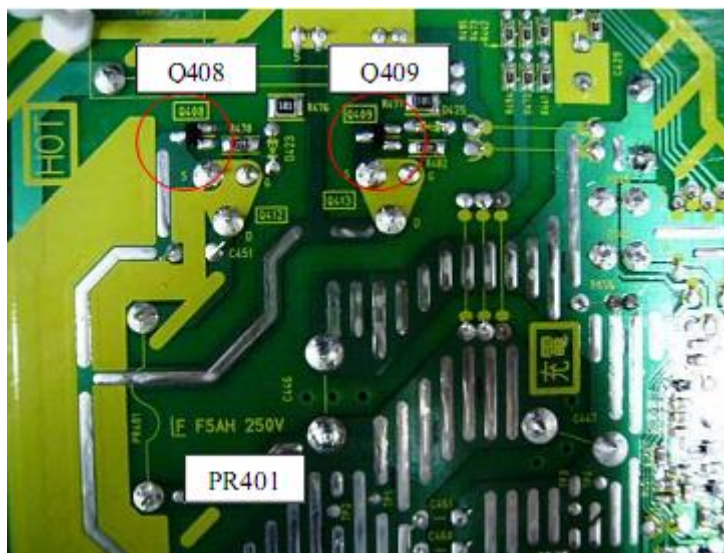
Symptom: Shutdown with Power LED 10 Blinks

Cause: Missing 395Vdc output due to shorted Q412 & Q413 and open PR401 in PSU board (P Board, p/n: TXN/P1BFTUS & TXN/P1BJTUS).

Repair/Solution:

Replace Q412, Q413, PR401 & check or replace Q408 & Q409. Always confirm condition of Q408 & Q409, in some cases could be shorted.





3) Model: Panasonic TH-42PX80U, TH-42PZ85U, TH-50PZ85U, TH-46PZ85U, TH-46PZ80U, TH-42PZ80U, TH-50PX80U, TH-46PZ80U, TH-42PZ800U, TH-46PZ800U, TH-50PZ80U, TH-50PZ800U, TH-50PZ850U, TH-58PZ800U, TH-58PZ850U, TH-65PZ850U

Symptom: Once AC power cord is plugged in, unit will turn on by itself. Depends on factory settings, unit will either display Video, Component or Tuner icon. After few seconds, screen will change to service mode automatically. Note: Since unit is in service mode, only buttons 1, 2, 3, or 4 on remote control are working (rest of buttons are non-functional).

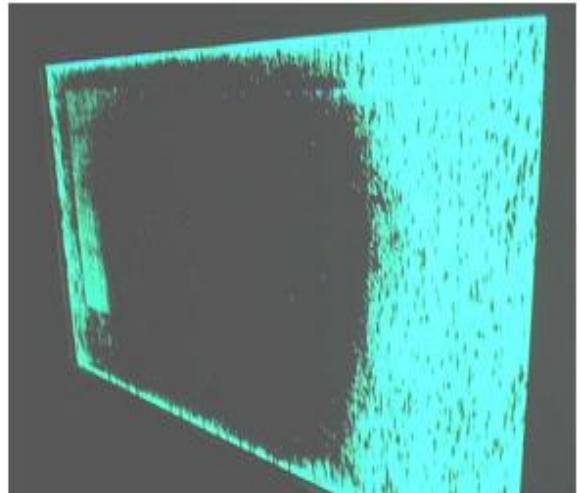
Cause: All new A boards (Mainboard) supplied from factory needs to be initialized.

Repair/Solution:

- 1) Perform HARD RESET of Plasma TV unit by pressing & holding VOL DOWN (-) on unit and MENU button on remote at the same time for about 3 seconds.
- 2) After hard reset, please confirm if plasma tv power ON in user mode and check overall functionality.

4) Model: Panasonic TH-42PD50 Plasma TV

Symptom: Display appears distorted (double) or full of randomly lit pixels as shown below:

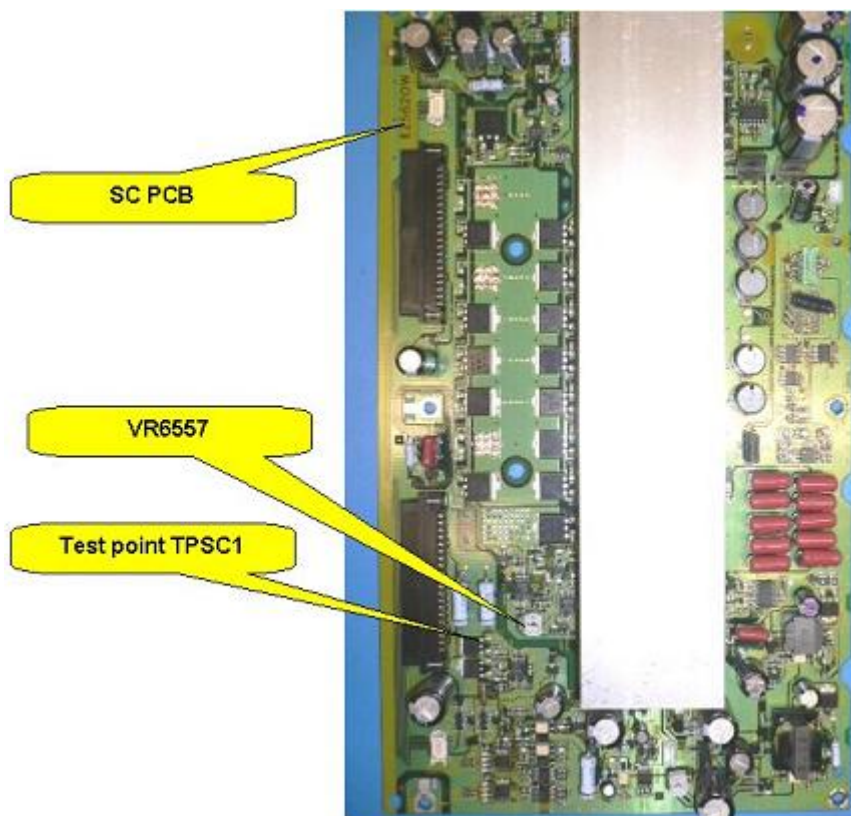


Cause: Initialization pulse is misaligned.

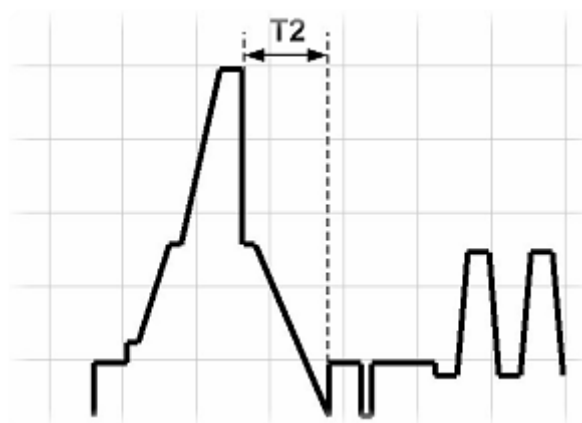
Repair/Solution:

Starting point of scanning pulse can be adjusted by VR6557 on SC board.
Procedure:

a) Connect oscilloscope to TPSC1 test point on SC board. For your information the Oscilloscope need to use the isolation transformer for safety purpose.



b) Adjust VR6557 on SC Board so T2 time is $184\mu\text{s}$ ($+5\mu\text{s}/-10\mu\text{s}$).



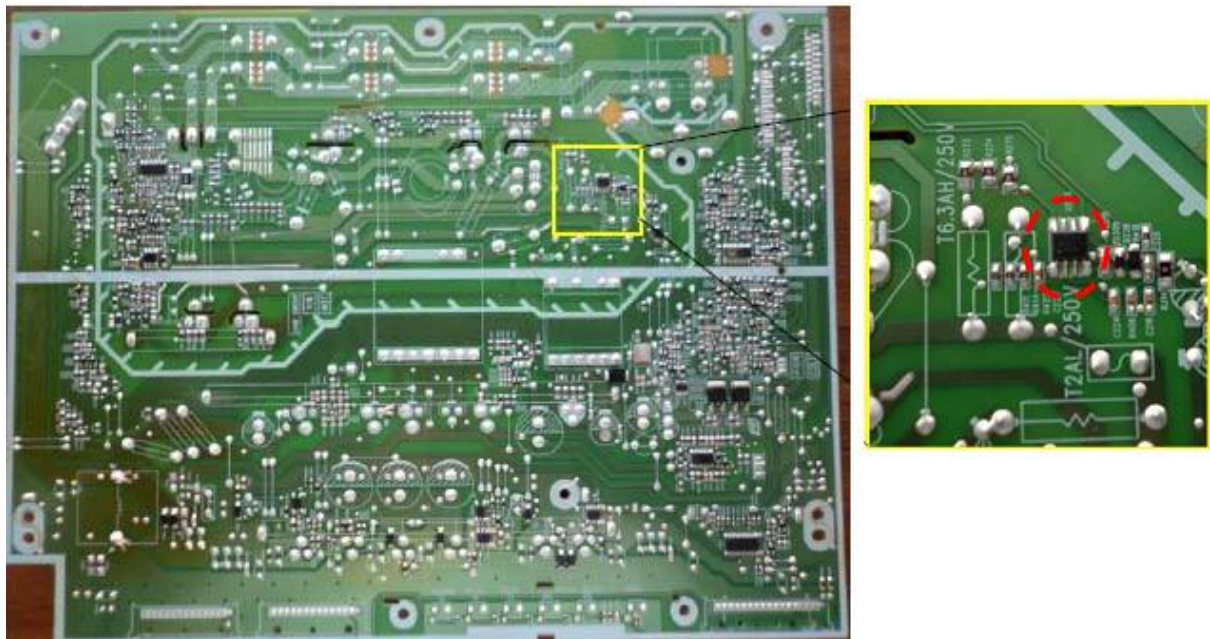
5) Model: Panasonic TC-P42X5, TC-P42XT50, TC-P50X5, TC-P50XT50 Plasma TV

Symptom: Tv is dead. No power, no blinking code and no power LED. Sometime power can be restored after the TV is re-plugged from AC line.

Cause: Defective integrated circuit U203 on power board (PSS board).

Repair/Solution:

Removed U203 (FAN6755UWMY) from PSS board and replace a new one.



6) Model: Panasonic TC-P50U50, TC-P50UT50 Plasma TV

Symptom: Tv is dead with 8 blinks power LED.

Cause: Defective SS board, part number TXNSS1SDUU

Repair/Solution:

Step-1: Identity three components on the board, D16041, Q16051 and R16051.

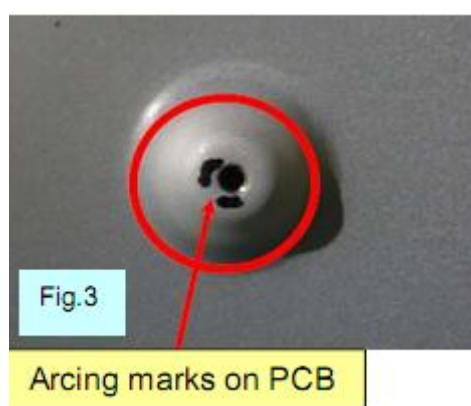
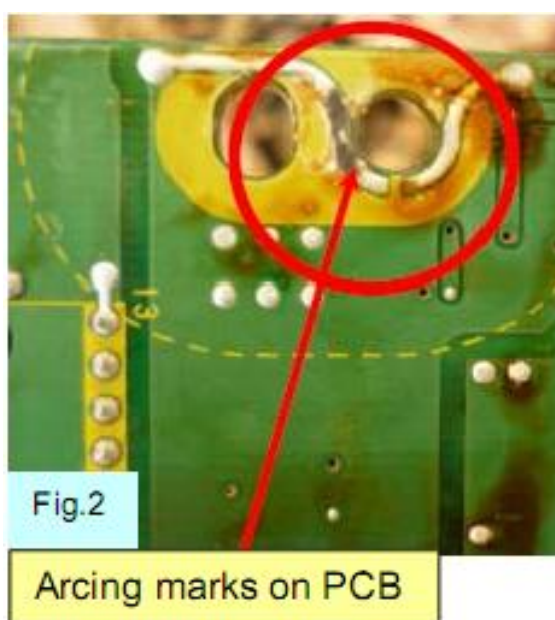
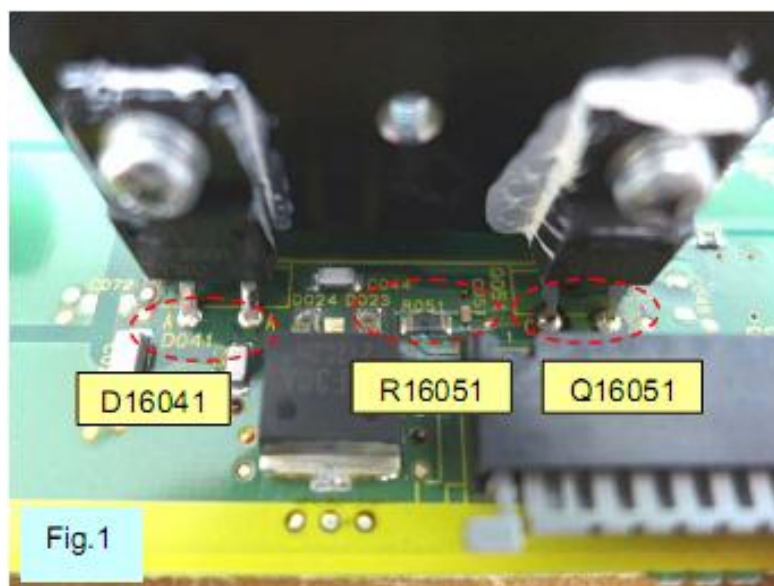
Step-2: If all failures, remove above parts from the board. Clean the heat sink and apply fresh compound.

Step-3: Replace with new part => Q16051= DG3D3020CVLW

=> D16041= B0FBCN000005

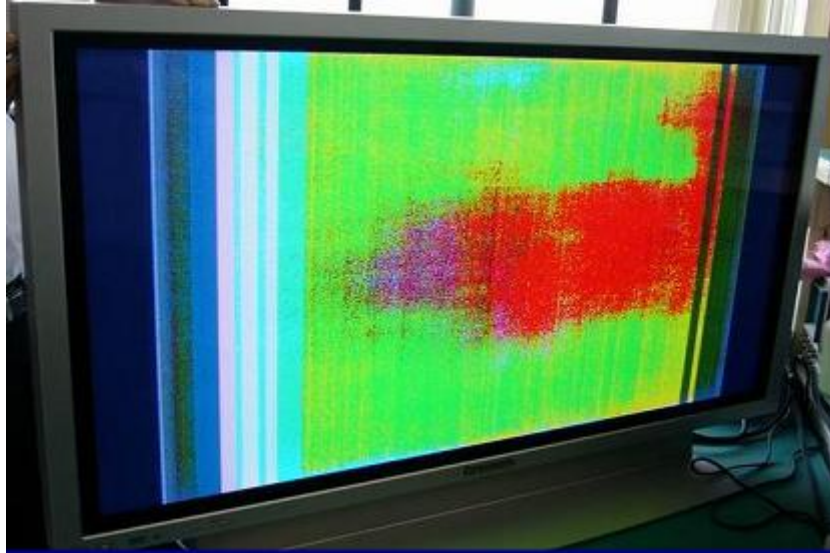
=> R16051= D0GF5R6JA047

Inspect all grounding paths around mounting holes on the board and on the PDP panel area and carefully clean noticed arcing marks using sand paper with 400~1000 grit.



7) Model: Panasonic TH-42PW5CH Plasma TV

Symptom: When power on the TV, the screen show display distortion as picture below. After about 10 minutes, the display back to normal.



Repair/Solution:

This type of symptom normally could be their SC, SU and SD board defective. Isolate the SU & SD board, found their SC board defective. After replace SC board, TV problem solved.

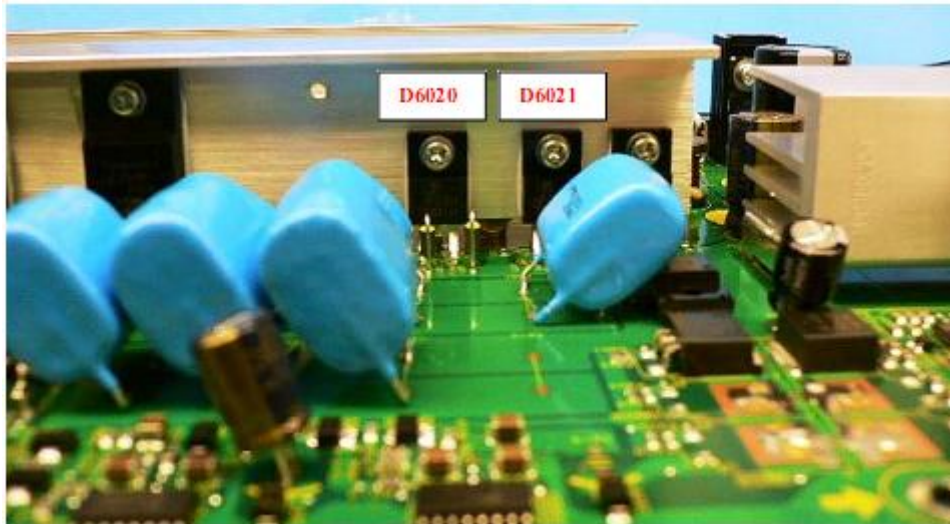
8) Model: Panasonic TH50PX50 & TH-50PX500 Plasma TV

Symptom: After upon power ON, relay clicks then power LED blinks 8 times.

Caused: No sustain pulse output waveform due to shorted D6020 & D6021.

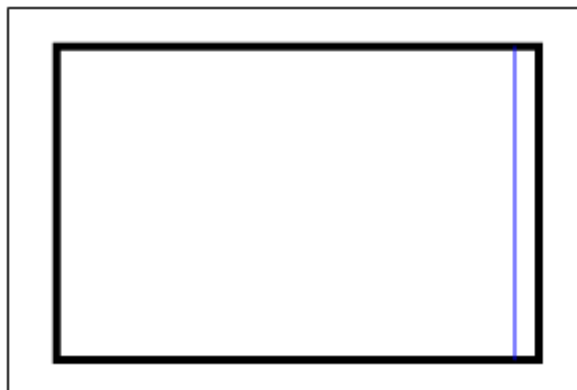
Repair/Solution:

Replace D6020 & D6021 (both part number: B0HBSN000008) on SS board (p/n: TNPA3568).



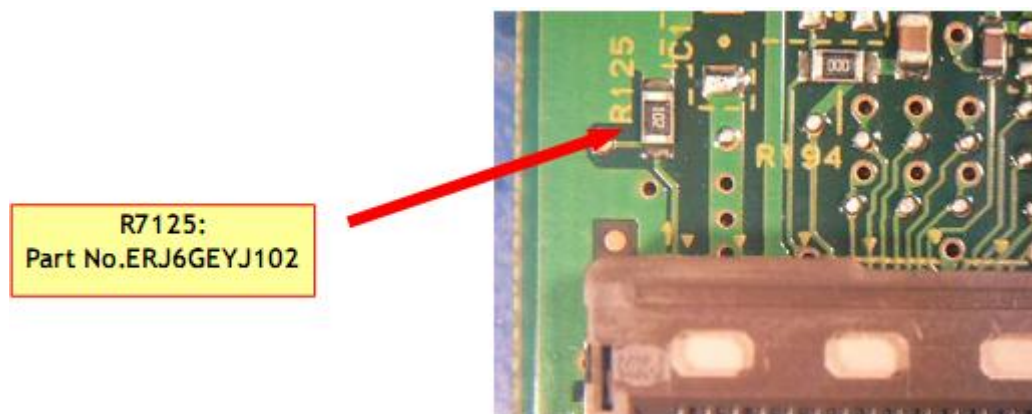
9) Model: Panasonic TH-42PD50 Plasma TV

Symptom: Blue vertical line at right most edge of the screen.



Repair/Solution:

Missing data line signal. Found the R125 (1K Ω) was opened on C1 board.



R7125:
Part No.ERJ6GEYJ102

<http://www.lcdrepairguide.com/plasma/>

10) Model: Panasonic TH-42PD50 Plasma TV

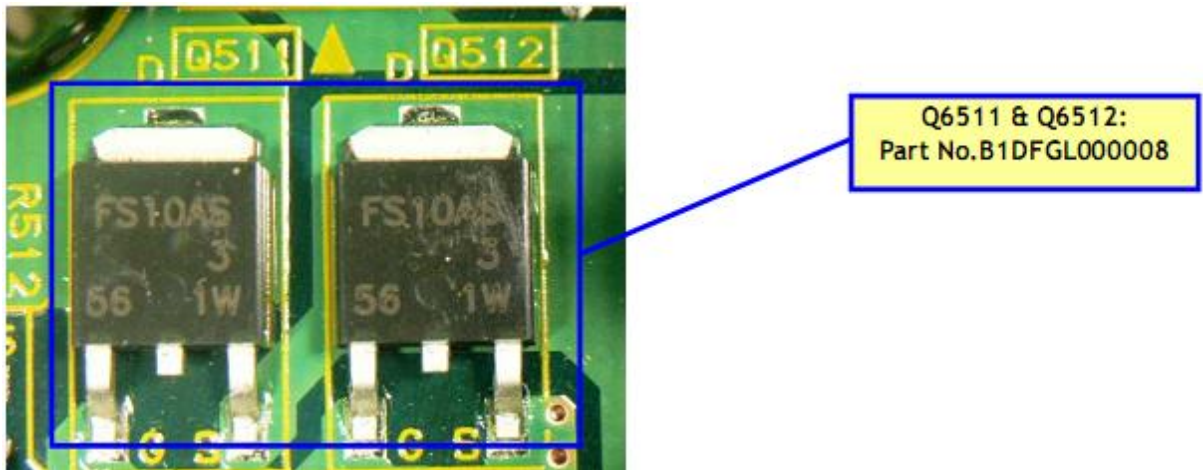
Symptom: After press power button, TV shutdown then power LED blinks 7x/times.

Cause: SOS protection circuitry detects problem in scan output waveform Vf due to shorted scan output transistor Q6511.

Repair/Solution:

Replace both Q6511 and Q6512 at the same time on SC board (p/n: TNPA3543).

Note: Replace both transistors even if only 1 is shorted! If not, the TV will not lasting long and come back with same symptom too.



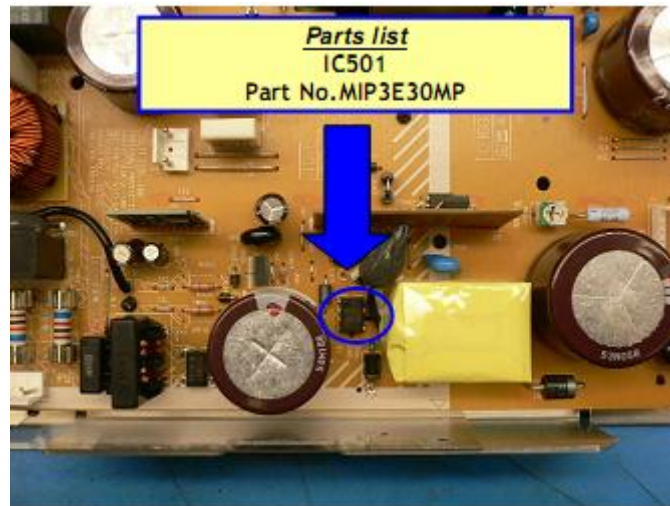
11) Model: Panasonic TH-42PX50 & TH-42PX500 Plasma TV

Symptom: Dead/ No power. Relay will not click & power LED remains off (no blinking code)

Cause: No standby voltage

Repair/Solution:

Replace IC501 (MIP3E30MP) on P Board (p/n: ETXMM563MDK)



12) Model: Panasonic TH-42PX50 & TH-42PX500 Plasma TV

Symptom: Dead/ No power. Relay will not click & power LED remains off (no blinking code).

Cause: No output from power output control module.

Repair/Solution:

Replace MC701 (IXMM564M-D-9) on P Board (p/n: ETXMM563MDK).



MC701 (Power Output Control
Module)
Part No. IXMM564M-D-9

13) Model: Panasonic TH-42PX50 & TH-42PX500 Plasma TV

Symptom: Display distorted problem



Cause: Missing TPVSET voltage due to open R6602 & shorted C6526.

Repair/Solution:

Replace R6602 (p/n: ERG1FJS471D) & C6526 (ECA2AHG470) on SC board (p/n: TNPA3557)

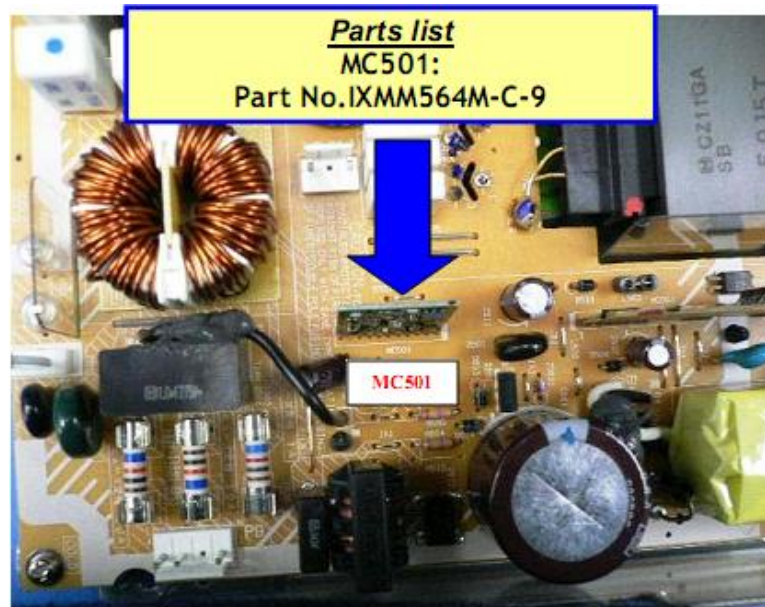
14) Model: Panasonic TH-50PX50 & TH-50PX500 Plasma TV

Symptom: Upon power ON, relay clicks then power LED blinks 10X.

Cause: No switching voltage output from F14_ON or 12V/15V_ON pins.

Repair/Solution:

Replace power module MC501 (IXMM564M-C-9) on P Board (p/n: ETXMM564MEK).



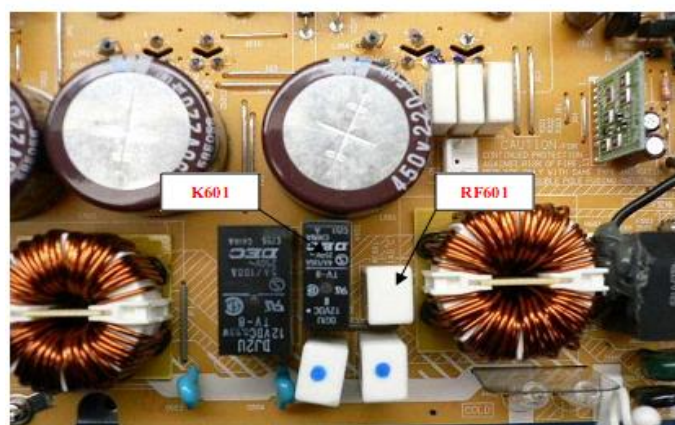
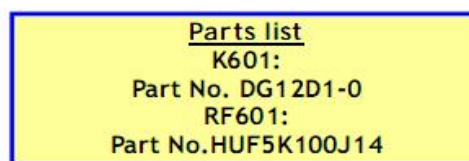
15) Model: Panasonic TH-50PX50 & TH-50PX500 Plasma TV

Symptom: Dead. Relay will not click & power LED remains off (no blinking code).

Cause: No primary supply to T501 thereby no secondary voltage outputs due to open in-rush current.

Repair/Solution:

Replace relay K601 and RF601 on P board (p/n: ETXMM564MEK)



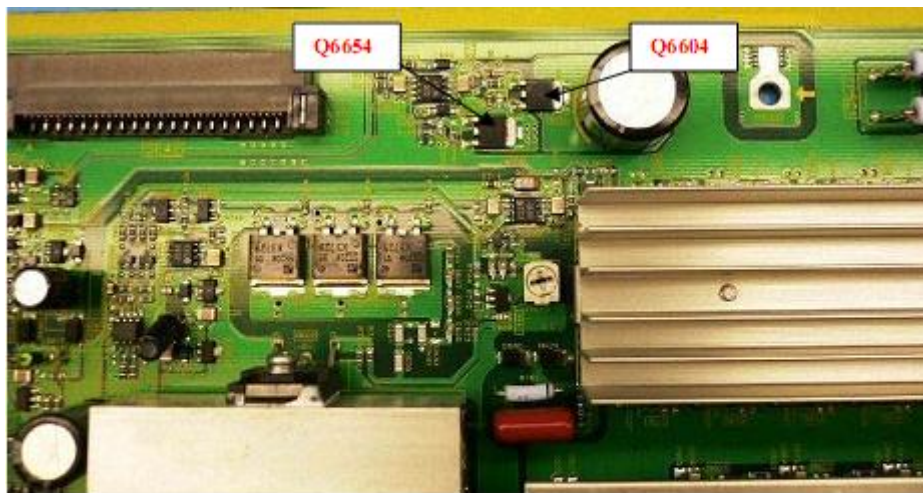
16) Model: Panasonic TH-50PX50 & TH-50PX500 Plasma TV

Symptom: After pressing power button, TV shutdown then power LED blinks 7X.

Cause: SOS protection circuitry detects problem in scan output waveform Vf due to shorted scan output transistor Q6604 & Q6654.

Repair/Solution:

Replace Q6604 and Q6654 on SC board (p/n: TNPA3567)



Parts list
Q6604 & Q6654:
Part No.B1DFFM000003

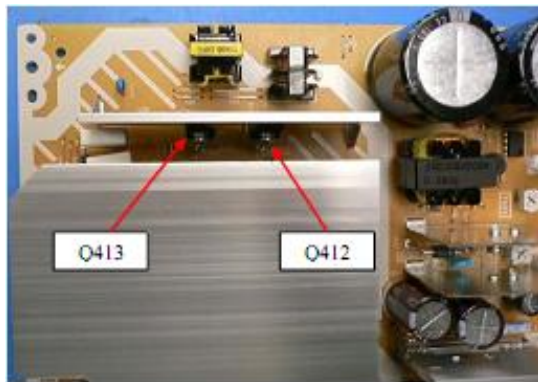
17) Model: Panasonic TH-42PD60 Plasma TV

Symptom: Shuts down with power LED blinking 10X.

Cause: Missing 395Vdc output due to shorted Q412 & Q413.

Repair/Solution:

Replace Q412, Q413, Q408, Q409, R478 and PR401 on the P board (p/n: TXN/P1ZQTU).



Parts list

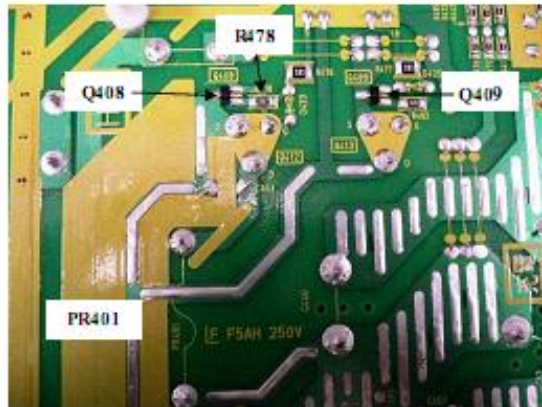
1. Q412 & Q413:
Part # - B1DAGQ000013

Parts list

2. Q408 & Q409:
Part # - B1DHCD000034

3. R478:
Part # - ERJ8GEYJ220

4. PR401:
Part # - K5Y502BA0001



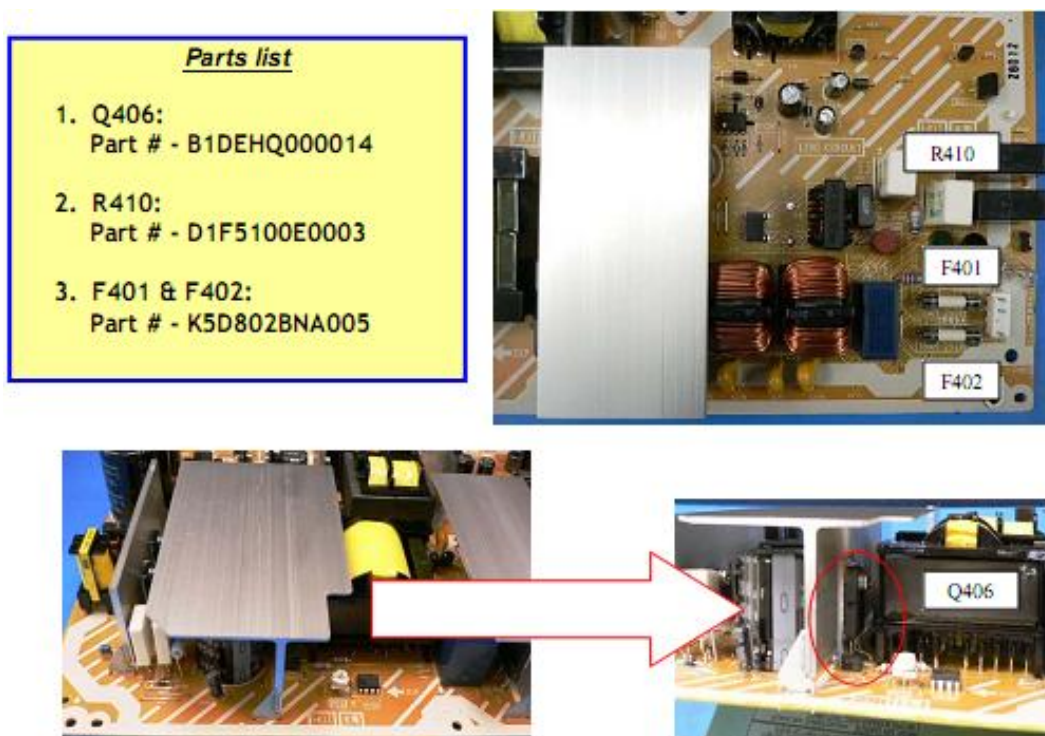
18) Model: TH-42PD60 Plasma TV

Symptom: Dead. Power LED off (no blinking code).

Cause: No primary AC voltage inputs due to open fuses caused by Q406 shorting out.

Repair/Solution:

Replace F401, F402, Q406 & check/ replace thermal resistor (R410) on the P board. Note: In some cases, R410 is open.



