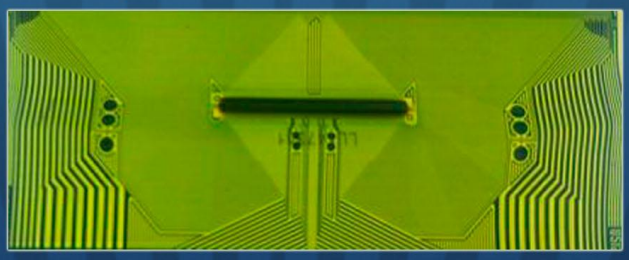
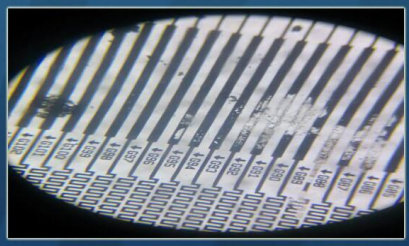
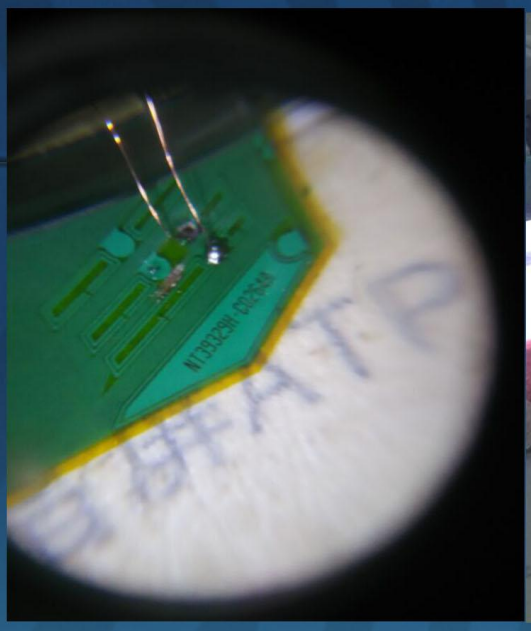
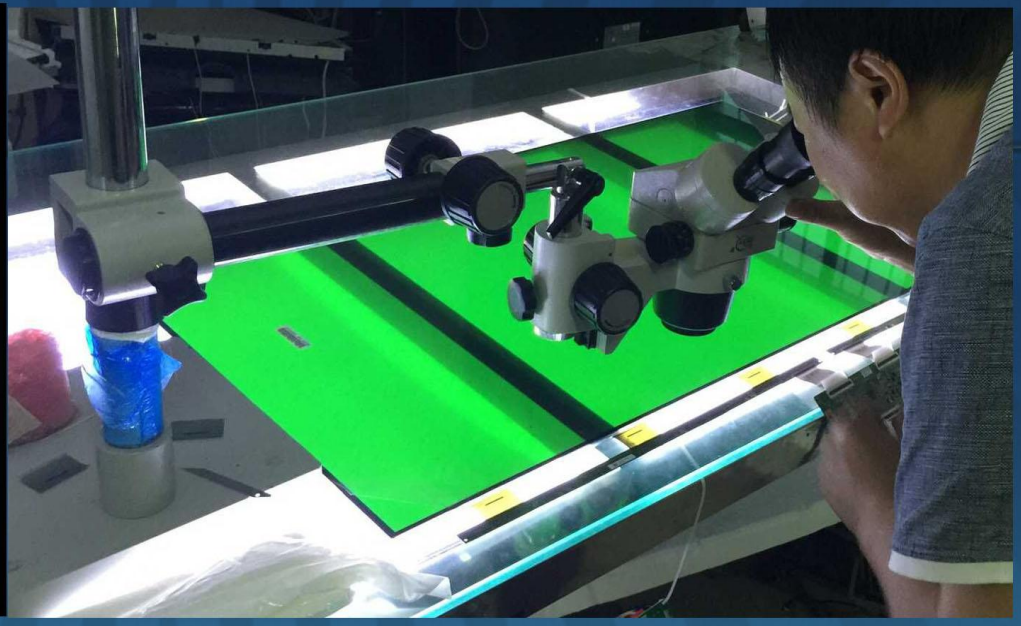
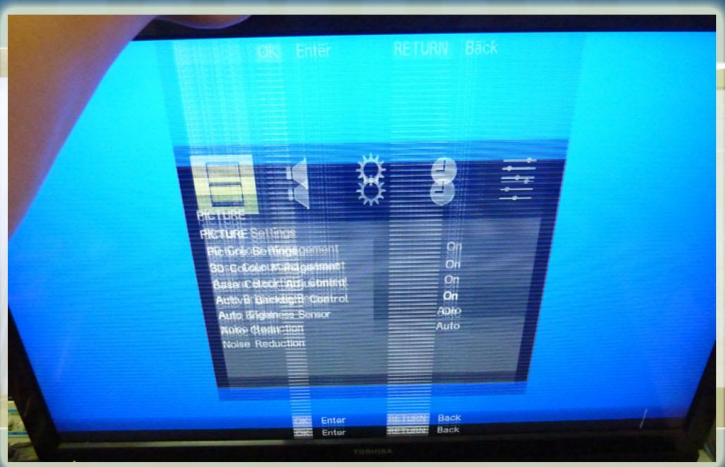
Troubleshooting & Repairing

LCD/LED Screen Panel Repair

by Kent Liew

2016



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

Thank You for Contribution

Here is to thank you to Mr. Vladimir, Mr. Lei Yang, Mr. Jonathan, Mr. Maronga Tapera, Mr. Ganesh and Mr. Huang. Because they had contributed the good repair information in part of this repair guides.

Table of Contents

BONUS-B

(This bonus NOT listed in this Ebook, it's on the Download Page)

*** Collection of T-con Board Repairing Information (Over 50+ Models of T-con Board)**

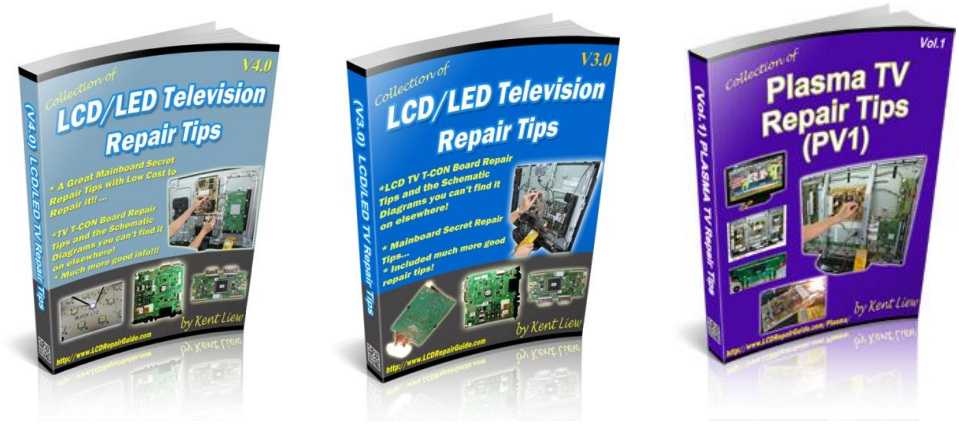
*** LG TFT-LCD-Production-Process-Explained**

*** LG 2012 Understanding T-con Troubleshooting & Training Guide**

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: (Please click on the ebook cover to get more details)

1) Flat Screen TV Troubleshooting & Repairing Ebooks:



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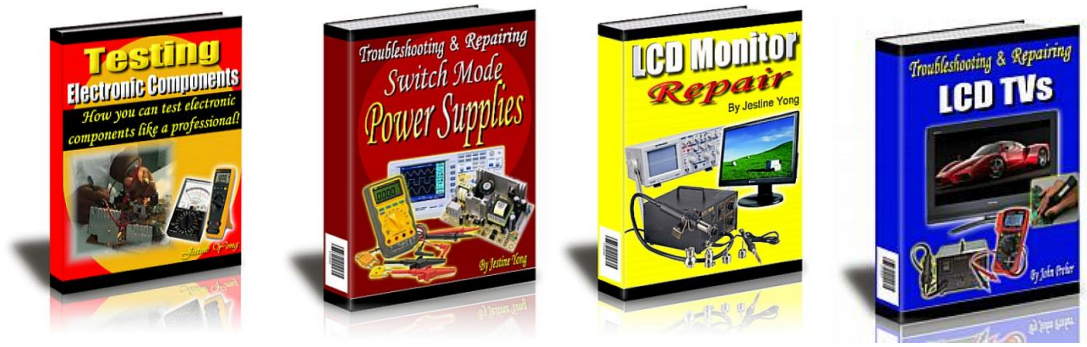


How to Use This Repair Guide

1) Yes, this repair guide not only can save you time and money, it also can earn more profit from repairing LCD/LED panel. Because of LCD/LED Panel is the most expensive spare part inside the TV and Monitor. If we can repair it, so the profit is quite high to compare repairing other section like PSU in TV.

2) Inside this repair guide, I will NOT or I will seldom to provide the repair case about the failure of "Bulged" or "Bad ESR" values of Electrolytic Capacitor/s. As a TV repairer it is a very first step to see and measure the PCB boards inside the TV. Because it is a very basic things as a repairer need to know or know how to measure it. I highly recommend using the Blue ESR tester to testing electrolytic capacitor.

3) If you don't want to start from the basic theory, but just want to solve your TV display problem, you can direct refer to the chapters 3, 4 & 5. So it will directly to show you what's wrong on this type of display symptom. Also the LCD and LED Backlight is not writing in this ebook, because I had wrote a lot this title in my V2, V3 and V4 ebook series.

4) When I'm mention **"LCD"** word in this ebook, actually it is included the **"LED"** at the same time. So I don't to write too many LED word in this ebook to save more space and reduce some file sizes in this ebook.

5) After you have finished reading this repair guide, I believe that you will have the confident to repair LCD/LED TV Panel now. It is because of we know how the LCD/LED Panel is working, why this display symptom is occur and also know how to troubleshooting it!

The LCD/LED Screen is the most expensive cost of the TV. Normally when the Panel is beyond repair, this TV will no point to continue repair. Either replaces a new or working Panel with reasonable price, or just selling their PCB board as it to the used spare part market. Nowadays, repairing the LCD/LED Panel has a high profit margin in TV or Monitor repair!

Part-1

Basic Theory of How do LCD Screen Work

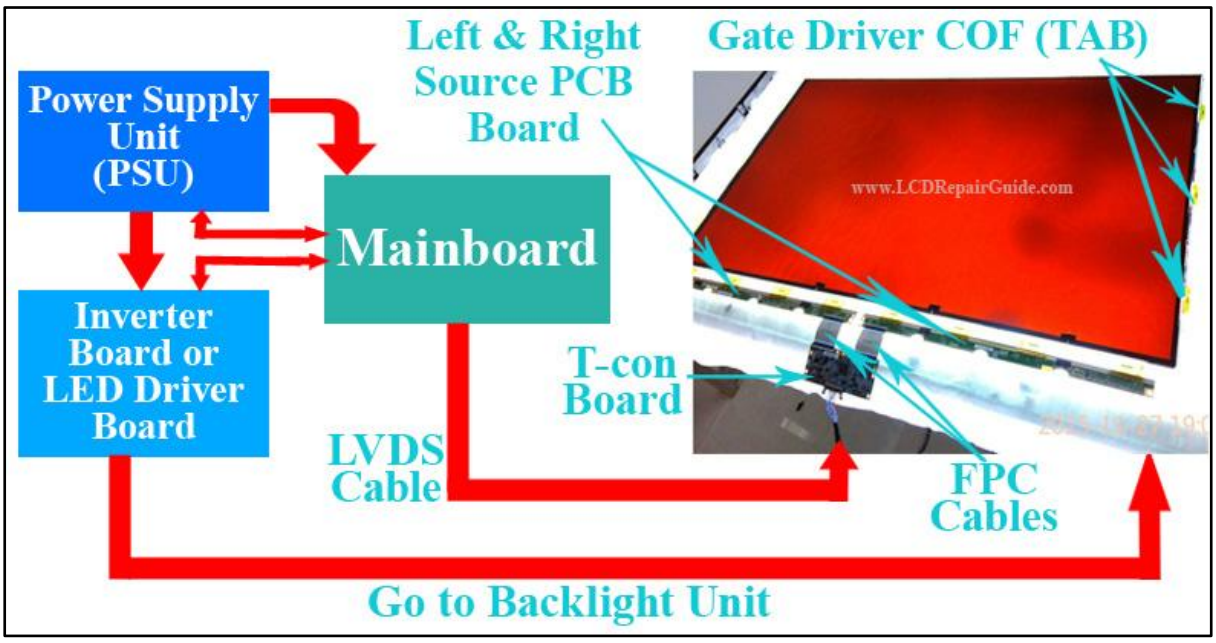
Nowadays, lots of the LCD & LED TV is in the market now. And this is the "peak season" these LCD & LED TV need to repair. But I found that, lots of the LCD TV or even LED TV I can found it in the recycling centers or factory! All these TV will be send to scrap and disposal as reuse their material only. So it is not only cause the money waste but it also increases the electronic waste on the earth.

Finally found the answer is because of these scrap LCD/LED TV problem can't be repair or not worth to repair it. Most of the symptom is because of "Display Problem"! The TV repairer told customer that this "Display Problem" is because of the Panel issue and no spare part to replace/repair or the repair cost is very expensive.

But I can say their answer is not 100% true! Because I had tried before to repair these scrap LCD/LED TV, if the TV not crack screen, leakage their liquid crystal in the panel or Samsung Panel without Gate/Y- TAB, their success rate to repair these scrap TV is about 60~70%! ! So the actual the answer is because lots of the TV repairer they don't know how to repair the LCD/LED Screen Panel. That's why I created this ebook to help TV repairer to increase their troubleshooting & repairing knowledge in LCD screen panel repair. And the highest profit to repairing TV is repair the TV screen/panel problem. ☺

How LCD/LED TV Works?

Before we repair the LCD/LED TV, we must know how it works. So when we repair the LCD/LED screen or panel, we need to know how it works too.



1) Power Supply Unit (PSU)

When the power supply input AC voltage and received a signal to power on, it will generate and output several types DC voltages to Mainboard and Inverter board (if that is LED TV, it is a LED Driver board).

2) Inverter Board/ LED Driver Board

* For LCD TV, the inverter board receives 24V (normally) from PSU and received a backlight on signal from Mainboard, it will generate and output the AC voltages to start-up the CCFL lamps. So the backlight unit (BLU) can working properly and supplies the light to Panel.

* For LED TV, the LED Driver board receives 24V (but different design will have different voltages. Please refer to their appropriate LED Driver board specification) from PSU and received a backlight on signal from Mainboard, it will step-up the DC voltage and output the DC voltage to start-up the LED Strip.

So the LED backlight can working properly and supplies the LED white light to Panel.

3) Mainboard Board

The TV Mainboard received the video & audio signals from Tv channel (Tuner), AV, HDMI and etc, after that convert the audio signals, amplifier it and send to speakers to generate the sound. At the same time, Mainboard also convert the video signals to LVDS signals and send to T-con board through LVDS cable/s. Mainboard also control whole Tv to on/off, Power Supply on or cutoff and Backlight on or cutoff.

4) T-con Board

When T-con board received the voltage supplies and LVDS signals from Mainboard, the T-con board will start working. The T-con Board converts the LVDS signal to TTL signals and through Timing Control circuit. After that generate the Data signals send to Source Driver Board. T-con board also generates the DC-DC voltages, Gamma circuit and control signals to control the Panel Glass working. For more details on how T-con board work, please read on chapter-2, How T-con Board works.

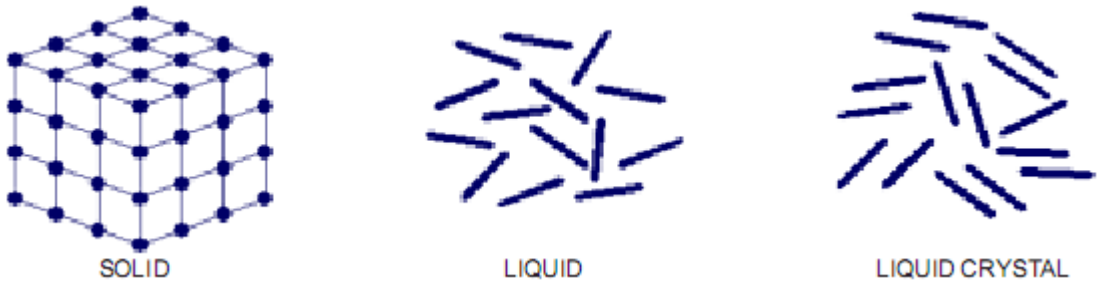
5) LCD Screen

When the LCD Screen received the voltage supply and LVDS signals from Mainboard, it can show the display on the screen. But we also need the backlight to supply the light to Panel, so that we can see the picture or movie on the screen. If no backlight, it looks like no display but using a torch light shot to the screen, we can see the images on the screen. So LCD Screen is use to convert the videos/digital signals to images and the images can see by our eyes.

How an LCD Display Work

Liquid Crystals

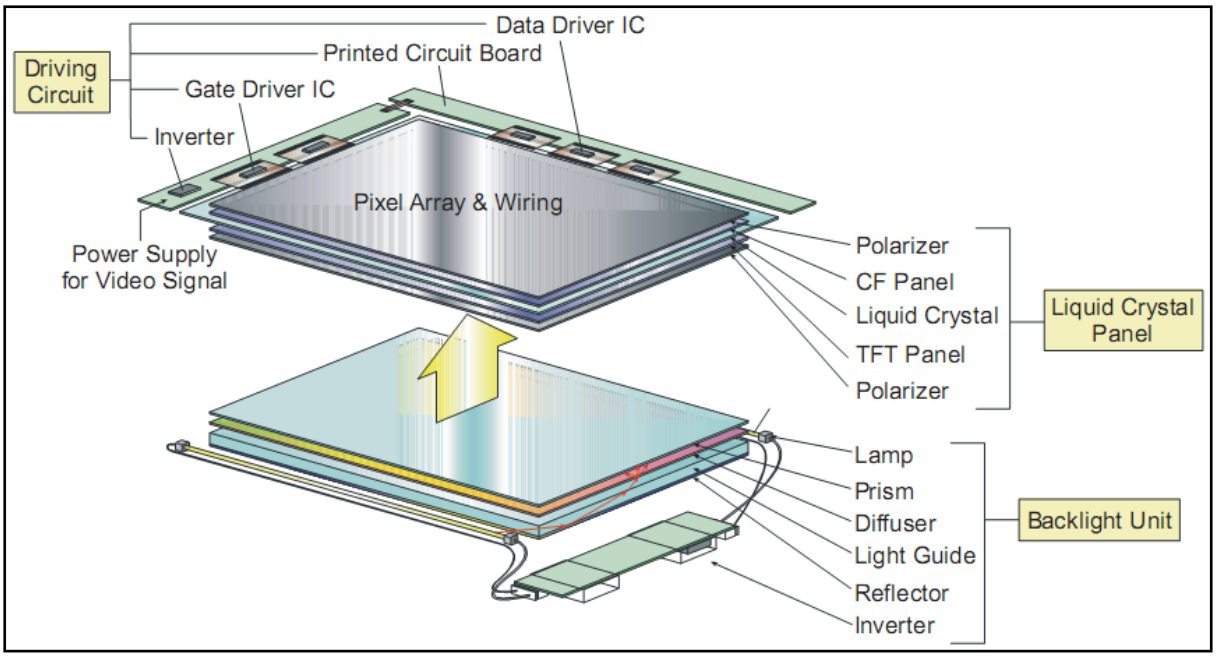
In school you learned that matter has three distinct states; solid, liquid, and gas. However, there are states of matter that may fall between these states, like liquid crystals. Basically they are crystals that hold their orientation (shape) but can flow similar to liquids. Their molecules point in same direction with respect to each other like in a solid, but they are free to change position like in a liquid. Think of a handful of pencils. They collectively hold their shape at rest, but change shape when you squeeze or let go of them.