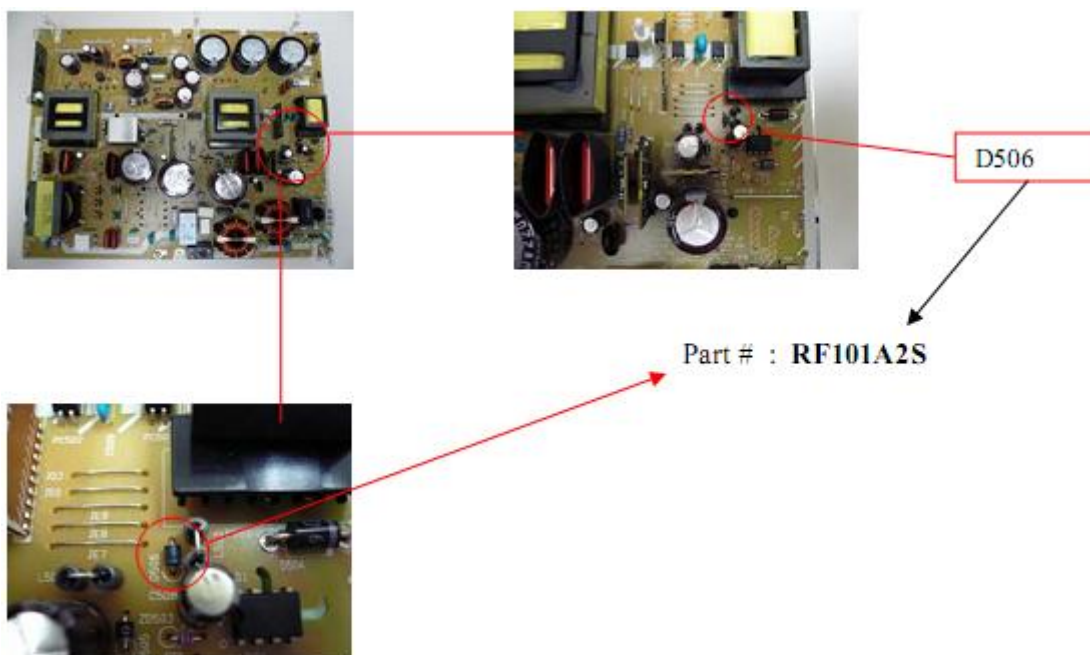
19) Model: Panasonic TH-50PX75 Plasma TV

Symptom: Dead. No relay clicks, no power LED.

Cause: Check main fuses F601, F602=> OK => check voltage TP3- TP4 (Hot ground!) => 160V => Check D506 for short (cold check with VOM)

Repair/Solution:

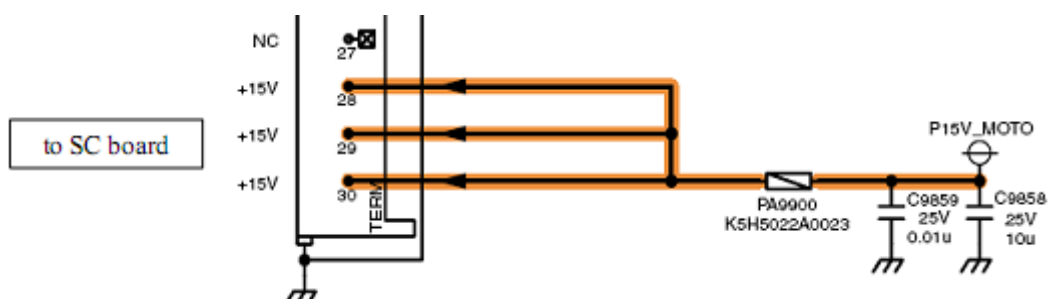
Found diode D506 shorted and replace it on P board (p/n: ETXMM655MEHS).



20) Model: Panasonic TH-42PX75 & 77, TH-50PX75 & TH-50PX77
Plasma TV

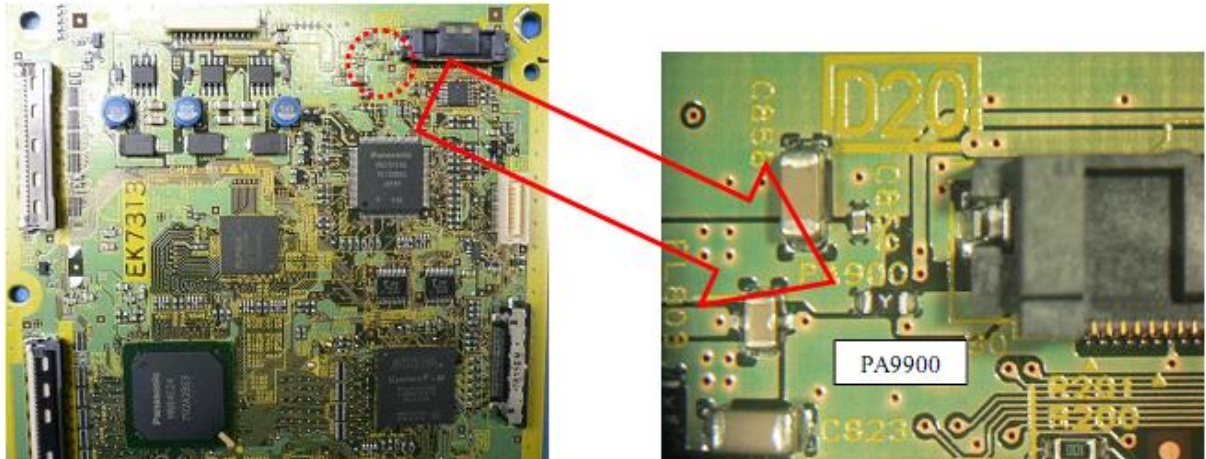
Symptom: Shuts down with power LED 7 blinks.

Cause: 15V line shorted to ground due to SC board failure. Fuse PA9900 (on D board) opens as soon as AC plugged in then symptom will be: shuts down with power LED 7 blinks thereafter.



Repair/Solution:

Replace SC board and change PA9900 SMD fuse (p/n: K5H5022A0023) on the D board. (D board p/n: TXN/D1HMTUJ [TH50PX75/77] & TXN/D1HNTUJ [TH42PX75/77]).



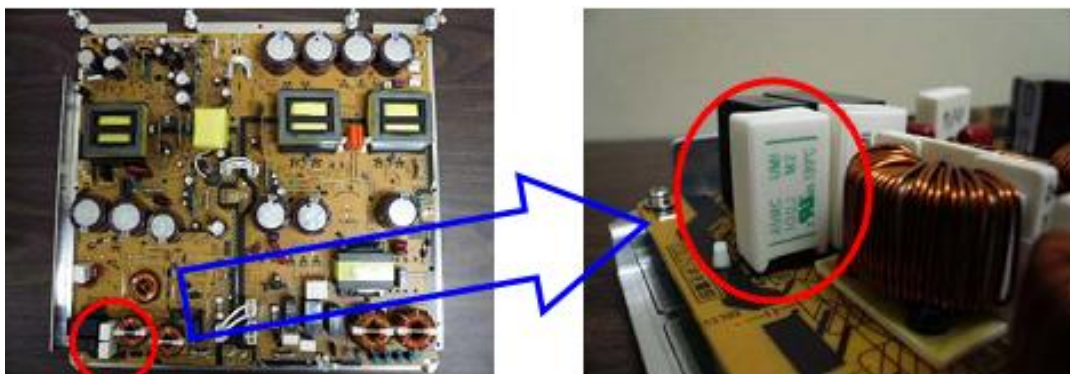
21) Model: Panasonic TH-58PZ700 & TH-58PZ750 Plasma TV

Symptom: No power. Relay does not click & power LED off.

Cause: Open thermal resistor RF701

Repair/Solution:

Replace RF1701 (p/n: A5MC100JP2) on P Board (p/n: ETXMM625MGHS)



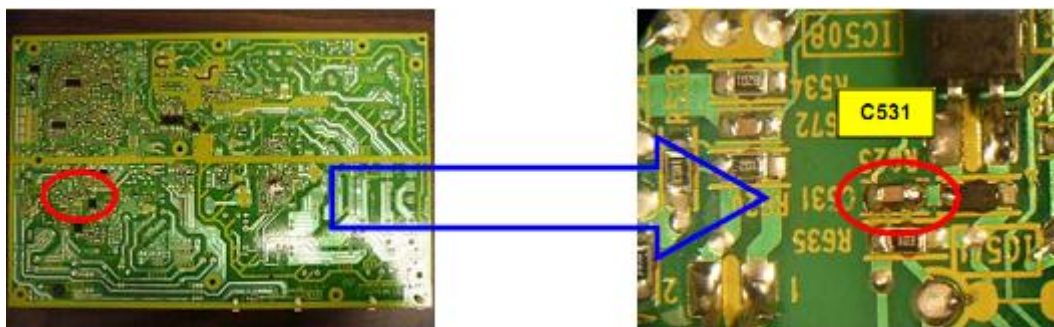
22) Model: Panasonic TH-42PX75 Plasma TV

Symptom: Upon power ON, TV shuts down with power LED 10 blinks.

Repair/Solution:

Shorted ceramic capacitor C531 on P board (p/n: TXN/P1HNTUS).

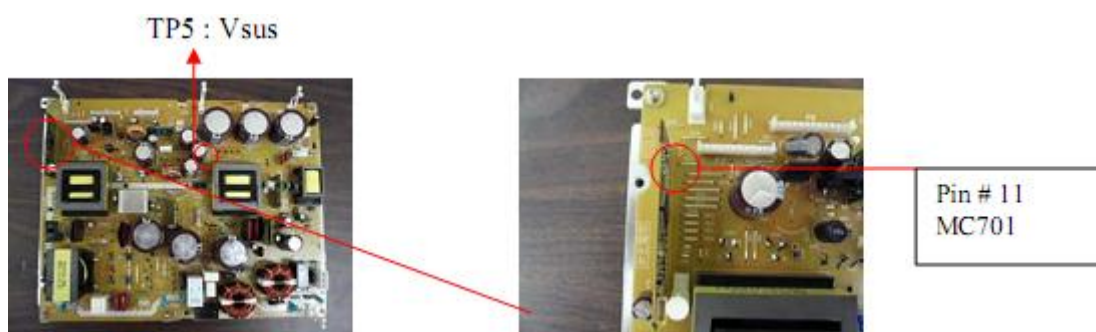
<http://www.lcdrepairguide.com/plasma/>



23) Model: Panasonic TH-50PX75 Plasma TV

Symptom: Standby OK, power on 3 seconds then shut down. LED blinks 10 times.

Troubleshooting: Check Vsus voltage: 180V is OK, then check pin-11 of MC701: Normal => 3V, Abnormal=> 0V. Note: The window for measure is <3 seconds. So please put probe on the test point before turn power on.



Cause: Thermal fuse inside transformer T201 opened.

Repair/Solution:

Replace T201 (p/n: ETB50LZ15GAD).

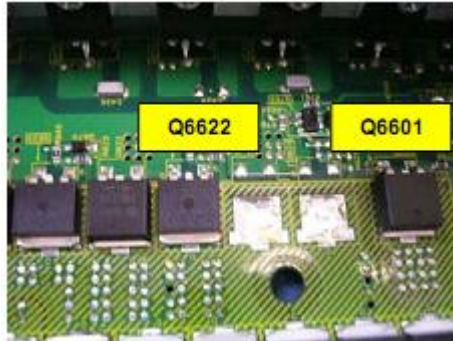
24) Model: Panasonic TH-42PZ77 & 700UA Plasma TV

Symptom: Shut down upon power ON then power LED blinking 7 times.

Cause: Shorted Q6601 & Q6602. In some cases, R6821 value is reduced (check resistance reading, normal value should between 209Ω ~231Ω) & also visually inspect resistor if discolored due to heating up. In both cases replace R6821.

Repair/Solution:

Replace Q6601 (p/n: B1DFES000003), Q6622 (p/n: B1DFKM000002) & check/replace R6821 (p/n: ERF5TJ221). SC board (p/n: TXNSC1NZTU).



25) Model: Panasonic TH-50PZ77 Plasma TV

Symptom: Distorted Display.



Cause: Insufficient solder on Q6681 pin (DRAIN).



Repair/Solution:

Re-solder Q6681.

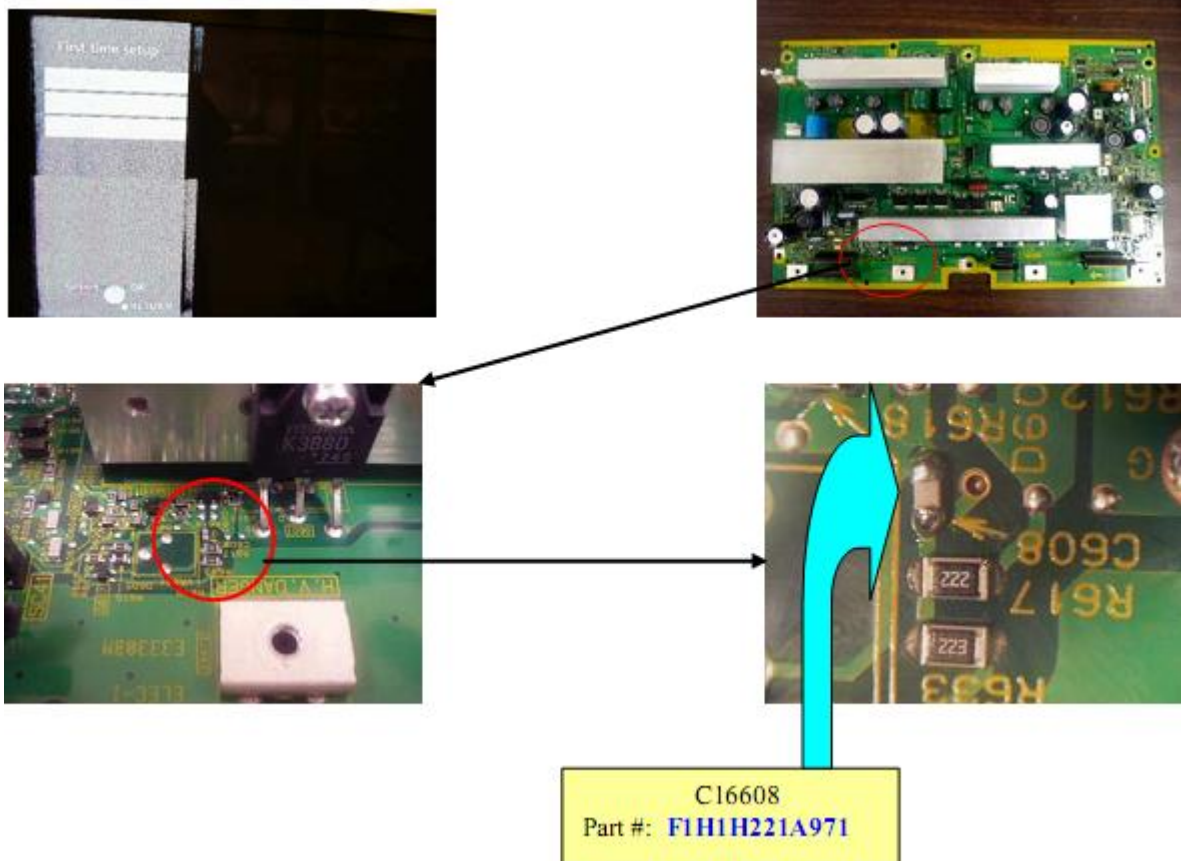
26) Model: Panasonic TH-50PX80 Plasma TV

Symptom: Picture has distorted color and color dots appear all over the screen.

Cause: Leaky capacitor C16608.

Repair/Solution:

Replace C16608 (p/n: F1H1H221A971) on SC board (p/n: TXNSC1RQTUS).



27) Model: Panasonic TH-42PX80 Plasma TV

Symptom: Green color distortion all over the screen.



Cause: Bad solder on IC9900 solder grid pads.

Repair/Solution:

Solder reflow of IC9900 on A board/Mainboard (p/n: TNPH0716S). Note: Requires CSP/BGA rework station.



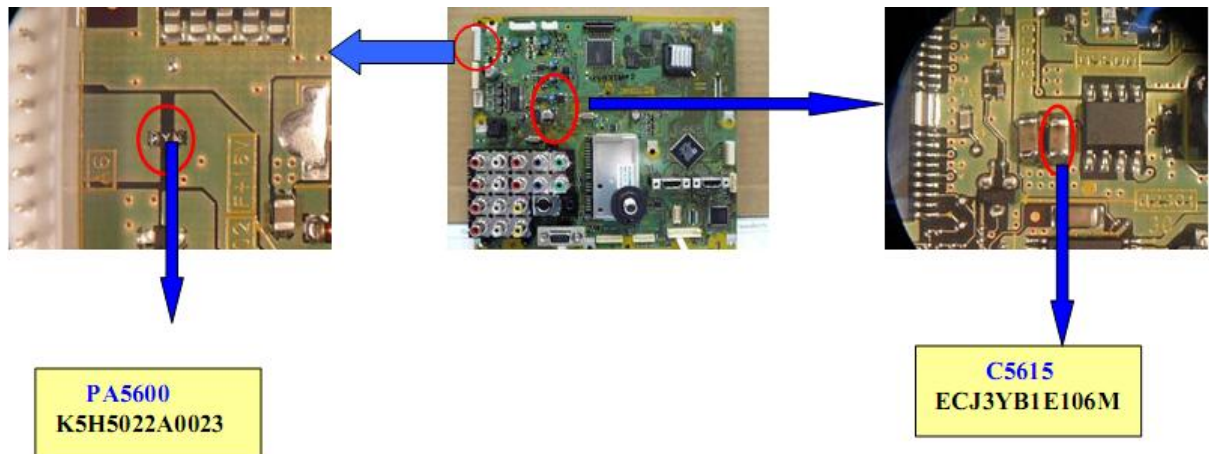
28) Model: Panasonic TH-42PZ85UA Plasma TV

Symptom: AC in, relay clicks, then after 5 seconds, clicks again then shutdown with 10 blinks.

Cause: Shorted capacitor and open fuse protector.

Repair/Solution:

Replace C5615 (p/n: ECJ3YB1E106M). Fuse protector PA5600 (p/n: K5H5022A0023).



29) Model: Panasonic TH-50PZ80UA Plasma TV

Symptom: Power on, then shut down, power LED 6 blinks error code.

Cause: Defective IC1651.

Repair/Solution:

Replace IC16521 (p/n: C0ZBZ0001324)



30) Model: Panasonic TH-42PZ77 & TH-42PZ700 Plasma TV

Symptom: Unit shuts down with power LED 10 blinks.

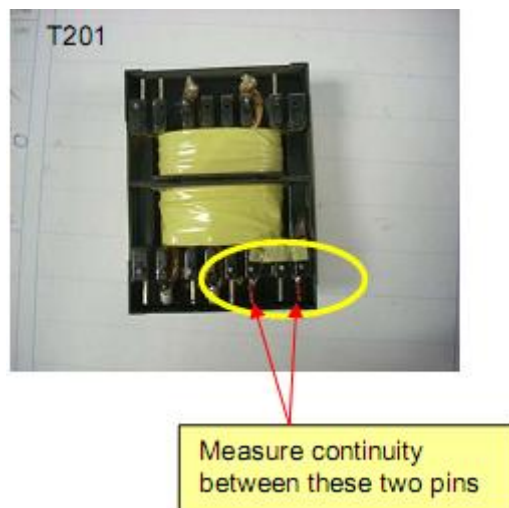
Cause: Open thermal fuse resistor inside transformer T201 on P board (p/n: ETX2MM681MFS).

Repair/Solution:

- a) Remove back plate from power supply.
- b) Take note of screws required to be removed as well as plastic clips holding the PCB to the plate.
- c) Remove T201 for location, refer to the picture below:



- d) Measure continuity between the 2 pins as shown in picture below:



- e) If the reading shoes “OPEN”, replace transformer T201 with part number ETB50LZ16GAD.

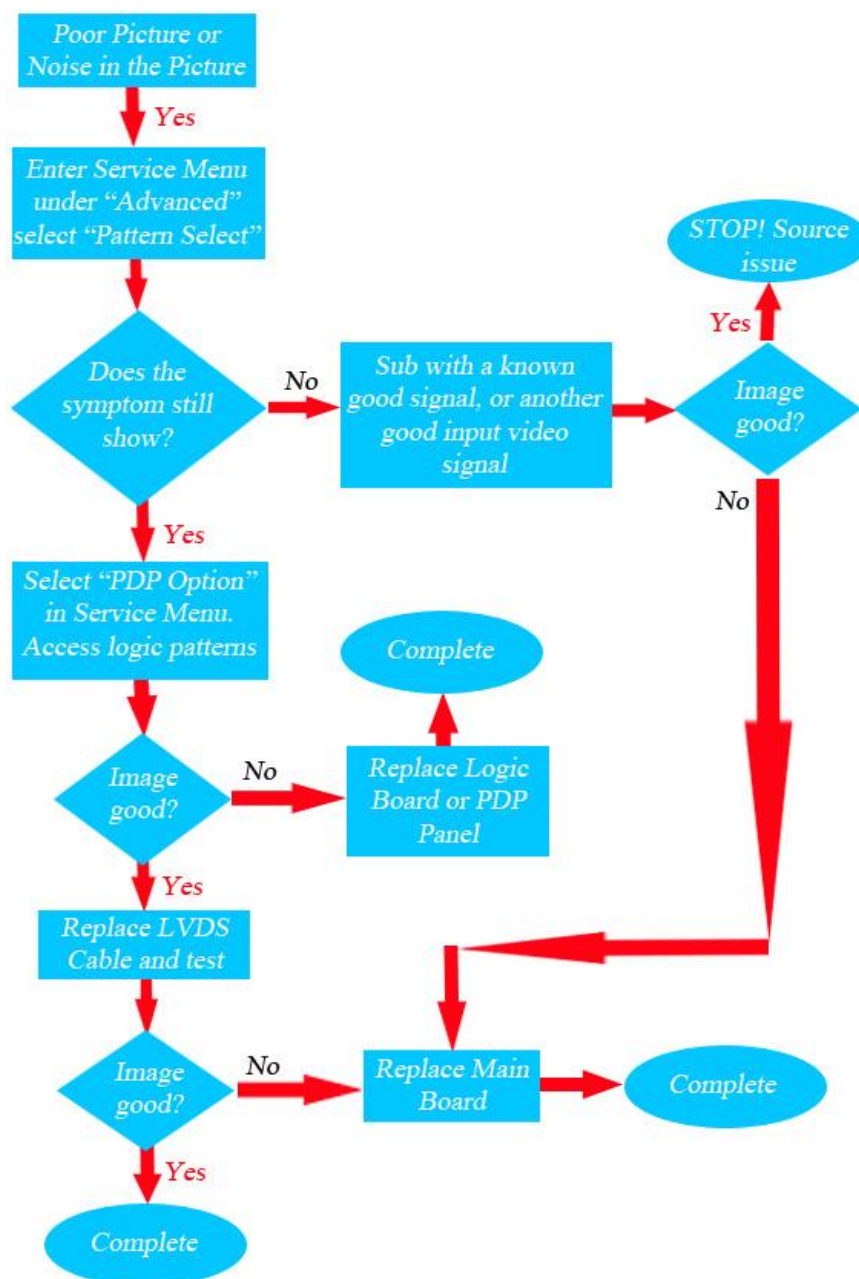
9.3- Samsung Plasma TV or Module/Panel Repair Tips

1) Model: Samsung 2009 Plasma TV or similar PDP problem

Symptom: “Noise” in the Video or Poor Image

Repair/Solution:

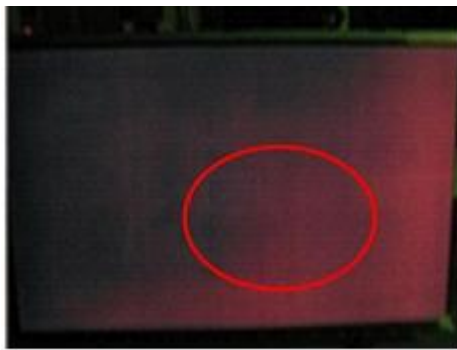
Before start any repair, use the Test Patterns in the Service Menu to determine the area to troubleshoot. Refer to the flowchart below:



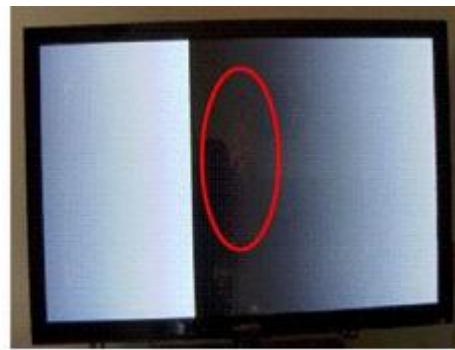
2) Model: Samsung PN50C430 & PN50C450 Plasma TV

Symptom: Reddish blur or Red Dots on the Screen after Warm-up.

Dark areas will display red dots. Running the screen wipe will show red discharge in the dark area of the image. On a black screen you may see a reddish background as picture below:



Reddish background



Red dots seen in dark area

Repair/Solution:

Note: There are two procedures in this repair, one for TVs produced in May through July 2010 and another one for TVs produced in August through September 2010.

(A) Repair for production range of May~ July 2010:

1. Determine the PDP firmware version.

- If the version is 1008.2 or higher, onsite service is required. Proceed to Step-4.
- If the version is earlier than 1008.2, do the firmware upgrade to 1008.2 or latest version. After that proceed to Step-5.

2. Determine what firmware version is currently installed.

3. If the firmware version is earlier than 1008.2: go to (a) below. If not, go to Step-4.

(a) Verify the panel voltage adjustments match the voltage sticker located on the PDP panel (refer to the photos at this repair tips bottom to locate).

PV1- Collection of Plasma TV Repair Tips

- (b) Download the firmware version 1008.2 from Samsung support website and follow their install instruction.
- (c) Power on the PDP and retest using the screen burn wipe test pattern.
- (d) If the red dots/reddish blur is still present, proceed to Step-4. If not present, go to (e).
- (e) Issue resolved.
- (f) Proceed to Step-5.

4. If the version is 1008.2:

- (a) Download the firmware version 1008.3 and upgrade the PDP.
- (b) Adjust the panel voltages (refer to the photos at the end of this repair tips).
 - Vs to +205VDC
 - Vscan to -178VDC
- (c) Power on the PDP and retest using the screen burn wipe test pattern.
- (d) If the issue is resolved, proceed to Step-5.
- (e) If the problem persists:
 - Replace the Y-Main, X-Main and Control Boards or panel.
 - Proceed to Step-5.

5. Repair Complete.

(Note: DO NOT perform this upgrade on TVs that fall out of the May-Sept production range.)

(A) Repair for production range of August~September 2010:

1. Determine the PDP firmware version.

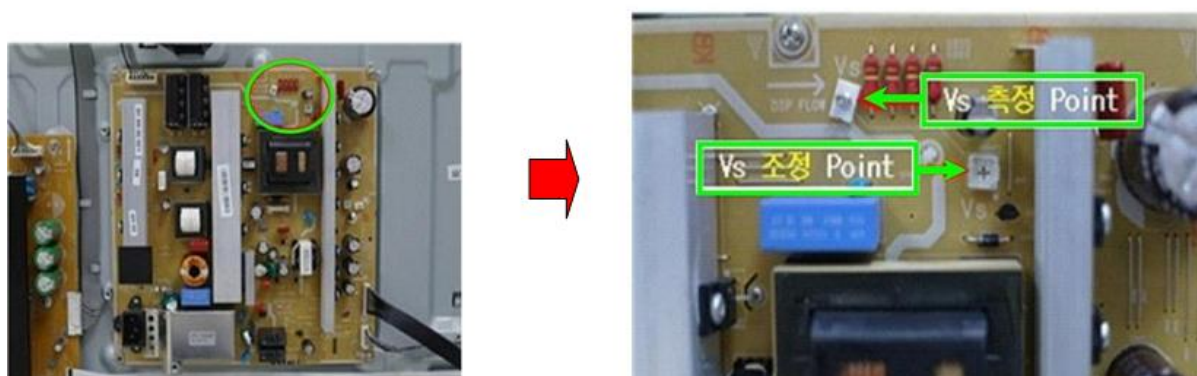
- If the version of firmware is 1008.3, proceed to Step-4.
- If the version of firmware is earlier than 1008.3, do the firmware upgrade to 1008.3 or latest version. After that proceed to Step-5.

2. Determine what firmware version is currently installed on the PDP.
 3. If the firmware version is 1008.3, skip to Step-4, otherwise:
 - (a) Verify the panel voltage adjustments match the voltage sticker located on the PDP panel.
 - (b) Download the firmware version 1008.3 from Samsung support website and follow their install instruction.
 - (c) Power on the PDP and retest using the screen burn wipe test pattern.
 - (d) If the red dots/reddish blur is still present, proceed to Step-4. If not present, go to (e).
 - (e) Issue resolved.
 - (f) Proceed to Step-5.
 4. Adjust Vs and Vscan voltages on the PDP panel.
 - (a) Adjust the panel voltages (refer to the photos at the end of this repair tips).
 - Vs to +205VDC
 - Vscan -178VDC
 - (b) Power on the PDP and retest using the screen burn wipe test pattern.
 - (c) If the issue is resolved, proceed to Step-5.
 - (d) If the problem persists:
 - Replace the Y-Main, X-Main and Control Boards or panel.
 - Proceed to Step-5.
 5. Repair Complete.
- (**Note:** DO NOT perform this upgrade on TVs that fall out of the May-Sept production range.)

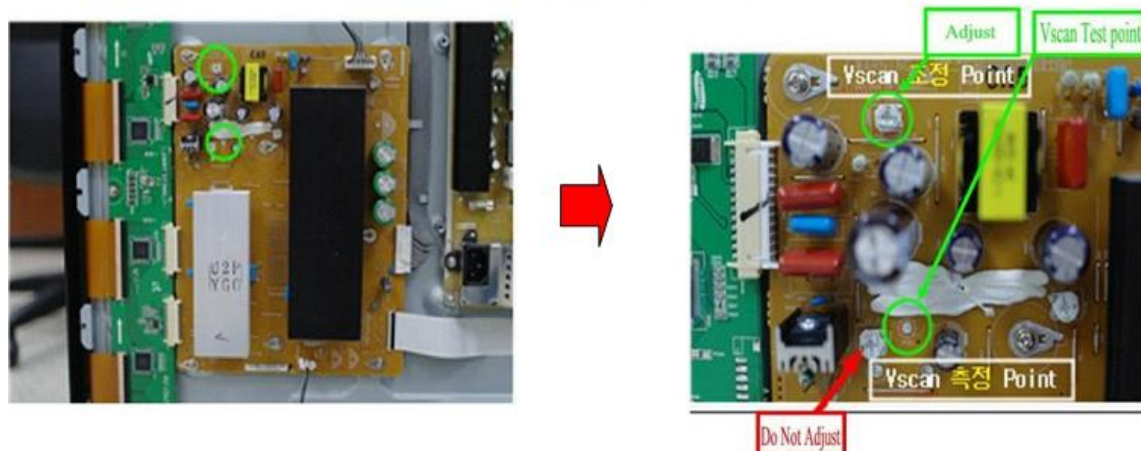
Below: Location of Voltage sticker on the PDP



Below: Location of Vs adjustment and test point



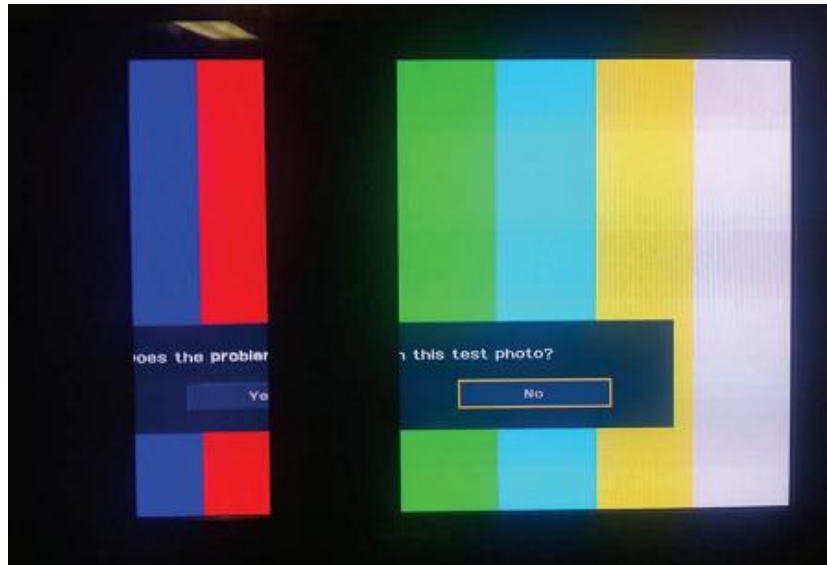
Below: Location of Vscan adjustment and test point (Note: Pay special attention to location of Vscan adj.)



Attention: Adjust the top VR to do the Vscan voltage adjustment, NOT the bottom one, refer to the photo above.

3) Model: Samsung PN42C450 Plasma TV

Symptom: Vertical Bar on the left side



Repair/Solution:

First, call out their Test Pattern or OSD Menu, the vertical bar also affects the test pattern or the OSD Menu, check & replace the F-Buffer board and their connection.

4) Model: Samsung PN50B450 Plasma TV

Symptom: There are several horizontal lines across the screen.

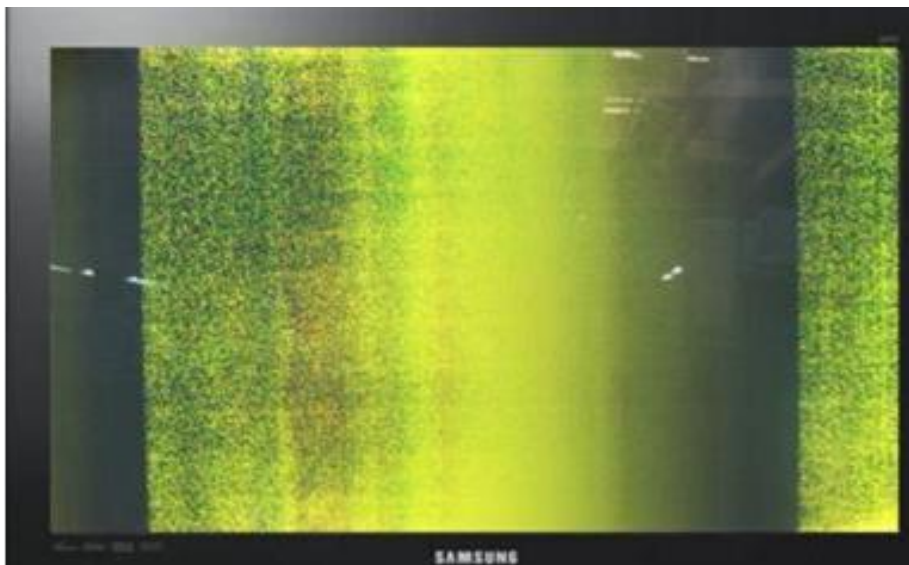


Repair/Solution:

After call out the test pattern, the symptom also affected test pattern picture. So it is confirmed that the problem was inside their Module/Panel, especially the Y-Buffer Board, Panel or Y-Main. Normally, this type of symptom needs to try to reseal their Buffer board cables properly first, before replace their board. Most of the time this type of the problem will re-solved.