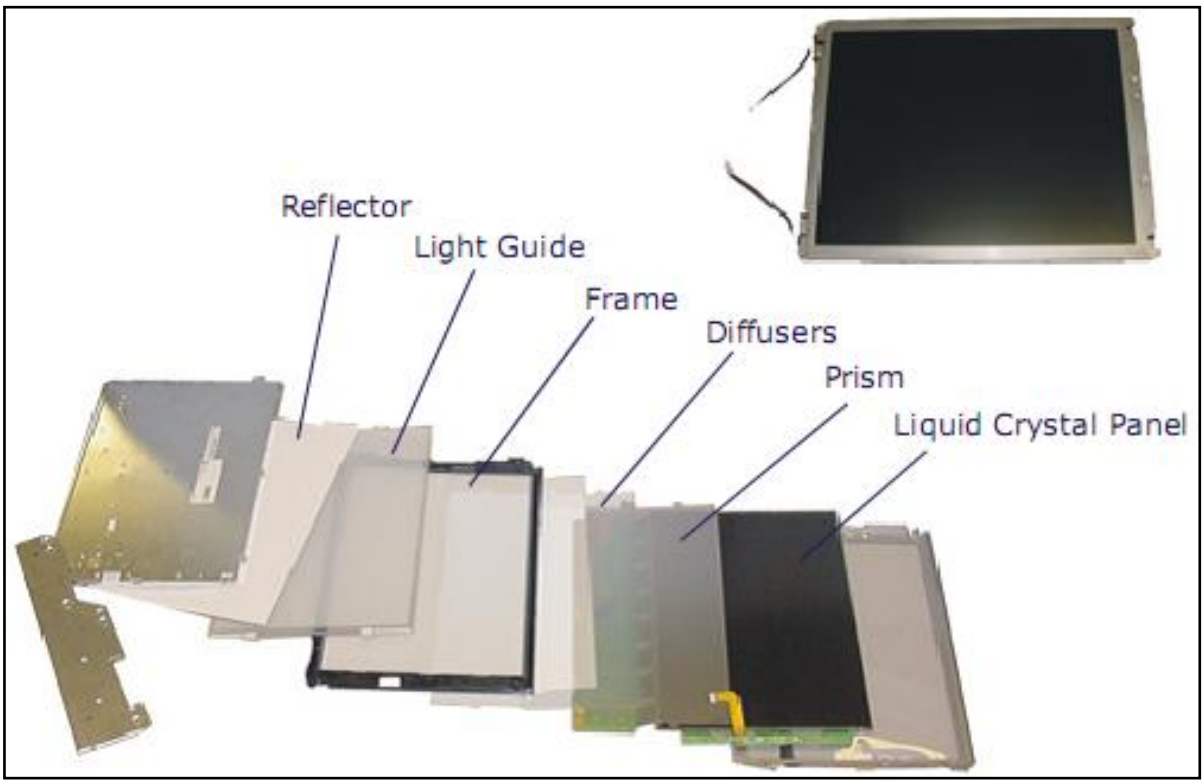


There are different phases and types of liquid crystals that perform differently. Small amounts of pressure, heat, and/or electricity can cause liquid crystals to change in some way. For LCDs we are interested in the electricity aspect, but pressure and heat are side effects that have to be dealt with. This is why LCDs have a limited operating range and distort when you press on the screen.

Liquid Crystal Display

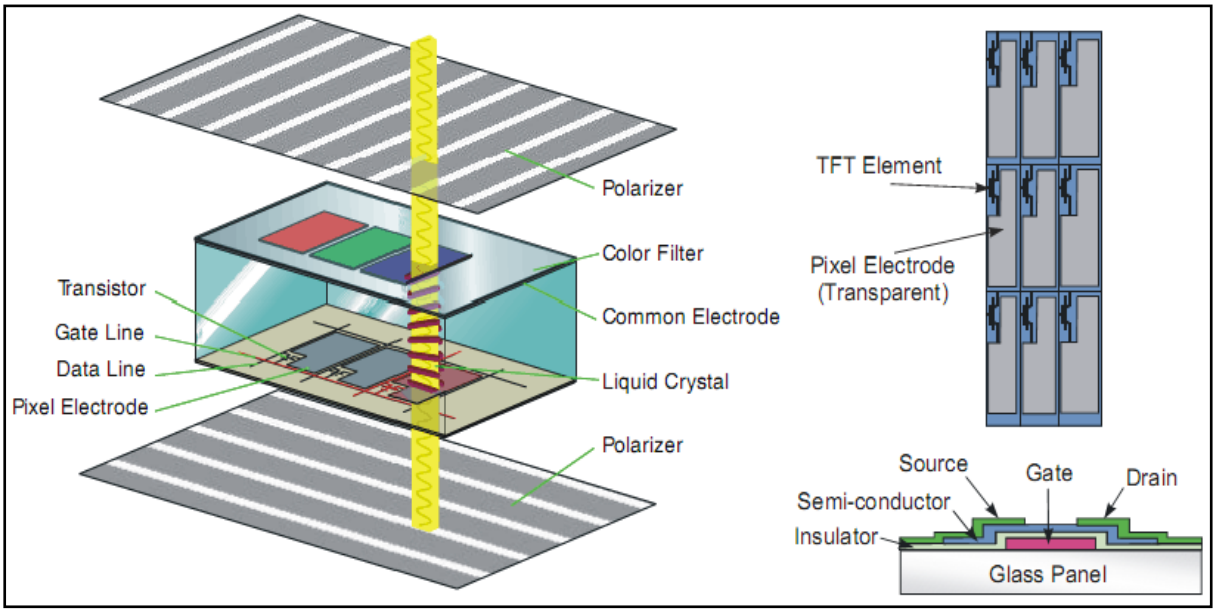
A Liquid Crystal Display is composed of a light source (backlight), a Liquid Crystal Panel, and a driving circuit. We start with a light source at the back of the panel composed of thin fluorescent bulbs (CCFLs - Cold Cathode Fluorescent Lamps). This light passes through filters to help create a uniform light source. Then the light passes through the Liquid Crystal Panel which is composed of thousands of pixels that control the flow of light through the panel to make images.





Liquid Crystal Panel

Below (on the left) is a cross section of a liquid crystal panel. The key to an LCD's operation is the polarizer. The polarizers only allow a certain wavelength of light to pass through. These two polarizers are mounted at a 90 degree angle with respect to each other, which prevents light from passing through. The liquid crystals are used to twist the light beam 90 degrees and allow light to pass through that cell. Color comes from a simple light filter.



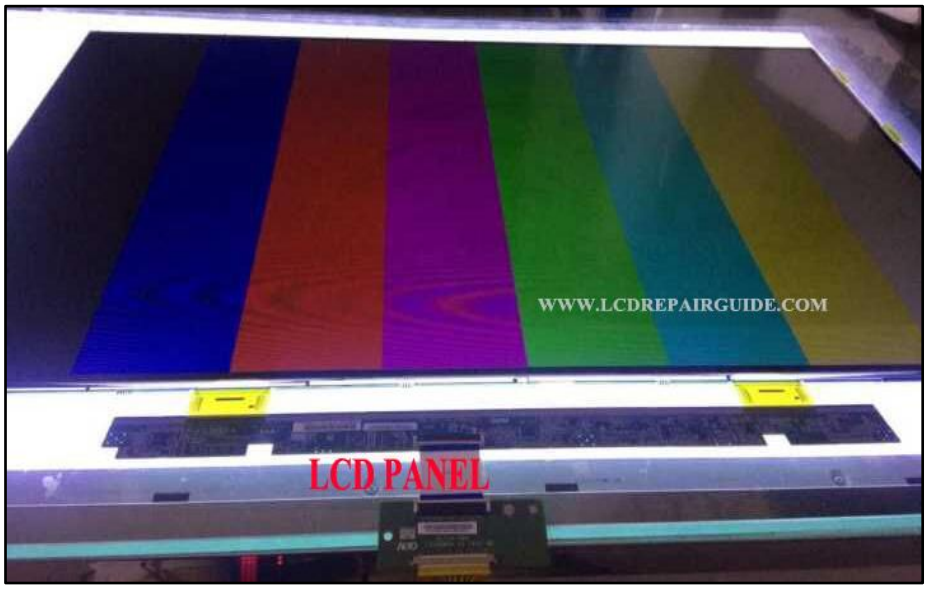
Each sub-pixel or cell (a red, green, and blue sub-pixel equal's one pixel) is controlled by a Thin Film Transistor (TFT). This provides accurate control of each cell and makes for an accurate picture. Some methods used in the past that didn't involve a switch and current could leak to surrounding cells resulting in a blurred image. A TFT is a semiconductor (bottom-right picture), it behaves like a relay switch.

What are LCD Screen and LCD Panel?

The words of LCD or LED screen or LCD or LED panel, actually both are different things. The LCD screen is meaning whole screen included Backlight, Metal Box (hold the backlight), T-con board and Panel Glass. Some LCD Screen also included the inverter board together and it is call as LCD Module.

The LCD Panel is meaning the Panel Glass only. Sometime it also included the T-con board or Timing control section in their Source Driver board.

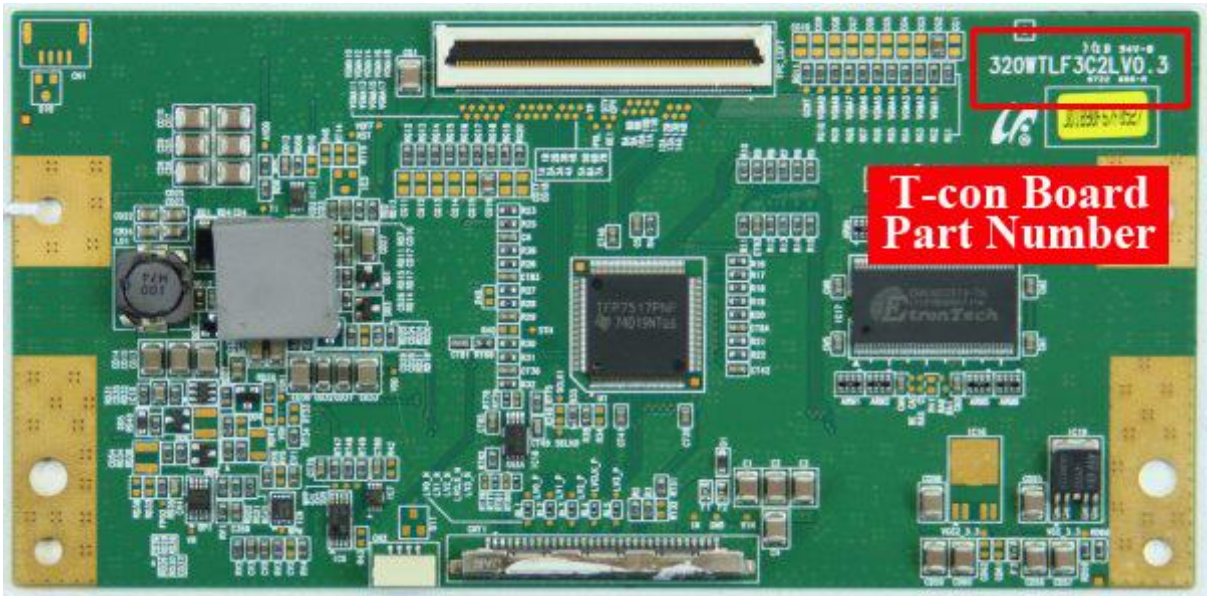
Different Sizes LCD Screens



LCD Panel

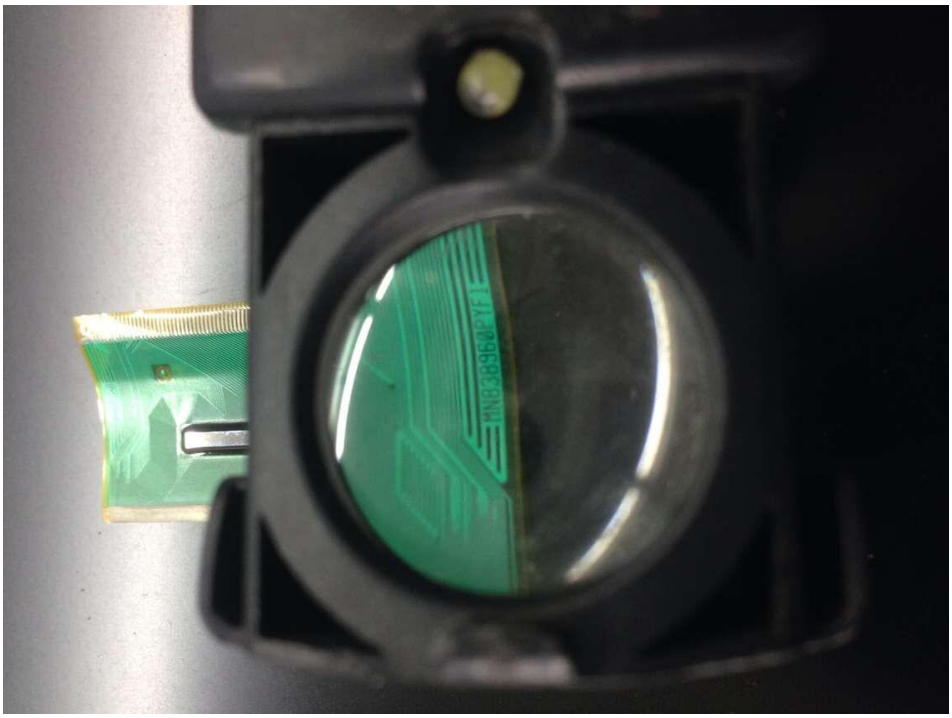
T-con Boar Part Number

The location of T-con Part Number:



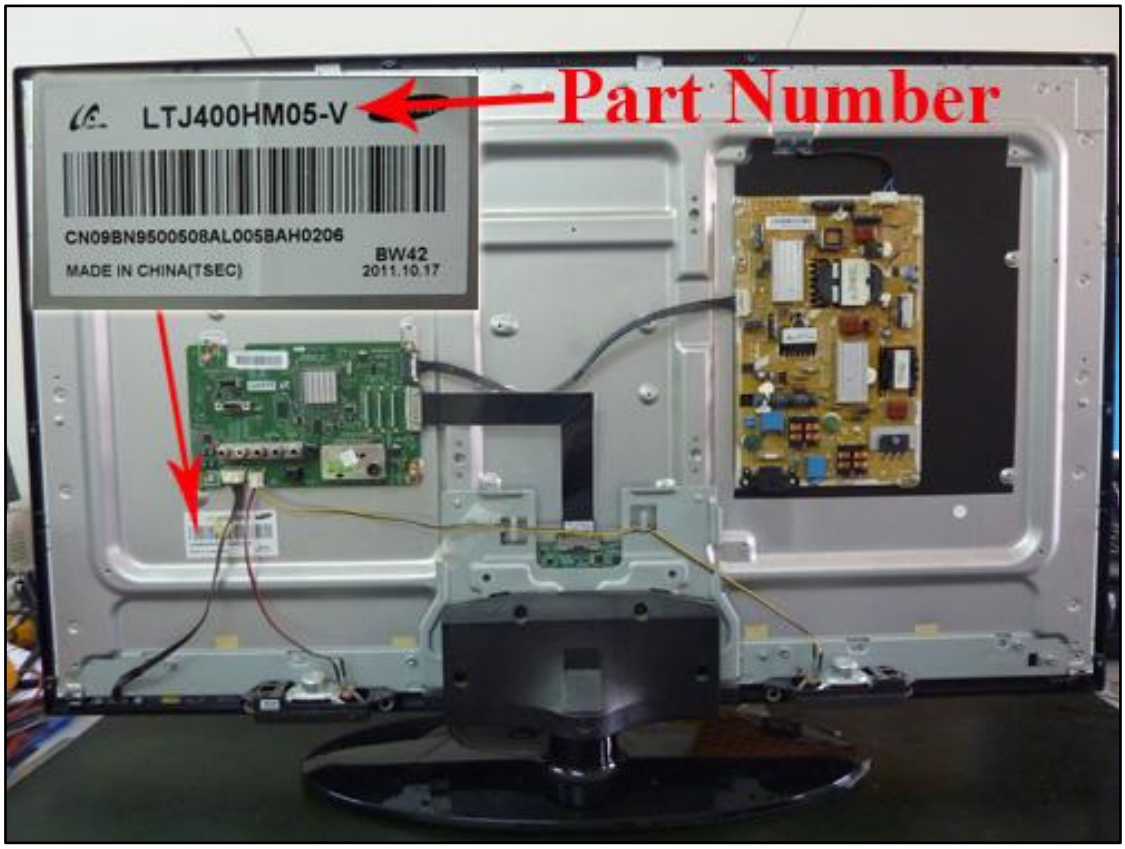
TAB/COF IC Part Number

The TAB part number is not on the center one but it is on the TAB file edges there as photo below:



LCD Panel Part or Model Number

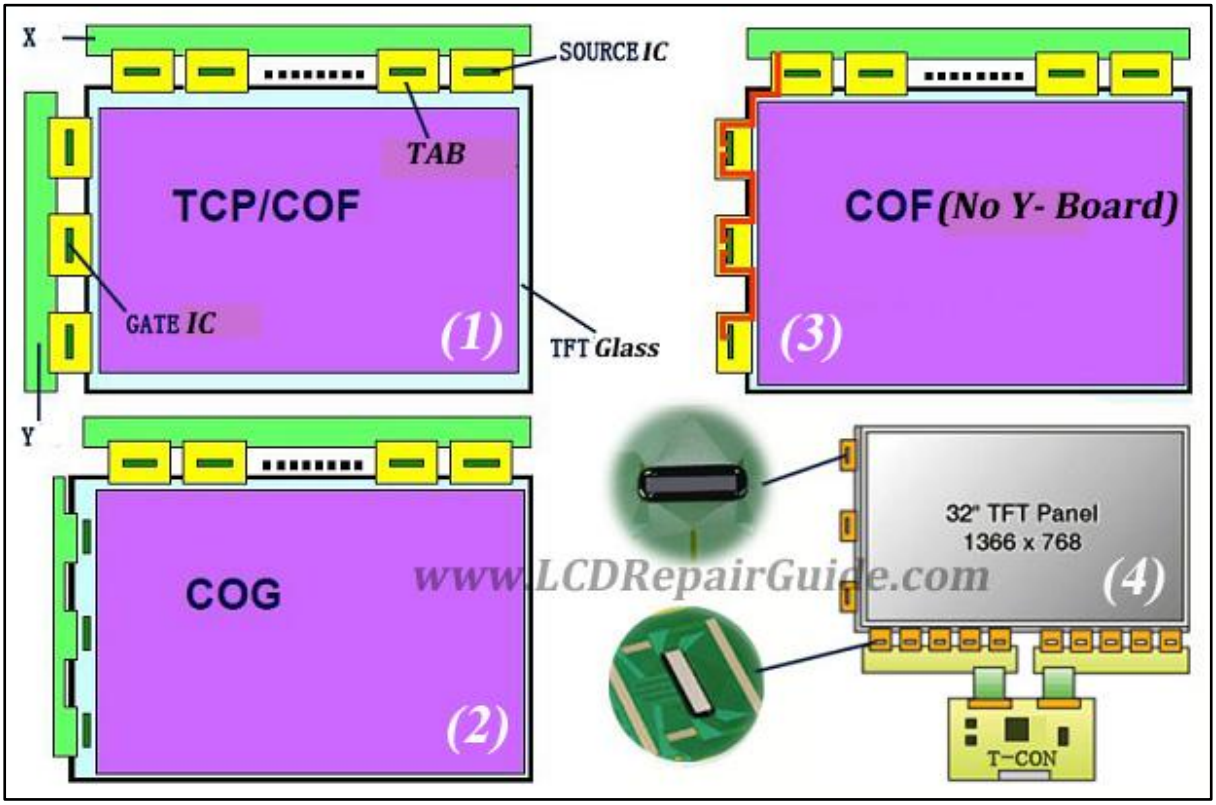
LCD Panel part number sticker location:



Part-2

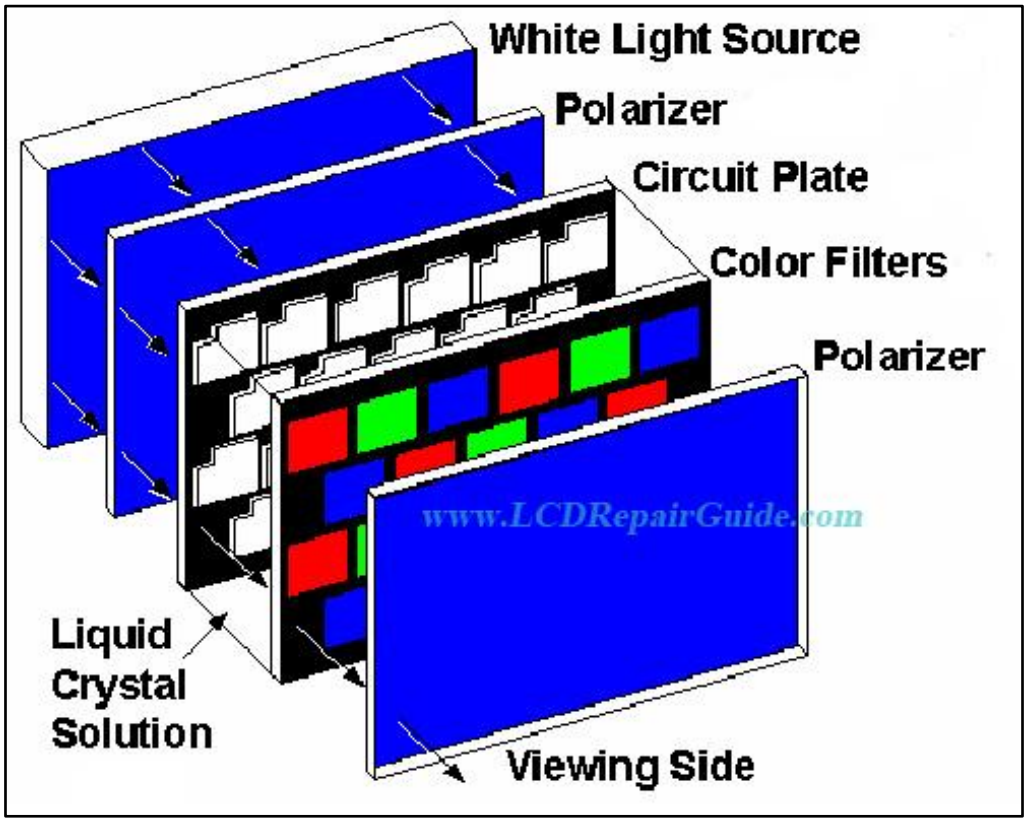
How an LCD/LED Screen Panel Works

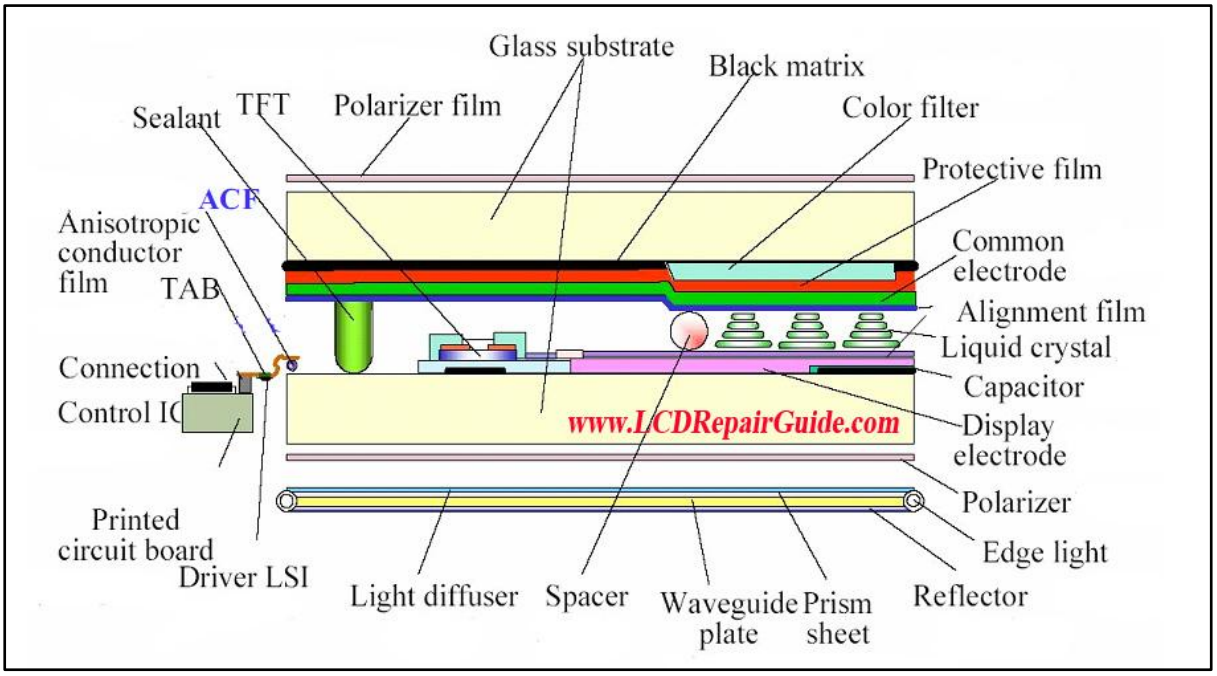
Types of LCD Panel and Their Structure



The above picture is to show different types of LCD Panel. Type (1) & (2) is the old technology of LCD Panel used. The latest technology is using the (3) and (4) types design now. One more LCD Panel design is without the external Gate Driver COF/TAB on both sides.

The TFT LCD Structure





Learn About LCD TV and TFT LCD Displays

*This title information is from http://serdis.dis.ulpgc.es/ and contributes by Samsung Electronics.

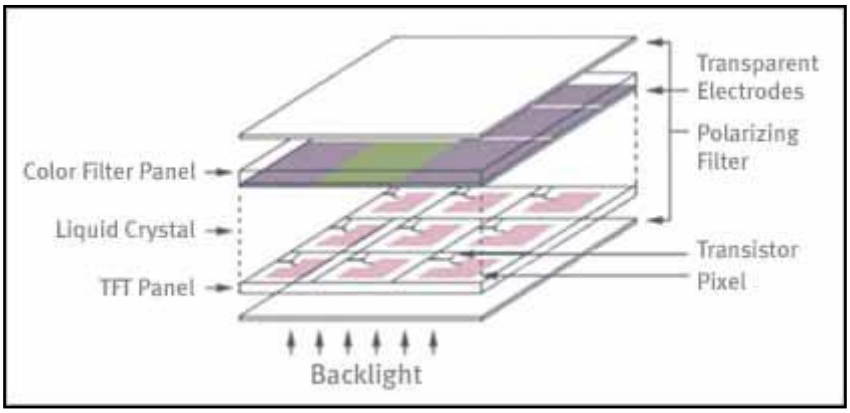
History of TFT LCD

Liquid crystal was discovered by the Austrian botanist Fredreich Rheinizer in 1888. "Liquid crystal" is neither solid nor liquid (an example is soapy water).

In the mid-1960s, scientists showed that liquid crystals when stimulated by an external electrical charge could change the properties of light passing through the crystals.

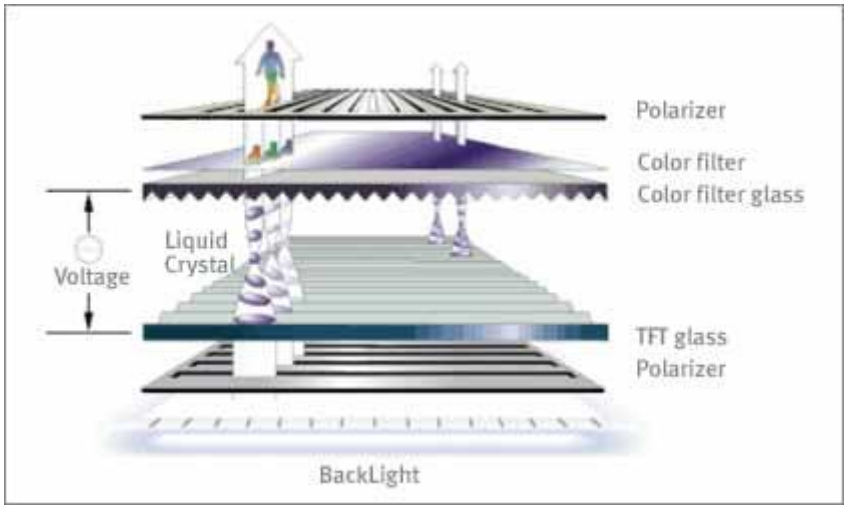
The early prototypes (late 1960s) were too unstable for mass production. But all of that changed when a British researcher proposed a stable, liquid crystal material (biphenyl).

Today's color LCD TVs and LCD Monitors have a sandwich-like structure (see figure below).



What is TFT LCD?

TFT LCD (Thin Film Transistor Liquid Crystal Display) has a sandwich-like structure with liquid crystal filled between two glass plates.



TFT Glass has as many TFTs as the number of pixels displayed, while a Color Filter Glass has color filter which generates color. Liquid crystals move according to the difference in voltage between the Color Filter Glass and the TFT Glass. The amount of light supplied by Back Light is determined by the amount of movement of the liquid crystals in such a way as to generate color.

TFT LCD - Electronic Aspects of LCD TVs and LCD Monitors

Electronic Aspects of AMLCDs

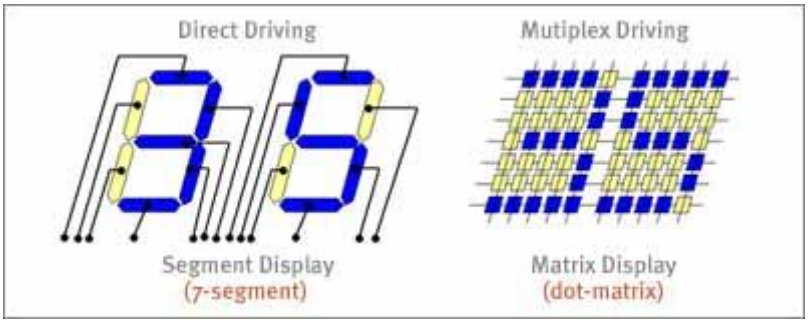
The most common liquid-crystal displays (LCDs) in use today rely on picture elements, or pixels, formed by liquid-crystal (LC) cells that change the polarization direction of light passing through them in response to an electrical voltage.

As the polarization direction changes, more or less of the light is able to pass through a polarizing layer on the face of the display. Change the voltage, and the amount of light is changed.

There are two ways to produce a liquid-crystal image with such cells: the segment driving method and the matrix driving method.
The segment driving method displays characters and pictures with cells defined by patterned electrodes.

The matrix driving method displays characters and pictures in sets of dots.

Direct vs. multiplex driving of LCD TVs.



The segment drive method is used for simple displays, such as those in calculators, while the dot-matrix drive method is used for high-resolution displays, such as those in portable computers and TFT monitors.

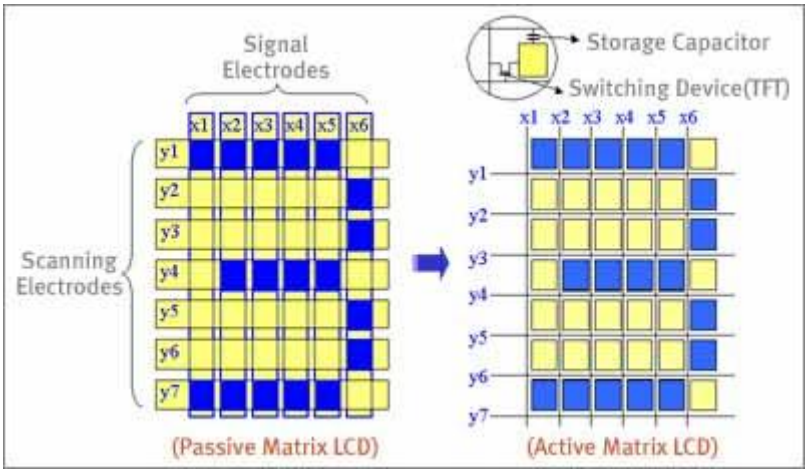
Two types of drive method are used for matrix displays. In the static, or direct, drive method, each pixel is individually wired to a driver. This is a simple driving method, but, as the number of pixels is increased, the wiring becomes very complex. An alternative method is the multiplex drive method, in which the pixels are arranged and wired in a matrix format.

To drive the pixels of a dot-matrix LCD, a voltage can be applied at the intersections of specific vertical signal electrodes and specific horizontal scanning electrodes. This method involves driving several pixels at the same time by time-division in a pulse drive. Therefore, it is also called a multiplex, or dynamic, drive method.

Passive and Active Matrix LCDs

There are two types of dot-matrix LCDs.

Passive-matrix vs. active-matrix driving of LCD Monitors.



In passive-matrix LCDs (PMLCDs) there are no switching devices, and each pixel is addressed for more than one frame time. The effective voltage applied to the LC must average the signal voltage pulses over several frame times, which results in a slow response time of greater than 150 msec and a reduction of the maximum contrast ratio. The addressing of a PMLCD also produces a kind of crosstalk that produces blurred images because non-selected pixels are driven through a secondary signal-voltage path. In active-matrix LCDs (AMLCDs), on the other hand, a switching device and a storage capacitor are integrated at the each cross point of the electrodes.

The active addressing removes the multiplexing limitations by incorporating an active switching element. In contrast to passive-matrix LCDs, AMLCDs have no inherent limitation in the number of scan lines, and they present fewer cross-talk issues. There are many kinds of AMLCD. For their integrated switching devices most use transistors made of deposited thin films, which are therefore called thin-film transistors (TFTs).

The most common semiconducting layer is made of amorphous silicon (a-Si). a-Si TFTs are amenable to large-area fabrication using glass substrates in a low-temperature (300 ℃ to 400 ℃) process.

An alternative TFT technology, polycrystalline silicon - or polysilicon or p-Si-is costly to produce and especially difficult to fabricate when manufacturing large-area displays.

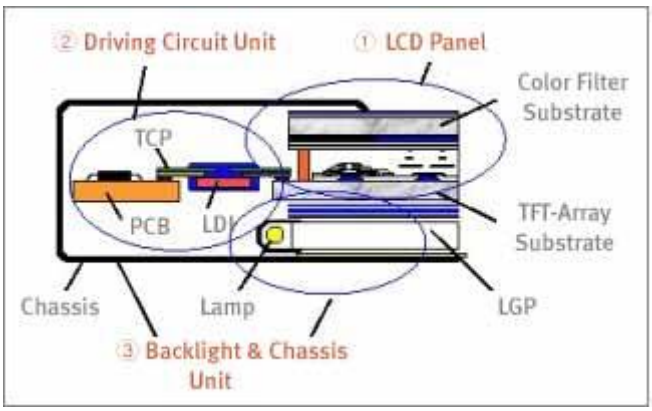
Nearly all TFT LCDs are made from a-Si because of the technology's economy and maturity, but the electron mobility of a p-Si TFT is one or two orders of magnitude greater than that of an a-Si TFT.

This makes the p-Si TFT a good candidate for an TFT array containing integrated drivers, which is likely to be an attractive choice for small, high definition displays such as view finders and projection displays.

Structure of Color TFT LCD TVs and LCD Monitors

A TFT LCD module consists of a TFT panel, driving-circuit unit, backlight system, and assembly unit.

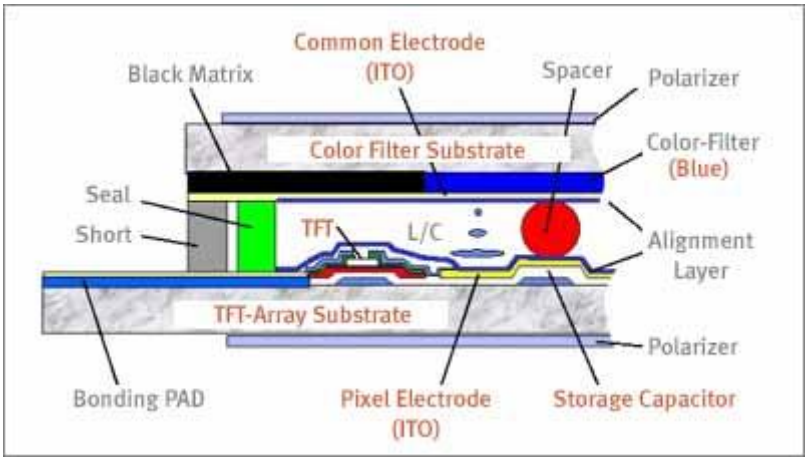
Structure of a color TFT LCD Panel:



1. LCD Panel
   - TFT-Array Substrate
   - Color Filter Substrate
2. Driving Circuit Unit
   - LCD Driver IC (LDI) Chips
   - Multi-layer PCBs
   - Driving Circuits
3. Backlight & Chassis Unit
   - Backlight Unit
   - Chassis Assembly

It is commonly used to display characters and graphic images when connected a host system.
The TFT LCD panel consists of a TFT-array substrate and a color-filter substrate.

The vertical structure of a color TFT LCD panel.

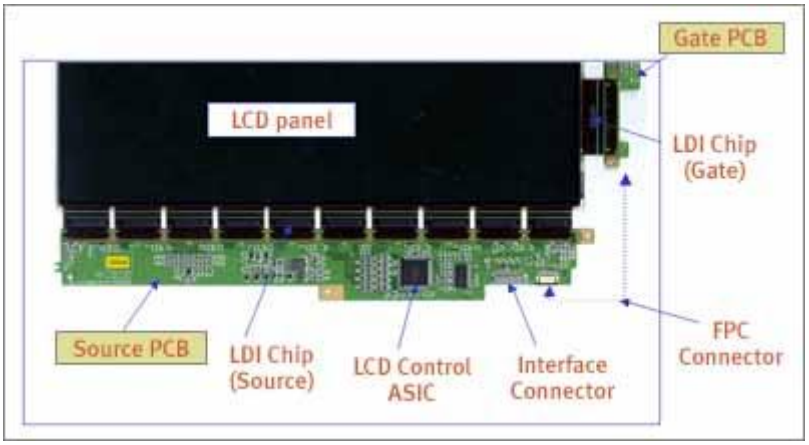


The TFT-array substrate contains the TFTs, storage capacitors, pixel electrodes, and interconnect wiring. The color filter contains the black matrix and resin film containing three primary-color - red, green, and blue - dyes or pigments. The two glass substrates are assembled with a sealant, the gap between them is maintained by spacers, and LC material is injected into the gap between the substrates. Two sheets of polarizer film are attached to the outer faces of the sandwich formed by the glass substrates. A set of bonding pads are fabricated on each end of the gate and data-signal bus-lines to attach LCD Driver IC (LDI) chips

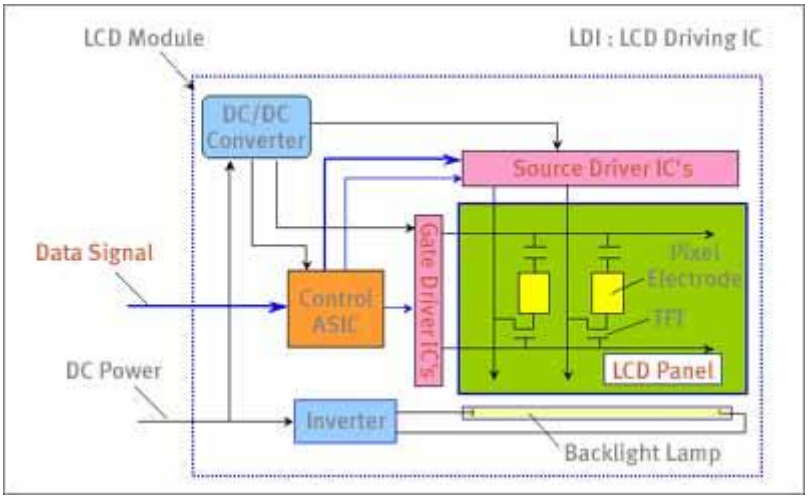
Driving Circuit Unit

Driving an a-Si TFT LCD requires a driving circuit unit consisting of a set of LCD driving IC (LDI) chips and printed-circuit-boards (PCBs).

The assembly of LCD driving circuits.



A block diagram showing the driving of an LCD panel.



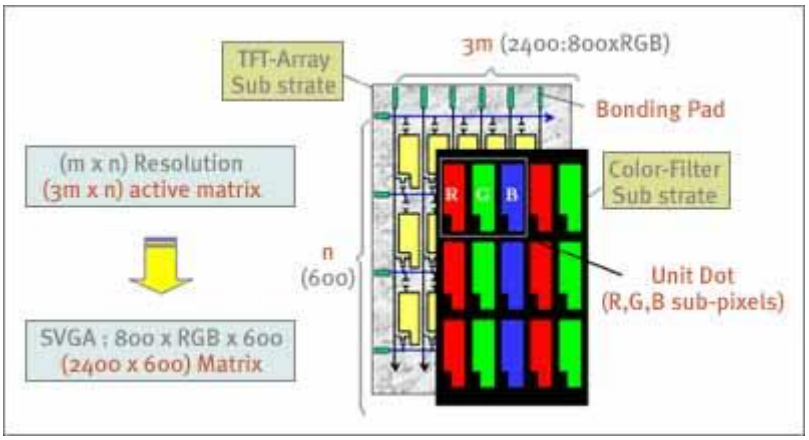
To reduce the footprint of the LCD module, the drive circuit unit can be placed on the backside of the LCD module by using bent Tape Carrier Packages (TCPs) and a tapered light-guide panel (LGP).

How TFT LCD Pixels Work

A TFT LCD panel contains a specific number of unit pixels often called subpixels. Each unit pixel has a TFT, a pixel electrode (IT0), and a storage capacitor (Cs).

For example, an SVGA color TFT LCD panel has total of 800x3x600, or 1,440,000, unit pixels. Each unit pixel is connected to one of the gate bus-lines and one of the data bus-lines in a 3mxn matrix format. The matrix is 2400x600 for SVGA.

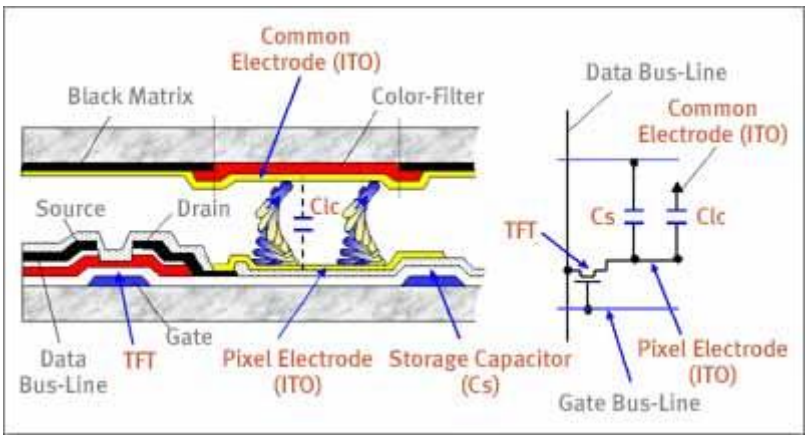
Structure of a color TFT LCD panel.



Because each unit pixel is connected through the matrix, each is individually addressable from the bonding pads at the ends of the rows and columns.
The performance of the TFT LCD is related to the design parameters of the unit pixel, i.e., the channel width W and the channel length L of the TFT, the overlap between TFT electrodes, the sizes of the storage capacitor and pixel electrode, and the space between these elements.
The design parameters associated with the black matrix, the bus-lines, and the routing of the bus lines also set very important performance limits on the LCD.

In a TFT LCD's unit pixel, the liquid crystal layer on the ITO pixel electrode forms a capacitor whose counter electrode is the common electrode on the color-filter substrate.

Vertical structure of a unit pixel and its equivalent circuit



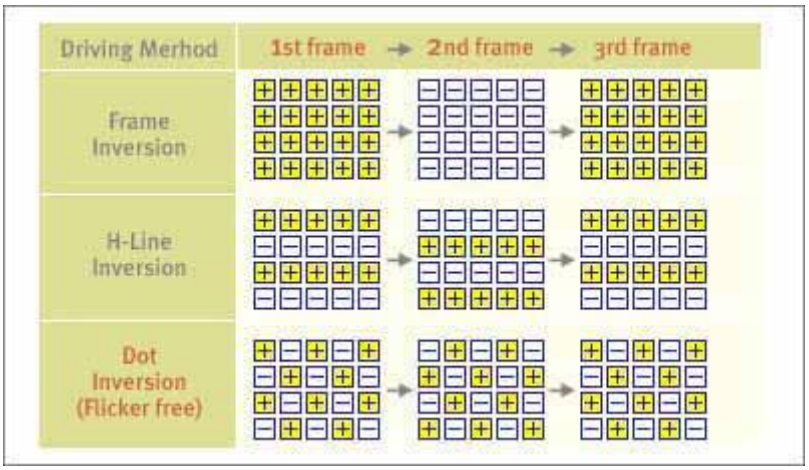
A storage capacitor (Cs) and liquid-crystal capacitor (CLC) are connected as a load on the TFT. Applying a positive pulse of about 20V peak-to-peak to a gate electrode through a gate bus-line turns the TFT on. Clc and Cs are charged and the voltage level on the pixel electrode rises to the signal voltage level (+8 V) applied to the data bus-line.

The voltage on the pixel electrode is subjected to a level shift of DV resulting from a parasitic capacitance between the gate and drain electrodes when the gate voltage turns from the ON to OFF state. After the level shift, this charged state can be maintained as the gate voltage goes to -5 V, at which time the TFT turns off. The main function of the Cs is to maintain the voltage on the pixel electrode until the next signal voltage is applied.

Liquid crystal must be driven with an alternating current to prevent any deterioration of image quality resulting from dc stress.
This is usually implemented with a frame-reversal drive method, in which the

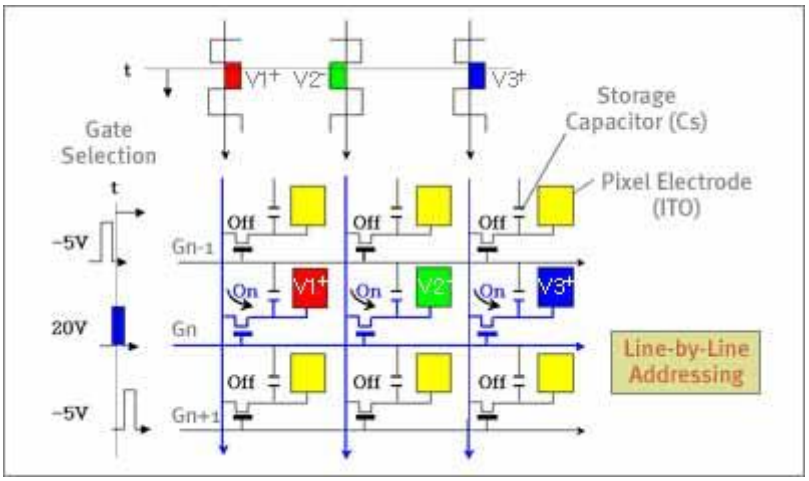
voltage applied to each pixel varies from frame to frame. If the LC voltage changes unevenly between frames, the result would be a 30-Hz flicker. (One frame period is normally 1/60 of a second.) Other drive methods are available that prevent this flicker problem.

Polarity-inversion driving methods.



In an active-matrix panel, the gate and source electrodes are used on a shared basis, but each unit pixel is individually addressable by selecting the appropriate two contact pads at the ends of the rows and columns.

Active addressing of a 3x3 matrix



By scanning the gate bus-lines sequentially, and by applying signal voltages to all source bus-lines in a specified sequence, we can address all pixels. One result of all this is that the addressing of an AMLCD is done line by line.

Virtually all AMLCDs are designed to produce gray levels - intermediate brightness levels between the brightest white and the darkest black a unit pixel

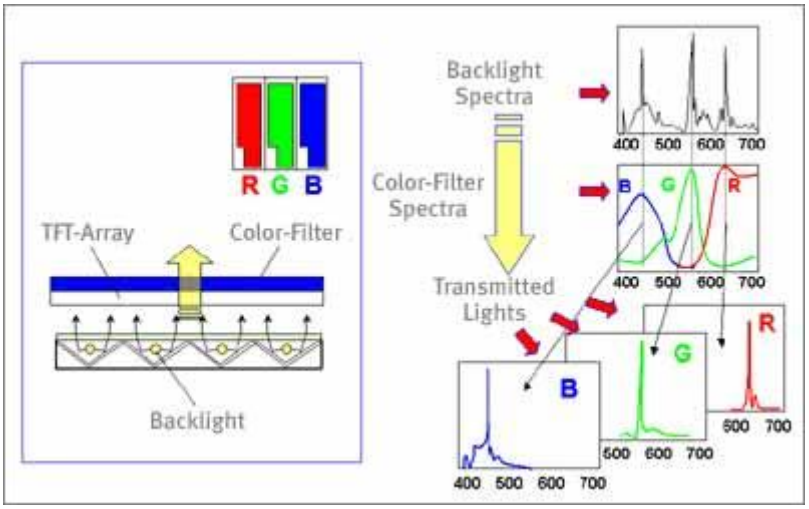
can generate. There can be either a discrete numbers of levels - such as 8, 16, 64, or 256 - or a continuous gradation of levels, depending on the LDI.

The optical transmittance of a TN-mode LC changes continuously as a function of the applied voltage.
An analog LDI is capable of producing a continuous voltage signal so that a continuous range of gray levels can be displayed.
The digital LDI produces discrete voltage amplitudes, which permits on a discrete numbers of shades to be displayed. The number of gray levels is determined by the number of data bits produced by the digital driver.

Generating Colors

The color filter of a TFT LCD TV consists of three primary colors - red (R), green (G), and blue (B) - which are included on the color-filter substrate.

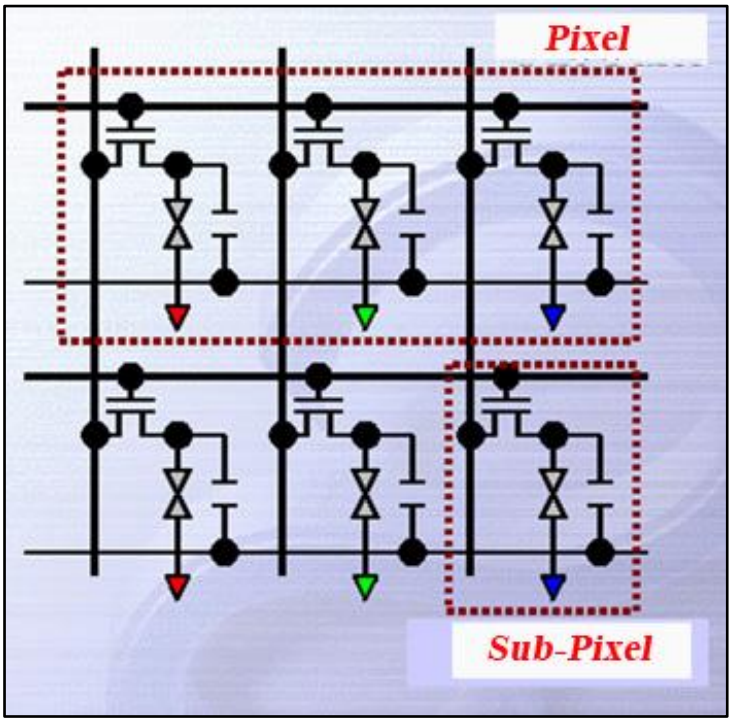
How an LCD Panel produces colors.



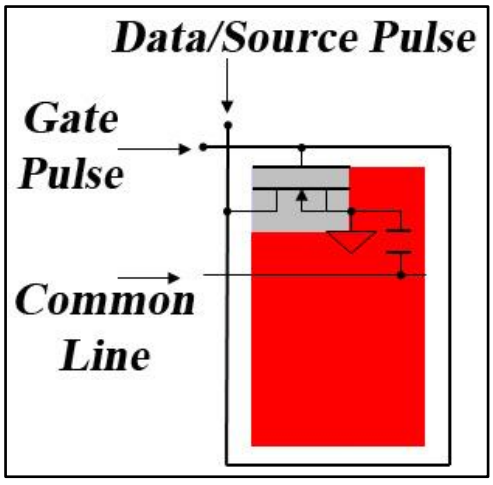
The elements of this color filter line up one-to-one with the unit pixels on the TFT-array substrate.
Each pixel in a color LCD is subdivided into three subpixels, where one set of RGB subpixels is equal to one pixel.
(Each subpixel consists of what we've been calling a unit pixel up to this point.)

Because the subpixels are too small to distinguish independently, the RGB elements appear to the human eye as a mixture of the three colors.
Any color, with some qualifications, can be produced by mixing these three primary colors. The total number of display colors using an n-bit LDI is given by 23n, because each subpixel can generate 2n different transmittance levels..