5) Model: Samsung PN50A400C2D Plasma TV

Symptom: Distorted Display



Repair/Solution:

Check or replace the X Main board and problem solved.

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6) Model: Samsung PN51E530, PN51E535, PN51E550 & PN51E6500 Plasma TV

Symptom: No Display, Sound OK, Standby LED “on”.

Repair/Solution:

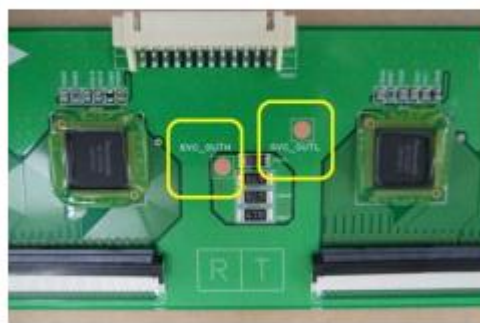
Confirm a Y buffer failure by measuring the resistance across SVC_OUTH and SVC_OUTL as shown below:

1. Replace the Y-Buffer if the resistance is below 50Ω.
2. Upgrade to the latest firmware. Refer to the chart below.

Model	Firmware Name	Applied Version
PN51E530, PN51E535	T-MX9FAUSC	1013.A
PN51E550; PN51E6500	T-MST10PAUSC	1012.9

PROCEDURE:

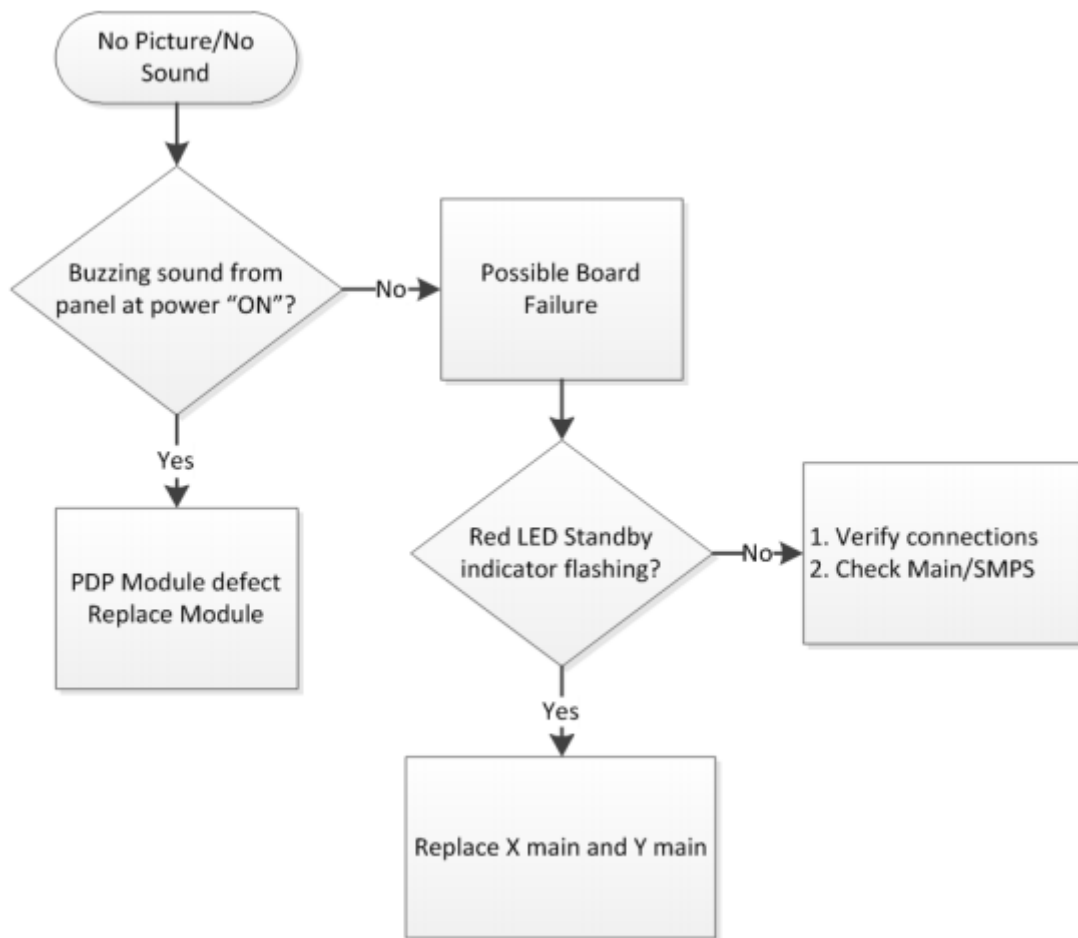
1. Measure the resistance between SVC_OUTH and SVC_OUTL.
2. If it measures lower than 50Ω, the scan IC on the Y-Buffer is defective. Replace the Y-Buffer board.
3. Check and upgrade the firmware to the most recent version available on GSPN. Refer to the chart above.



7) Model: Samsung PN51D530A3F Plasma TV

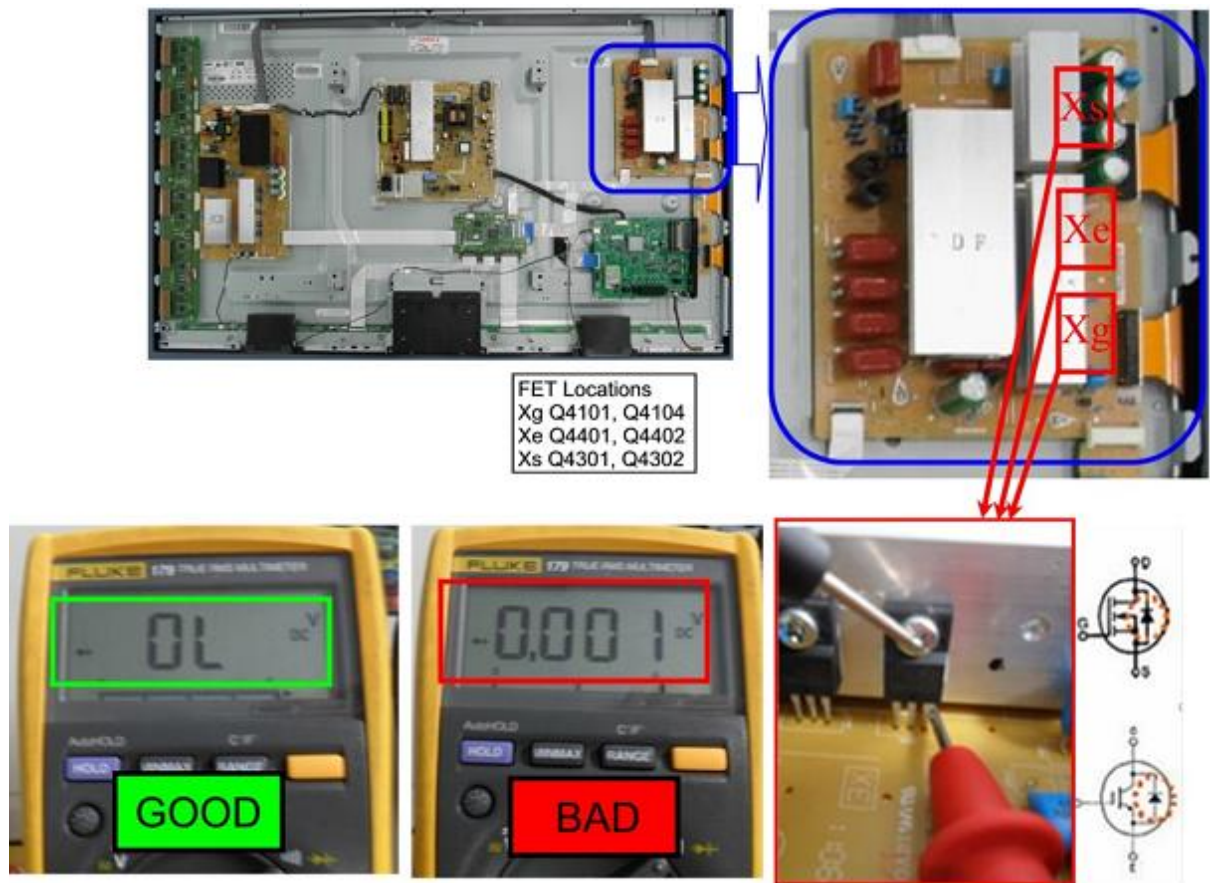
Symptom: Tv will not power “on”. No display and no sound

Repair/Solution:



Determine the X main board FET failure is the cause of no power “ON” by following the procedure below. If any of the X main FETs fail the “Diode” test, replace both X main (p/n: BN96-20048A) and Y main (p/n: BN96-20046A).

Procedure: Disconnect AC power to the TV. Measure pin-3 of each FET (Xg/Xe/Xs packages) to ground (mounting screw or heat sink) using the Multi-Meter “Diode” function as shown below. If the FET is defective or shorted, there will be a zero voltage drop, which is reflected in the Multi-meter readout of, or approaching, zero.

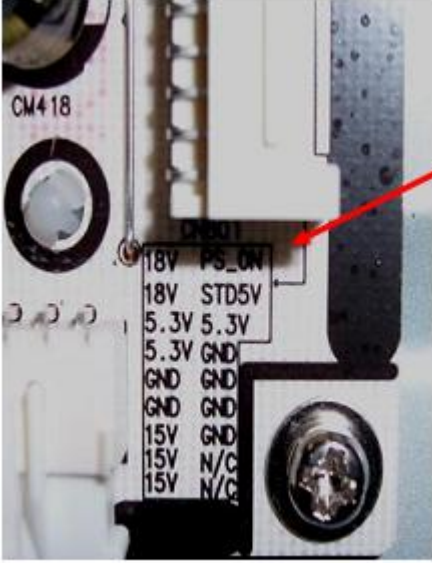


8) Model: Samsung 2010 Plasma TV SMPS Forced Mode

Symptom: PSU Self Test Method

Repair/Solution:

In prior model year Plasma TV, we could force the PSU to turn on by jumping out the PS_ON line to ground. You can do the same thing on the 2010 models. However, the cables connecting the Main board to the SMPS have changed. They no longer have 24-pin connectors. The 2010 models have either a 12-pin or an 18-pin connector.



Pin No.	Signal	Pin No.	Signal
1	FS_ON	10	18V
2	STD5V	11	18V
3	5.3V	12	5.3V
4	GND	13	5.3V
5	GND	14	GND
6	GND	15	GND
7	GND	16	15V
8	N/C	17	15V
9	N/C	18	15V

Shown above is an example of the 2010 SMPS with an 18-pin connector

Below: The pin assignments for the 12-pin connector.

Pin No.	Signal
1	PS_ON
2	STBY
3	GND
4	VAMP
5	GND
6	GND
7	D5.3V
8	D5.3V
9	GND
10	15V
11	15V
12	D5.3V

The one feature on 2010 models consistent with prior years is that the PS_ON is still pin-1. 2010 Cable part numbers:

12P- BN39-01285C

18P- BN39-01267B or C. The difference between B and C is the length of the cable.

24P Cable part number: BN39-00802P or S

Prior to 2010, the Samsung Plasma SMPS models used cables with a 24-pin connector to connect the Main Board to the SMPS. Below is the pin assignment for the 24 pin connector.

Pin No.	Signal	Pin No.	Signal
1	PS_ON	13	D5.3V
2	VS_ON	14	D5.3V
3	STBY	15	D5.3V
4	GND_STBY	16	D5.3V
5	GND_15Vamp	17	GND_15V
6	GND_15Vamp	18	GND_15V
7	15Vamp	19	GND_15V
8	15Vamp	20	D15V
9	GND_5.3V	21	D15V
10	GND_5.3V	22	D15V
11	GND_5.3V	23	AC_DET
12	GND_5.3V	24	N.C [VI]

10. Plasma TV Repair Case History

This is a full story on how to repair a Panasonic Plasma TV in components level repair. All the steps and method use to solved this Plasma TV problem.

Model: Panasonic TH-P42X28K Plasma TV



Manufacture: 2010

Panel- MC106H30U13

A board (Mainboard) – TNPH0842 MM

SN Board – TNPA5066 AB

SS Board – TNPA5072

X Board – TNPA5075

* Since the exact model of TH-P42X28K service manual is not, so found the nearest model of plasma tv service manual are TH-P42X20A & TH-P42C20C is nearly same as TH-P42X28K. (Found the service manuals & training manuals in www.Plasma-Television-Repair.com).

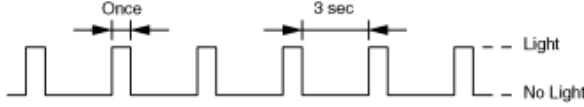
Symptom: Power LED 1 Blink Error Code

When AC applied to this Plasma TV, the power LED is lit with Red light. After press the power button, the LED light change to green color and blinking about 20~30 times then change to 1 blink red color LED light. When the LED light change to green color and blinking, the PSU board Relay can hear “Tic” one sound, after several seconds the Relay sound got “Tic, Tac” 2 times sound and the LED light change to 1 blink red color light.

<http://www.lcdrepairguide.com/plasma/>

Repair/Solution:

Refer to the TH-P42X20A service manual- Power LED Blinking timing chart:

Blinking Times	Blinking timing	Contents	Check point
1		Unknown SOS	-
		Panel information SOS PD4 Start SOS	-
2		15V SOS	A-Board P-Board
3		3.3V SOS	A-Board
4		Power SOS	P-Board

The 1 time blinking error is “Unknown SOS” or Panel information SOS or PD4 Start SOS. So what’s the problem is?

Found the 2010 Model Plasma TV Training Manual said the 1 blink SOS error code is the “Communication error between System CPU (IC8001) and Panel CPU (IC9003). Search the 2012 & 2013 Model Plasma TV Training Manual said it is the A board (Mainboard) defective.

Blinks	Item	Detection	Signal
1	System Error	Information error FLASH check sum error Power startup error Communication (IC8000 and IC9300) error	-
2	P15V DET	P3.3V: Low power P15V: Missing	Normal: H Abnormal: L
Fast 3 (except ST60 series)	Boot error (SUB3.3V)	Incomplete Boot Program execution of PEAKS IC (IC8000)	-
6,7,8,9	Panel SOS	Normal :0-0.45V SOS8_SS :0.55-0.95V SOS6_SC :1.13-1.55V SOS_DCC :1.75-2.15V	A/D Input Voltage

2013 Models Plasma TV Power LED Error Code



[PSU board and the A board](#)

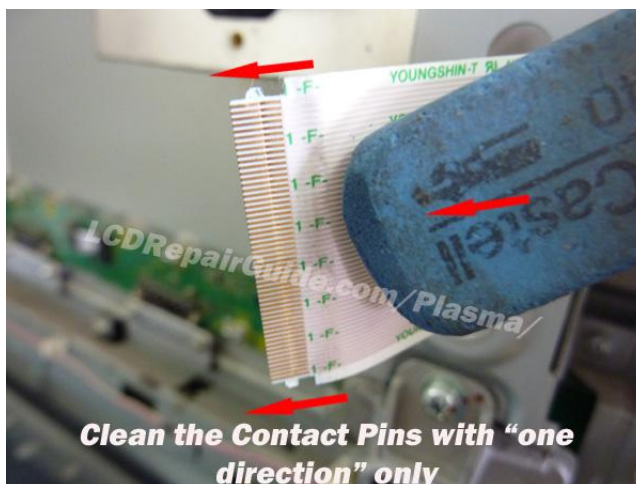
Because of not sure what's wrong about this Plasma TV, so just the normal procedure/steps to troubleshooting the Plasma TV.

1) First try to Self Test the PSU board. Please refer to the Panasonic PSU board Self Test Method. Found that the PSU board can output all normal and stable voltages. So confirm that the PSU board is OK.



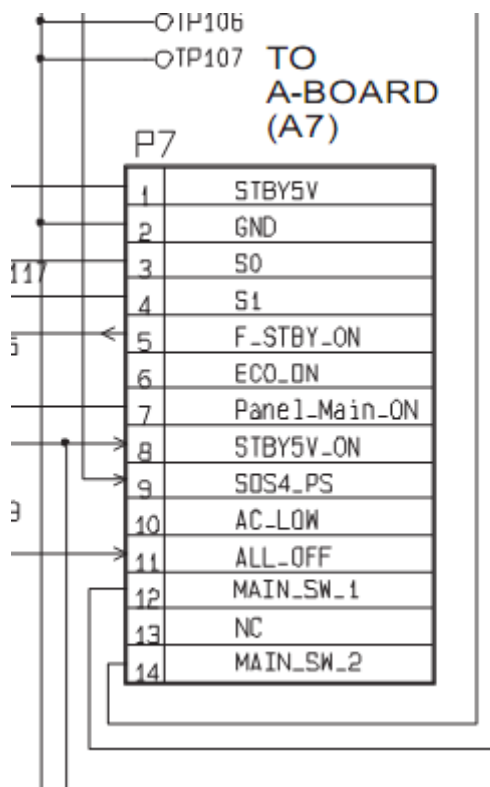
2) Clean most of their FFC cables contact pins, especially the FFC cables connected to Mainboard (A board) and to SN & C1/C2 boards. Normally I like to use the rubber eraser to clean their contact pins (golden finger). Remember, when use the eraser to clean the contact pins, must just clean it in one direct only. If not, it will damage their contact pins.

<http://www.lcdrepairguide.com/plasma/>



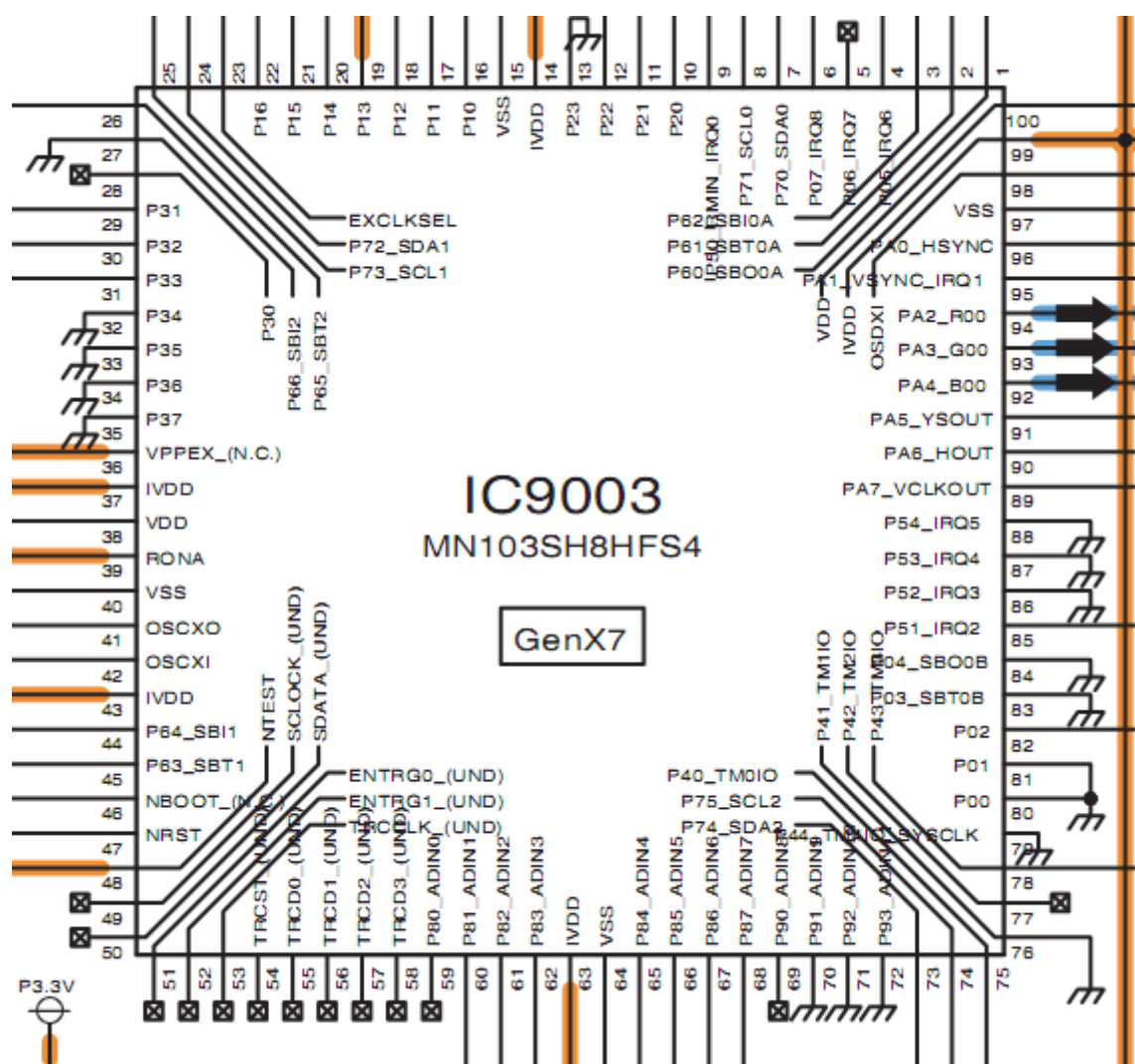
After clean all the FFC cables contact pins, insert back their cables properly. Power on the TV still the same problem.

3) Checking the PSU board connector P7 all voltage & signal pins, found that their pin-7 (Panel_Main_On) quite strange. Before the Mainboard shut down the system, all signals line voltage are remain, except this pin-7 (3.279V) just came after 1 or 2 seconds then shut off quickly. Other signal pins still remain the same till the LED light change to Red 1 blink.



Try to disconnect the PSU board P7 connector pin-7, check their signal still same problem. Trace it to the Mainboard (A Board), found this signal is sent from IC9003 (Micon) pin-75 through a resistor R9145 (100 ohm). This Panel_Main_On is output from this pin-75, check this pin their signal still shut off quickly.

Suspect this IC9003 is defective. Before that, checking their Vcc input, Crystal 10MHz, Reset signal all testing and looking good. I even re-program their EEPROM IC (IC9001) but still same problem! So suspect it could be the IC9003 defective.

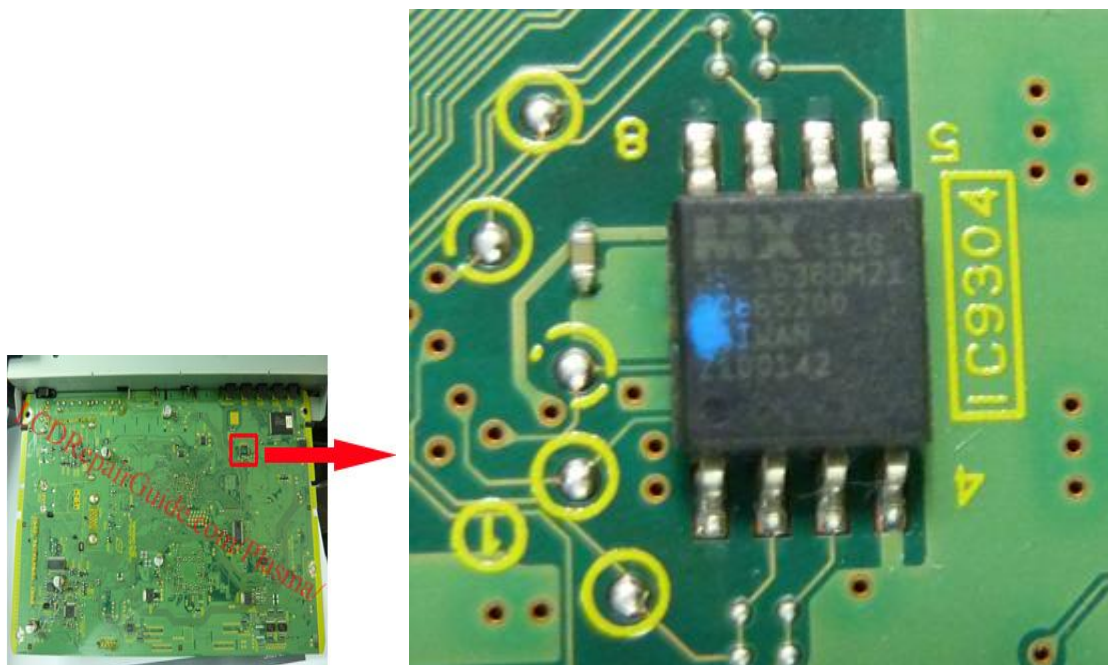


4) Until this step, I can confirm that the problem was in the A Board (Mainboard), same like their latest model training manual said it is the A Board defective. If just to replace the A Board, the cost quite expensive and

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it is just the used board only. If need to replace the IC9003, it is impossible to get this IC.

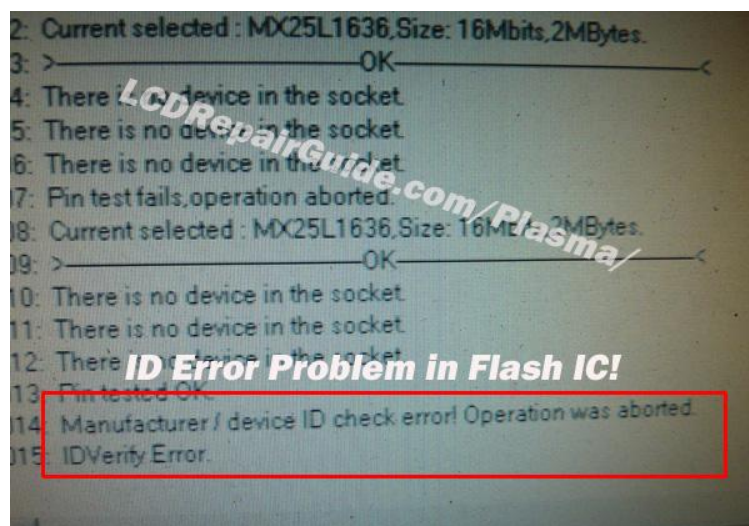
5) When check back to the Error Code description there, 1 Blink error is a communication error in between IC8001 and IC9003. So I think it could be affect by the Flash Memory or their firmware too. It is because lots of the latest model of LCD/LED TV has this type of problem too. So try to checking their Flash Memory IC9304 (MX25L1636DM2I) with my ISP Programmer.



6) Use my ISP Programmer try to reading this Flash IC, and here the result:



The Programmer can detect it as a MX25L1636 flash IC. Click to select “Read” the flash IC and found this error!

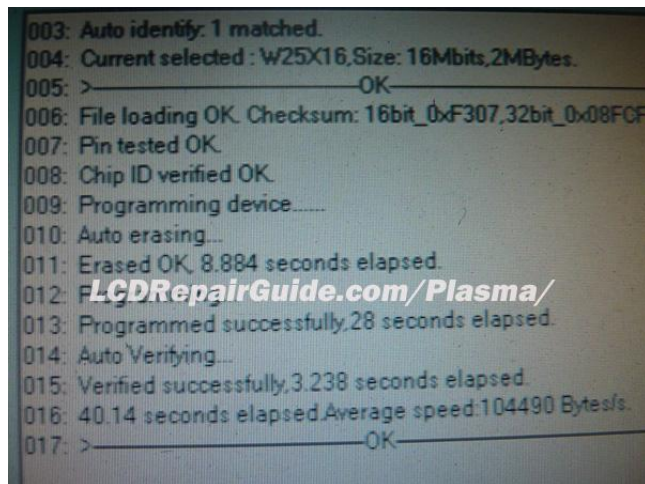


Wow! Bingo! Their Flash Memory IC was damage and the problem is their flash chip ID missing.

7) Because my stock for this part number flash memory was finished. So I try to use the equivalent flash memory. Found one similar capacity of 2MByte (16M bits) flash memory Winbond 25X16 to replace it.



8) The problem now is where to get the same model & version firmware?! Found a friend from oversea he provided the firmware to me but their original model is TH-P42C20 version! Even it is not the exactly same model Tv, because of this plasma TV is similar or nearest the TH-P42C20 Plasma TV, so I will give it a try. As usual, use the Programmer to programming this firmware into the new flash IC (W25X16).



```
003: Auto identify: 1 matched.
004: Current selected : W25X16,Size: 16Mbits,2MBytes.
005: >-----OK-----
006: File loading OK. Checksum: 16bit_0xF307,32bit_0x08FCF
007: Pin tested OK.
008: Chip ID verified OK.
009: Programming device.....
010: Auto erasing...
011: Erased OK, 8.884 seconds elapsed.
012: LCDRepairGuide.com/Plasma/
013: Programmed successfully,28 seconds elapsed.
014: Auto Verifying...
015: Verified successfully,3.238 seconds elapsed.
016: 40.14 seconds elapsed,Average speed:104490 Bytes/s.
017: >-----OK-----
```

After successfully program the firmware into the new flash IC, solder it back to the A Board. This is time to see the result of this Plasma TV with new firmware and flash IC. After power on the TV, look at their green LED light blinking about 6~7 seconds, finally the Red 1 blink LED light appears again! OMG!

9) What's wrong to this TV? The new firmware is not compatible with this TV? The new flash IC is not match with MX25L1636? Or ... So hard to think what's wrong to this TV? Give up and replace a new A Board? But one thing can sure that their original flash IC (MX25L1636) is damage. So the problem will be the firmware is not match with this TV or the flash IC is not compatible with the MX25L1636! Actually I can't get the other same or similar firmware for this TV, so I choose to replace another flash IC to this A Board and give it a try.

10) Suddenly I remember that the 25X16 is not match with MX25L1636! (refer to my V4.0 LCD/LED TV Repair Tips eBook at: www.LCDRepairGuide.com/V4/). So I try to find another flash IC, so I found the 25Q64 (W25Q64) as an equivalent for MX25L1636. Even their capacity is bigger than the original, but I believe that it can use as a equivalent MX25L1636. As usual, programming the firmware into it and then solder it back to A Board.

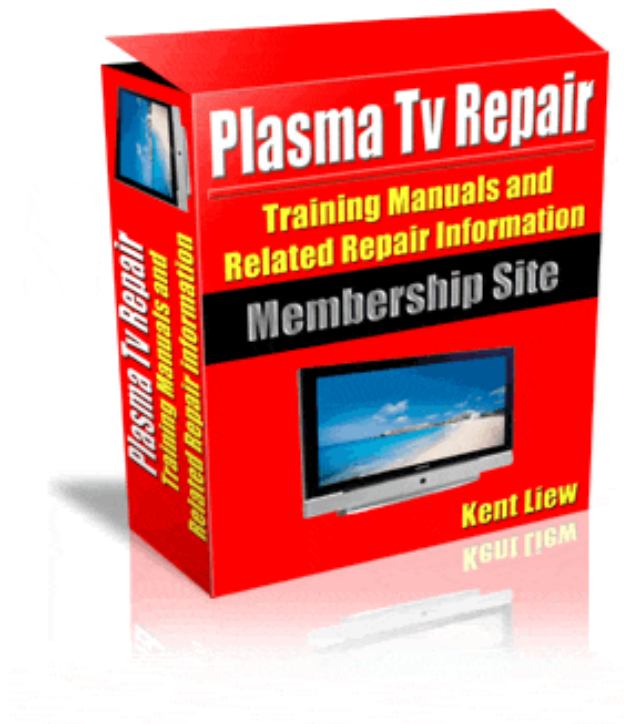


Power on the Plasma TV, the Power LED blinking green light, after several seconds, the green light is lit and the white snow was appear!! Wow! Bingo! Finally this Panasonic TH-P42X28K Plasma TV problem solved!



*For the complete learning Plasma Television repair, highly recommend you join the Plasma Television Repair membership site as below:

[Http://www.Plasma-Television-Repair.com](http://www.Plasma-Television-Repair.com)



Conclusion:

I strongly suggest you to print out this e-book and binding it as a book for easy reference.

If you have questions about Plasma Television Repair, please do not hesitate to send me an email at:

fastrepairguide@gmail.com

I wish you all the best and look forward to hearing your success story. Enjoy repair!

To your success,

Kent Liew

<http://www.LCDRepairGuide.com>

<http://www.LCD-Television-Repair.com>

<http://www.Plasma-Television-Repair.com>

<http://www.Projection-Tv-Repair.com>

<http://www.FastRepairGuide.com>

If you want to buy the Test Equipment, Tools and Spare Parts please visit to the page here:

<http://www.LCDRepairGuide.com/Plasma/tools>

All these tools and equipment will help you in troubleshooting and repairing the electronics devices.

BONUS-A Section:

BONUS-A: (Inside this eBook)

LG Plasma TV Interconnect Schematic Diagrams.....	319
LG 42PG20- 42G1 Panel	320
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LG 60PK750- 60R1Panel	344

BONUS-B: **(NOT inside this eBook)**. It was inside the Download Page:

LG Plasma TV Training

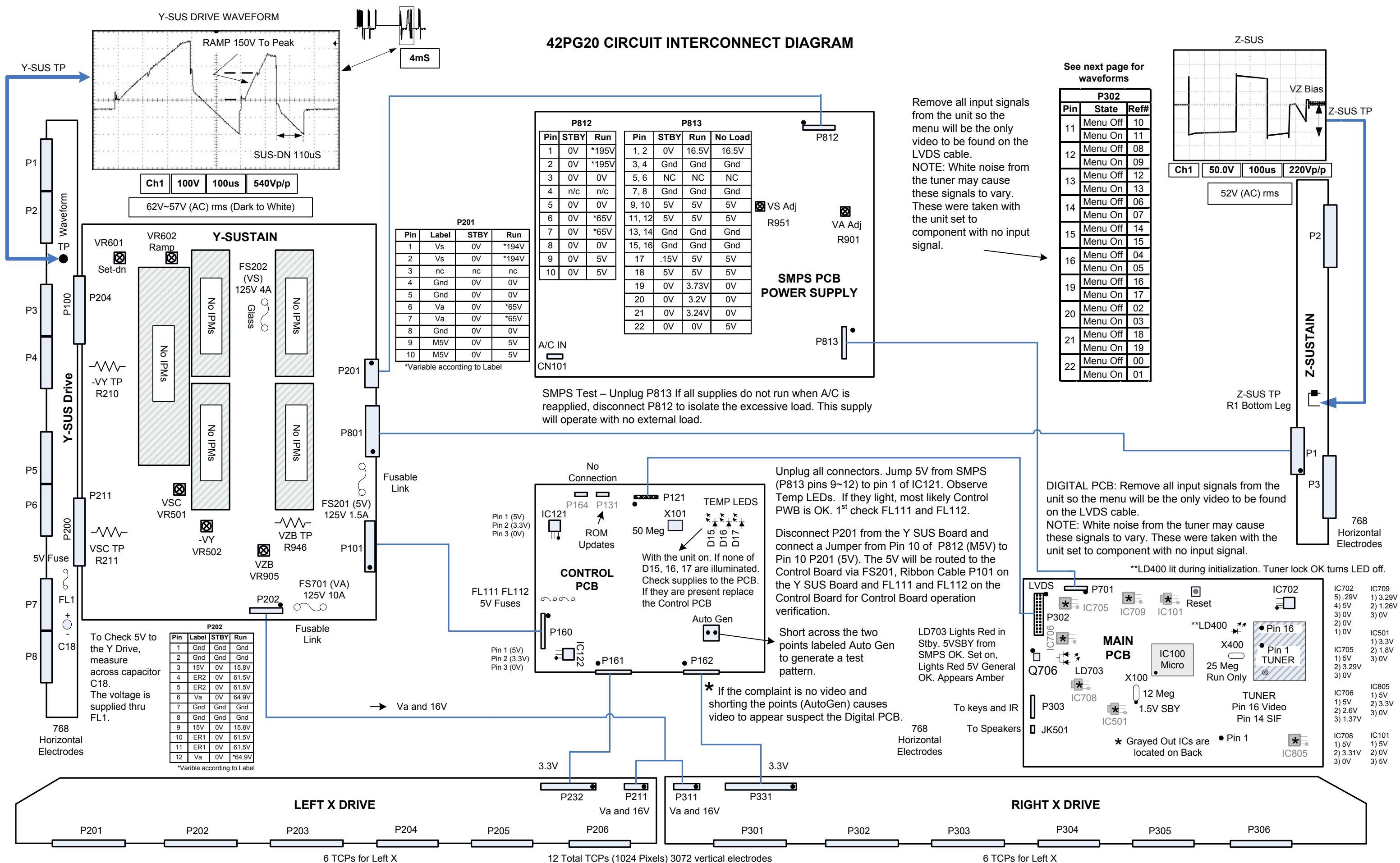
Panasonic Plasma TV Training

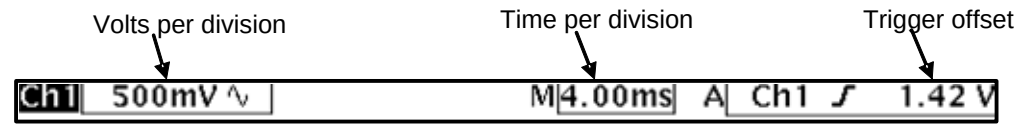
Samsung Plasma TV Training

Various Models Plasma TV PSU Schematic Diagrams

(The Bonus-B section included over 500 pages & 270MB files size!)

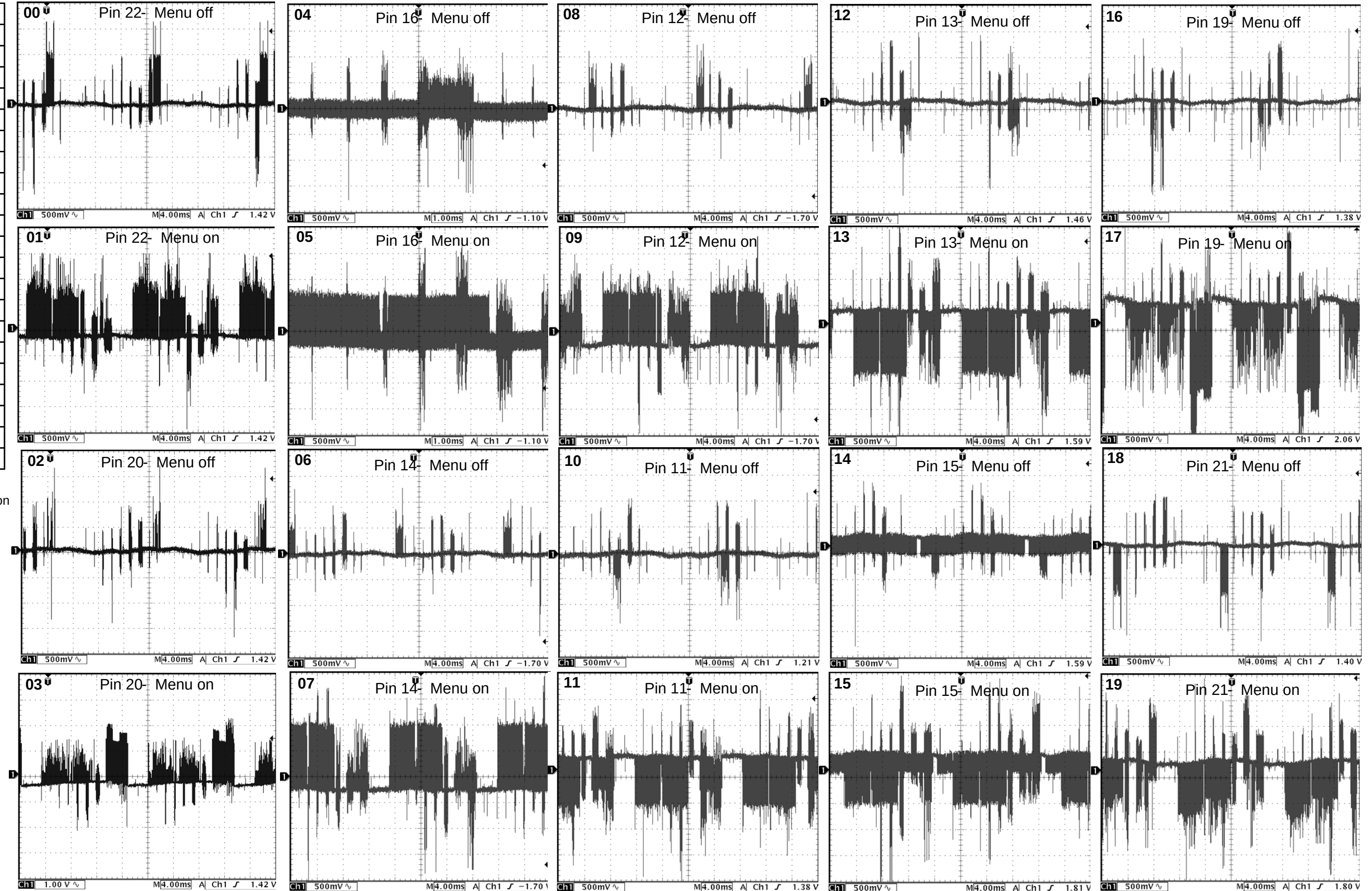
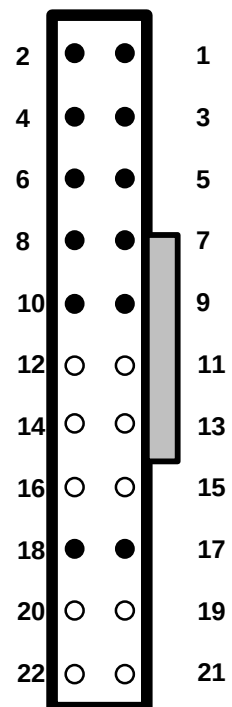
<http://www.LCDRepairGuide.com/Plasma/>



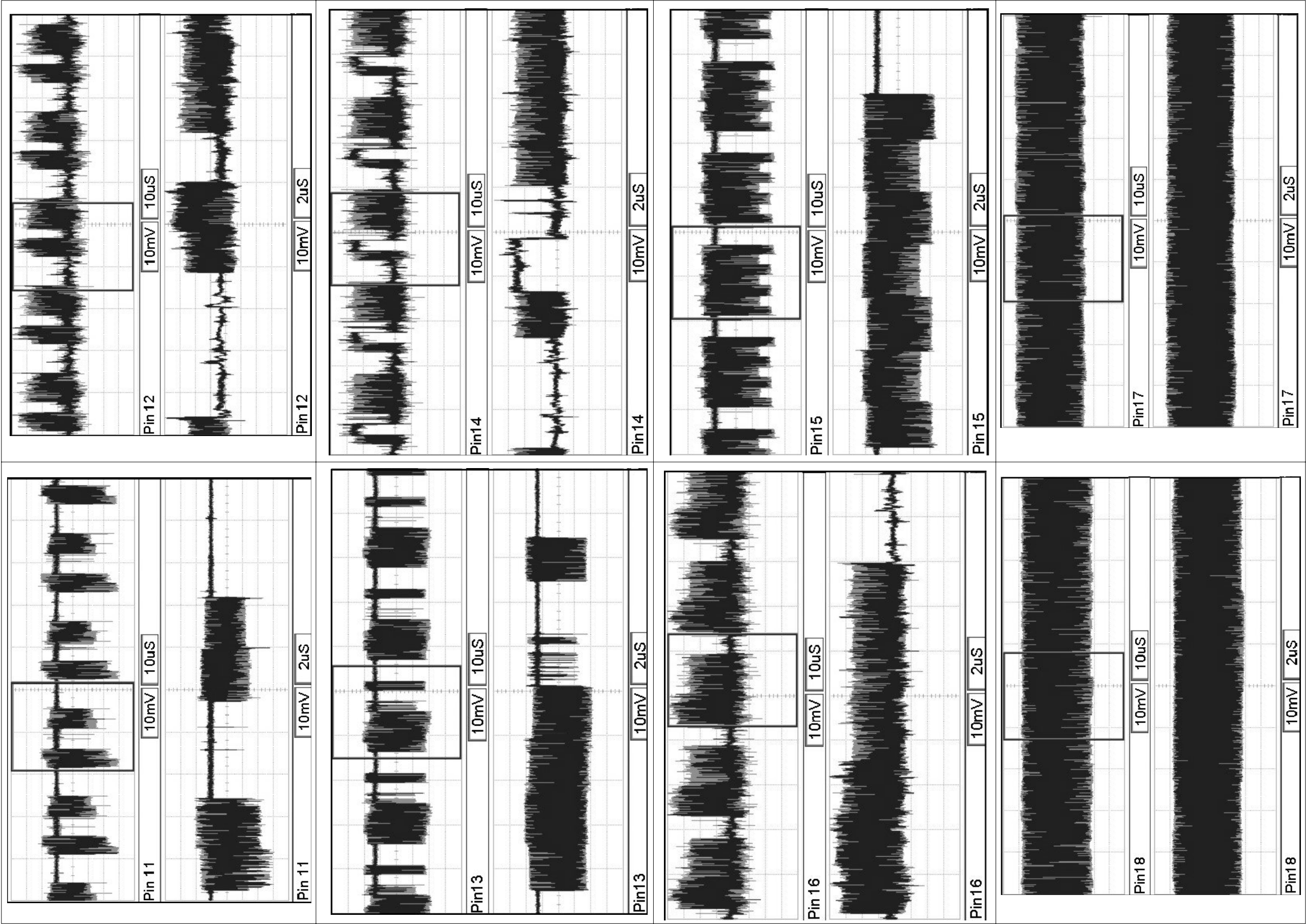
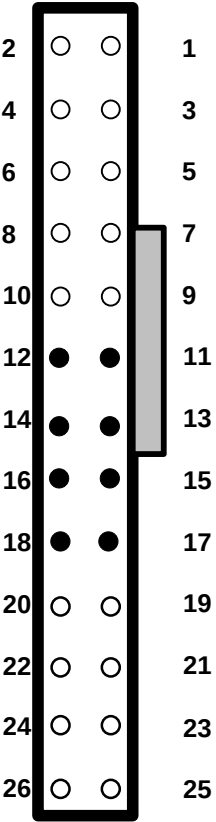


P302		
Pin	State	Ref #
11	Menu Off	10
	Menu On	11
12	Menu Off	08
	Menu On	09
13	Menu Off	12
	Menu On	13
14	Menu Off	06
	Menu On	07
15	Menu Off	14
	Menu On	15
16	Menu Off	04
	Menu On	05
19	Menu Off	16
	Menu On	17
20	Menu Off	02
	Menu On	03
21	Menu Off	18
	Menu On	19
22	Menu Off	00
	Menu On	01

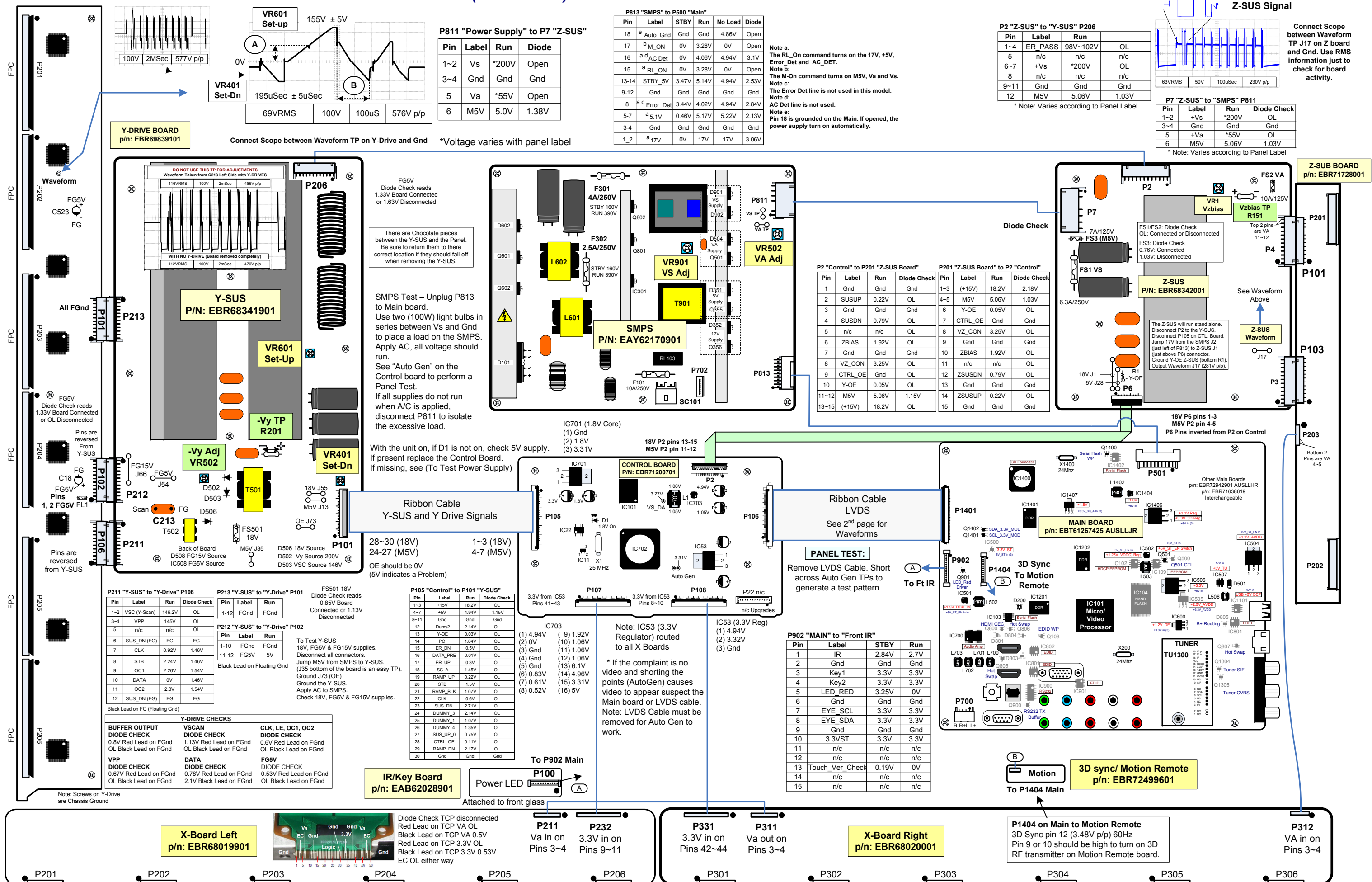
Connector P302 Configuration
○ - indicates signal pins.



Connector P1002 Configuration
● - indicates signal pins.



42PW350 (42T3 Panel) CIRCUIT INTERCONNECT DIAGRAM



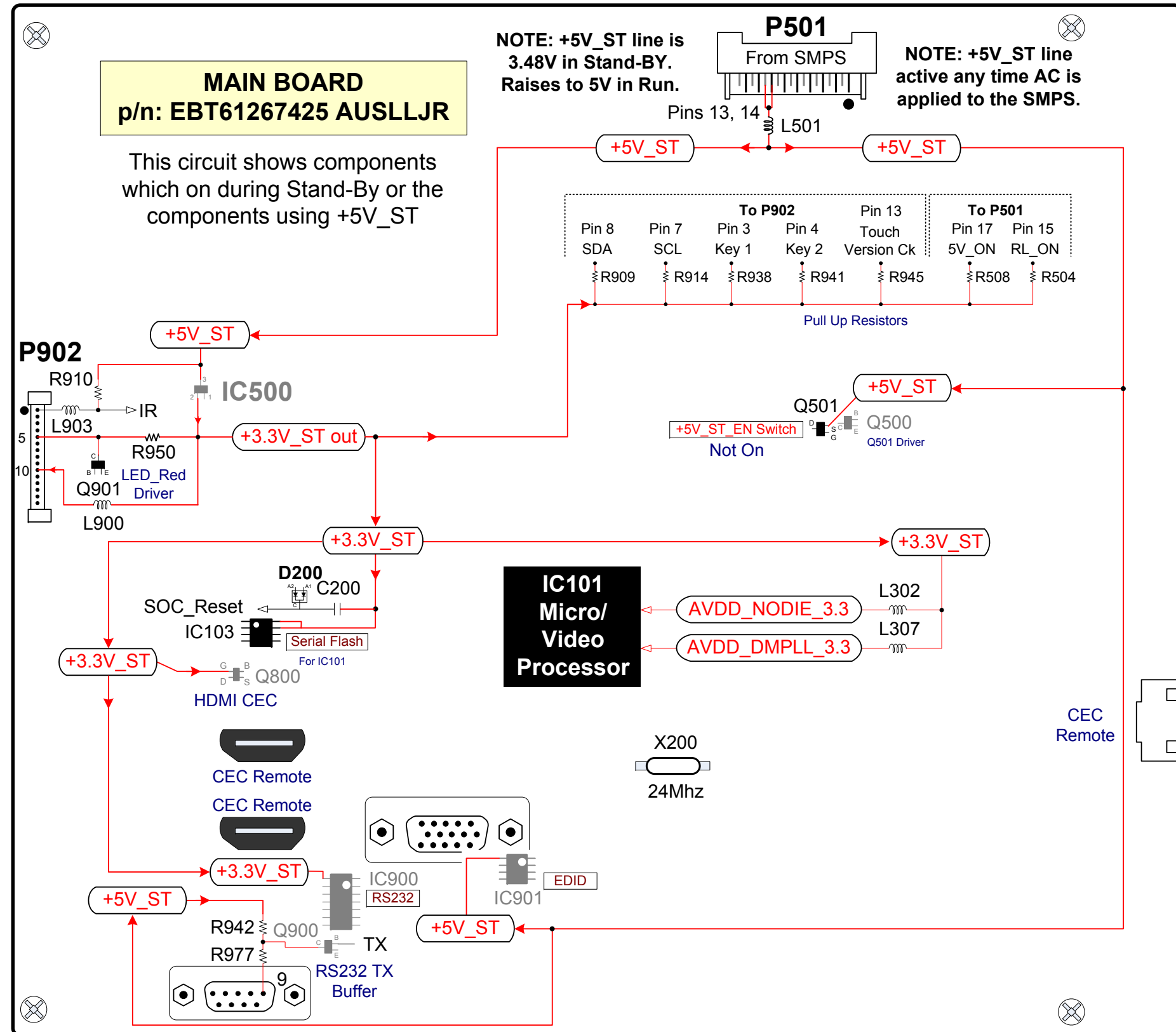
42PW350 Main Board (Front Side) Component Voltages

IC103  Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.29V [6] 3.29V [7] 3.29V [8] 3.29V	Serial Flash Pin For HDMI	IC502  Pin [1] 5V (In) [2] 5V (In) [3] 0V [4] 0V [5] 081V [6] 0.81V [7] 0.72V [8] 0.53V [9] 1.7V [10] 1.3V [11] 1.3V [12] 1.3V [13] 6.47V [14] 0.25V [15] 2.96V [16] 5V (In)	+1.26V_VDDC Regulator	IC507  Pin [1] 11.1V [2] 17V [3] 3.1V [4] 1.8V [5] 0.8V [6] 0.6V [7] 0V [8] 5V	+5V_TU Regulator	IC1404  Pin [1] 5V (In) [2] 0V [3] 0V [4] 0V [5] 0V [6] 0.8V [7] 0.65V [8] 0.54V [9] 1.7V [10] 1.05V [11] 1.05V [12] 1.05V [13] 6.1V [14] 0.15V [15] 2.9V [16] 0V	+1.0V Regulator	Q501  Pin [B] 0.7V [C] 5.2V [E] 5.2V	+5V_ST_EN Switch
IC501  Pin [1] 5V (In) [2] 5V (In) [3] 0V [4] 0V [5] 0V [6] 0.81V [7] 0.72V [8] 0.53V [9] 1.7V [10] 1.58V [11] 1.58V [12] 1.58V [13] 6.7V [14] 0.12V [15] 2.98V [16] 2.98V (In)	+1.5V_DDR_IN Regulator	IC504  Pin [1] 0V [2] 3.3V (Out) [3] 5.2V (In)	+3.3V_AVDD Regulator	D200  Pin [A1] 0V [C] 0V [A2] 0V	Reset Speed Up	IC1406  Pin [1] 0V [2] 3.31V (Out) [3] 5V (In)	+3.3V_VST +3.3V_3D	Q1401  Pin [B] 3.28V [C] 3.3V [E] 3.28V	SCL_3.3V_MOD Buffer
		IC506  Pin [1] 0V [2] 3.3V (Out) [3] 5.2V (In)	+3.3V Regulator	D501  Pin [A] 0V [C] 5V	Reg IC507	IC1407  Pin [1] 0V [2] 1.8V (Out) [3] 3.3V (In)	(+1.8V) Regulator	Q1402  Pin [B] 3.28V [C] 3.3V [E] 3.28V	SDA_3.3V_MOD Buffer

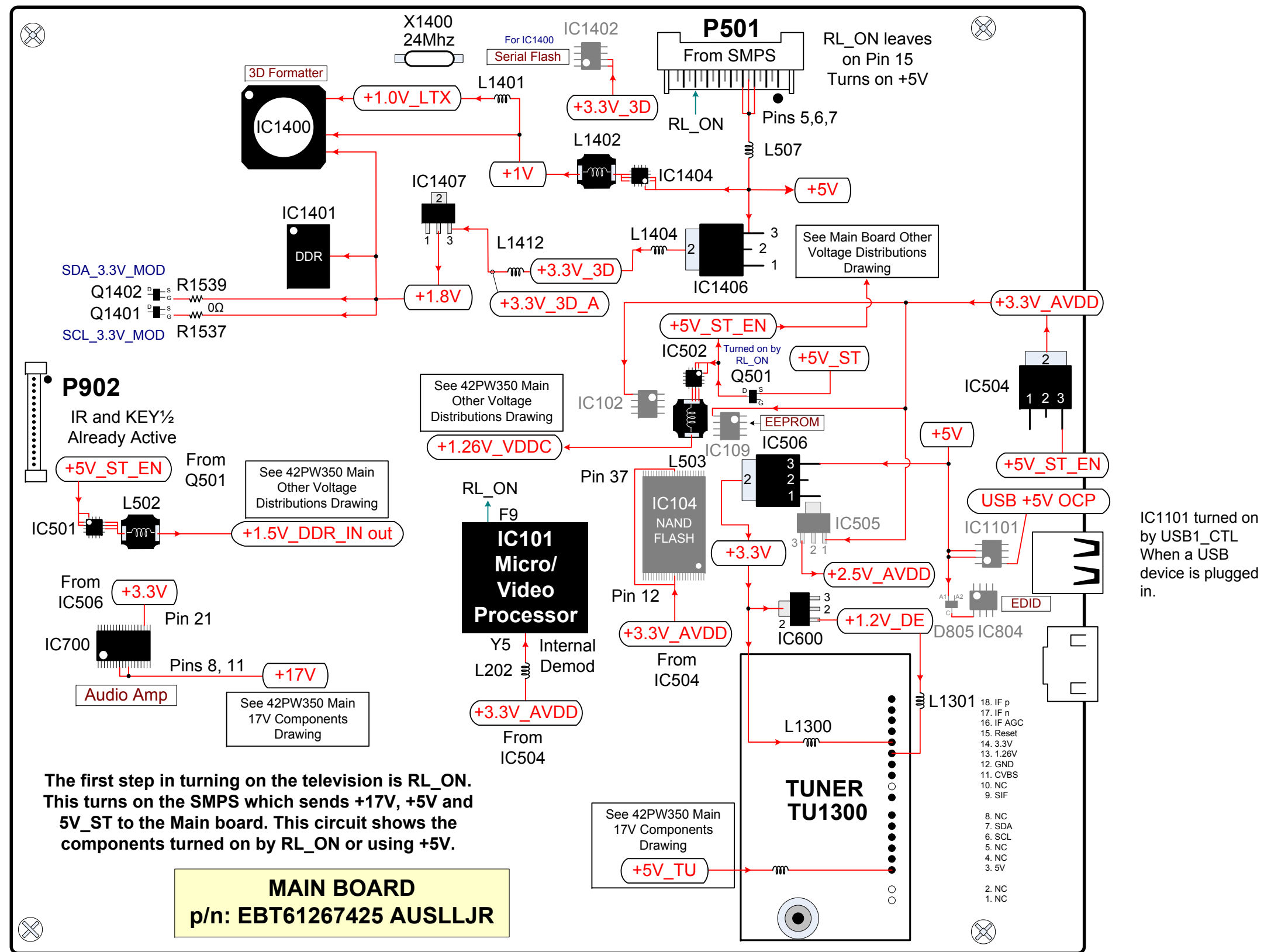
42PW350 Main Board (Back Side) Component Voltages

IC102  Pin [1] Gnd [2] Gnd [3] 3.3V [4] Gnd [5] 3.3V [6] 3.3V [7] 3.3V [8] 3.3V	HDCP EEPROM	IC505  Pin [1] 3.3V (In) [2] Gnd [3] 2.52V (Out)	+2.5V_AVDD Regulator	IC900  Pin [1] 3.3V [2] 5.6V [3] 0V [4] 0V [5] (-5.6V) [6] (-5.6V) [7] 5.7V [8] 0V [9] 3.3V [10] 0V [11] 3.3V [12] 3.3V [13] 0V [14] (-5.6V) [15] Gnd [16] 3.3V (B+)	RS232 Tx/Rx	IC1101  Pin [1] Gnd [2] 5.1V (In) [3] 5.1V (In) [4] 3.3V [5] 0V [6] 5.1V (Out) [7] 5.1V (Out) [8] n/c	USB 5V Limiter	Q800  Pin [1 B] 3.29V [2 S] 3.29V [3 D] 3.23V [4 G] 3.3V	HDMI CEC Buffer
IC109  Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.3V [6] 0V [7] 3.3V [8] 3.3V	EEPROM for Micro	IC801  Pin For HDMI [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.3V [6] 3.3V [7] 3.3V [8] 3.3V	IC801, IC802 EDID Data	IC1402  Pin [1] 3.29V [2] 0V [3] 3.3V [4] 0V [5] 0V [6] 0V [7] 3.29V [8] 3.29V	Serial Flash	Q806  Pin [B] 0V [C] 0V [E] 0V	Hot Swap	Q807  Pin [B] 0.1V [C] 0V [E] 0V	Hot Swap
IC500  Pin [1] Gnd [2] 3.3V (Out) [3] 5.09V (In)	3.3V_VST Regulator	IC804  Pin For HDMI [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.3V [6] 3.3V [7] 3.3V [8] 3.3V	EDID Data Side Input	IC901  Pin For HDMI [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.3V [6] 3.3V [7] 3.3V [8] 3.3V	EDID Data for PC	Q103  Pin [B] 0V [C] 5V [E] 0V	EDID WP	Q900  Pin [B] 0.63V [C] 0V [E] 0V	Hot Swap
				Q500  Pin [B] 0.64V [C] 0V [E] 0V	+5V_ST_EN Switch CTL	Q1304  Pin [B] 0.23V [C] 0V [E] 0.92V	Tuner SIF	Q1305  Pin [B] 3.63V [C] 0V [E] 4.3V	Tuner CVBS
						D801  Pin [A1] 3.28V [C] 3.32V [A2] 0V	Biasing for Q800	D803  Pin [A1] 0V [C] 3.32V [A2] 3.28V	5V Routing
						D804  Pin [A1] 3.28V [C] 3.32V [A2] 0V	5V Routing	D805  Pin [A1] 5.1V [C] 4.9V [A2] 0V	5V Routing

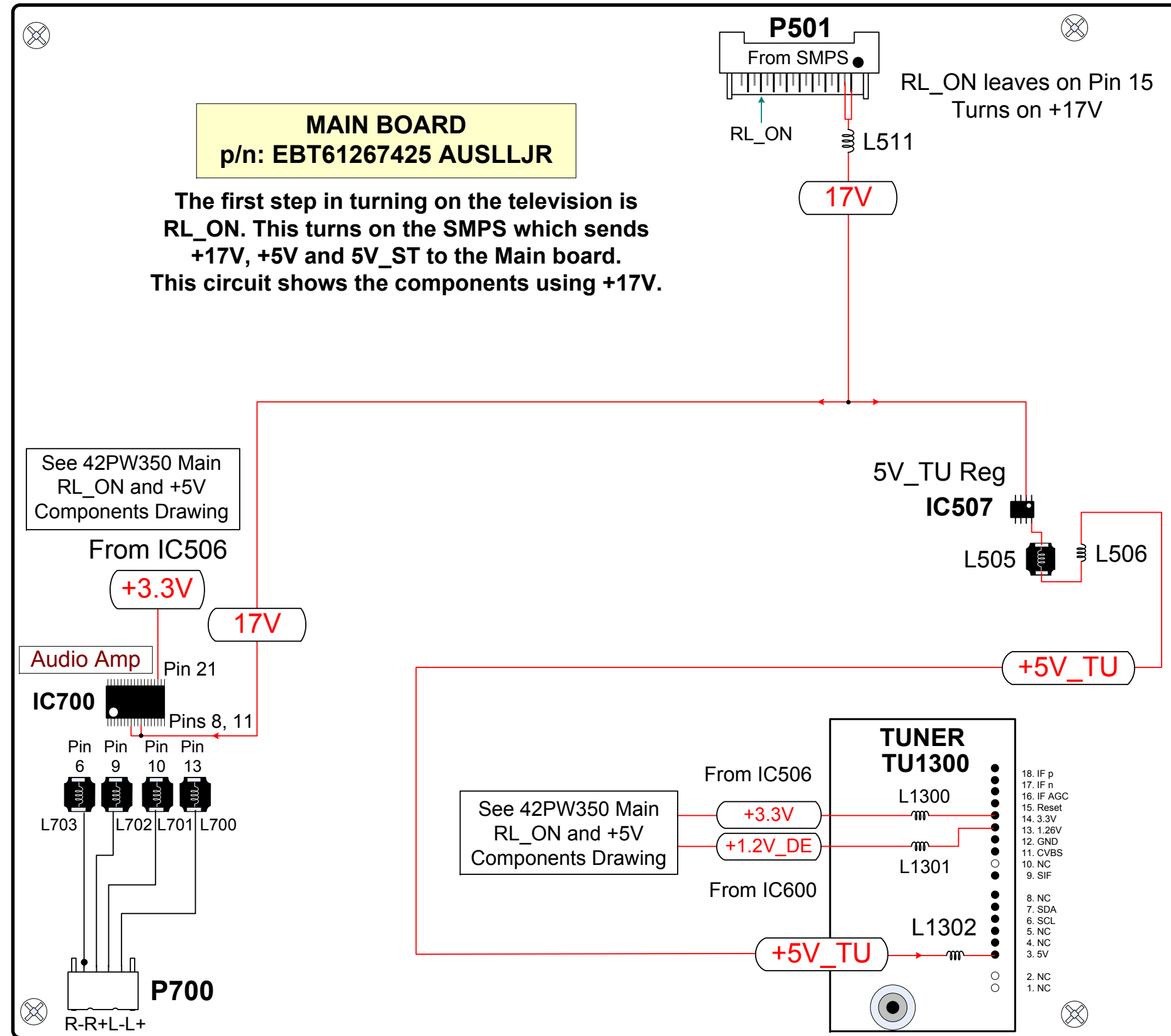
42PW350 Main +5V_ST and +3.3V_ST



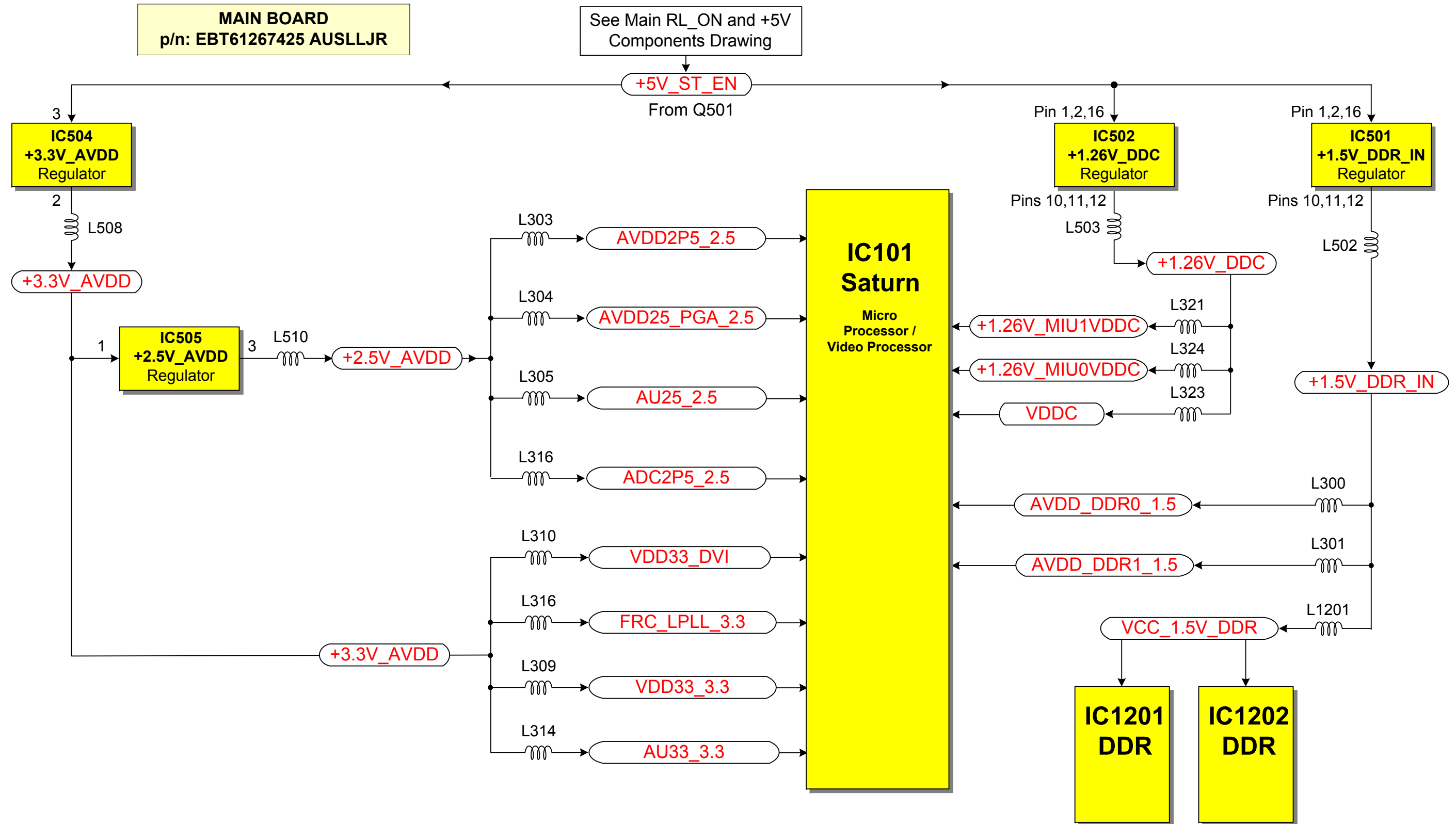
42PW350 Main RL_ON and +5V Components



42PW350 Main +17V Components

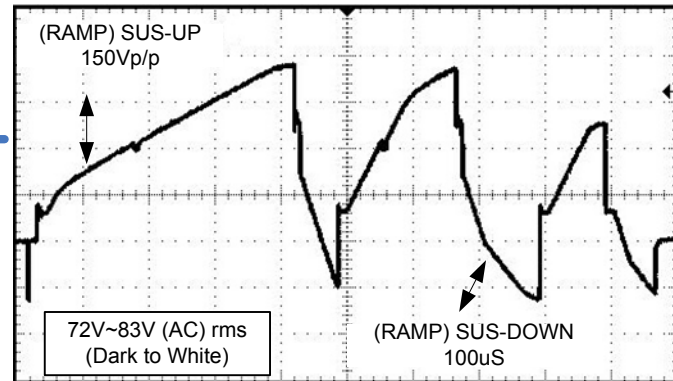


42PW350 Main Other voltage Distributions

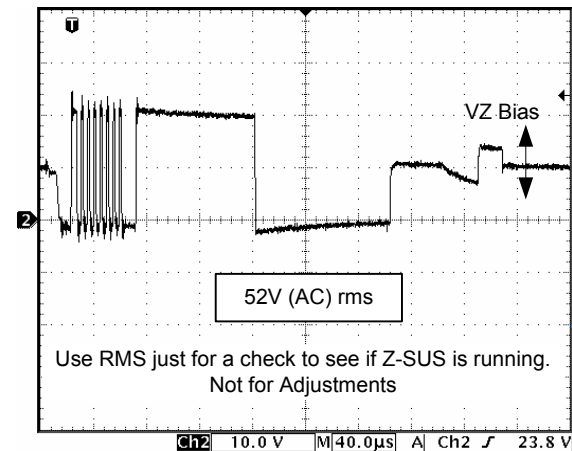


50PG20 INTERCONNECT DIAGRAM

Y-SUS DRIVE WAVEFORM



Z-SUS DRIVE WAVEFORM



- During SMPS Test (Described below), P803 disconnected;
- 1) P801 and P802 connected. Y-SUS and Z-SUS will produce sustain waveforms.
 - 2) P801 connected P802 disconnected, Y-SUS will produce sustain waveform, Z-SUS does not.
 - 3) P801 disconnected P802 connected. No SUS waveforms are produced due to a loss of control PWB B+ routed through the Y-SUS PWB.