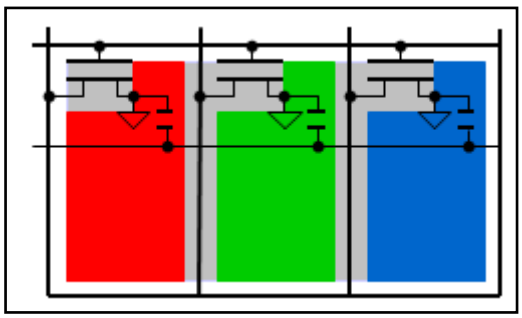
The TFT LCD Pixel

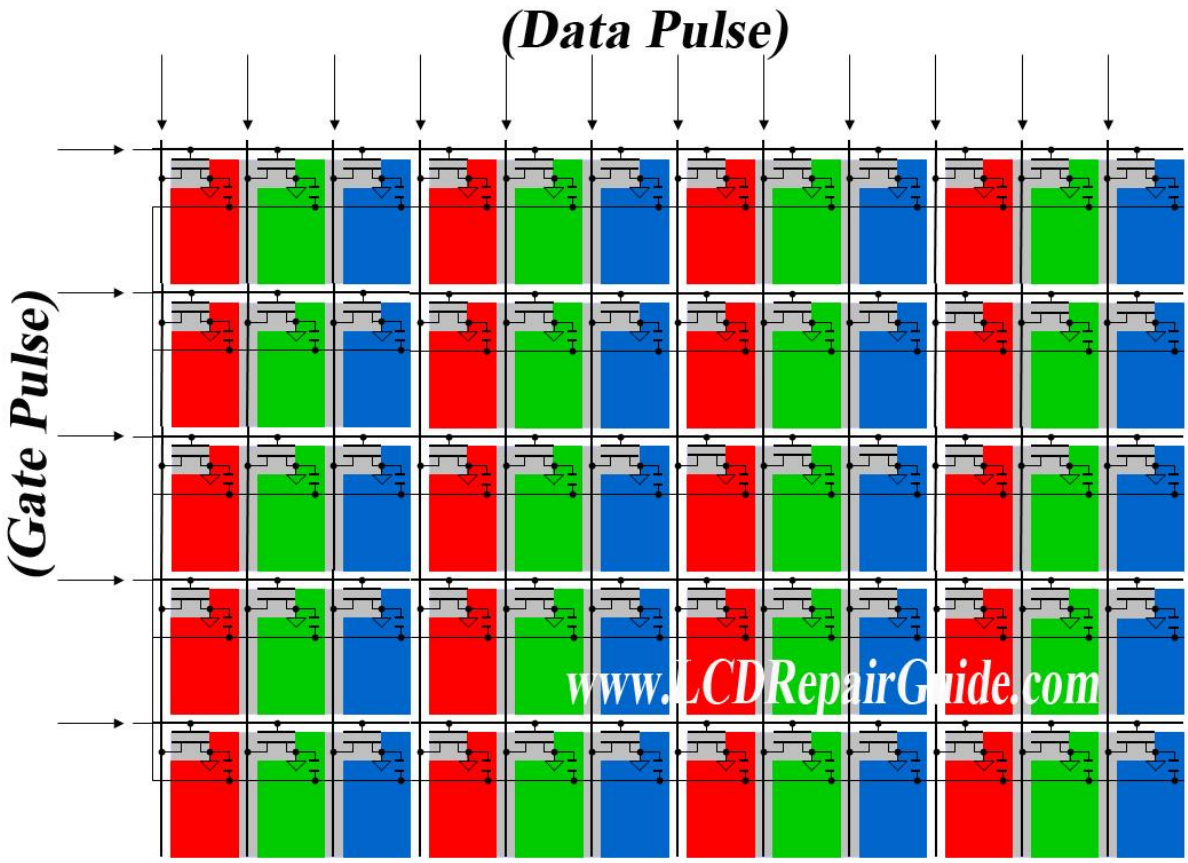


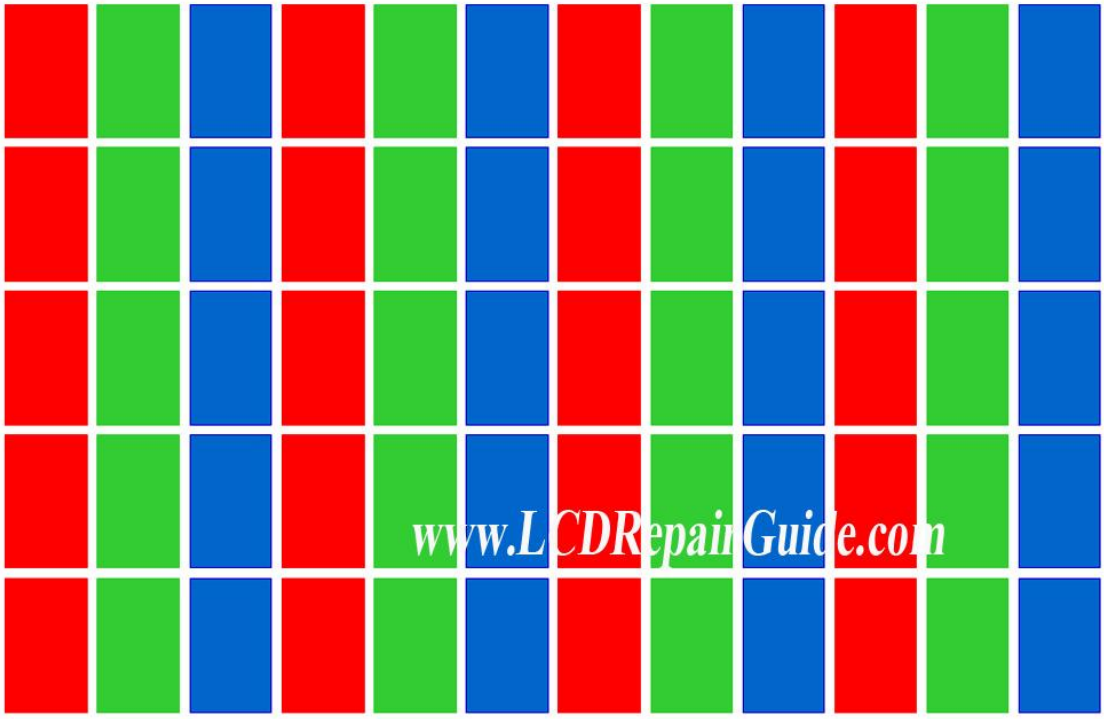
A Sub-Pixel:



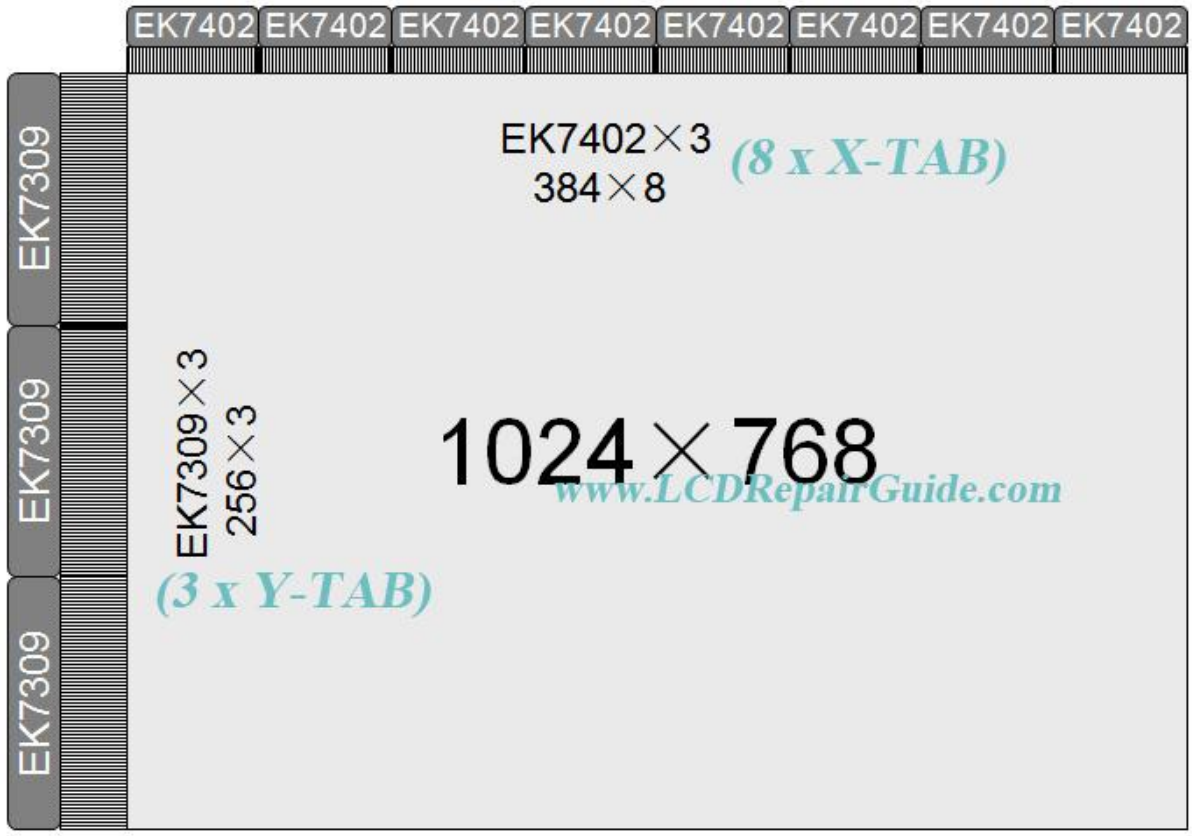
A Pixel (Dot):

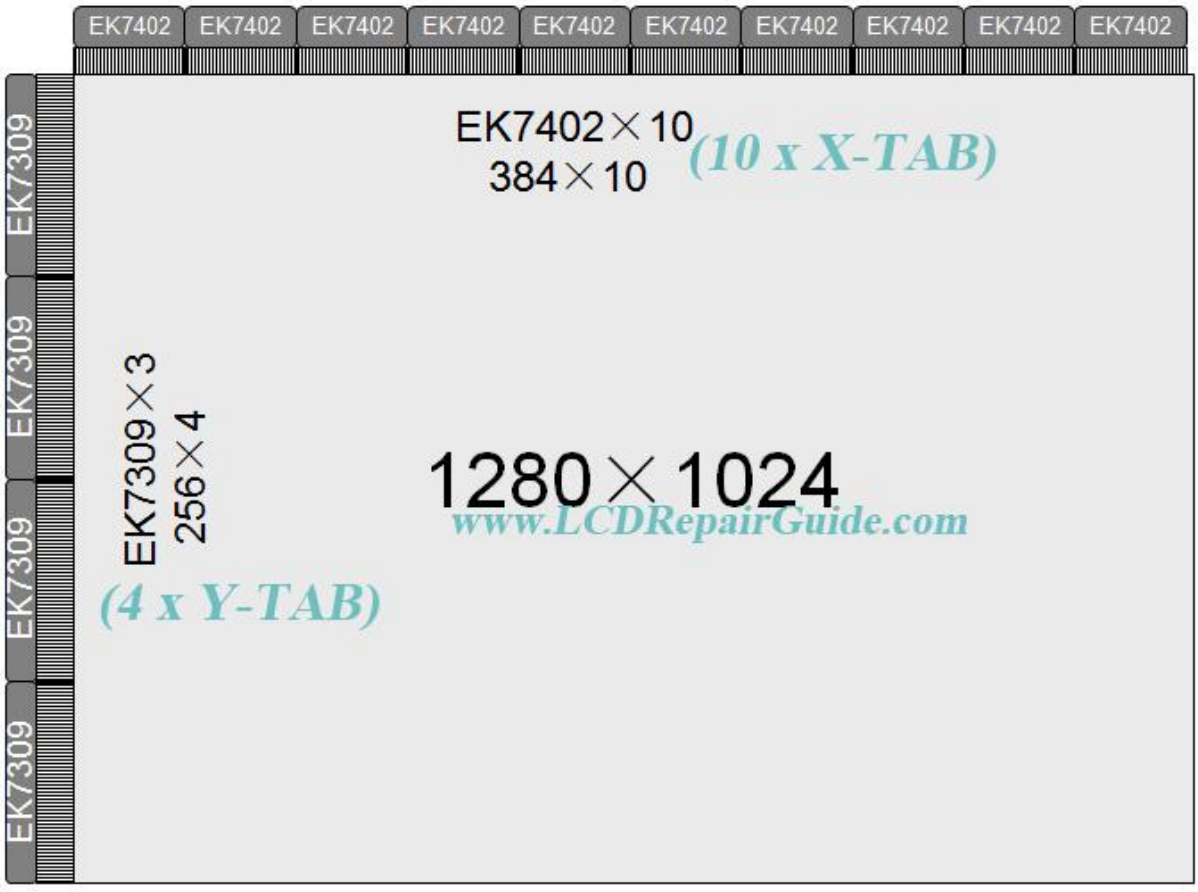




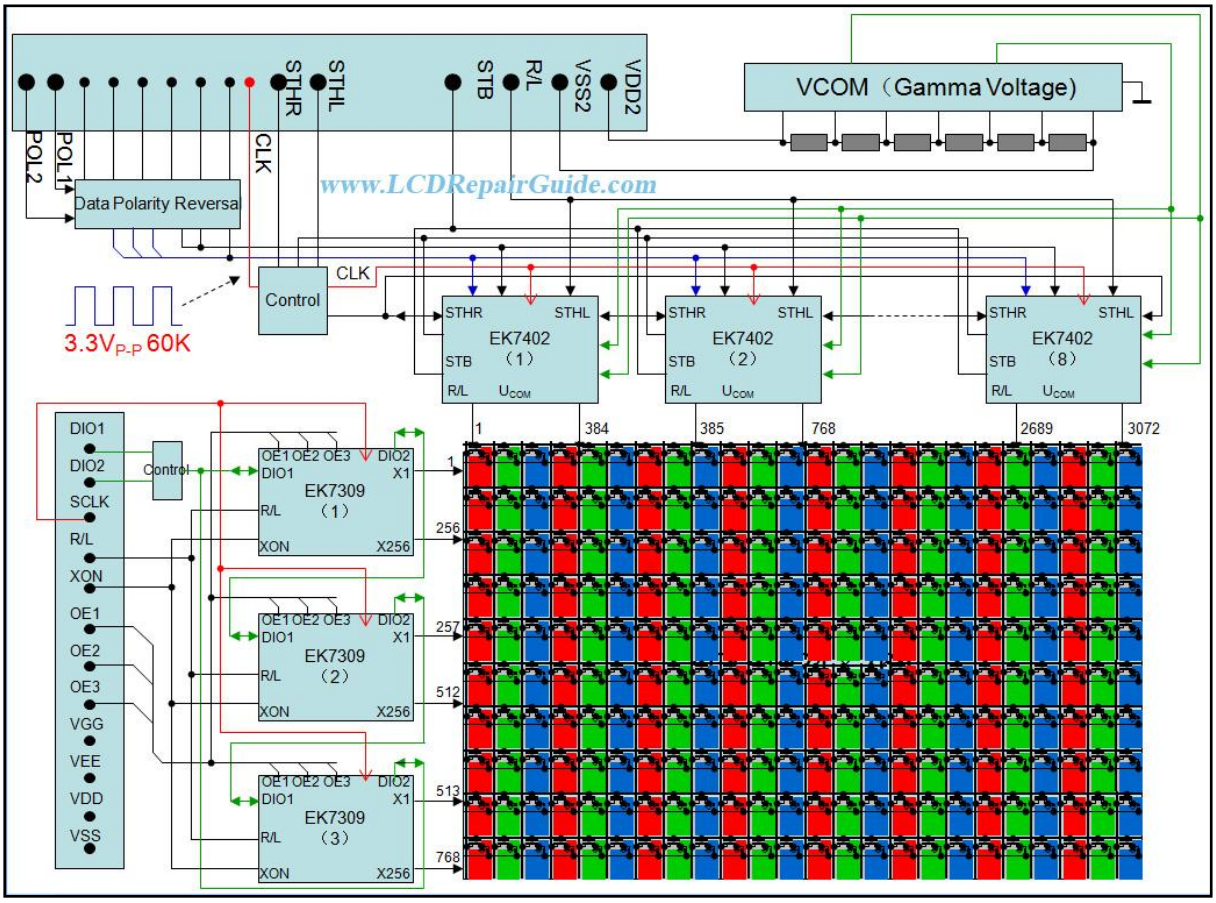


The Resolution of an LCD Panel with TAB/COF





A Block Diagram of Driving an LCD Panel

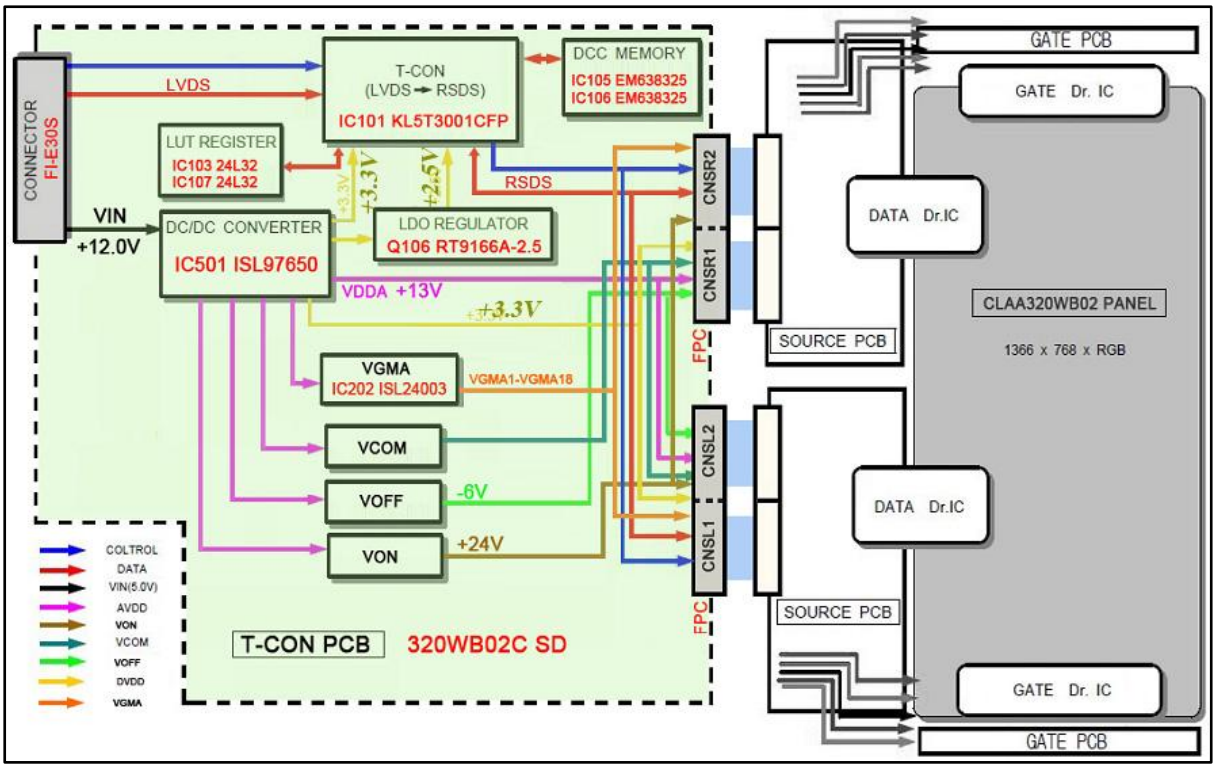


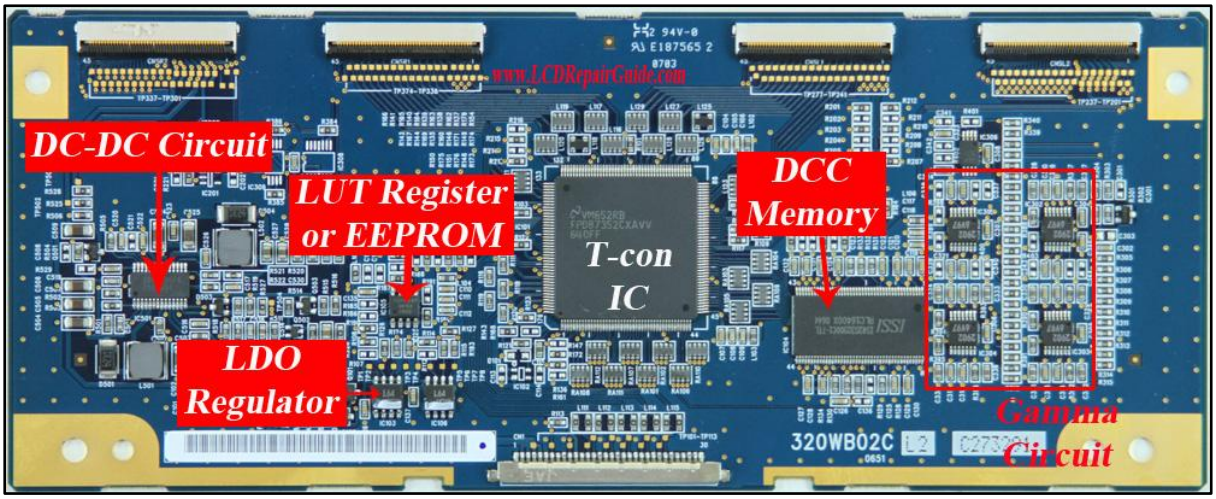
Gate Driver Signals & Supply Lines:

DIO1, DIO2, SCLK, R/L, XON, OE1, OE2, OE3, VGG, VEE, VDD, VSS.