Vs, Va and M5V

P803 Connector "SMPS" to P701 "Main"

Pin	Label	STBY	Run	No Load	Diode
1, 2	15V	0V	16V	16V	2.26V
3, 4	Gnd	Gnd	Gnd	Gnd	Gnd
5, 6	12V	0V	12V	12V	2V
7, 8	Gnd	Gnd	Gnd	Gnd	Gnd
9-12	5V	5V	5V	5V	1.7V
13-16	Gnd	Gnd	Gnd	Gnd	Gnd
17	5_V Det	0V	5V	5V	1.56V
18	AC Det	5V	5V	5V	2.56V
19	RL_On	0V	4.5V	0V	2.6V
20	Vs_On	0V	3.2V	0V	2.7V
21	M5V_ON	0V	3.2V	0V	2.6V
22	AUTO	0V	0V	5V	2.1V

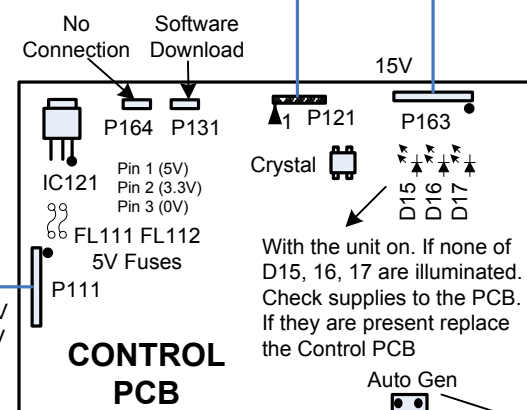
A/C IN No Connection P701

SMPS POWER SUPPLY

Pin	Label	STBY	Run
1	SUS-DN	0V	16V
2	SUS-UP	0V	16V
3	ER-DN	Gnd	Gnd
4	ZBIAS	0V	0.48V
5	ZB-CON	0V	0.27V
6	ER-UP	0V	0.1V
7	ENABLE	0V	0.06V
8	none	Gnd	Gnd
9	none	0V	0V
10	none	0V	1.93V
11	none	0V	2.66V
12	none	Gnd	Gnd

SMPS Test – Unplug P803 If all supplies do not run when A/C is reapplied, disconnect P801 and P802 one at a time to isolate the excessive load. This supply will operate with no external load.

Pin	Label	STBY	Run
1	CLK	0V	3.2V
2	STB	0V	0.76V
3	OSC1	0V	0V
4	OSC2	0V	3V
5	DATA	0V	0.6V
6	SUS_DN	0V	0V
7	SUS_UP	0V	2V
8	ER_DN	0V	1.2V
9	ER_UP	0V	2V
10	SET_UP	0V	0.26V
11	SET_DN	0V	0.2V
12	PASS_TOP	0V	0.2V
13	DELTA_VY	0V	0.16V
14	DET_LEVEL	0V	0V
15	SLOPE_KEY	0V	0V
16	SET_UP	0V	1.9V
17	SET_DN	0V	1.4V
18	X_ER	0V	2.9V
19	Y_ENABLE	0V	0.6V



Remove all input signals from the unit so the menu will be the only video to be found on the LVDS cable. NOTE: White noise from the tuner may cause these signals to vary. These were taken with the unit set to component with no input signal.

See next page for waveforms

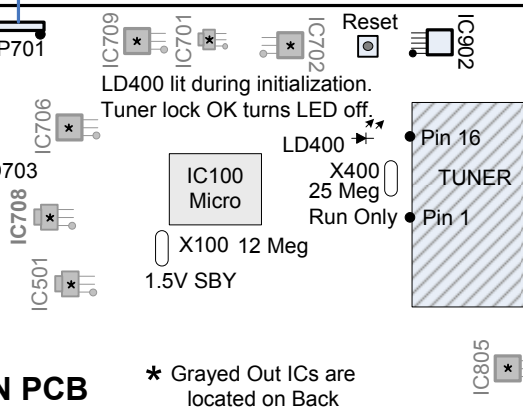
Short across the two points labeled Auto Gen to generate a test pattern.

* If the complaint is no video and shorting the points (AutoGen) causes video to appear suspect the Digital PCB.

Pin	State	Ref#
11	Menu Off	10
12	Menu Off	11
13	Menu Off	08
14	Menu Off	09
15	Menu Off	12
16	Menu Off	13
17	Menu Off	06
18	Menu Off	07
19	Menu Off	14
20	Menu Off	15
21	Menu Off	04
22	Menu Off	05
23	Menu Off	02
24	Menu Off	03
25	Menu Off	18
26	Menu Off	19
27	Menu Off	00
28	Menu Off	01

Z-SUS

** LD703 Lights Red in Stby. 5VSBY from SMPS OK. Set on, Lights Red 5V General OK. Appears Amber



* Grayed Out ICs are located on Back

LEFT X DRIVE

CENTER X DRIVE

RIGHT X DRIVE

IC701	1) 5V	IC709	1) 3.29V
IC702	2) 0V	IC710	2) 1.26V
IC703	3) 5V	IC711	3) 0V
IC704	1) 5V	IC712	1) 3.3V
IC705	2) 3.3V	IC713	2) 1.8V
IC706	3) 0V	IC714	3) 0V
IC707	1) 5V	IC715	1) 5V
IC708	2) 3.29V	IC716	2) 3.3V
IC709	3) 0V	IC717	3) 0V
IC710	1) 5V	IC718	1) 5V
IC711	2) 3.64V	IC719	2) 0V
IC712	3) 1.38V	IC720	3) 0V
IC721	1) 5V	IC722	1) 5V
IC723	2) 3.3V	IC724	2) 0V
IC725	3) 0V	IC726	3) 0V

Volts per division

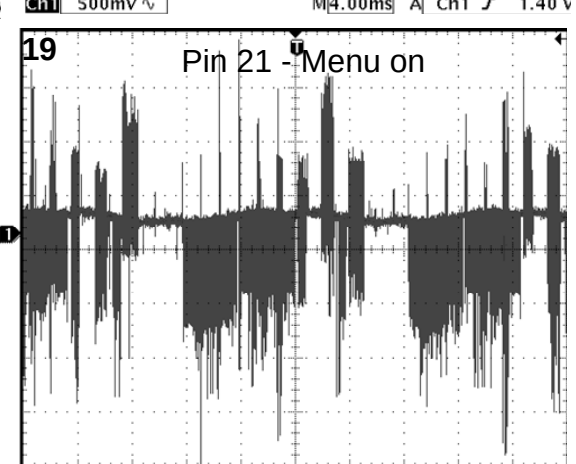
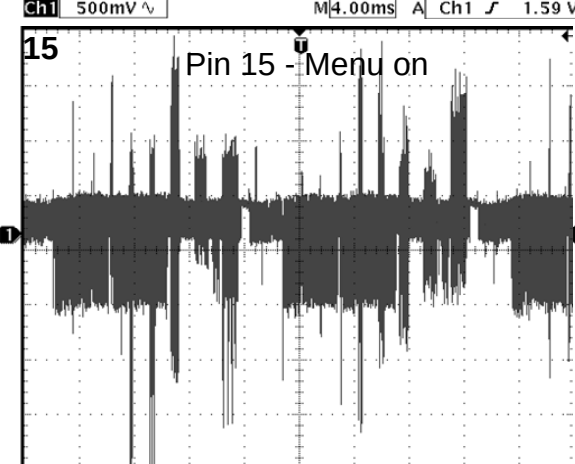
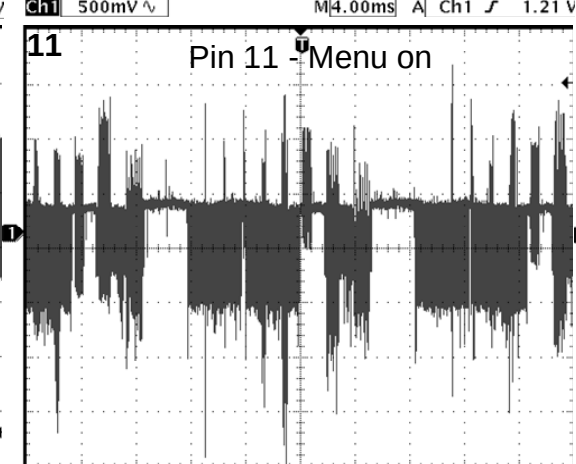
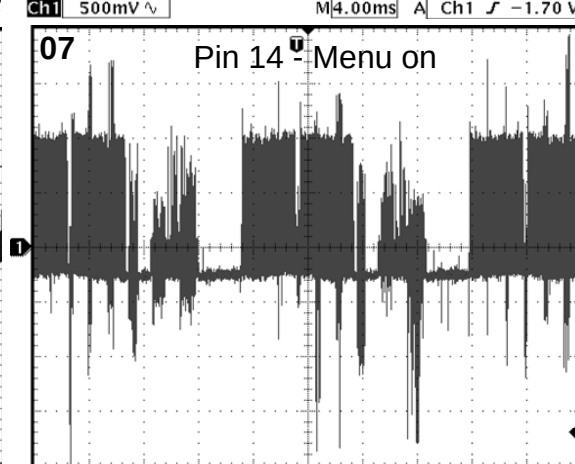
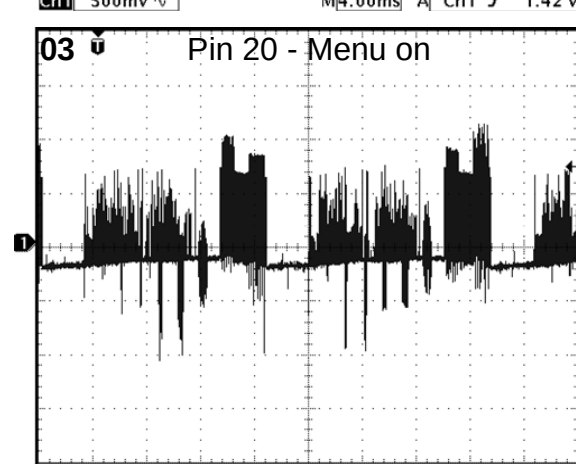
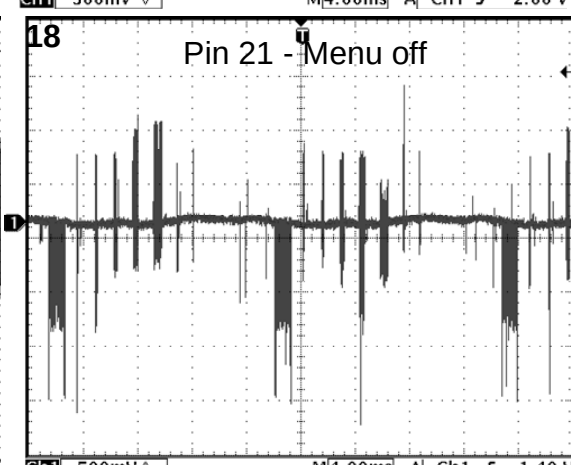
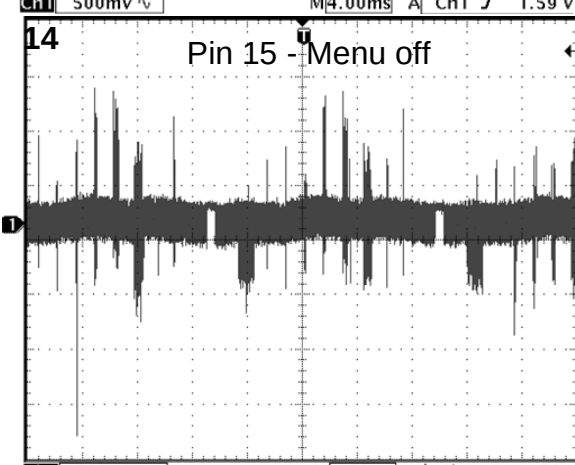
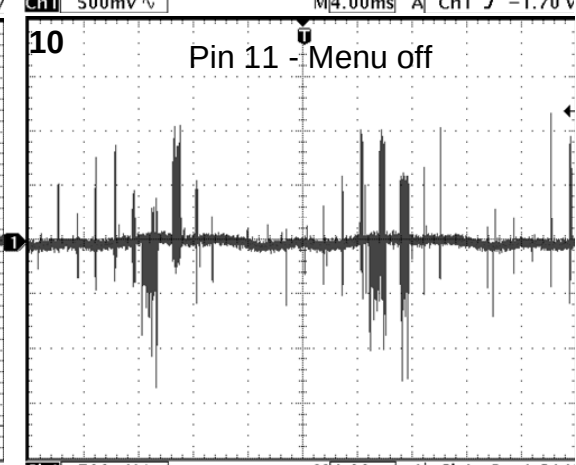
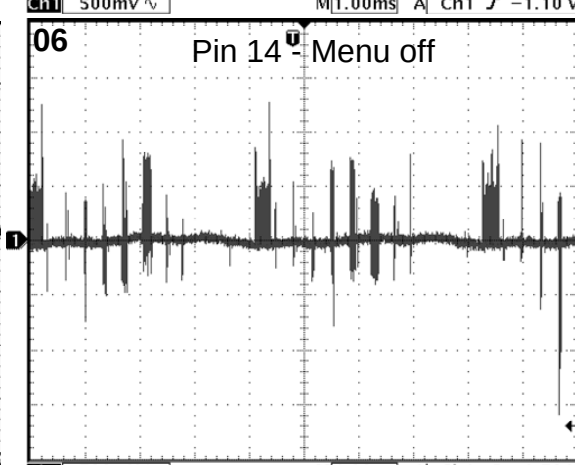
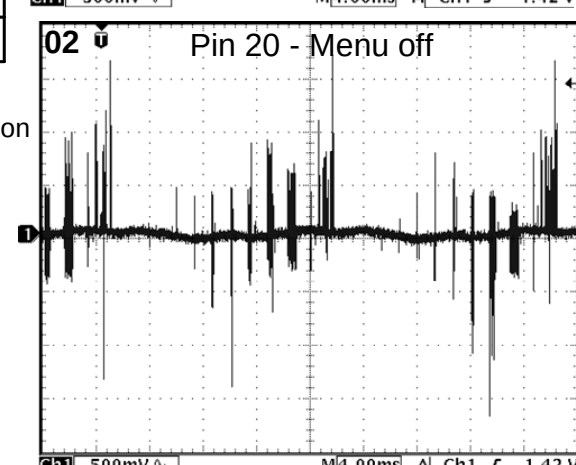
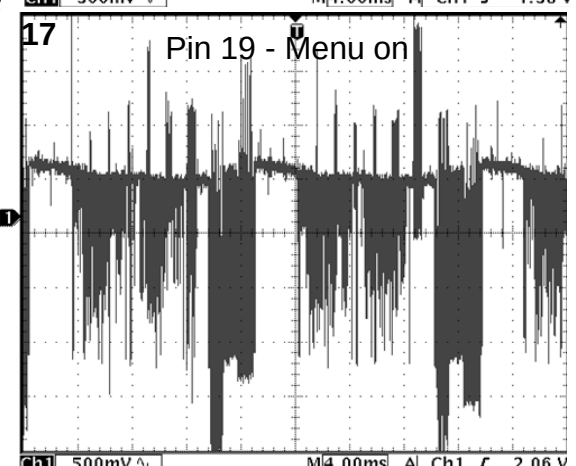
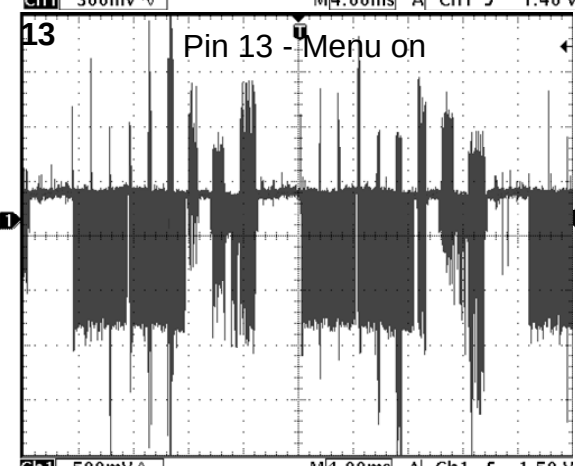
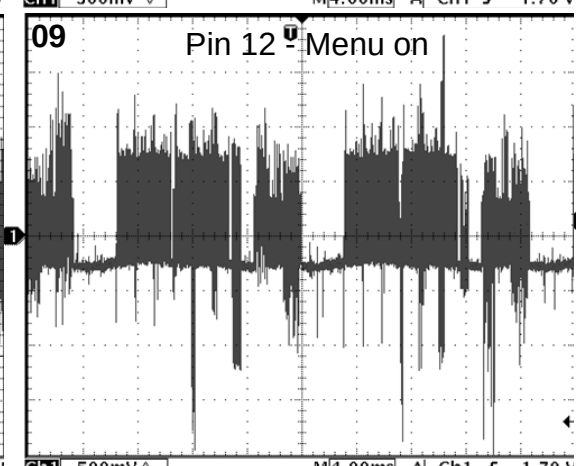
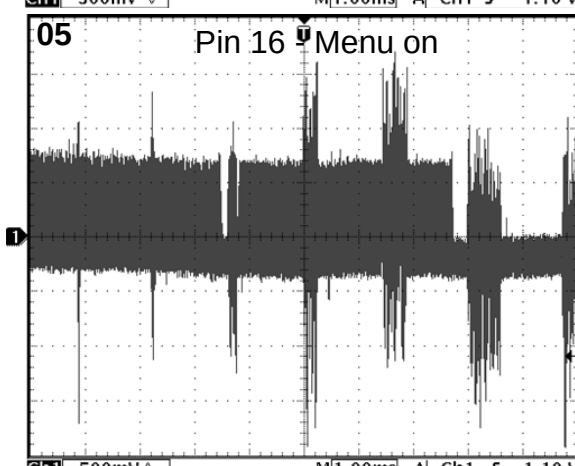
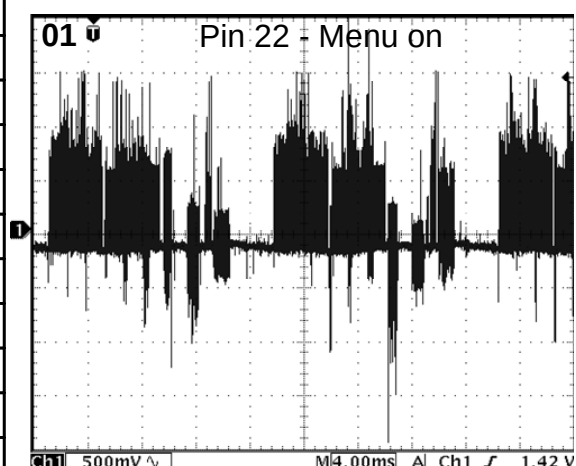
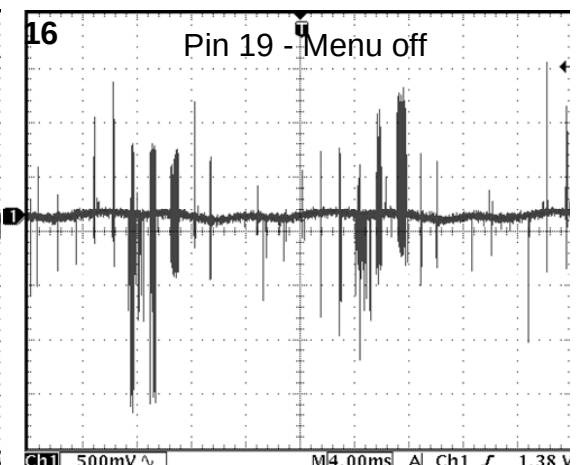
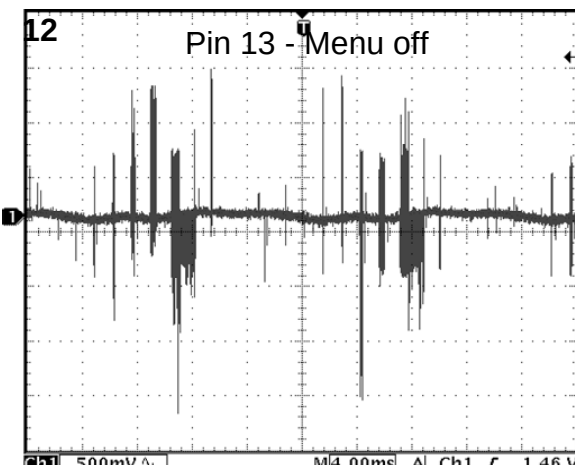
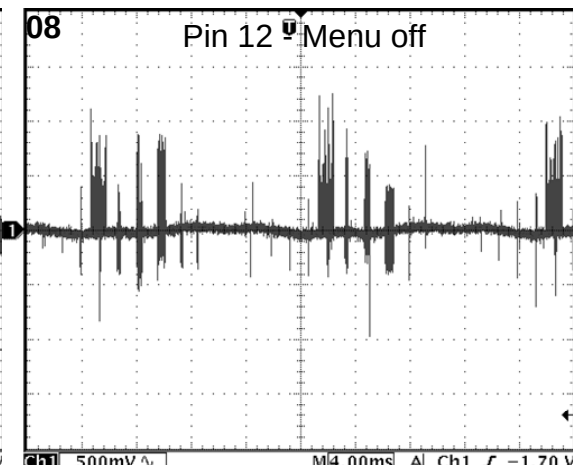
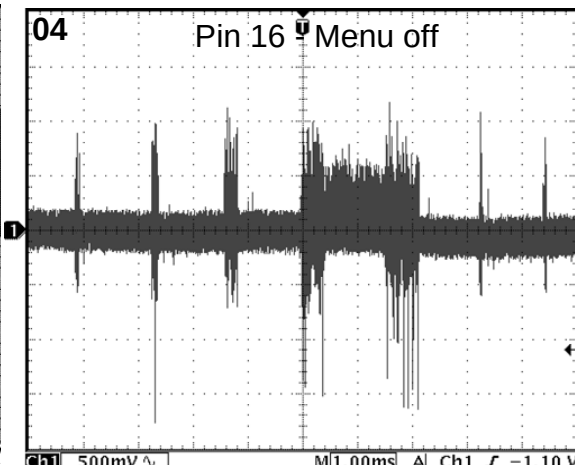
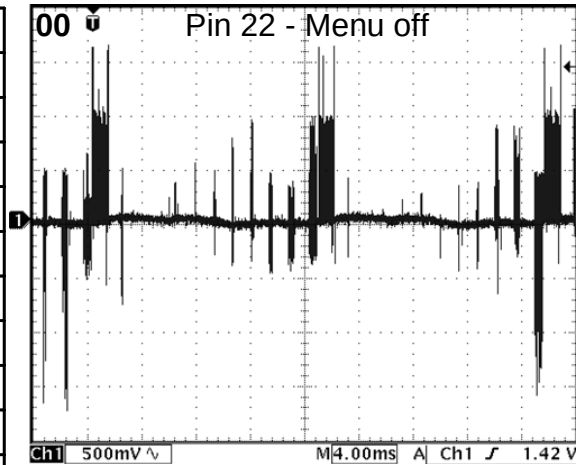
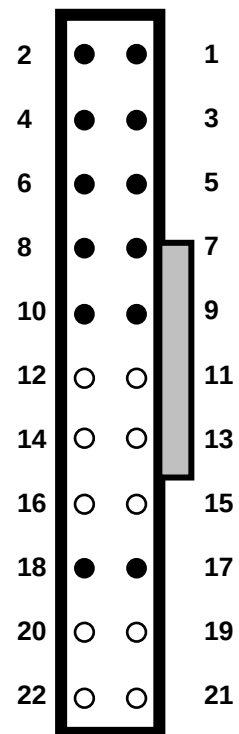
Time per division

Trigger offset

Ch1 500mV V M4.00ms A Ch1 S 1.42 V

P302		
Pin	State	Ref #
11	Menu Off	10
	Menu On	11
12	Menu Off	08
	Menu On	09
13	Menu Off	12
	Menu On	13
14	Menu Off	06
	Menu On	07
15	Menu Off	14
	Menu On	15
16	Menu Off	04
	Menu On	05
19	Menu Off	16
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20	Menu Off	02
	Menu On	03
21	Menu Off	18
	Menu On	19
22	Menu Off	00
	Menu On	01

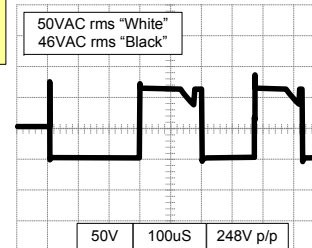
Connector P302 Configuration
○ - indicates signal pins.



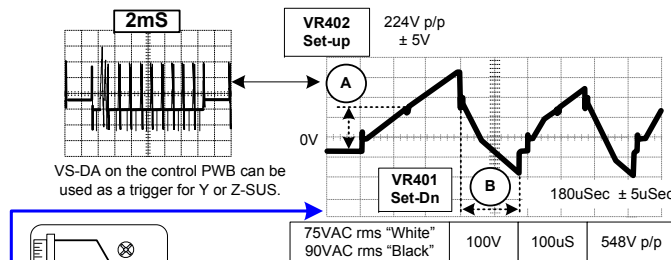
50PJ350 (50T1 Panel) CIRCUIT INTERCONNECT DIAGRAM

SMPS Stand-Alone Test – Unplug P813 to Main board.
Use two (100W) light bulbs in series between Vs and Gnd to place a load on the SMPS.
Apply AC, all voltage should run. To Test the Set without Main board, leave P812 connected. Do not use light bulbs.
See "Auto Gen" on the Control board to perform a Panel Test.
If all supplies do not run when A/C is applied, disconnect P812 to isolate the excessive load.

Panel: 50T1
p/n: EAJ60716304 (PDP50T10000.ADLGB)
p/n: EAJ60716316 (PDP50T10000.ASLGB)



Connect Scope between Waveform TP J36 on Z board and Gnd. Use RMS information just to check for board activity.
VS-DA on the control PWB can be used as a trigger for Y or Z-SUS.



Connect Scope between Waveform TP on Y-Drive and Gnd

WARNING:
Remove upper Y-DRIVE Board completely if P110 or P204 is removed.

Step 1: RL_On command turns on the 17V, +5V, AC-Det and Error_Det. If Missing, the set will Shut Off after 10 Seconds. Error_Det. is not used by the Main.

Step 2: M5 On command Turns on M5V, then Va, then Vs.

Pin	Label	Run	Diode
1~2	Gnd	Gnd	Gnd
3	n/c	n/c	n/c
4~5	+Vs	*206V	Open
6	n/c	n/c	n/c
7~11	ER_PASS	98V~102V	Open

Pin	Label	Run	P210 Diode	P812 Diode
1~2	VS	*195V	Open	Open
3	n/c	n/c	n/c	n/c
4~5	Gnd	Gnd	Gnd	Gnd
6~7	VA	*60V	Open	Open
8	Gnd	Gnd	Gnd	Gnd
9~10	M5V	5.1V	1.19V	2.1V

- Note: The RL_On turns on +5V, 17V Error Det. and AC_DET.
- Note: The M5-On command turns on M5V, Va and Vs.
- Note: The Error Det line is not used in this model.
- Note: If the AC Det line is Missing, the TV will turn off in 10 Seconds.
- Note: Pin 18 is grounded on the Main. If opened, the power supply turns on automatically.

Pin	Label	Run	Diode
1	(+15V)	16V	Open
2	(+15V)	16V	Open
3	(+5V)	4.9V	1.52V
4	(+5V)	4.9V	1.52V
5	Gnd	Gnd	Gnd
6	Y_OE	0.058V	3.09V
7	ZBIAS	1.83V	Open
8	Slop_Ctl	Gnd	Open
9	Z_ER	0.14V	Open
10	ZSUS_DN	0.77V	Open
11	ZSUS_UP	0.17V	Open
12	Gnd	Gnd	Gnd

FS201 Va
Diode Check reads Open with Board Disconnected or Connected

FS202 M5V
Diode Check reads 0.97V Board Connected or 1.19V Disconnected

Control Board Test
With the unit on, if D201 is not on, check 5V supply from FS202 on the Y-SUS. Also on pins 4~7 of P111. If present replace the Control Board. If missing, See (To Test Control Board)

FS204 Protects 16V Creation D501 and IC501. Diode Check 1.61V With Board Disconnected or 1.59V Connected

Note: IC231 (3.3V Regulator) routed to all X Boards

To Test Control Board:
Disconnect all connectors. Jump STBY 5V from SMPS P813 Pin 13 to pin 3 (bottom leg) of IC231. Apply AC and turn on the Set. Observe Control board LED D201, if it's on, most likely Control board is OK.

* If the complaint is no video and shorting the points (AutoGen) causes video to appear suspect the Main board or LVDS Cable.
Note: LVDS Cable must be removed for Auto Gen to work.

PANEL TEST:
Disconnect P301, Remove LVDS Cable. Short across Auto Gen TP's to generate a test pattern. When A/C power is applied.

Measuring Voltage on Pin 1 of P101 with DVM turns the TV on. If TV is on, Input Menu pops up.

Pin	Label	STBY	Run	Diode	Pin	Label	STBY	Run	Diode
1	IR	3.3V	3.76V	3.12V	9	Gnd	Gnd	Gnd	Gnd
2	Gnd	Gnd	Gnd	Gnd	10	3.3V_ST	3.3V	3.29V	0.85V
3	Key 1	3.3V	3.29V	1.53V	11	3.3V_MST	0V	3.31V	0.50V
4	Key 2	3.3V	3.29V	1.53V	12	LED Blue	0V	0V	Open
5	LED-R	2.7V	0.21V	Open					
6	Gnd	Gnd	Gnd	Gnd					
7	SCL	0V	3.27V	2.64V					
8	SDA	0.25V	3.27V	2.64V					

Pin	Label	STBY	Run	No Load	Diode
1~2	16V	0V	17V	17V	Open
3~4	Gnd	Gnd	Gnd	Gnd	Gnd
5~7	5V	0.46V	5.17V	5.19V	0.94V
8	Error_Det	2.85V	4.9V	4.9V	3.04V
9~12	Gnd	Gnd	Gnd	Gnd	Gnd
13~14	STBY_5V	3.46V	5.14V	5.19V	1.07V
15	RL_ON	0V	2.43V	0V	2.62V
16	AC Det	0V	4.44V	4.92V	3.1V
17	M_ON	0V	3.29V	0V	Open

Z-Drive Creation Signals

Pin	Label	STBY	Run	No Load	Diode
1~2	16V	0V	17V	17V	Open
3~4	Gnd	Gnd	Gnd	Gnd	Gnd
5~7	5V	0.46V	5.17V	5.19V	0.94V
8	Error_Det	2.85V	4.9V	4.9V	3.04V
9~12	Gnd	Gnd	Gnd	Gnd	Gnd
13~14	STBY_5V	3.46V	5.14V	5.19V	1.07V
15	RL_ON	0V	2.43V	0V	2.62V
16	AC Det	0V	4.44V	4.92V	3.1V
17	M_ON	0V	3.29V	0V	Open

P301 "Main" to "SMPS" P813

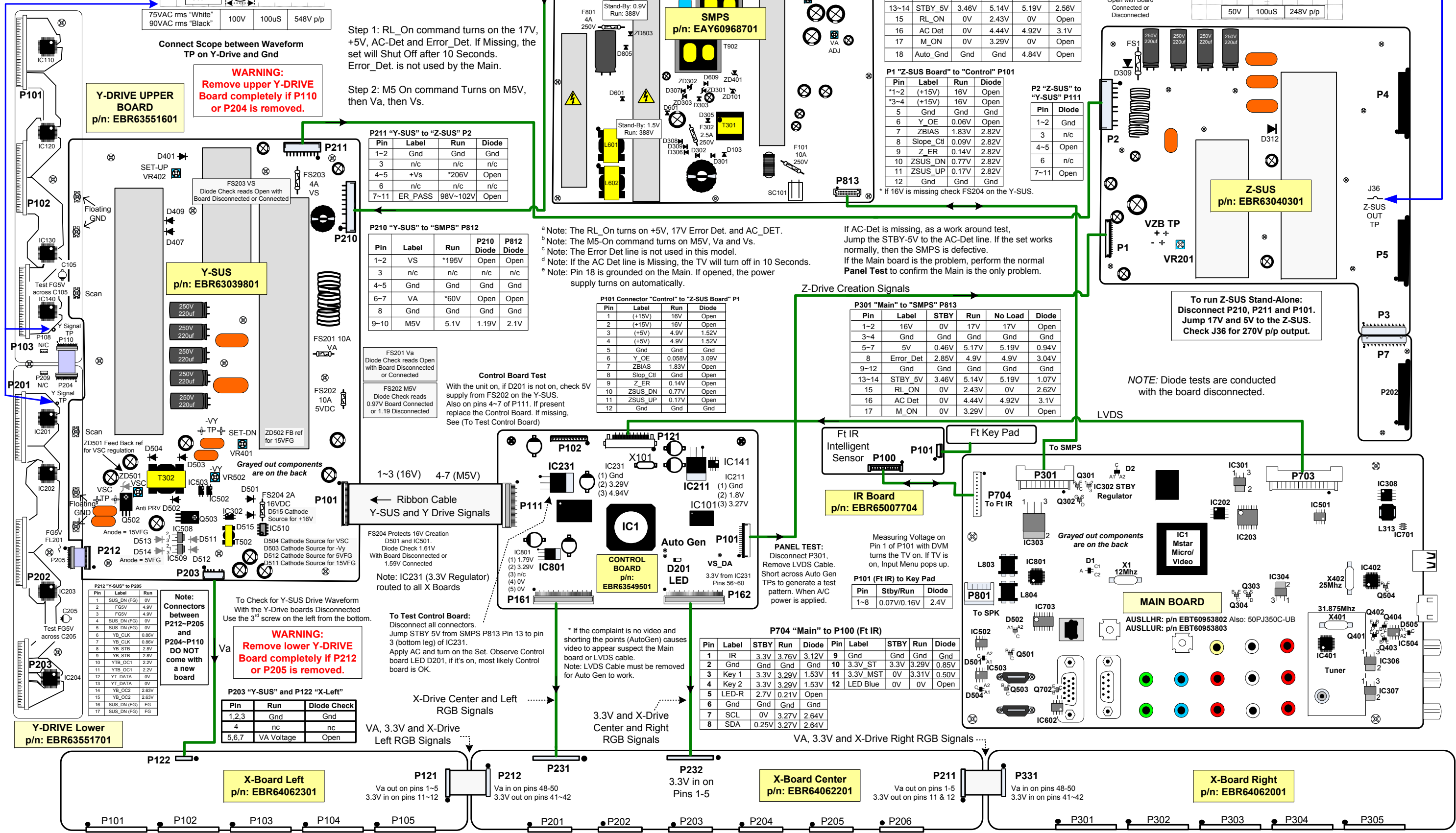
Pin	Label	STBY	Run	No Load	Diode
1~2	16V	0V	17V	17V	Open
3~4	Gnd	Gnd	Gnd	Gnd	Gnd
5~7	5V	0.46V	5.17V	5.19V	0.94V
8	Error_Det	2.85V	4.9V	4.9V	3.04V
9~12	Gnd	Gnd	Gnd	Gnd	Gnd
13~14	STBY_5V	3.46V	5.14V	5.19V	1.07V
15	RL_ON	0V	2.43V	0V	2.62V
16	AC Det	0V	4.44V	4.92V	3.1V
17	M_ON	0V	3.29V	0V	Open

P101 (Ft IR) to Key Pad

Pin	Stby/Run	Diode
1~8	0.07V/0.16V	2.4V

To run Z-SUS Stand-Alone:
Disconnect P210, P211 and P101.
Jump 17V and 5V to the Z-SUS.
Check J36 for 270V p/p output.

NOTE: Diode tests are conducted with the board disconnected.



Note: Connectors between P212-P205 and P204-P110 DO NOT come with a new board

To Check for Y-SUS Drive Waveform With the Y-Drive boards Disconnected Use the 3" screw on the left from the bottom.

WARNING:
Remove lower Y-DRIVE Board completely if P212 or P205 is removed.

Pin	Run	Diode Check
1,2,3	Gnd	Gnd
4	nc	nc
5,6,7	VA Voltage	Open

X-Drive Center and Left RGB Signals

VA, 3.3V and X-Drive Left RGB Signals

3.3V and X-Drive Center and Right RGB Signals

VA, 3.3V and X-Drive Right RGB Signals

50PJ350 Main Board (Front Side) Component Voltages

IC202 7V (to IC405)

Pin Regulator

- [1] Gnd
[2] Gnd
[3] Gnd
[4] Gnd
[5] 3.3V
[6] 3.3V
[7] Gnd
[8] 3.3V

IC308 1.3V_VDDC

Pin Regulator

- [1] Do not measure
[2] Gnd
[3] 5.04V
[4] 6.07V
[5] 4.99V
[6] 1.28V
[7] 1.28V
[8] 4.27V

Use scope:
Pin 1: 1.4~1.7V P/P
Using DVM, set
shuts off.

Use scope:
Pin 8: 600mV P/P
Using DVM, set
shuts off.

Q401 Tuner CVBS

Pin Buffer (Analog)

- [B] 1.19V
[E] 1.86V
[C] Gnd

Q402 IF_P Buffer

Pin (Digital)

- [B] 1.18V
[E] 1.18V
[C] Gnd

Q403 Tuner SIF

Pin Buffer (Digital)

- [B] 1.32V
[E] 1.99V
[C] Gnd

Q404 IF_N Buffer

Pin (Digital)

- [B] 1.32V
[E] 1.99V
[C] Gnd

Q502 HDMI CEC

Pin Buffer

- [1 B] Gnd
[2 S] 3.18V
[3 D] 3.29V
[4 G] 3.3V

D1 Reset

Pin Speed Up

- [A1] Gnd
[A] 0V
[A2] Gnd

D2 LED-R

Pin Routing

- [A1] 0V
[C] 0.13V
[A2] 0.28V

D501 B+ Routing

Pin to IC502

- [A1] 0V
[A] 4.54V
[A2] 5.0V

D504 B+ Routing

Pin to IC504

- [A1] 0V
[A] 4.54V
[A2] 5.0V

D505 B+ Routing

Pin to IC503

- [A1] 0V
[A] 4.54V
[A2] 5.0V

50PJ350 Main Board (Back Side) Component Voltages

IC203 Winbond Serial

Pin Flash

- [1] 0V
[2] 3.30V
[3] n/c
[4] n/c
[5] n/c
[6] n/c
[7] 0V
[8] 3.3V
[9] 0V
[10] Gnd
[11] n/c
[12] n/c
[13] n/c
[14] n/c
[15] 0V
[16] 0V

IC301 1.8V_MST

Pin Regulator

- [1] 0.6V
[2] 1.85V (Out)
[3] 3.3V (In)

IC302 3.3V_VST

Pin Regulator

- [1] Gnd
[2] 3.3V (Out)
[3] 5.09V (In)

IC303 3.3V_MST

Pin Regulator

- [1] Gnd
[2] 3.3V (Out)
[3] 5.04V (In)

IC304 1.2V_DVDD Reg

Pin Dig Ch Only

- [1] Gnd
[2] 1.2V (Out)
[3] 3.3V (In)

IC306 3.3V_TU

Pin Regulator

- [1] Gnd
[2] 3.3V (Out)
[3] 4.97V (In)

IC307 1.8V_TU

Pin Regulator

- [1] Gnd
[2] 1.8V (Out)
[3] 3.3V (In)

IC501 HDCP Data

Pin EEPROM

- [1] Gnd
[2] Gnd
[3] 3.3V
[4] Gnd
[5] 3.3V
[6] 3.3V
[7] 3.3V
[8] 3.3V

IC502 IC503, IC504

EDID Data

- Pin For HDMI
[1] Gnd
[2] Gnd
[3] Gnd
[4] Gnd
[5] 4.52V
[6] 4.52V
[7] 3.33V
[8] 4.53V

IC602 RGB

Pin EEPROM

- [1] Gnd
[2] Gnd
[3] Gnd
[4] Gnd
[5] 5.09V
[6] 5.09V
[7] 3.33V
[8] 5.09V

IC701 USB 5V

Pin Limiter

- [1] 4.97V (In)
[2] Gnd
[3] 3.3V (Enable)
[4] 0V
[5] 0V
[6] 4.97V (Out)

IC703 RS232 Tx/Rx

- Pin
[1] 3.3V
[2] 5.45V
[3] 0V
[4] 0V
[5] (-5.37V)
[6] (-5.4V)
[7] (-5.4V)
[8] 0V
[9] 3.3V
[10] 3.3V
[11] n/c
[12] n/c
[13] 0V
[14] 5.45V
[15] Gnd
[16] 3.3V (B+)

Q301 Driver for 5V_MST

Pin Switch Q302

- [B] 0.6V
[C] 0V
[E] Gnd

Q302 5V_MST

Pin Switch

- [G] 0V
[S] 5.09V
[D] 5.04V

Q303 3.3V_PVSB Sw

Pin Dig Ch Only

- [G] 0V
[S] 3.3V
[D] 3.3V

Q304 Driver for 3.3V_PVSB

Pin Switch Q303

- [B] 0.64V
[C] 0V
[E] Gnd

Q501, Q503

Hot Swap

- Pin Switch for HDMI
[B] 0V
[C] 0V
[E] Gnd

Q702 RS232

Pin Tx Buffer

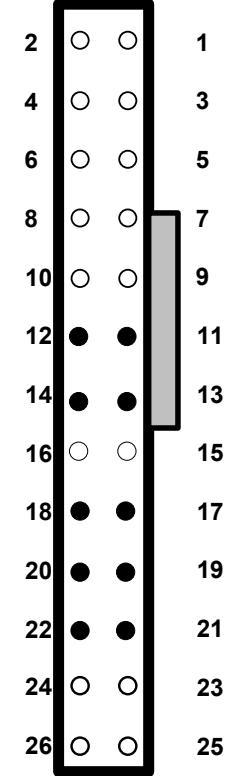
- [B] 0.6V
[C] 0V
[E] Gnd

D502 HDMI CEC Limiter

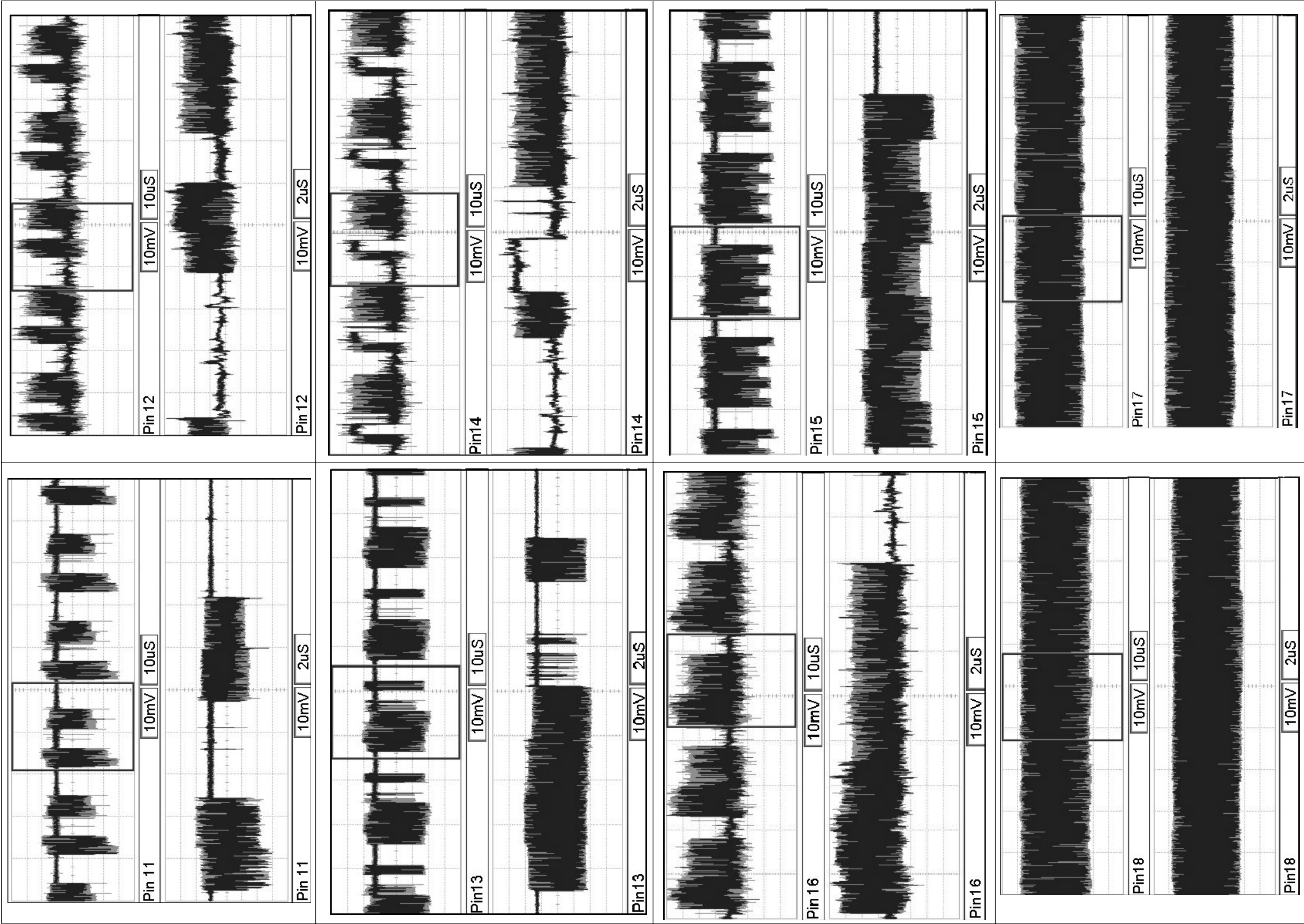
Pin

- [A1] 0V
[A2] 3.28V
[C] 3.1V

Connector P703 Configuration
● - indicates signal pins.



15 and 16
Is the Video Clock and
Data lines



50PK250 Main Board (Front Side) Component Voltages

IC202 7V (to IC405)

Pin Regulator

- [1] Gnd
[2] Gnd
[3] Gnd
[4] Gnd
[5] 3.3V
[6] 3.3V
[7] Gnd
[8] 3.3V

IC308 1.3V_VDDC

Pin Regulator

- [1] Do not measure
[2] Gnd
[3] 5.04V
[4] 6.07V
[5] 4.99V
[6] 1.28V
[7] 1.28V
[8] 4.27V

Use scope:
Pin 1: 1.4~1.7V P/P
Using DVM, set
shuts off.

Use scope:
Pin 8: 600mV P/P
Using DVM, set
shuts off.

Q401

Tuner CVBS



- [B] 1.19V
[E] 1.86V
[C] Gnd

Q402

IF_P Buffer



- [B] 1.18V
[E] 1.18V
[C] Gnd

Q403

Tuner SIF



- [B] 1.32V
[E] 1.99V
[C] Gnd

Q404

IF_N Buffer



- [B] 1.32V
[E] 1.99V
[C] Gnd

Q502

HDMI CEC



- [1 B] Gnd
[2 S] 3.18V
[3 D] 3.29V
[4 G] 3.3V

D1

Reset



- [A1] Gnd
[A] 0V
[A2] Gnd

D2

LED-R



- [A1] 0V
[C] 0V
[A2] 0V

D501

B+ Routing



- [A1] 0V
[A] 4.54V
[A2] 5.0V

D504

B+ Routing



- [A1] 0V
[A] 4.54V
[A2] 5.0V

D505

B+ Routing



- [A1] 0V
[A] 4.54V
[A2] 5.0V

50PK250 Main Board (Back Side) Component Voltages

IC203 Winbond Serial

Pin Flash

- [1] 0V
[2] 3.30V
[3] n/c
[4] n/c
[5] n/c
[6] n/c
[7] 0V
[8] 3.3V
[9] 0V
[10] Gnd
[11] n/c
[12] n/c
[13] n/c
[14] n/c
[15] 0V
[16] 0V

IC301 1.8V_MST

Pin Regulator

- [1] 0.6V
[2] 1.85V (Out)
[3] 3.3V (In)

IC302 3.3V_VST

Pin Regulator

- [1] Gnd
[2] 3.3V (Out)
[3] 5.09V (In)

IC303

3.3V_MST



- [1] Gnd
[2] 3.3V (Out)
[3] 5.04V (In)

IC304

1.2V_DVDD Reg



- [1] Gnd
[2] 1.2V (Out)
[3] 3.3V (In)

IC306

3.3V_TU



- [1] Gnd
[2] 3.3V (Out)
[3] 4.97V (In)

IC307

1.8V_TU



- [1] Gnd
[2] 1.8V (Out)
[3] 3.3V (In)

IC501

HDCP Data



- [1] Gnd
[2] Gnd
[3] 3.3V
[4] Gnd
[5] 3.3V
[6] 3.3V
[7] 3.3V
[8] 3.3V

IC502-IC503

EDID Data



- [1] Gnd
[2] Gnd
[3] Gnd
[4] Gnd
[5] 4.52V
[6] 4.52V
[7] 3.33V
[8] 4.53V

IC602

RGB



- [1] Gnd
[2] Gnd
[3] Gnd
[4] Gnd
[5] 5.09V
[6] 5.09V
[7] 3.33V
[8] 5.09V

IC701

USB 5V



- [1] 4.97V (In)
[2] Gnd
[3] 3.3V (Enable)
[4] 0V
[5] 0V
[6] 4.97V (Out)

IC703

RS232 Tx/Rx



- [1] 3.3V
[2] 5.45V
[3] 0V
[4] 0V
[5] (-5.37V)
[6] (-5.4V)
[7] (-5.4V)
[8] 0V
[9] 3.3V
[10] 3.3V
[11] n/c
[12] n/c
[13] 0V
[14] 5.45V
[15] Gnd
[16] 3.3V (B+)

Q301

Driver for 5V_MST



- [B] 0.6V
[C] 0V
[E] Gnd

Q302

5V_MST



- [G] 0V
[S] 5.09V
[D] 5.04V

Q303

3.3V_PVSB Sw



- [G] 0V
[S] 3.3V
[D] 3.3V

Q304

Driver for 3.3V_PVSB



- [B] 0.64V
[C] 0V
[E] Gnd

Q501, Q503

Hot Swap



- [B] 0V
[C] 0V
[E] Gnd

Q702

RS232



- [B] 0.6V
[C] 0V
[E] Gnd

Q703

Buzzer



- [B] 0.71V
[C] 0V
[E] Gnd

D502

HDMI CEC Limiter



- [A1] 0V
[A2] 3.28V
[C] 3.1V

50PK250 LVDS
WAVEFORMS

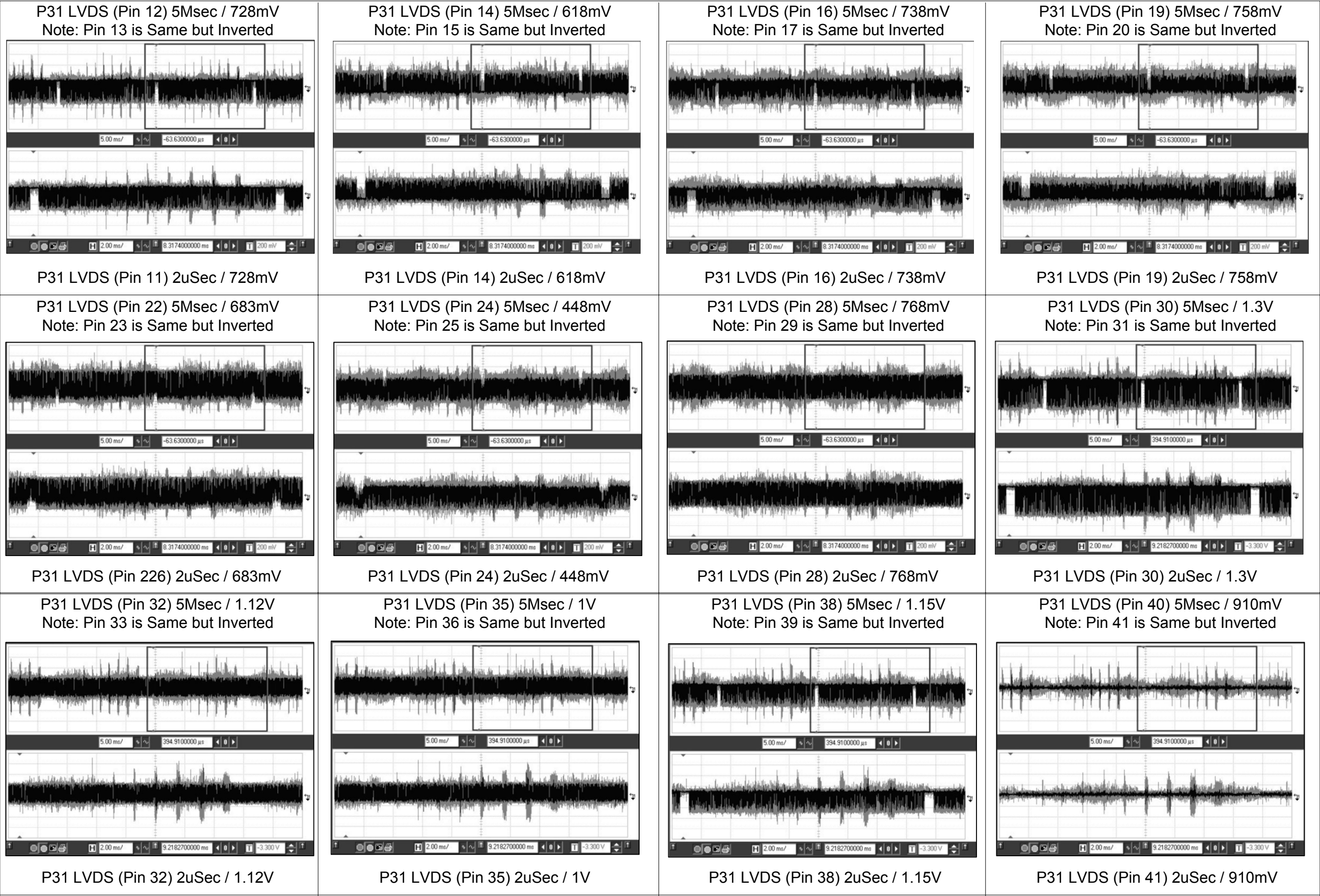
Main P701	P31 Control
Pin	Pin
1	50-51
3	49
4	48
5	47
6	46-44
*11	*41
*12	*40
*13	*39
*14	*38
15	37
16	36
17	35
18	34
*19	*33
*20	*32
*21	*31
*22	*30
*23	*29
*24	*28
25-26	26-27
*27	*25
*28	*24
*29	*23
*30	*22
31	21
32	20
33	19
34	18
*35	*17
*36	*16
*37	*15
*38	*14
*39	*13
*40	*12
41	11
42-45	7-10
46	6
47	5
48	4
49	3
50	2
51	1

Clock
Clock

Clock
Clock

NOTE: LVDS P31 Information
There are actually 20 pins carrying Video 4 pins are carrying clock signals to the Control board. With 1080P, pins 35 and 36 would have signals present.

WAVEFORMS:
Waveforms taken using 1080P SMTP Color Bar input. All readings give their Time Base related to scope settings.



**50PQ30 LVDS
P1003
WAVEFORMS**

Connector P1003
Configuration

● indicates
signal pins.

2	○	○	1
4	○	○	3
6	○	○	5
8	○	○	7
10	○	○	9
12	●	●	11
14	●	●	13
16	●	●	15
18	●	●	17
20	●	●	19
22	●	●	21
24	○	○	23
26	○	○	25

**NOTE: LVDS P1003
Information**

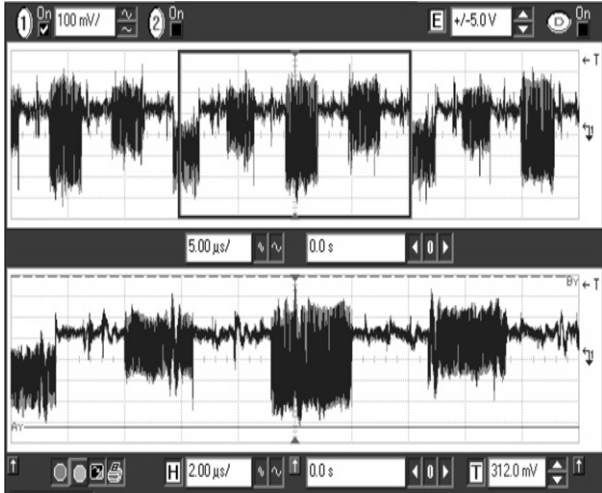
There are actually 12 pins carrying Video 2 pins are carrying clock signals (17 and 18) to the Control board. With high activity video, pins 21 and 22 would have signals present.

WAVEFORMS:

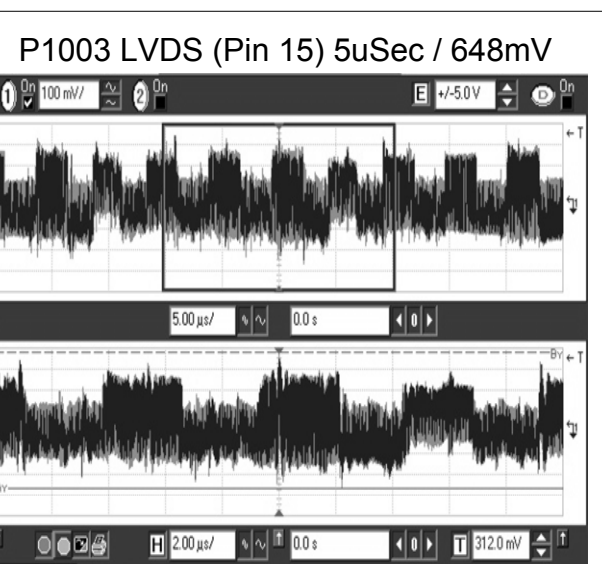
Waveforms taken using SMP Color Bar input. All readings give their Time Base related to scope settings.

All waveforms taken from the P1003.