(This Gate Drive Signals & Supply lines information is use for the LCD Panel Cut Off Modification use)

How a CPT CLAA320WB02 LCD Panel Work





Terminology of the T-con Board and LCD Panel

No.	Marking Code	Description	Remark (Typically)
1.	VON, VGH, VGON, VDDG	Gate-On Supply. VON is the positive supply voltage for the CKV_, CKVB_, and STVP high-voltage driver outputs. Bypass to GND with a minimum 1uF ceramic capacitor. This VGH ($V_{Gate\ High}$) voltage was generated by DC-DC circuits. And their voltage is about 20V ~30V but it will depends on the T-con board design. The feature of VGH voltage is to supply to the Gate Driver Board as a "Switch ON" feature. It can switch on the TFT cells in LCD Panel and display shows.	20V~ 30V
2.	VOFF, VGL, VGOFF, VEEG	Gate-Off Supply. VOFF is the negative supply voltage for the CKV_, CKVB_, and STVP high-voltage driver outputs. Bypass to GND with a minimum 1uF ceramic capacitor. The VGL ($V_{GateLow}$) voltage was generated by the DC-DC section too. Some T-con board will use a higher voltage as -15V or a lower voltage as -1V. So it will depend on the T-con design and it's not much on the market. Typically is -5V~ -7V. This negative voltage is supply to Gate Driver Board. The VGL voltage is as "Switch Off" feature. When VGL negative voltage is supply, the VGH voltage on TFT cells will "Clear" by VGL voltage, so that the next data can shows on that TFT cells.	-5V~ -8V
3.	VDD, Vlogic, Vddd, Dvdd	Supply Input. VDD is the logic supply input for the scan driver. Bypass to GND through a minimum 0.1uF capacitor. This VDD voltage is output from the DC-DC IC or using an external Voltage Regulator IC to generate. It is 3.3V and other voltages like 2.5V (VDD25) and 1.8V (VDD18) was using the VDD 3.3V voltage to convert. After VDD voltage generate it is supply to Timing Control section, Source Driver Board and Gate Driver Board.	3.3V
4.	VDA, Avdd, Vdda, Vsource	This VDA voltage is about 14V ~20V and it will depends on their T-con board design. The VDA voltage is generated by DC-DC Converter circuits. It is use to supply to the GAMMA circuits and reaching to the Source Driver Board	13V~ 20V

5.	AGND	Ground	
6.	BGND	Amplifier Ground	
7.	GND	Ground/ Logic Ground	
8.	PGND	Power Ground. Source connection of the internal step-up regulator power switch.	
9.	STV	Vertical Sync Input. The rising edge of STV begins a frame of data. The STV input is used to generate the high-voltage STVP output.	
10.	STVP	High-Voltage Scan-Drive Output. STVP is connected to VOFF when STV is low and is connected to VON when STV is high and CPV1 is low. When both STV and CPV1 are high, STVP is high impedance.	
11.	CPV1	CPV (Clock Pulse Vertical) -Vertical Clock Pulse Input. CPV1 controls the timing of the CKV1 and CKVB1 outputs, which change state (by first sharing charge) on its falling edge.	
12.	CPV2	Vertical Clock Pulse Input. CPV2 controls the timing of the CKV2 and CKVB2 outputs, which change state (by first sharing charge) on its falling edge.	
13.	CPV3	Vertical Clock Pulse Input. CPV3 controls the timing of the CKV3 and CKVB3 outputs, which change state (by first sharing charge) on its falling edge.	
14.	CKV1	CKV(Clock Signal)- High-Voltage Scan-Drive Output. When enabled, CKV1 toggles between its high state (connected to VON) and its low state (connected to VOFF) on each falling edge of the CPV1 input. Further, CKV1 is high impedance whenever CPV1 and STV are both low.	
15.	CKV2	High-Voltage Scan-Drive Output. When enabled, CKV2 toggles between its high state (connected to VON) and its low state (connected to VOFF) on each falling edge of the CPV2 input. Further, CKV2 is high impedance whenever CPV2 and STV are both low.	
16.	CKV3	High-Voltage Scan-Drive Output. When enabled, CKV3 toggles between its high state (connected to VON) and its low state (connected to VOFF) on each falling edge of the CPV3 input. Further, CKV3 is high impedance whenever CPV3 and STV are both low.	

17.	CKVB1	CKVB (Inverted Clock Signal)- High-Voltage Scan-Drive Output. CKVB1 is the inverse of CKV1 during active states and is high impedance whenever CKV1 is high impedance.	
18.	CKVB2	High-Voltage Scan-Drive Output. CKVB2 is the inverse of CKV2 during active states and is high impedance whenever CKV2 is high impedance.	
19.	CKVB3	High-Voltage Scan-Drive Output. CKVB3 is the inverse of CKV3 during active states and is high impedance whenever CKV3 is high impedance.	
20.	CKVCS1	CKV1 Charge Sharing Connection. CKVCS1 connects to CKVBCS1 whenever CPV1 and STV are both low (to make CKV1 and CKVB1 high impedance) to allow CKVB1 to connect to CKV1, sharing charge between the capacitive loads on these two outputs.	
21.	CKVCS2	CKV2 Charge-Sharing Connection. CKVCS2 connects to CKVBCS2 whenever CPV2 and STV are both low (to make CKV2 and CKVB2 high impedance) to allow CKVB2 to connect to CKV2, sharing charge between the capacitive loads on these two outputs.	
22.	CKVCS3	CKV3 Charge-Sharing Connection. CKVCS3 connects to CKVBCS3 whenever CPV3 and STV are both low (to make CKV3 and CKVB3 high impedance) to allow CKVB3 to connect to CKV3, sharing charge between the capacitive loads on these two outputs.	
23.	CKVBCS1	CKVB1 Charge-Sharing Connection. CKVBCS1 connects to CKVCS1 whenever CPV1 and STV are both low (to make CKV1 and CKVB1 high impedance) to allow CKV1 to connect to CKVB1, sharing charge between the capacitive loads on these two outputs.	
24.	CKVBCS2	CKVB2 Charge-Sharing Connection. CKVBCS2 connects to CKVCS2 whenever CPV2 and STV are both low (to make CKV2 and CKVB2 high impedance) to allow CKV2 to connect to CKVB2, sharing charge between the capacitive loads on these two outputs.	
25.	CKVBCS3	CKVB3 Charge-Sharing Connection. CKVBCS3 connects to CKVCS3 whenever CPV3 and STV are both low (to make CKV3 and CKVB3 high impedance) to allow CKV3 to connect to CKVB3, sharing charge between the capacitive loads on these two outputs.	
26.	BOOST	Operational Amplifier Supply Input. Connect to VMAIN (Figure 2) and bypass to BGND with a 1µF or greater ceramic capacitor.	

27.	COMP	Compensation Input for Error Amplifier. Connect a series RC from COMP to AGND. Typical values are 180k and 470pF.	
28.	DISH	VOFF Discharge Connection. Pulling DISH below ground activates an internal connection between VOFF and GND, rapidly discharging the VOFF supply. Typically, DISH is capacitively connected to VDD, so that when VDD falls, VOFF is discharged.	
29.	DLY	Startup Delay Setting. Connect a capacitor to adjust the delay.	
30.	EN	Enables the Scan IC. Drive EN high to start up the Scan IC after a delay time, which is set by a capacitor at DLY.	
31.	FB	Feedback Input. Reference voltage is 1.24V nominal. Connect external resistor-divider midpoint here and minimize trace area. Set VOUT according to: VOUT = 1.24V (1 + R1/R2).	
32.	GOFF	Gate-Off Supply. GOFF is the negative supply voltage for the CKV_, CKVB_, and STVP_ high-voltage driver outputs. Bypass to AGND with a minimum of 1µF ceramic capacitor.	
33.	GON	Gate-On Supply. GON is the positive supply voltage for the CKV_, CKVB_, and STVP_ high-voltage driver outputs. Bypass to AGND with a minimum of 1µF ceramic capacitor.	
34.	IN	Step-Up Regulator Supply Input. Bypass IN to AGND (pin 34) with a 1µF or greater ceramic capacitor.	
35.	LX	Switching Node. Connect inductor/catch diode here and minimize trace area for lowest EMI.	
36.	NEG	Operational Amplifier Inverting Input	
37.	OE	Active-High Gate-Pulse Output Enable. CKV_ and CKVB_ leave the floating charge-sharing state on the rising edge of OE.	
38.	OECON	Active-Low Output-Enable Timing Input. OECON is driven by an RC-filtered version of the OE input signal. If OE remains high long enough for the resistor to charge the capacitor up to the OECON threshold, the OE signal is masked until OE goes low and the capacitor is discharged below the threshold through the resistor.	

39.	OUT	Adjustable Sink-Current Output. OUT connects to the resistive voltage-divider at the op amp input POS (between BOOST and GND) that determines the VCOM output voltage. IOUT lowers the divider voltage by a programmable amount.	
40.	POS	Operational Amplifier Non-inverting Input	
41.	SET	Full-Scale, Sink-Current Adjustment Input. Connect a resistor, RSET, from SET to GND to set the full scale adjustable sink current that is VBOOST / (20 x RSET). IOUT is equal to the current through RSET.	
42.	VCOM	Operational Amplifier Output	
43.	VL	3.3V On-Chip Regulator Output. This regulator powers internal analog circuitry for the step-up regulator, op amp, and VCOM calibrator. External loads up to 10mA can be powered. Bypass VL to GND with a 0.22µF or greater ceramic capacitor.	
44.	WPN	Active-Low, Write-Protect Input. When WPN is low, I2C commands are ignored and the VCOM calibrator settings cannot be modified.	
45.	WPP	Write-Protect Output. WPP is the inverse of WPN. It can be used to control active-high, write-protect inputs on other devices.	
46.	XAO	In order to solve the problem of image-retention effect of TFT-LCD, the technique of XAO function (power off control) is mostly used at present. XAO function means that XAO is set to low level when the display is turned off. For example, the logic low level is set to 0˜3.3 v, and thus all outputs of the gate driver will be shifted to high level at the same time and all TFT will be turned on. The charge stored on the CS can thus be discharged and the image-retention effect can be eliminated. However, the common method of using XAO function is to send XAO signal into logic control circuit and to convert low level to high level output through level shifter. After the display is turned off, much charge on the capacitor will be discharged since the voltage of power supply is maintained only by the capacitor and all TFT at low level will function at the same time. Therefore, when the pulse of XAO reaches, the gate voltage of all TFT are all shifted to VGH, and thus a large current is produced at the moment in which the gate of TFT on gate driver circuit is activated. This large current may cause the trace on gate driver circuit to burn. Furthermore, VDD voltage will also decrease rapidly and thus causes the conversion of the level shifter to fail and the XAO function to lose efficacy.	

47.	GSC	Gate Shift Clock- Two clock signals GSC of a gate driver IC occur in a horizontal synchronous interval, and a GSC gate pulse is generated with each clock signal GSC of the gate driver IC. The gate start pulse has to occur so as to operate the gates	
48.	GOE	Gate Operation Enable- A timing controller supplying a gate operation enable (GOE) signal to the gate driver. a reset circuit supplying a reset signal to the timing controller, the reset signal enabling the GOE signal; and a filtering circuit connected to the reset circuit, the filtering circuit permitting a GOE mask time of the GOE signal to be longer than about 16 msec and reducing an impulse of the clock signal.	
49.	GSP	Gate Start Pulse	
50.	POL	Polarity Reverse	
51.	SSC	Source Sampling Clock	
52.	SOE	Source Output Enable	
53.	SSP	Source Start Pulse	

Typical Waveform of Gate Driver Control Signals

These signals waveform is a refer purpose only. Because with different design and manufacture it will has different result of waveforms.

(A)

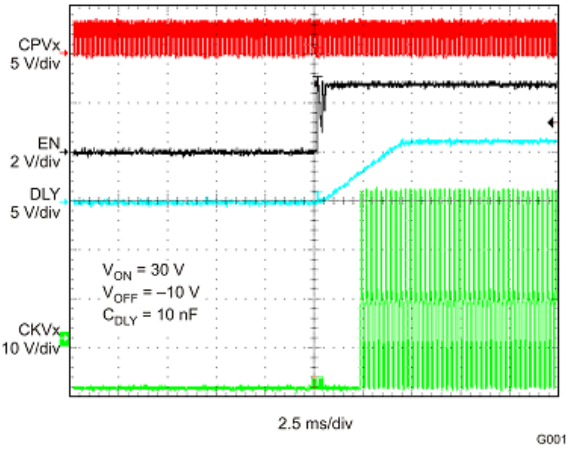


Figure 4. Start-Up Sequence CKVx, EN = HIGH After UVLO

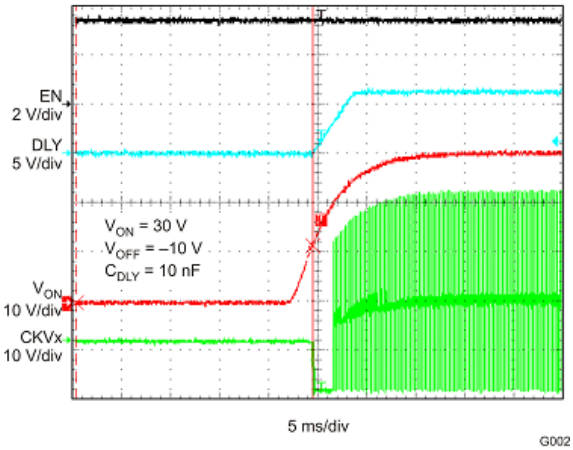


Figure 5. Start-Up Sequence CKVx, EN = HIGH Before UVLO

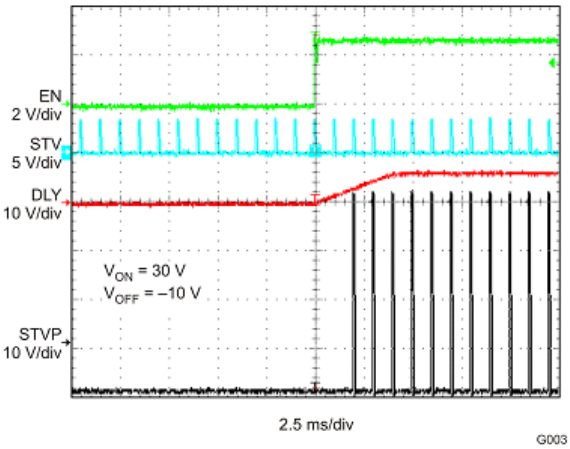


Figure 6. Start-Up Sequence STVP, EN = HIGH After UVLO

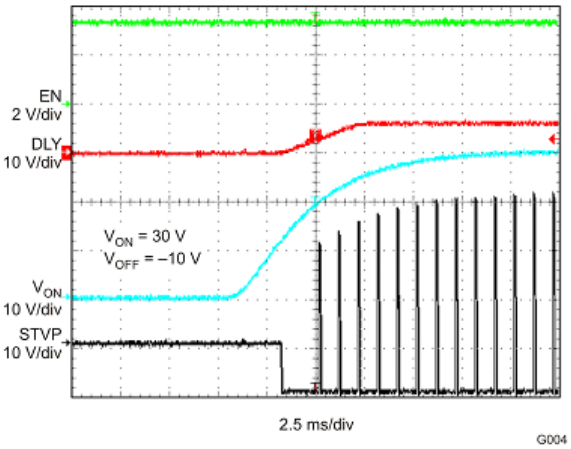


Figure 7. Start-Up Sequence STVP, EN = HIGH After UVLO

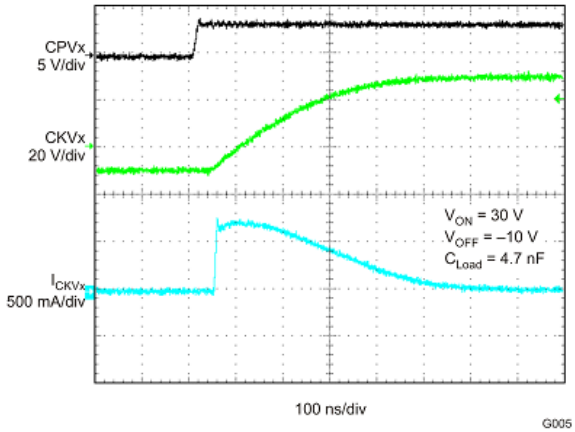


Figure 8. Rise Time / Propagation Delay of CKVx, STV = HIGH

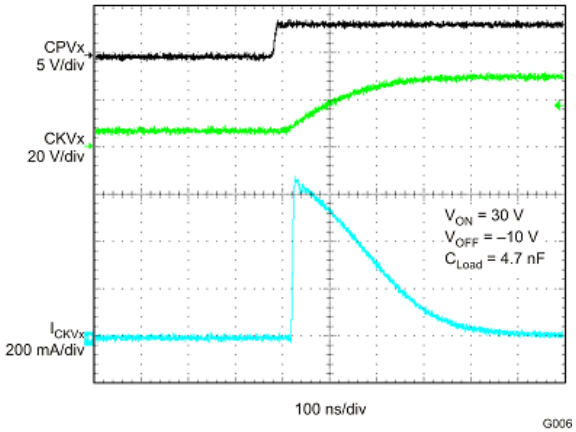


Figure 9. Rise Time / Propagation Delay of CKVx, STV = LOW

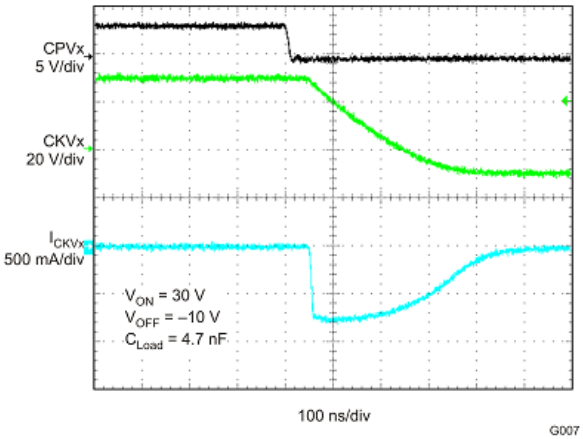


Figure 10. Fall Time / Propagation Delay of CKVx, STV = HIGH

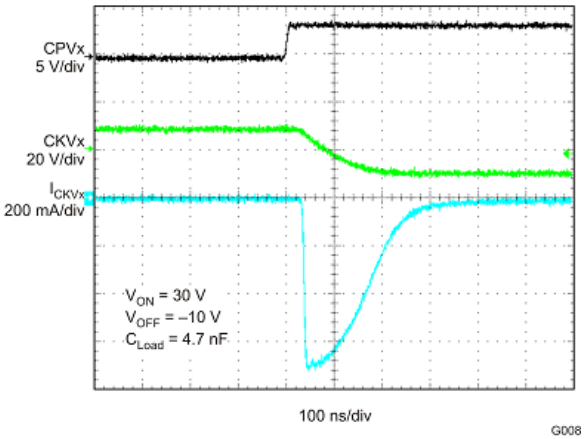


Figure 11. Fall Time / Propagation Delay of CKVx, STV = LOW

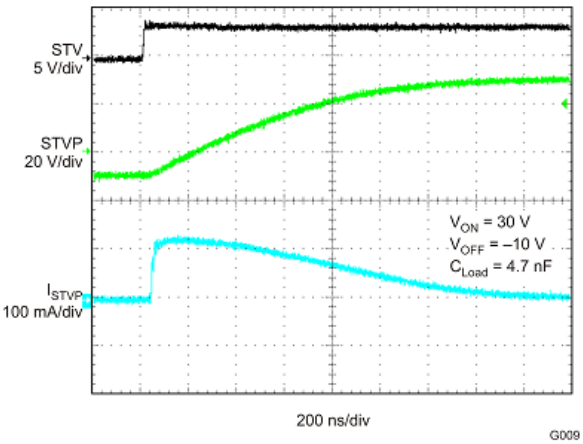


Figure 12. Rise Time / Propagation Delay of STVP, CPV1 = LOW

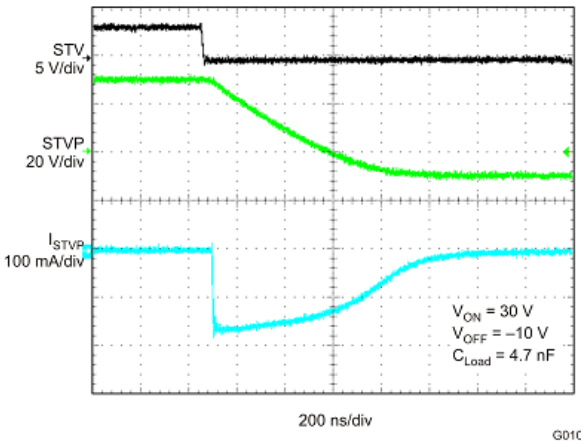


Figure 13. Fall Time / Propagation Delay of STVP, CPV1 = LOW

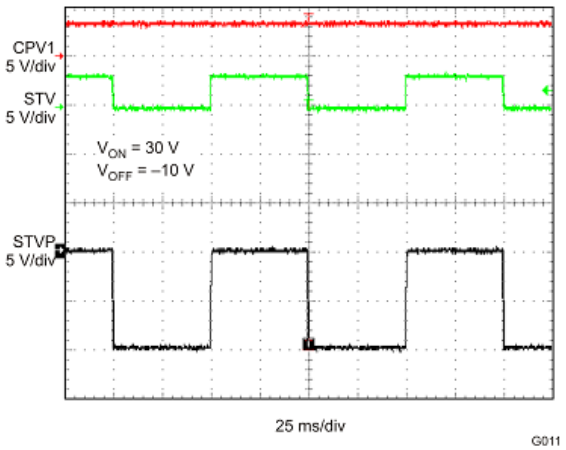


Figure 14. STVP Output, CPV1 = HIGH

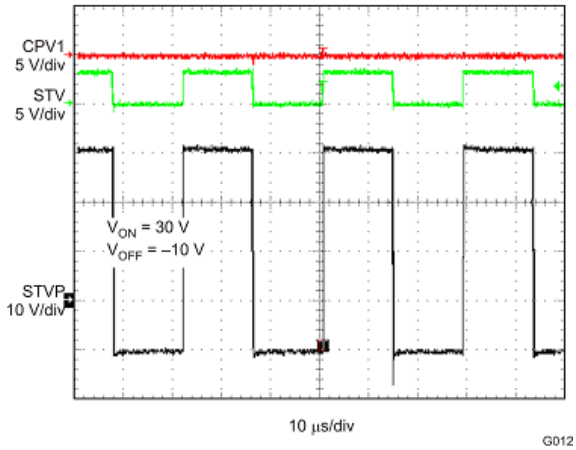


Figure 15. STVP Output, CPV1 = LOW

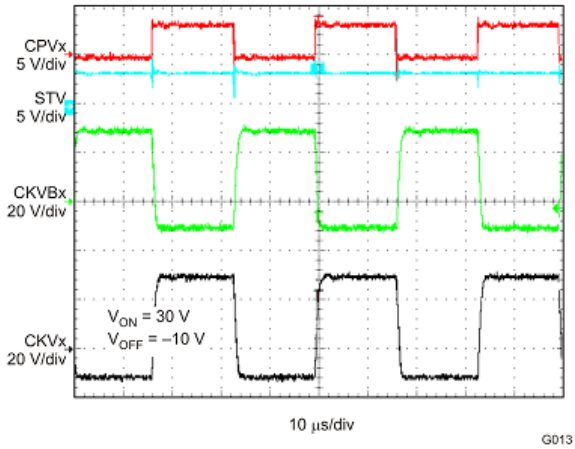


Figure 16. CKVx, CKVBx Outputs, STV = HIGH

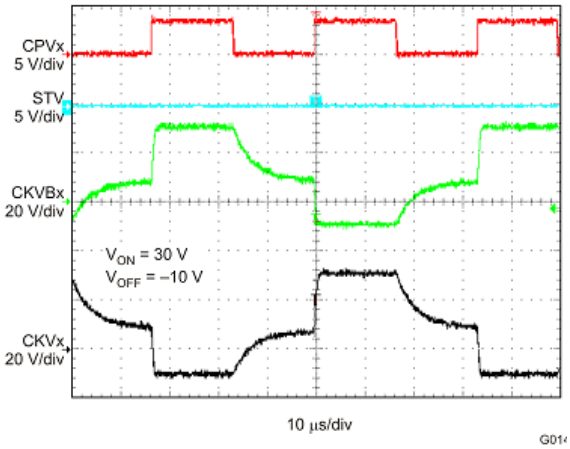
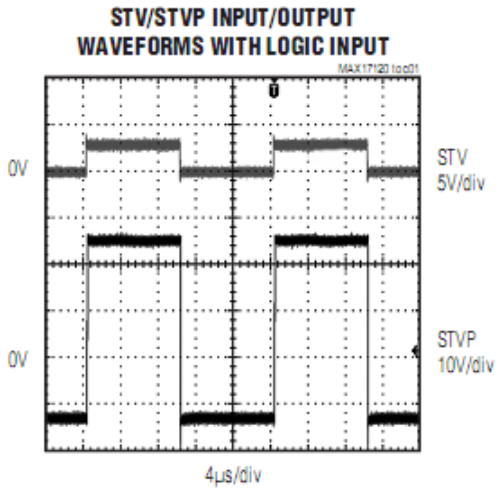
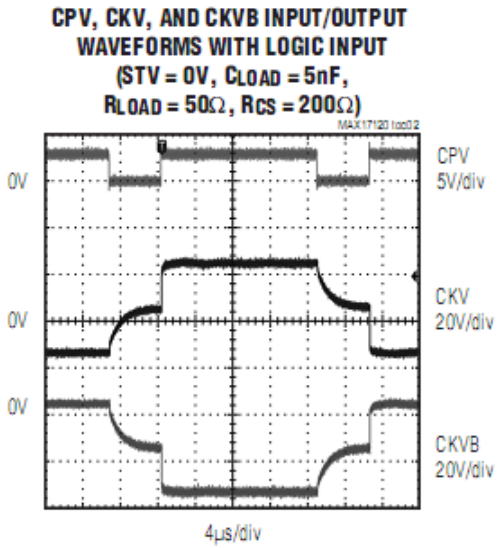


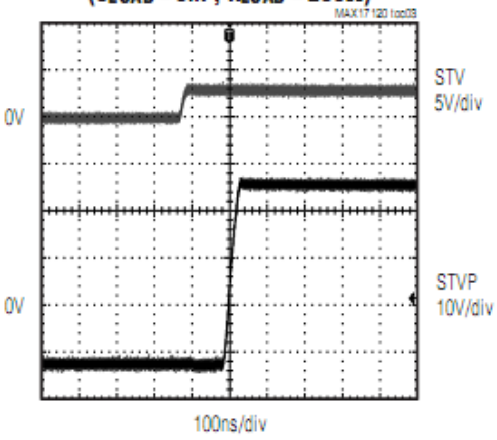
Figure 17. CKVx, CKVBx Outputs, STV = LOW

(B)

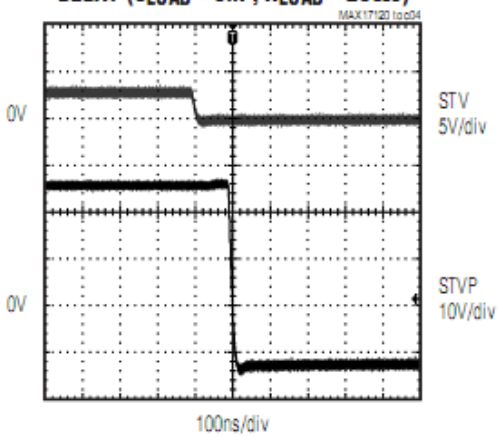




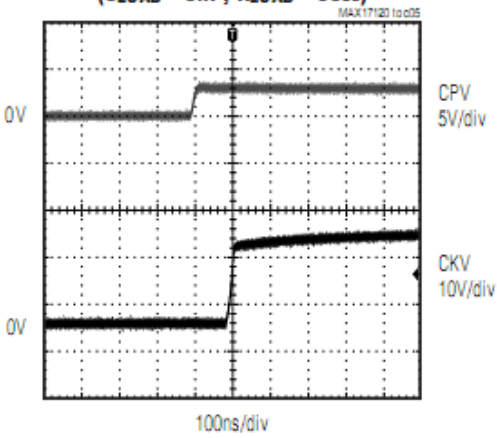
STV RISING EDGE PROPAGATION DELAY (C_{LOAD} = 5nF, R_{LOAD} = 200Ω)



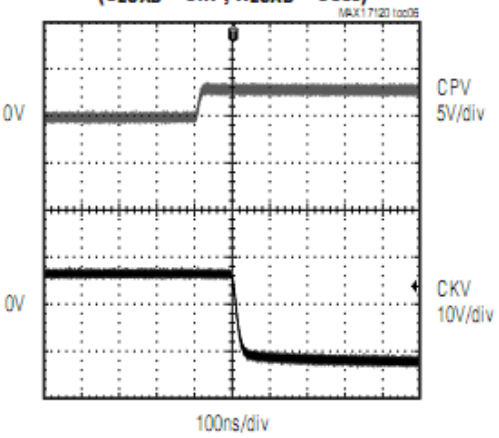
STV FALLING EDGE PROPAGATION DELAY (C_{LOAD} = 5nF, R_{LOAD} = 200Ω)



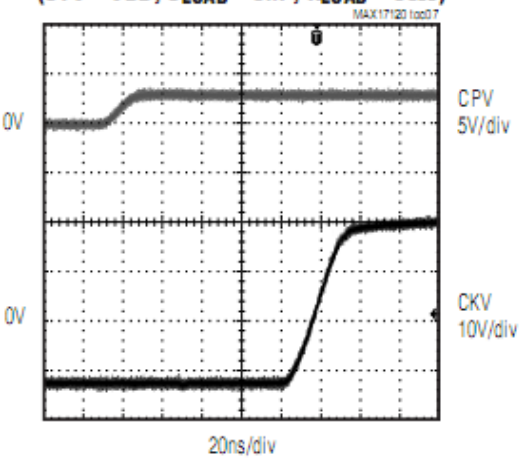
CPV/CKV RISING EDGE PROPAGATION DELAY (C_{LOAD} = 5nF, R_{LOAD} = 50Ω)



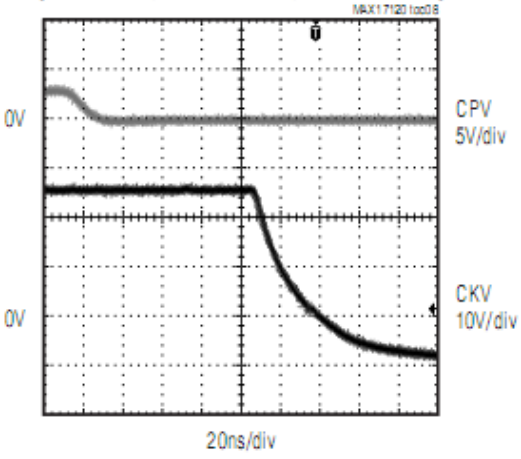
CPV/CKV FALLING EDGE PROPAGATION DELAY (C_{LOAD} = 5nF, R_{LOAD} = 50Ω)



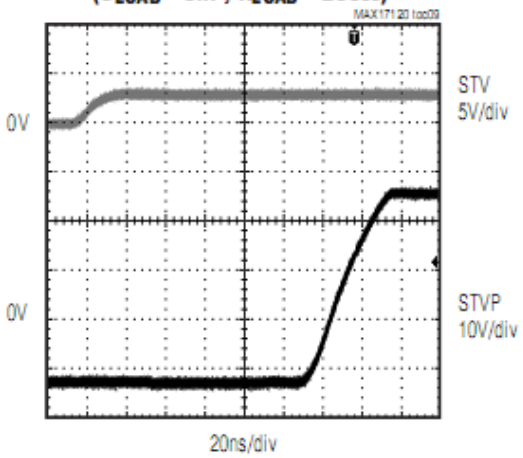
CKV SLEW RATE ON RISING EDGE (STV = VDD, C_{LOAD} = 5nF, R_{LOAD} = 50Ω)



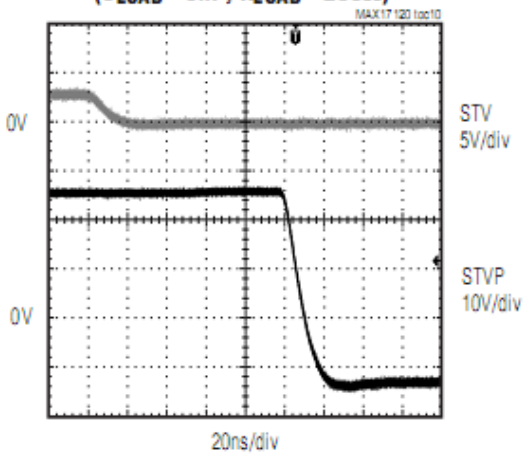
CKV SLEW RATE ON FALLING EDGE (STV = VDD, C_{LOAD} = 5nF, R_{LOAD} = 50Ω)



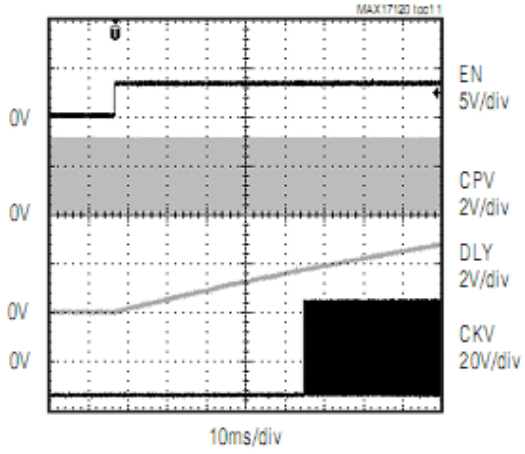
STVP SLEW RATE ON RISING EDGE
(C_{LOAD} = 5nF, R_{LOAD} = 200Ω)