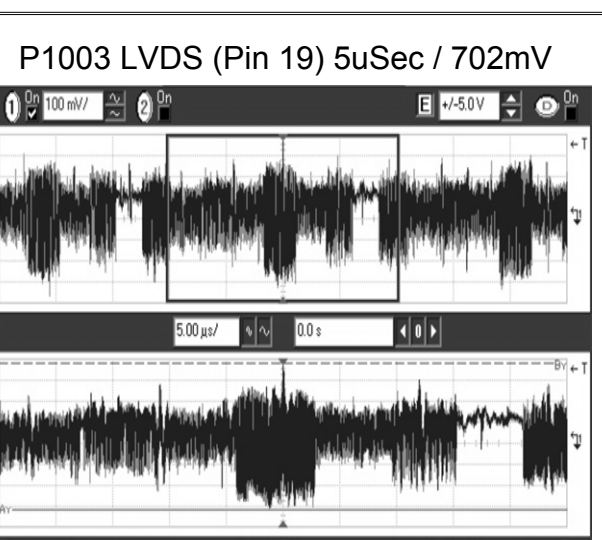
P1003 LVDS (Pin 11) 5uSec / 718mV



P1003 LVDS (Pin 11) 2uSec / 718mV



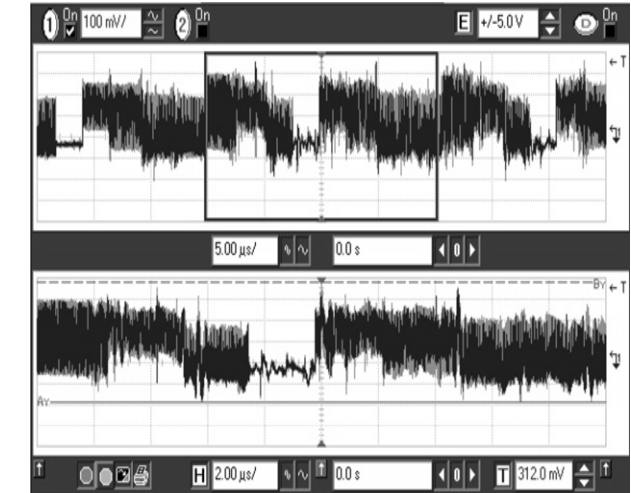
P1003 LVDS (Pin 15) 5uSec / 648mV



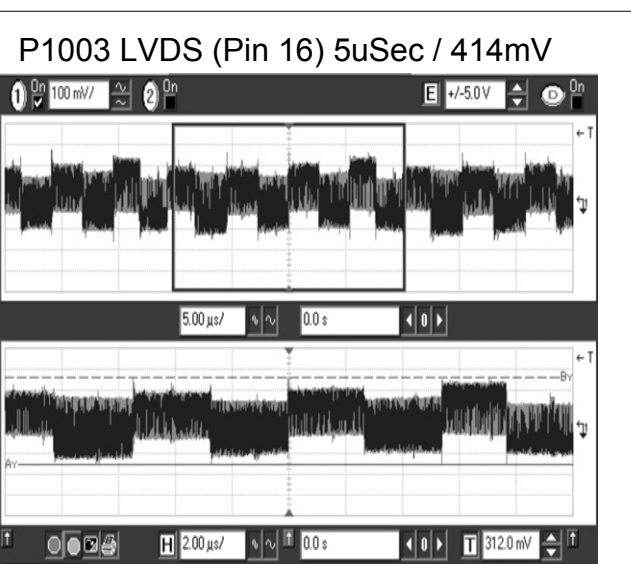
P1003 LVDS (Pin 19) 5uSec / 702mV

P1003 LVDS (Pin 19) 2uSec / 702mV

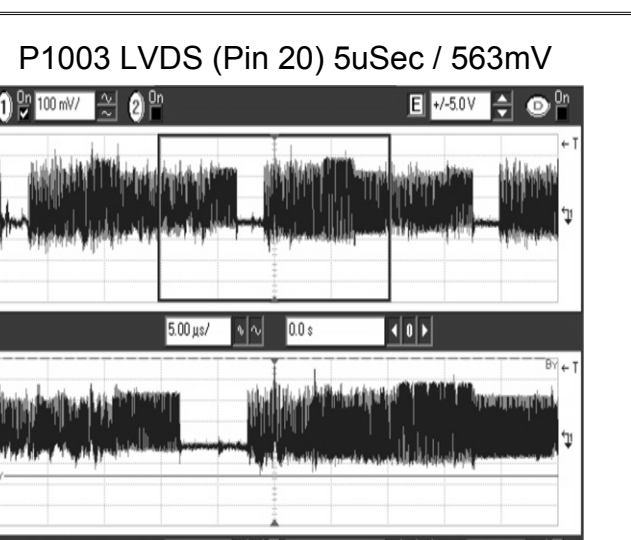
P1003 LVDS (Pin 12) 5uSec / 565mV



P1003 LVDS (Pin 12) 2uSec / 565mV



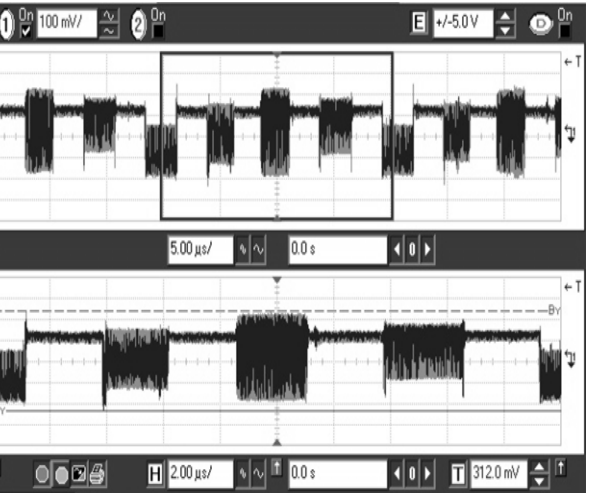
P1003 LVDS (Pin 16) 5uSec / 414mV



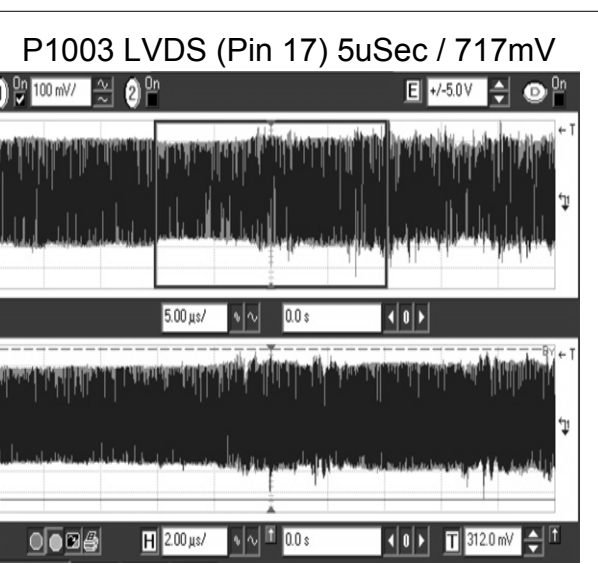
P1003 LVDS (Pin 20) 5uSec / 563mV

P1003 LVDS (Pin 20) 2uSec / 563mV

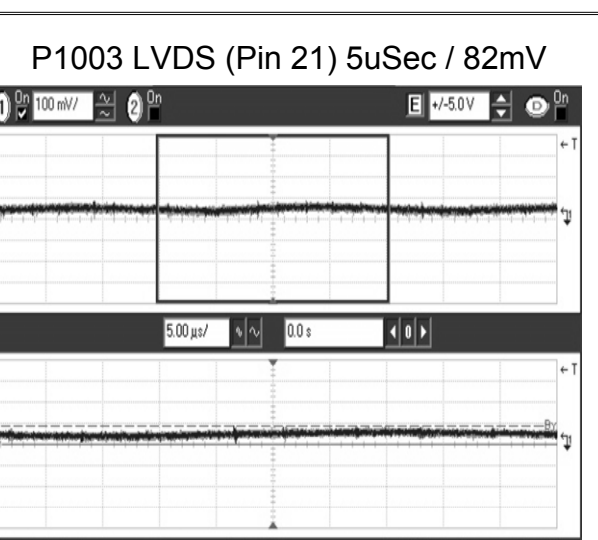
P1003 LVDS (Pin 13) 5uSec / 479mV



P1003 LVDS (Pin 13) 2uSec / 479mV



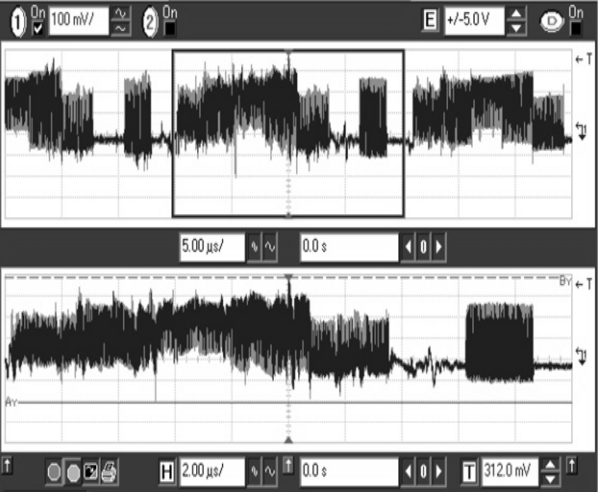
P1003 LVDS (Pin 17) 5uSec / 717mV



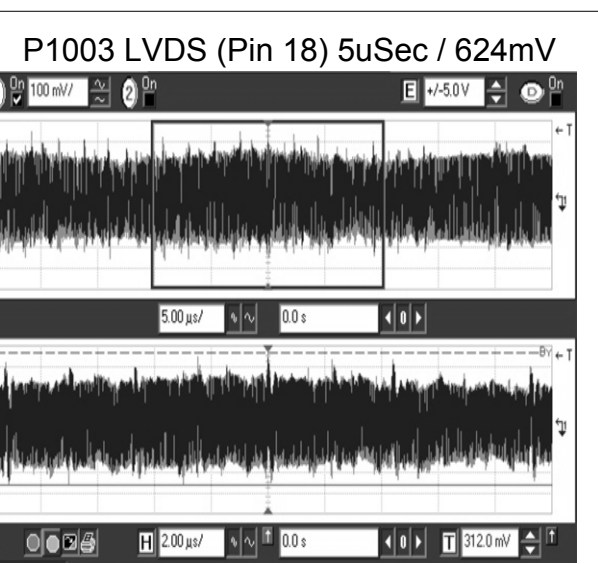
P1003 LVDS (Pin 21) 5uSec / 82mV

P1003 LVDS (Pin 21) 2uSec / 82mV

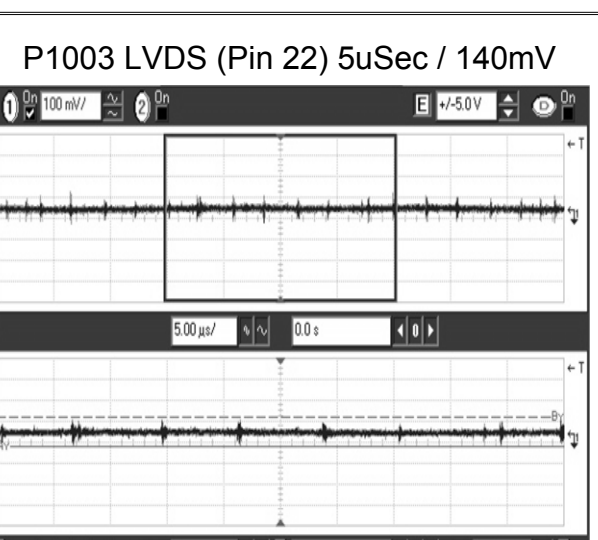
P1003 LVDS (Pin 14) 5uSec / 594mV



P1003 LVDS (Pin 14) 2uSec / 594mV



P1003 LVDS (Pin 18) 5uSec / 624mV

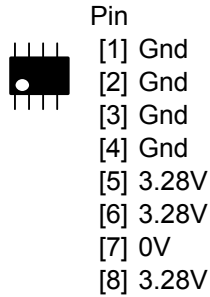


P1003 LVDS (Pin 22) 5uSec / 140mV

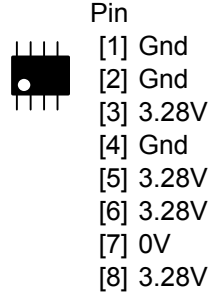
P1003 LVDS (Pin 22) 2uSec / 140mV

50PQ30 MAIN (BACK SIDE) SIMICONDUCTORS

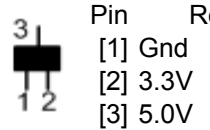
IC201 NVRAM



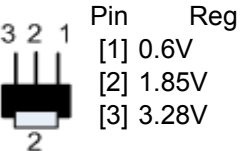
IC202 HDCP



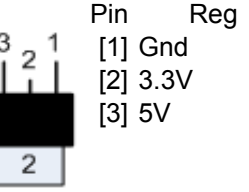
IC301 5VST to 3.3V VST



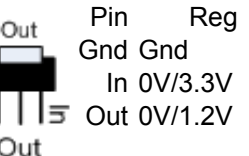
IC304 1.8VMST



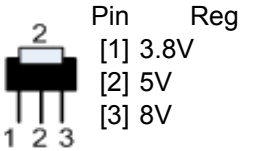
IC305 3.3VMST



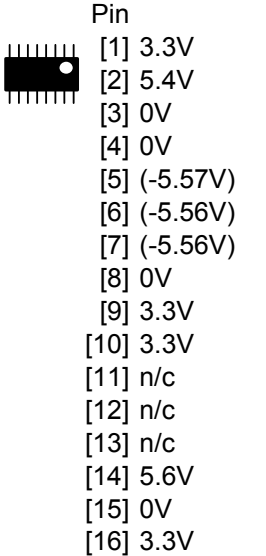
IC502 1.2V PVSB
On Digital CH / Off Analog



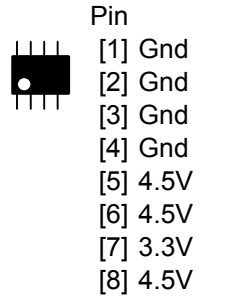
IC505 5V (Tuner)



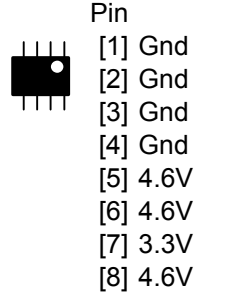
IC601 RS232 Control



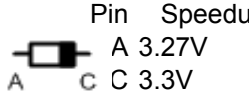
IC602 RS232 RAM



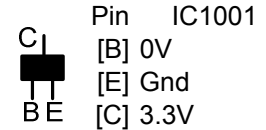
IC802/3 HDMI1/2



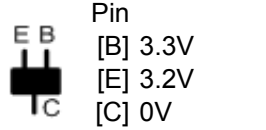
D1001 For IC1001 3.3V



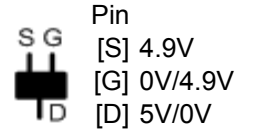
Q1001 Pow Down



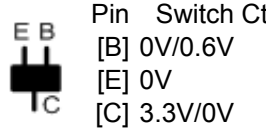
Q302 Reset



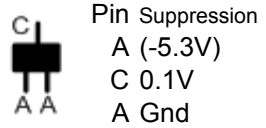
Q303 5V MST Switch



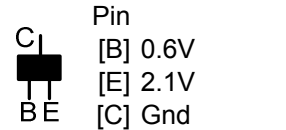
Q501 3.3V VMST



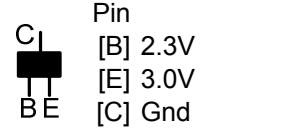
D627 RS232 TX Noise



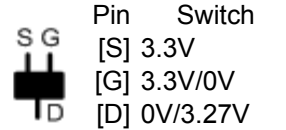
Q502 Video Buffer



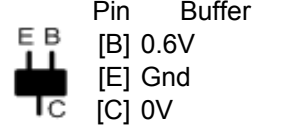
Q503 SIF Buffer



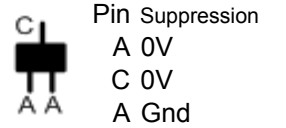
Q504 3.3V PVSB



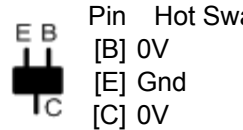
Q601 RS232 TX



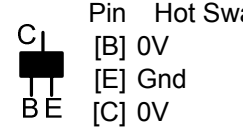
D628 RS232 RX Noise



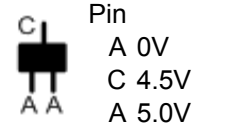
Q890/2 HDMI1/2



Q891 HDMI3/4

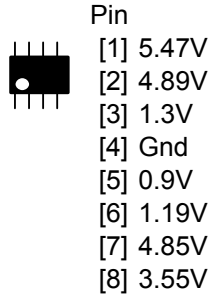


D633 RGB B+

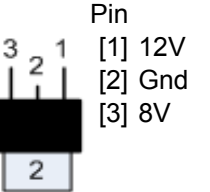


50PQ30 MAIN (FRONT SIDE) SIMICONDUCTORS

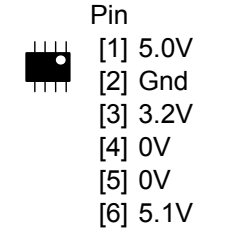
IC302 1.3V VDDC



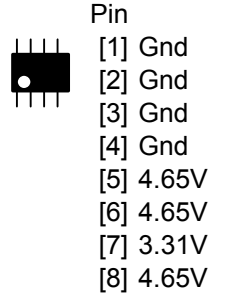
IC503 9V Reg



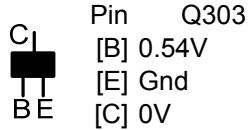
IC804 USB 5V



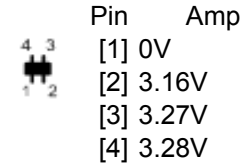
IC805 HDMI3 EDID



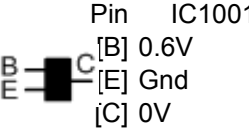
Q301 Turns on



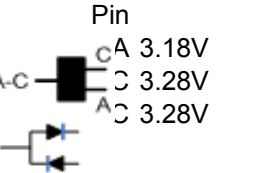
Q801 HDMI CEC



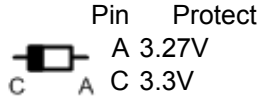
Q1002 Pow Down



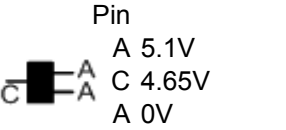
D303 Reset



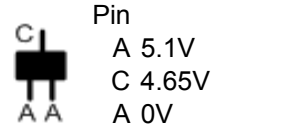
ZD601 Wired Remote T



D805 HDMI2 PWR



D806 HDMI3 PWR



50PS60 TV INTERCONNECT DIAGRAM

NOTE: Diode tests are conducted with the PWB disconnected.

Note: If AC Det (Pin 18) is missing, the set will come on like normal, then in under 10 seconds it will turn off.

Note: The 17V supply will pulsate 2 to 3 times a second with Vs unloaded.

P814 "SMPS" - P1108 "MAIN"

Pin	Label	STBY	Run	Diode Check
1,2	17V	0V	17V	2.2V
3,4	Gnd	Gnd	Gnd	Gnd
5,6	12V	0V	12V	Open
7,8	Gnd	Gnd	Gnd	Gnd
9,10,12	5V	0.5V	5V	1.2V
11	5V STBY	5V	5V	Open
13,14,15	Gnd	Gnd	Gnd	Gnd
16	NC	NC	NC	NC
17	5V DET	0V	4.7V	1.45V
18	A/C DET	5V	5V	1.45V
19	RL ON	0V	3.3V	Open
20	VS ON	0V	3.2V	Open
21	M5V ON	0V	3.3V	Open
22	AUTO GND	0V	0V	Open
23	STBY 5	5V	5.0V	Open
*24	KEY ON	*0V	*0V	Open

Pins 1,2 (17V) turned on with Vs On.

Pins 9,10,12 (+5V) turned on with Relay On Command.

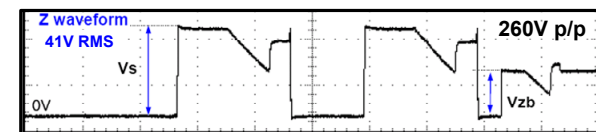
Pin 17 (5V Det) not used.

TIP: To Test Z-SUS Without a good Y-SUS.
1) Light bulb load Vs.
2) Jump the 17V from pin 1 or pin 2 P814 to the Z-SUS connector P100 1~5.

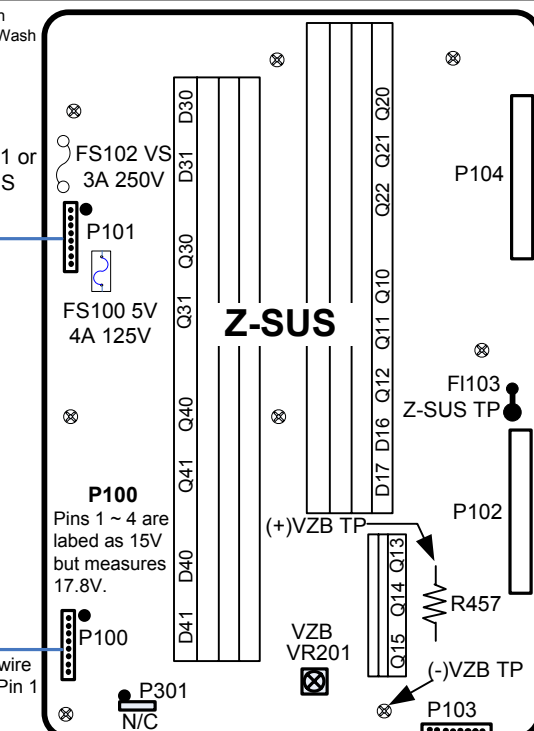
*If pin 24 is at 4.3V with the unit is in standby the Power Button is released and will prevent the unit from coming on.

TIP: If A/C DET is low or missing, Remove AC Det (pin 28) out of P814 and jump it to any pin carrying 5V STBY. Then reapply power to the unit. If the TV now stays on, suspect a defective SMPS.

Z-SUS LOCATION	Generic Part
D16, 17	RF2001
Q10, 11, 12, 20, 21, 22, 30, 31, 40, 41	45F122
D30, 31, 40, 41	MA3DF30
Q13, 14	20NF20
Q15	51N25



Read in White Wash



P100 "Z-SUS" - P2 "Control"

Pin	Label	Run	Diode Check
1~4	15V	17.8V	1.49V
5	Gnd	Gnd	Gnd
6	ER-UP	0V	2.2V
7	ER-DN	0V	1.8V
8	Gnd	Gnd	Gnd
9	Z Bias	3.0V	1.2V
10	Gnd	Gnd	Gnd
11	SUS-UP	0.4V	.5V
12	SUS-DN	0.7V	.5V

The 17.8V on pins 1 ~ 4 is derived by the Y-SUS PWB.

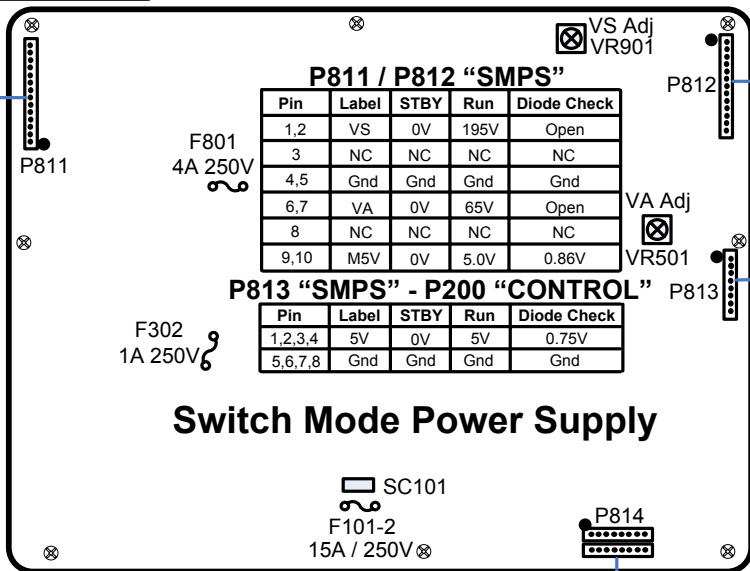
P1101 "Main" - J1 "Ft IR"

Pin	Label	STBY	Run	Diode Check
1	IR	4V	3.98V	2V
2	Gnd	Gnd	Gnd	Gnd
3	Key1	3.29V	3.29V	1.9V
4	Key2	3.29V	3.29V	1.9V
*5	Key On	0V/4.3V	0V	Gnd / Open
6	Gnd	Gnd	Gnd	Gnd
7	EYEQ SCL	3V	3.3V	2V
8	EYEQ SDA	3V	3.3V	2V
9	Gnd	Gnd	Gnd	Gnd
10	STBY 5V	5V	5V	1.25V
11	+5V	0.56V	5V	0.6V
12	Gnd	Gnd	Gnd	Gnd
13	LED R	3.19V	0V	1.87V
14	LED W	0V	0V	1.7V
15	LED Cent	0V	0V	1.5V

P2 "Control"

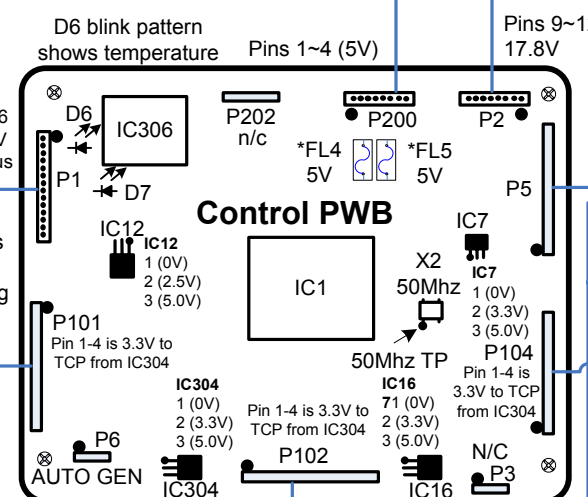
Pin	Diode Check
1	1.48V
2	1.48V
3	1.48V
4	1.48V
5	Gnd
6	1.48V
7	1.48V
8	1.4V
9~12	1.32V

Note: P2 pins reversed from P100



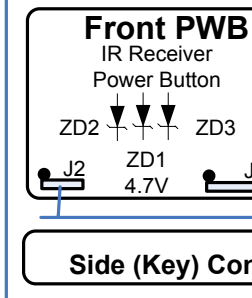
Switch Mode Power Supply

SMPS TEST: Removing connector P814 will force the SMPS into full run mode. Only do this with AC power removed then reapply AC power. Complete testing of the SMPS requires that you load VS with 2 100 watt light bulbs with P811 and P812 unplugged to verify it is functioning correctly.

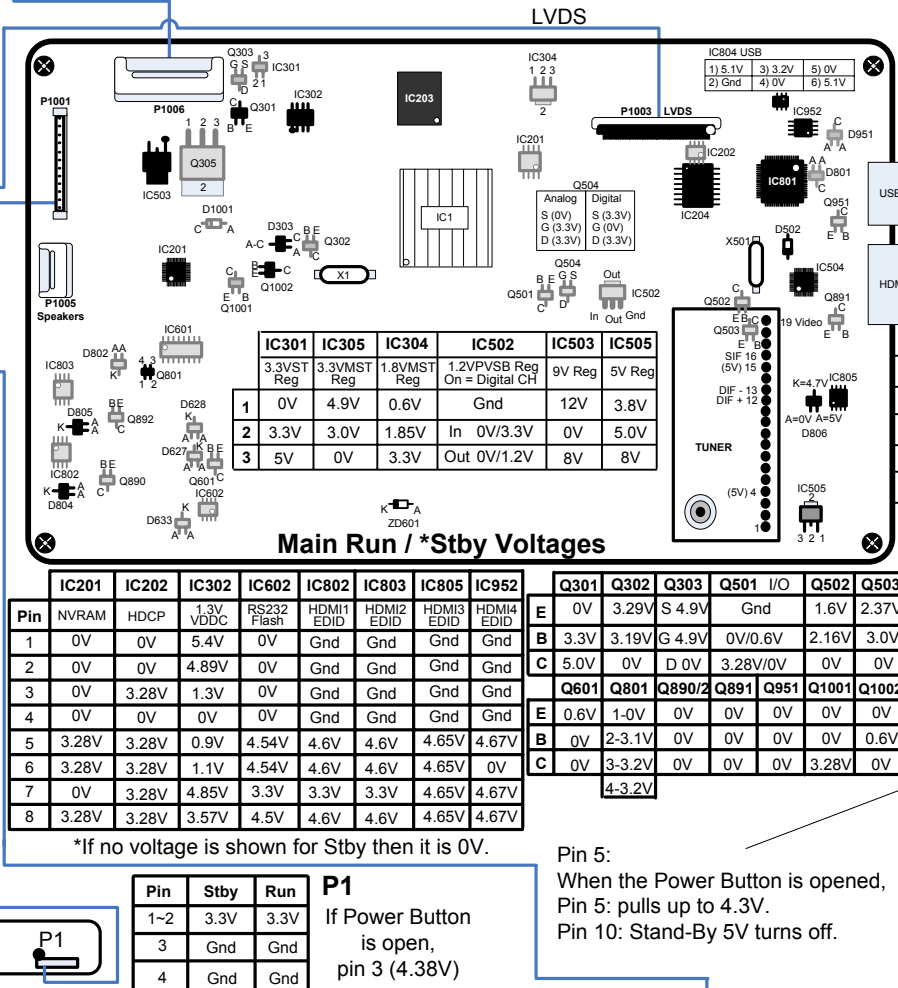


AUTO GEN is activated by shorting pin 1 to pin 2 of connector P6. Note: The LVDS cable must be removed for Auto Gen to work.

* **FL4 / FL5:** These EMI filters have 4 solder tack points the center two are tied to ground.



Side (Key) Controls



*If no voltage is shown for Stby then it is 0V.

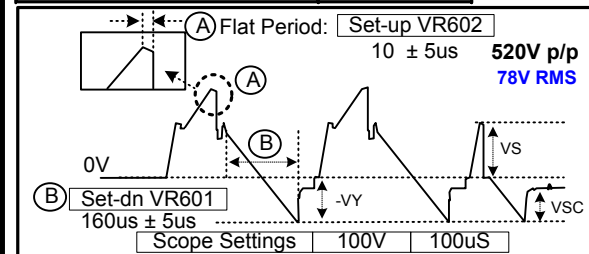
Pin 5:

When the Power Button is opened, Pin 5: pulls up to 4.3V.
Pin 10: Stand-By 5V turns off.

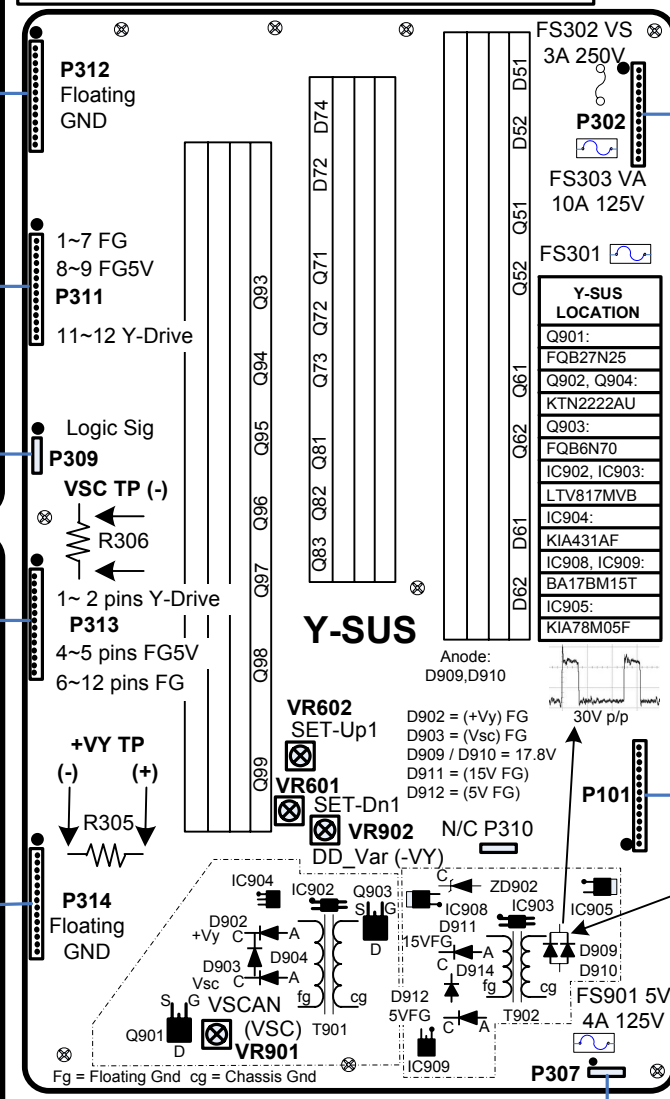
Pin	Stby	Run
1~2	3.3V	3.3V
3	Gnd	Gnd
4	Gnd	Gnd

P1
If Power Button is open, pin 3 (4.38V)

Y-SUS LOCATION	Generic Part
D51, 52, 61, 62, 71, 72	MA3DF30
Q51, 52, 61, 62, 71, 72, 73, 81, 82, 83	45F122
Q98, 99	K3667
Q93, 94, 95, 96, 97	IRF114229



Read in White Wash



Y-SUS

Anode: D909, D910
D902 = (+V_y) FG
D903 = (V_{sc}) FG
D909 / D910 = 17.8V
D911 = (15V FG)
D912 = (5V FG)

P116	P214
Pin	Run V
1~2	140V
3	nc
4~5	FG5V
6~12	F Gnd

Voltages are reference to floating ground.

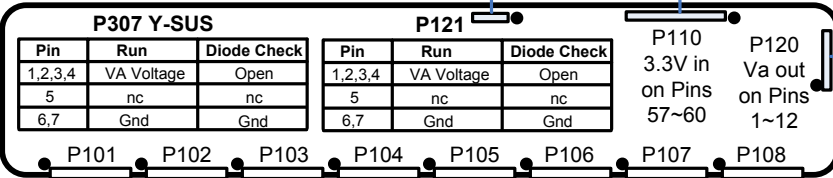
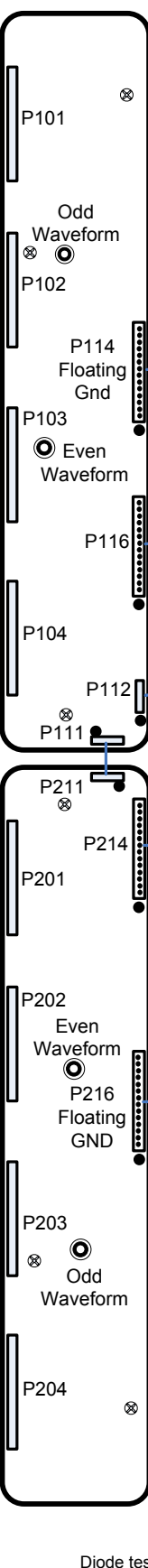
P311	P313
Pin	Run V
1~7	F Gnd
8~9	5V
10	nc
11~12	140V

Diode test is reference to floating GND (F Gnd)

These voltages are reference to floating GND.

LOC	Pin 1	Pin 2	Pin 3	Pin 4	LOC	Developes	Cathode
IC902	9V	8V	Cold Gnd	1.8V cg	D902	+V _y	180V
IC903	1V	0V	Cold Gnd	.08V cg	D903	V _{sc}	163V
IC904	2.1V	0V	7.7V	N/A	D911	15VFG Reg	23.3V
IC905	17.9V	Cold Gnd	5V	N/A	D912	5VFG Reg	10.58V
IC908	23.3V	0V	15.2V	N/A	D914	5VFG Reg	5.0V
IC909	10.5V	0V	5.0V	N/A	ZD902	Feedback	15.3V
Q901	140V	144V	163V	A	ZD902	Anode	3V
Q903	85V	88V	275V	C			

*Generic parts list for sub supplies located in and above Y-SUS.

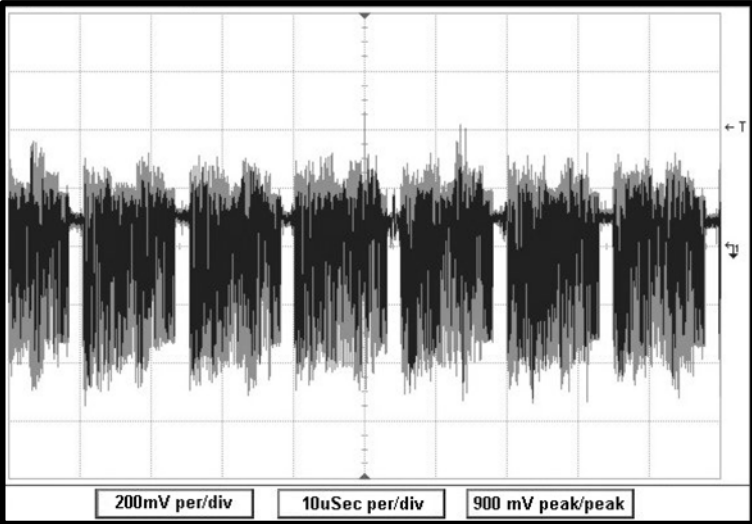


50PS60 LVDS P1003 WAVEFORMS

NOTE: LVDS P1003 Information
There are actually 20 pins carrying Video plus 4 pins carrying clock signals to the Control board. Only 8 are shown as an example of what signals are on each pin.

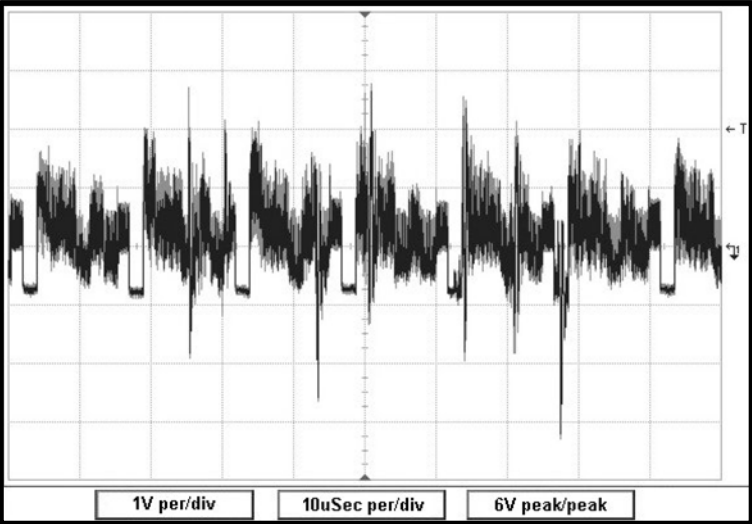
WAVEFORMS:
Waveforms taken using SMTP Color Bar input. All readings give their Time Base related to scope settings. All waveforms taken from the P1003.

MAIN PWB VIDEO TEST POINT (Pin 28)



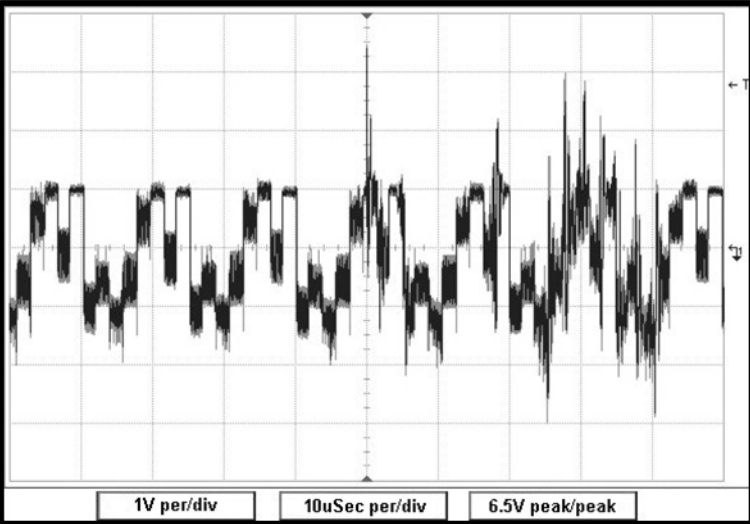
200mV per/div 10uSec per/div 900mV p/p

MAIN PWB VIDEO TEST POINT (Pin 27)



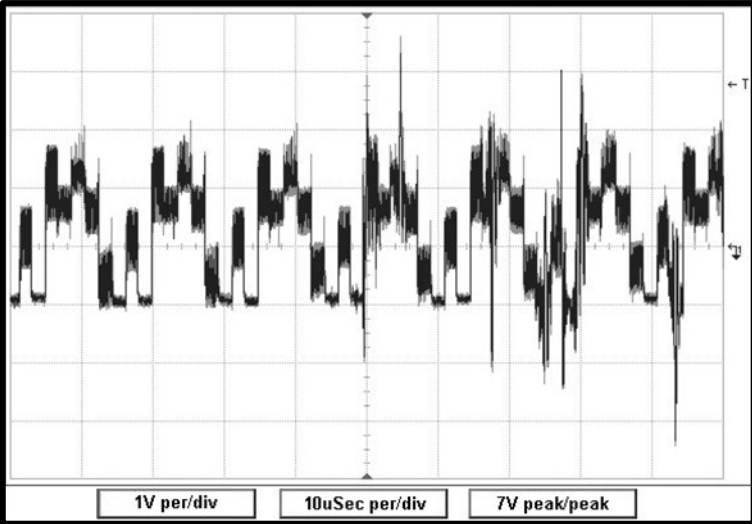
1V per/div 10uSec per/div 6V p/p

MAIN PWB VIDEO TEST POINT (Pin 22)



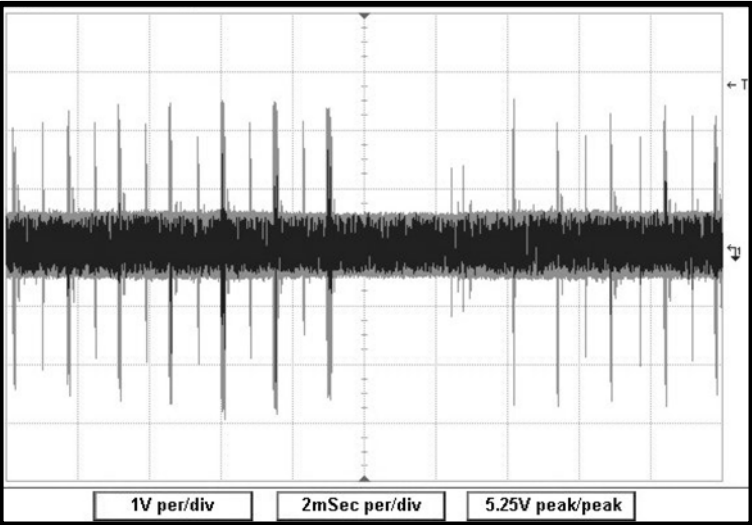
1V per/div 10uSec per/div 6.25V p/p

MAIN PWB VIDEO TEST POINT (Pin 21)



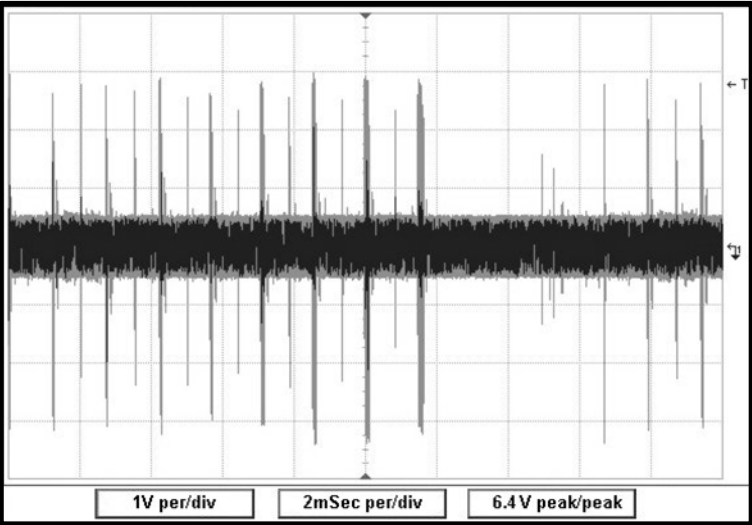
1V per/div 10uSec per/div 7V p/p

MAIN PWB VIDEO TEST POINT (Pin 17)



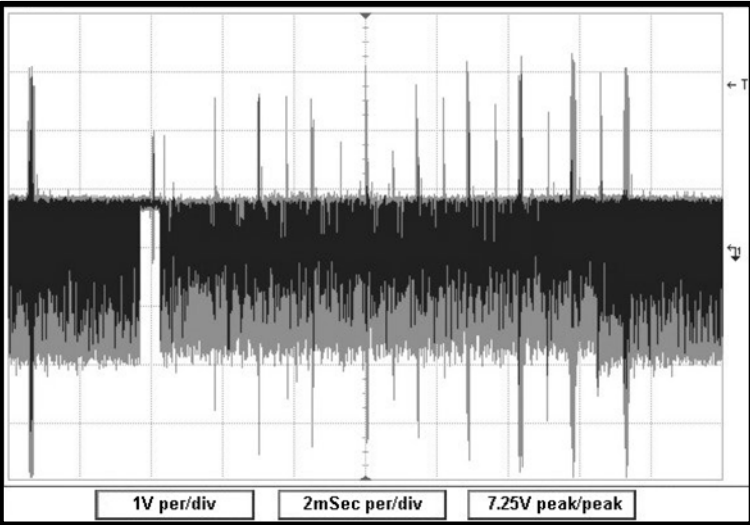
1V per/div 2mSec per/div 5.25V p/p

MAIN PWB VIDEO TEST POINT (Pin 16)



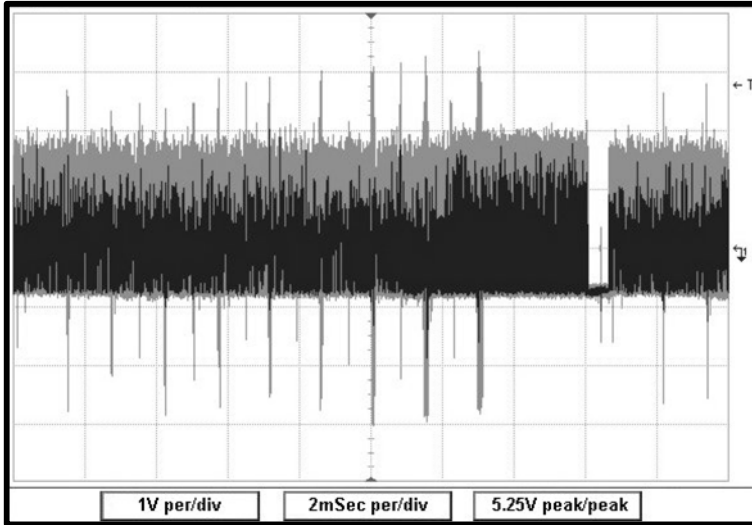
1V per/div 2mSec per/div 6.4V p/p

MAIN PWB VIDEO TEST POINT (Pin 12)



1V per/div 2mSec per/div 7.25V p/p

MAIN PWB VIDEO TEST POINT (Pin 11)



1V per/div 2mSec per/div 5.25V p/p

50PS60 MAIN (BACK SIDE) SIMICONDUCTORS

IC201 NVRAM Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.28V [6] 3.28V [7] 0V [8] 3.28V	IC304 1.8VMST Pin Reg [1] 0.6V [2] 1.8V [3] 3.28V	IC505 5V (Tuner) Pin Reg [1] 3.8V [2] 5V [3] 8V	IC602 RS232 RAM Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 4.5V [6] 4.5V [7] 3.3V [8] 4.5V	Q1001 Pow Down Pin IC1001 [C] 0V [E] Gnd [C] 3.3V	Q502 Video Buffer Pin [B] 0.6V [E] 2.1V [C] Gnd	Q890/2 HDMI1/2 Pin Hot Swap [B] 0V [E] Gnd [C] 0V
IC202 HDCP Pin [1] Gnd [2] Gnd [3] 3.28V [4] Gnd [5] 3.28V [6] 3.28V [7] 3.28V [8] 3.28V	IC305 3.3VMST Pin Reg [1] Gnd [2] 3.0V [3] 4.9V	IC601 RS232 Control Pin [1] 3.3V [2] 5.4V [3] 0V [4] 0V [5] 5.3V [6] 5.3V [7] 5.3V [8] 0V [9] 3.3V [10] 3.3V [11] 0.3V [12] 3.3V [13] 0V [14] 5.4V [15] 0V [16] 3.3V	IC802/3 HDMI1/2 Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 4.5V [6] 4.5V [7] 3.3V [8] 4.5V	Q302 Reset Pin [B] 3.3V [E] 3.2V [C] 0V	Q503 SIF Buffer Pin [B] 2.3V [E] 3.0V [C] Gnd	Q891/951 HDMI3/4 Pin Hot Swap [B] 0V [E] Gnd [C] 0V
IC301 3.3V VST Pin [1] Gnd [2] 3.3V [3] 5.0V	IC502 1.2V PVSB On Digital CH / Off Analog Pin Reg Gnd Gnd In 0V/3.3V Out 0V/1.2V		D1001 IC1001 Pin Reset Limit A 3.27V C 3.3V	Q303 Reset Pin [S] 4.9V [G] 4.9V [D] 0V	Q501 1.2V PVSB Pin Switch [S] 3.3V [G] 3.3V/0V [D] 0V/3.27V On Digital CH / Off Analog	
				Q501 1.2V PVSB Pin Switch [B] 0V/0.6V [E] 0V [C] 3.3V/0V On Digital CH / Off Analog	Q601 RS232 TX Pin Buffer [B] 0.6V [E] Gnd [C] 0V	
				D951 HDMI4 PWR Pin A 5.1V C 4.65V A 0V	D627 RS232 TX Noise Pin Suppression A (-5.3V) C 0.1V A Gnd	D628 RS232 RX Noise Pin Suppression A 0V C 0V A Gnd
					D633 RGB B+ Pin A 0V C 4.5V A 5.0V	D801 EDID B+ Pin A 4.6V C 4.9V A 5.1V
						D802 HDMI CEC Pin B+ A 0V C 3.17V A 3.27V

50PS60 MAIN (FRONT SIDE) SIMICONDUCTORS

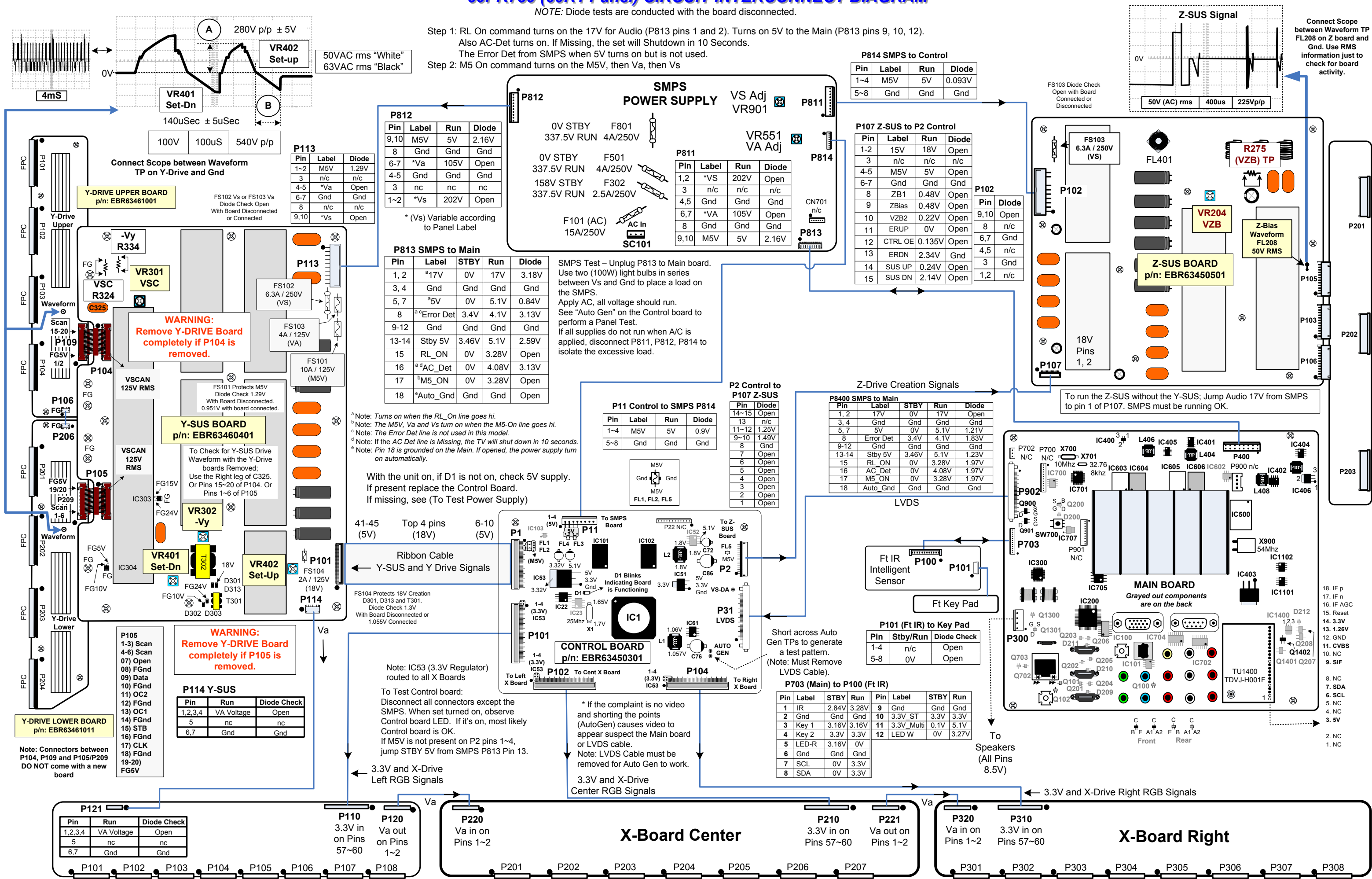
IC302 1.3V VDDC Pin [1] 5.47V [2] 4.89V [3] 1.3V [4] Gnd [5] 0.9V [6] 1.19V [7] 4.85V [8] 3.55V	IC804 USB 5V Pin [1] 5.0V [2] Gnd [3] 3.2V [4] 0V [5] 0V [6] 5.1V	IC952 HDMI4 EDID Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 4.65V [6] 0V [7] 4.65V [8] 4.65V	Q301 Turns on Pin Q303 [B] 0.54V [E] Gnd [C] 0V
IC503 9V Reg Pin [1] 10V [2] Gnd [3] 8V	IC805 HDMI3 EDID Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 4.65V [6] 4.65V [7] 3.31V [8] 4.65V	D303 Reset Pin A 3.18V AC 3.28V C 3.28V	Q801 HDMI CEC Pin Amp [1] 0V [2] 3.16V [3] 3.27V [4] 3.28V
D804 HDMI1 PWR Pin A 5.1V C 4.65V A 0V	D805 HDMI2 PWR Pin A 5.1V C 4.65V A 0V	D806 HDMI3 PWR Pin A 5.1V C 4.65V A 0V	Q1002 Pow Down Pin IC1001 [B] 0.6V [E] Gnd [C] 0V

60PK750 (60R1 Panel) CIRCUIT INTERCONNECT DIAGRAM

NOTE: Diode tests are conducted with the board disconnected.

Step 1: RL On command turns on the 17V for Audio (P813 pins 1 and 2). Turns on 5V to the Main (P813 pins 9, 10, 12). Also AC-Det turns on. If Missing, the set will Shutdown in 10 Seconds. The Error Det from SMPS when 5V turns on but is not used.

Step 2: M5 On command turns on the M5V, then Va, then Vs



**60PK750 LVDS
P1 WAVEFORMS**

Control	Main
1	51
2	50
3	49
4	48
5	47
6	46
7	45
8	44
9	43
10	42
11	41
12	40
13	39
14	38
15	37
16	36
17	35
18	34
19	33
20	32
21	31
22	30
23	29
24	28
25	27
26	26
27	25
28	24
29	23
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32	20
33	19
34	18
35	17
36	16
37	15
38	14
39	13
40	12

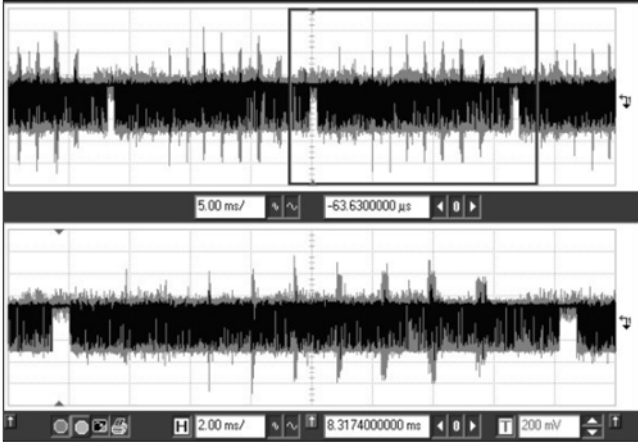
**NOTE: LVDS P31
Information**

There are actually 20 pins carrying Video 4 pins are carrying clock signals to the Control board. With 1080P, pins 35 and 36 would have signals present.

WAVEFORMS:

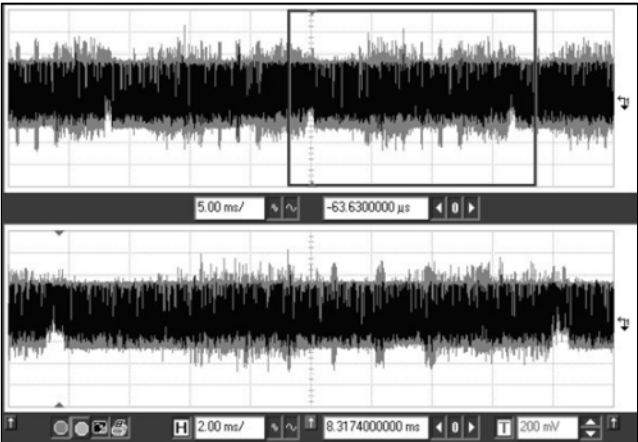
Waveforms taken using 1080P SMTP Color Bar input. All readings give their Time Base related to scope settings.

P31 LVDS (Pin 12) 5Msec / 728mV
Note: Pin 13 is Same but Inverted



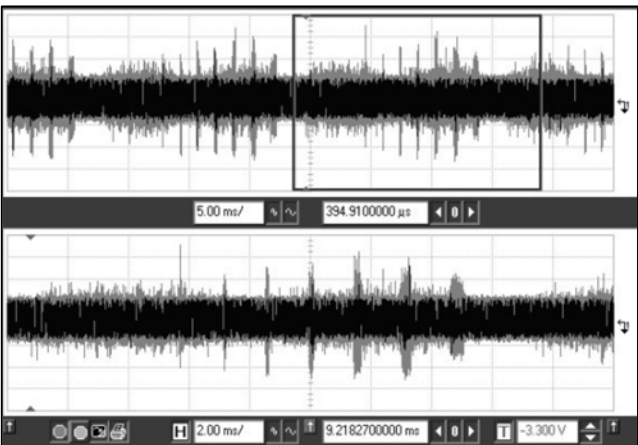
P31 LVDS (Pin 11) 2uSec / 728mV

P31 LVDS (Pin 22) 5Msec / 683mV
Note: Pin 23 is Same but Inverted



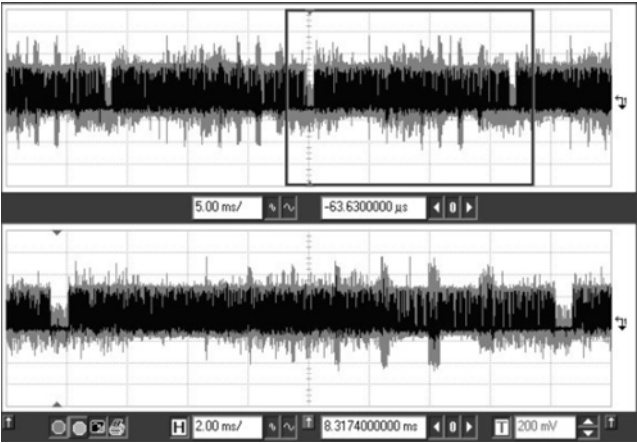
P31 LVDS (Pin 226) 2uSec / 683mV

P31 LVDS (Pin 32) 5Msec / 1.12V
Note: Pin 33 is Same but Inverted



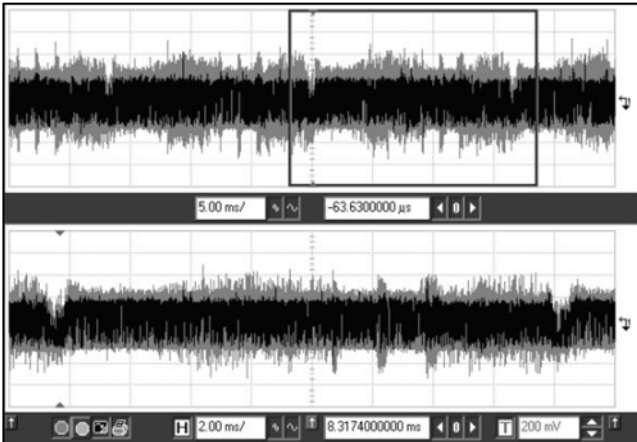
P31 LVDS (Pin 32) 2uSec / 1.12V

P31 LVDS (Pin 14) 5Msec / 618mV
Note: Pin 15 is Same but Inverted



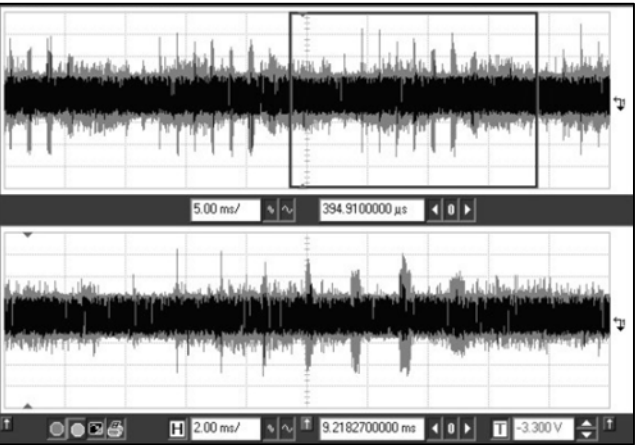
P31 LVDS (Pin 14) 2uSec / 618mV

P31 LVDS (Pin 24) 5Msec / 448mV
Note: Pin 25 is Same but Inverted



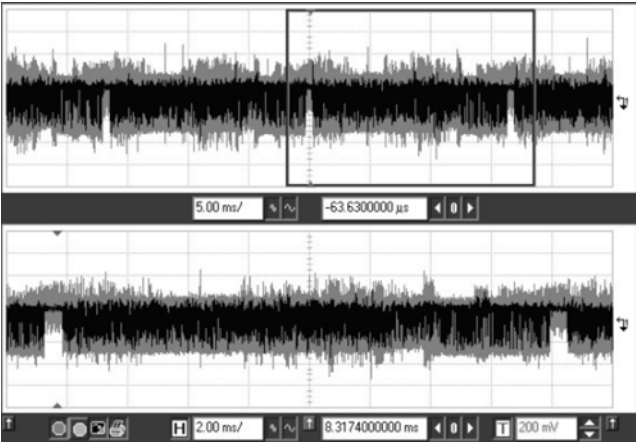
P31 LVDS (Pin 24) 2uSec / 448mV

P31 LVDS (Pin 35) 5Msec / 1V
Note: Pin 36 is Same but Inverted



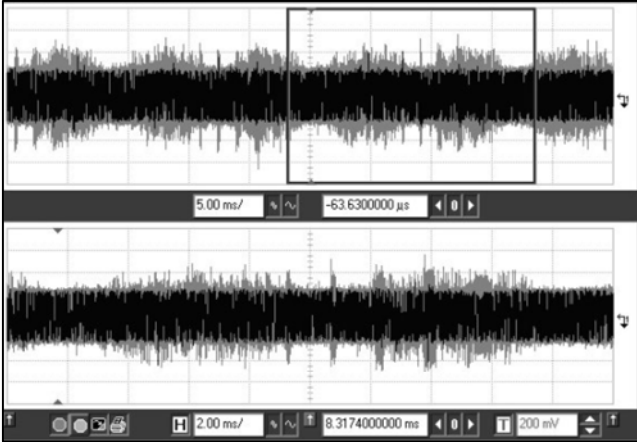
P31 LVDS (Pin 35) 2uSec / 1V

P31 LVDS (Pin 16) 5Msec / 738mV
Note: Pin 17 is Same but Inverted



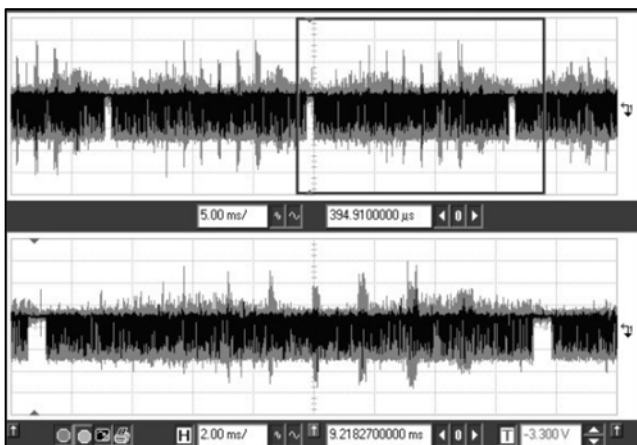
P31 LVDS (Pin 16) 2uSec / 738mV

P31 LVDS (Pin 28) 5Msec / 768mV
Note: Pin 29 is Same but Inverted



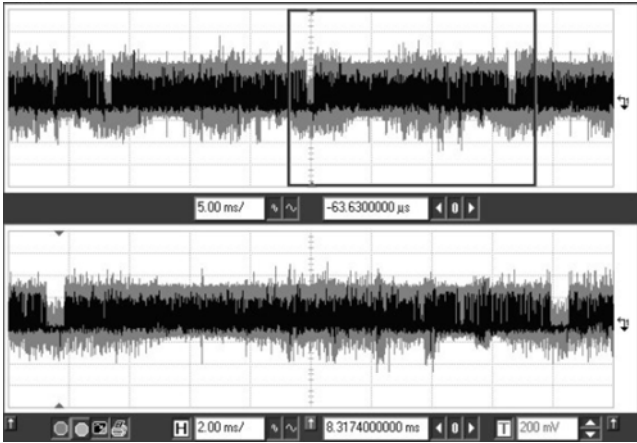
P31 LVDS (Pin 28) 2uSec / 768mV

P31 LVDS (Pin 38) 5Msec / 1.15V
Note: Pin 39 is Same but Inverted



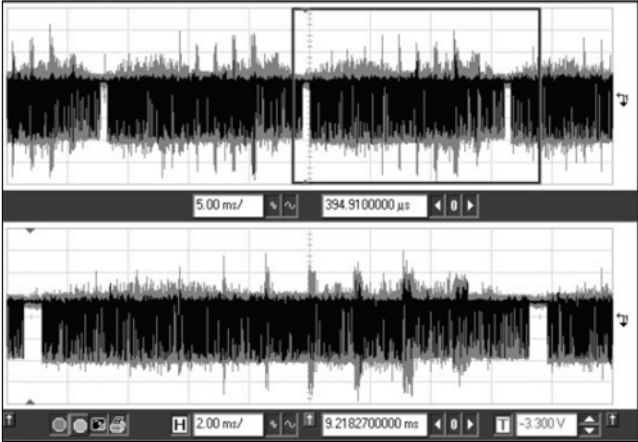
P31 LVDS (Pin 38) 2uSec / 1.15V

P31 LVDS (Pin 19) 5Msec / 758mV
Note: Pin 20 is Same but Inverted



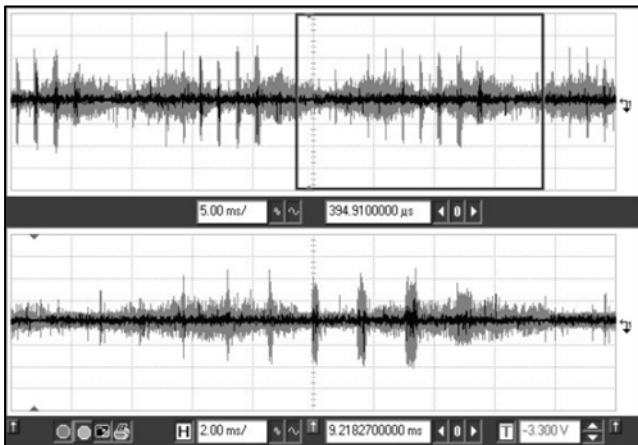
P31 LVDS (Pin 19) 2uSec / 758mV

P31 LVDS (Pin 30) 5Msec / 1.3V
Note: Pin 31 is Same but Inverted



P31 LVDS (Pin 30) 2uSec / 1.3V

P31 LVDS (Pin 40) 5Msec / 910mV
Note: Pin 41 is Same but Inverted



P31 LVDS (Pin 41) 2uSec / 910mV

60PK750 Main Board Component Voltages

60PK750 Main Board (Front Side) Component Voltages

IC400 3.3V_NEC_ST Pin Regulator  [1] Gnd [2] 3.3V [3] 5V	IC402 D3.3V / +3.3V Pin Regulator  [1] 5V [2] 3.3V [3] 3.3V [4] 7.48V [5] 3.3V [6] 0.8V [7] 5V [8] Gnd	IC404 7V (to IC405) Pin Regulator  [1] 17.1V [2] 7.11V [3] 7.11V [4] 11.95V [5] 3.3V [6] 0.8V [7] 5.0V [8] Gnd	IC405 D1.2V / A1.2V Pin Regulator  [1] Gnd [2] 4.99V [3] Gnd [4] 1.26V [5] 0V [6] n/c [7] 6.17V [8] 5.0V [9] 5.0V [10] 5.0V [11] 1.27V [12] Gnd [13] 3.3V [14] 0.83V	IC705 NVRAM Pin  [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.28V [6] 3.28V [7] Gnd [8] 3.28V	IC1102 USB2 5V Pin  [1] Gnd [2] 5.14V [3] 5.14V [4] 0.04V [5] 3.28V [6] 4.94V [7] 4.94V [8] n/c	Q901 SDA to LVDS Pin FET  [G] 3.276V [S] 3.289V [D] 3.28V
IC401 DDR 1.8V Pin Regulator  [1] 6.75V [2] 5.0V [3] 1.85V [4] Gnd [5] Gnd [6] 2.356V [7] 0.9V [8] 1.0V [9] 2.4V [10] 3.3V	IC403 A2.5V Pin Regulator  [1] 1.26V [2] 2.5V [3] 5V			IC1101 USB1 5V Pin  [1] 5.0V [2] Gnd [3] 3.2V [4] 0V [5] 0V [6] 5.1V [7] 0V [8] 3.28V	Q701 RS232 IR Pin Buffer  [B] 0.574V [E] Gnd [C] 0V	Q1402 Video Buffer Pin  [B] 2.05V [E] 2.75V [C] Gnd
			IC406 5V (Tuner) Pin Reg  [1] 7.13V [2] 5V [3] 7V		Q900 SCL to LVDS Pin FET  [G] 3.28V [S] 3.28V [D] 3.28V	

60PK750 Main Board (Back Side) Component Voltages

IC100 RS232 Pin Control  [1] 1.65V [2] 1.65V [3] 4.56V [4] 1.65V [5] 1.65V [6] 4.66V [7] Gnd [8] n/c [9] 1.657V [10] 0V [11] 4.5V [12] 0V [13] 1.657V [14] 5.12V	IC700 Micro Pin EEPROM  [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.3V [6] 3.3V [7] Gnd [8] 3.3V	IC704 RS232 Pin Selector  [1] 3.26V [2] 3.26V [3] n/c [4] n/c [5] n/c [6] Gnd [7] n/c [8] Gnd [9] Gnd [10] 4.99V [11] 4.99V [12] 0.88V [13] 3.3V [14] 3.3V [15] 3.3V [16] 5V	Q100 RGB W/P Pin  [B] 0V [C] 5.12V [E] Gnd	Q203 Hot Swap Pin HDMI3  [B] 4.27V [C] 0V [E] Gnd	Q702 IR Out Pin 2nd Buffer  [B] 0V [C] 3.32V [E] Gnd	D209 HDMI Hot Swap Pin Routing HDMI1  [A1] 5.13V [A2] 0.15V [C] 4.67V
			Q101 Wired IR Pin 1st Buffer  [B] 0V [C] 3.33V [E] Gnd	Q204 Hot Swap Pin HDMI1  [B] 0V [C] 4.26V [E] Gnd	Q703 IR Out Pin 1st Buffer  [B] 0.62V [C] 0V [E] Gnd	D210 HDMI Hot Swap Pin Routing HDMI2  [A1] 5.13V [A2] 0.15V [C] 4.67V
IC101 RS232 Pin EEPROM  [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 4.325V [6] 4.8V [7] 5.12V [8] 5.0V	IC702 RS232 Pin Selector  [1] 3.34V [2] 5.78V [3] 0V [4] 0V [5] 0.2V [6] (-5.68V) [7] 5.78V [8] Gnd [9] n/c [10] Gnd [11] 3.3V [12] 0V [13] 0V [14] (-5.68V) [15] Gnd [16] 3.3V	IC707 Reset IC Pin  [1] 3.3V [2] Gnd [3] 3.31V	Q200 CEC Remote Pin HDMI  [B] 2.59V [G] 3.3V [S] 2.58V [D] 3.25V	Q206 Hot Swap Pin HDMI3  [B] 0V [C] 4.26V [E] Gnd	Q1300 Wired IR Pin 1st Buffer  [E] Gnd [B] 0V [C] 17V	D211 HDMI Hot Swap Pin Routing HDMI3  [A1] 5.13V [A2] 0.15V [C] 4.67V
IC602 DDR_VTT Pin Regulator  [1] Gnd [2] 3.3V [3] 0.43V [4] 0.94V [5] 1.857 [6] 3.3V [7] 1.86V [8] 0.93V		IC1400 Reset IC Pin  [1] 0V [2] 1.29V [3] 3.27V	Q201 Hot Swap Pin HDMI1  [B] 4.27V [C] 0V [E] Gnd	Q207 Hot Swap Pin HDMI4  [B] 4.28V [C] 0V [E] Gnd	Q1301 Wired IR Pin 2nd Buffer  [G] 17V [S] 17.1V [D] 0V	D212 HDMI Hot Swap Pin Routing HDMI4  [A1] 5.13V [A2] 0.15V [C] 4.67V
			Q202 Hot Swap Pin HDMI2  [B] 4.27V [C] 0V [E] Gnd	Q208 Hot Swap Pin HDMI4  [B] 0V [C] 5V [E] Gnd	Q1401 SIF Buffer Pin  [B] 0.165V [E] 0.83V [C] Gnd	D200 HDMI CEC Limiter Pin  [A1] 0V [A2] 3.31V [C] 3.18V