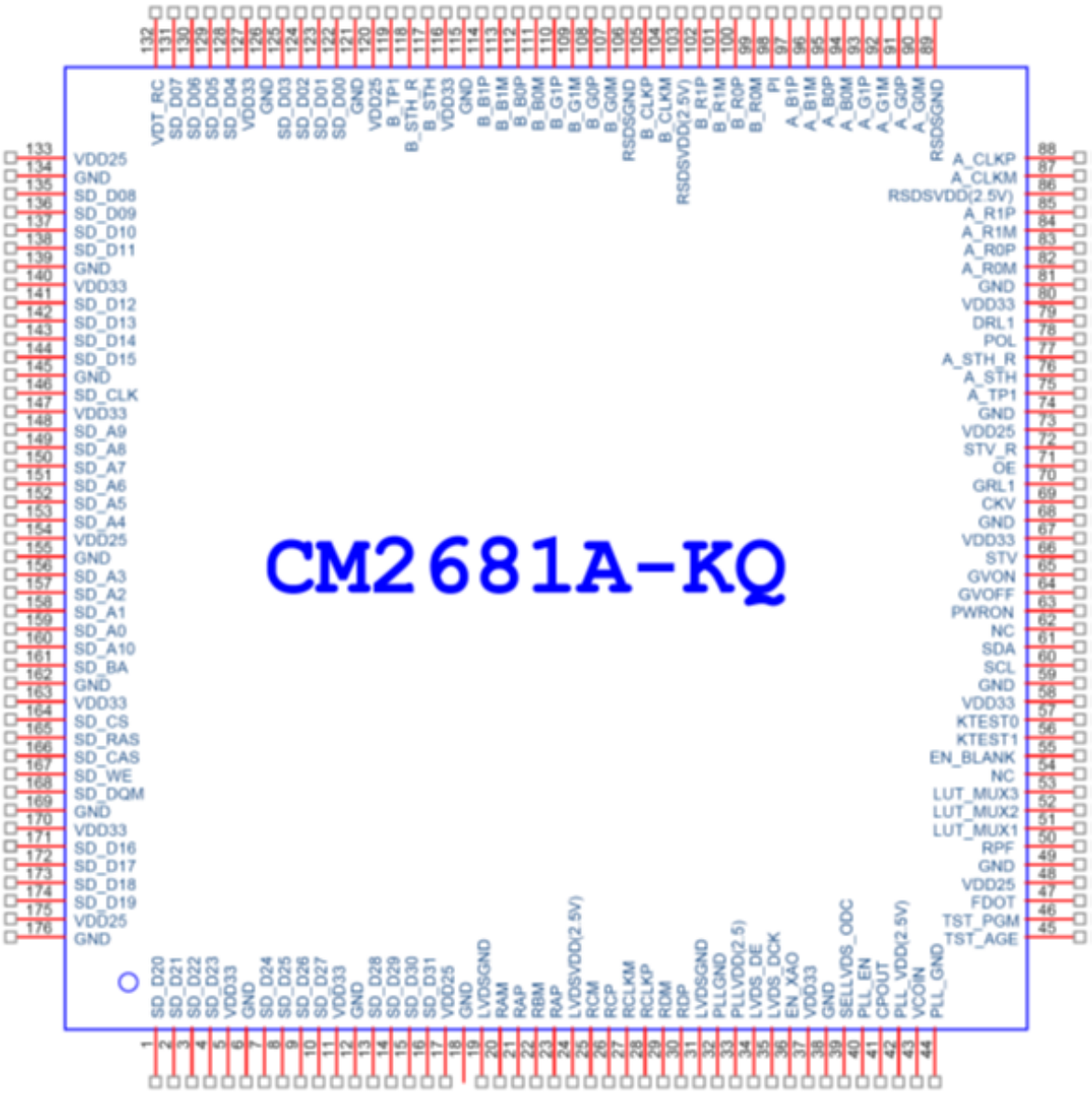
STVP SLEW RATE ON FALLING EDGE
(C_{LOAD} = 5nF, R_{LOAD} = 200Ω)



ENABLE DELAY FUNCTION



Timing Control (TCON) IC CM2681A-KQ Diagram



If These Supply Voltages & Control Signals Missing What will Happen in LCD Panel?

(A) If missing or abnormal supply voltages of:

1.VGH (VON): Display will slow motion, white screen, display darkness or display blank.

2. VGL (Voff): Ghosting display, washed out display with vertical lines/bars.

3. VDA (Avdd): Display fully of vertical color lines/bars.

4. VDD (Vlogic): No display.

(B) If missing or abnormal of the gate control signals:

The display symptom is involved on horizontal area. Like double images, jittering or jumping display, thin horizontal lines (a 1/3, 2/3 or full screen. It is not one horizontal line/bar only) and so on.

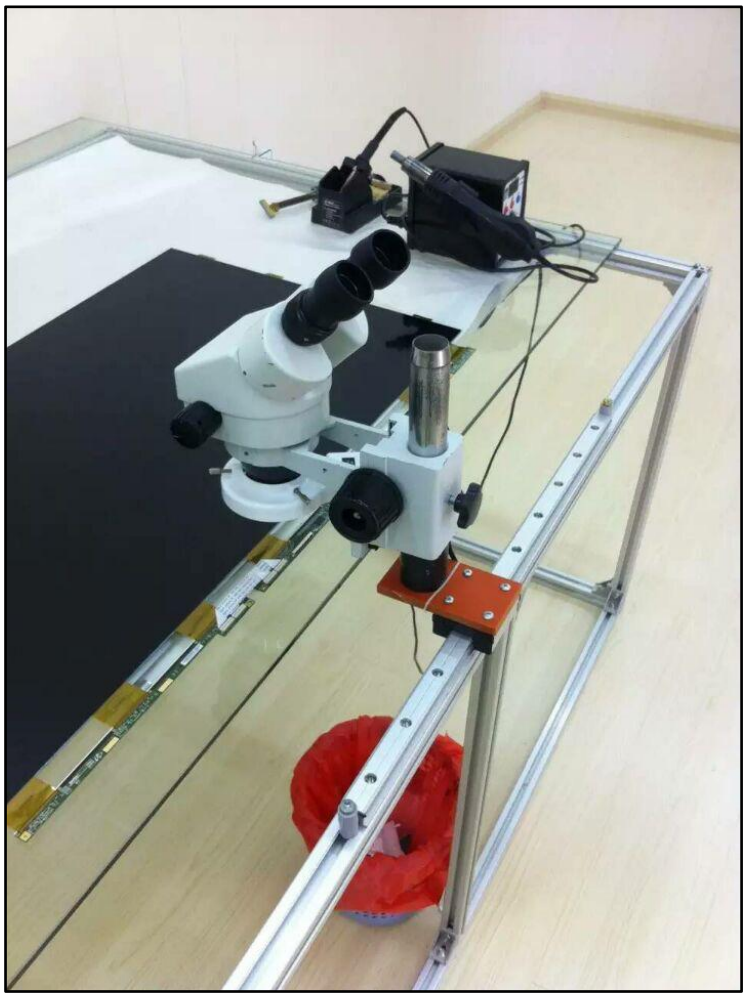
Part-3

How to Troubleshooting & Repairing LCD/LED Screen & Panel

Tools and Equipment for LCD Screen Panel Repair

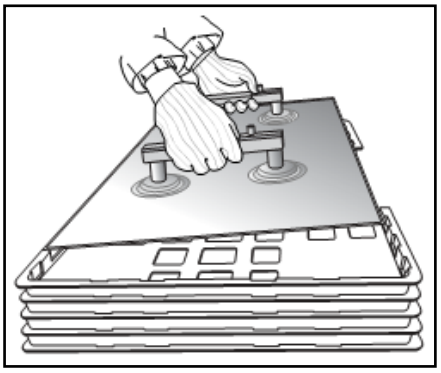
Before starting repair LCD Panel, the first thing is we must have the right tools. Without the tools, we can't do anything even you know how to repair it. The common tools like Multimeter, cutter, soldering iron, Oscilloscope (50MHz ~100Mhz, optional) and etc it is a common use tools. But I will list out some special tools to helps TV repairer to repair LCD Panel easily.

1) Magnifier: more than 60X is better. Also prepare a small magnifier in the pocket, when need to see a small thing or lines it will helps to you.



2) A clean and big table: To suitable for big size LCD Panel repair. Like the photo above. Also put the fluorescent light below the table as a backlight of Panel.

3) Vacuum Pad: To let us easy to pick up the LCD Panel safely and easily.



4) LCD/LED Panel Tester: This is a MUST have tool to let us easily diagnosis LCD Panel working or not, and no more guess game in LCD Panel repair. If you know how to setting TV Mainboard and programming their firmware through ISP Programmer, you can use the Universal TV Mainboard as a LCD Panel Tester. Because the Universal TV Mainboard can support more range of LCD Panel. It can support 15inches ~42 inches or 26 inches ~84inches LCD Panel.

With the above tools and equipment, it will increase your LCD Panel repairing speed and you will enjoy repairing LCD Panel.

How to Isolate Display Problem from Mainboard, T-con Board or LCD Panel?

This is an important subject to all TV repairers. Because every day the TV repairer will facing many TV display problem on their workbench. So they need to know the faster way to how to isolate TV display problem.

1) Mainboard or T-con board Problem?

In this section, you have two methods to isolate the display problem from Mainboard and T-con board.

a) First is call out the TV OSD Menu (just click on the remote control MENU button is ok). If the OSD Menu can show good display, that's mean the problem is in the Mainboard or there LVDS cable/s there. But when the display problem still present on the OSD Menu there, that mean higher percentage is their T-con board or LCD Panel defective. But this method is not 100% accurate.

b) So using the LCD Panel Tester to test the T-con board and we can know the result directly. Or we can also using the Universal TV Mainboard as an LCD Panel Tester. If you know how change their setting. Besides these LCD Panel testers, actually I also found other design LCD Panel tester in the market now. But compare with their price and performance, I think these two types LCD Panel Tester is ok to use. Unless you're repair the 4K (or above) type LCD Panel.

2) T-con Board or LCD Panel?

In this section, I will recommend to read on this ebook “Part-3: LCD Panel Cut Off Modification”.

Actually this method not only can repair the display Double Images problem, it cans also diagnosis the LCD Panel at the same time. Even this method is not 100% accurate but it still acceptable. Compare to the TV repairer have buy the TAB Bonding Machine. Normally they are just directly replacing a working T-con board to testing it. Even that T-con was built-in the Source PCB board. Their reason is this method will save time and increase the repairing speed. Because they need to repair over 200 pcs LCD panel per month. But the question is, when all these LCD Panel came in with different brands and models, so how can they prepare all these T-con board? It will stuck the cash flow for a company.

So why not learn the troubleshooting & repairing skills to save money and even troubleshooting time if you know exactly how it work.

What is TAB Bypass Modification?

This repairing method only can apply to the LCD Panel with external Gate Driver TAB/COF. If the LCD Panel Gate Driver COF built-in the LCD Panel glass, so this method will not work to this LCD Panel.

The TAB Bypass Modification method is use to solve the LCD Panel Gate Driver control lines and supply voltage lines circuit break inside the glass! If your LCD Panel facing this problem, even you have the expensive TAB Bonding Machine also can't help in this issue.

How to do the TAB Bypass Modification? First we need to standby some tools and spare parts before starting to do the TAB Bypass Modification.

1) Multimeter

2) Magnifier- more than 60x is better

3) Thin copper wire (0.1mm)

4) TAB Bypass List (inside this ebook Part-5: TAB/COF Bypass List)

* If you know where to connect from T-con board or Source PCB to TAB IC correct point, then no need to refer to this list.

5) Fine tip soldering iron

For example, when a TV problem is Display Slow Motion symptom, normally it is because of their VGH voltage missing on the Gate Driver side. Using Multimeter to measure VGH voltage is present on the Source PCB or not. If yes, continue to checking the Y-TAB testing point. With the help of TAB Bypass List, we know that which point is the Y-TAB VGH voltage point. If no any VGH voltage here or the voltage drop a lot causing by supply line increasing

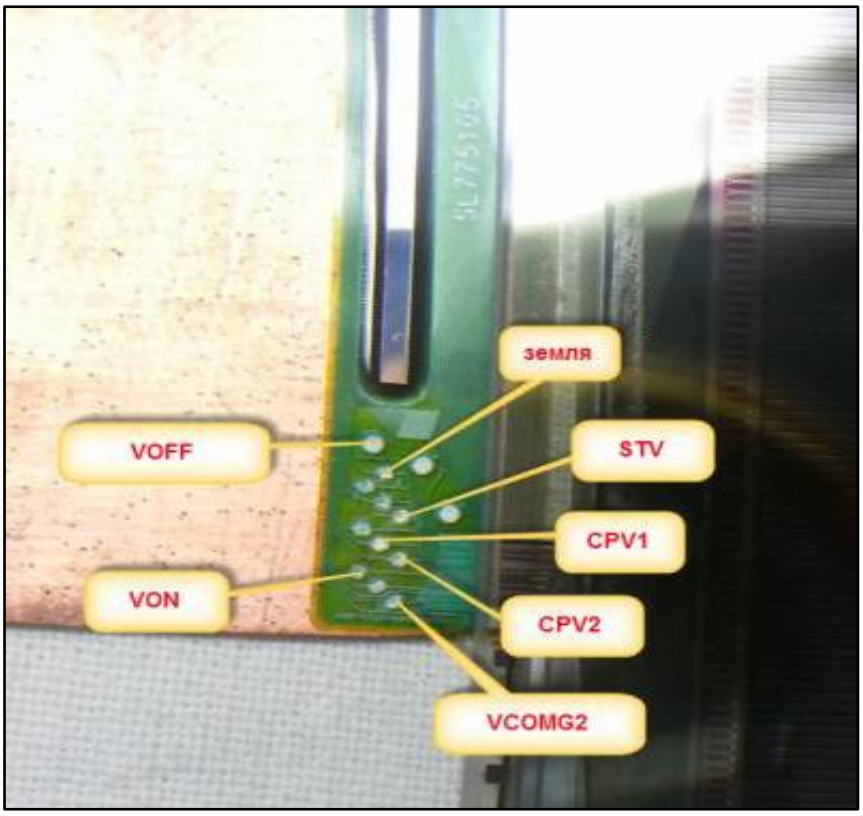
resistance. Now we can use the thin copper wire to solder Y-TAB VGH voltage point. After that find the VGH point on Source PCB or T-con board there and solder that thin copper wire. That's all.

Sometime the circuit break inside the LCD Panel glass is not just one line only. Maybe 2 or more lines, especially their top corner side if broken a bit. It can be more than 10 lines too!

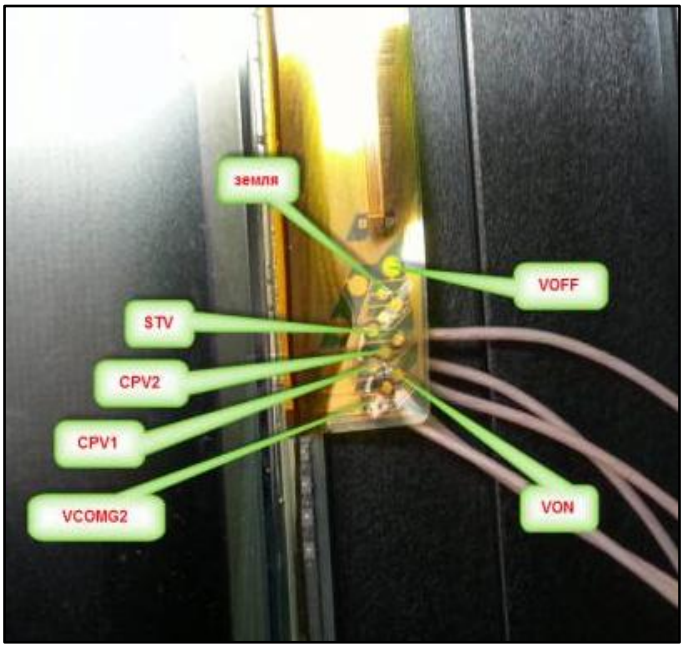
If TAB part number not in the list or we don't know which point is for which signal line, so how to solve this problem? Actually we can use the Magnifier over 60X to trace their lines from Source PCB to the Y-TAB there. If the LCD Panel top corner is broken, so we can use this method to repair the LCD Panel. Because when the Panel top corner side is broken, it will need to connect more than 5 or 10 lines! So it will hard to get the full TAB voltage point, unless you use this method to find it out.

Below is a sample photos on how to do TAB Bypass Modification:

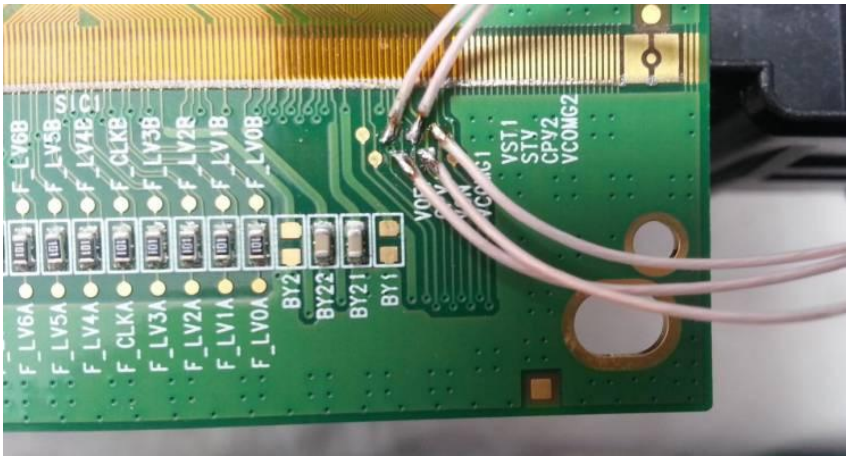
1. Check the voltage on Source PCB there.



2. Checking the voltage values on Y-TAB to make sure that supply voltages or signals is reaching there. If not, that's mean this line is circuit break inside the Panel glass.



3. Solder the appropriate TAB point, where their voltage or signal lines are open circuit from Source PCB.



4. Finally solder these wires to the correct points on the Source PCB.

What is LCD Panel Cut Off Modification?

This repairing method is for diagnosis LCD Panel when occur short circuit or leakage inside the Panel. Even this method is not 100% accurate, but it has higher rate as over 80% accuracy. From the theory of how is LCD Panel work, 'most' of the LCD/LED Panel has both sides of Gate Driver, especially for HD LCD Panel or above level Panel. That's why, when the LCD Panel one of their Gate Driver side failure or short circuit, we can diagnosis and cut off their shorted line/s to save an expensive LCD Panel.

A) When to use this "LCD Panel Cut Off Modification Method"?

1) When LCD Panel symptom is Double Images or Jittering/Jumping display.

2) When the LCD Panel problem has unstable Horizontal Lines/Bars.

3) When suspect one of the Gate Driver side has short circuit in signal lines or voltage supply lines.

4) The LCD Panel has fully of horizontal thin lines on the screen.

5) The strange display problem occurs in LCD Panel. When facing this type of display problem, we can try to use this method to isolate the problem is occurs in Gate Driver side or not. Or which Gate Driver side is causing the problem occurs.

6) To isolate the display problem in LCD Panel or T-con board itself.

B) How to use this "LCD Panel Cut Off Modification Method"?

We must know which are the Gate Driver control signal lines (included the clock lines) and voltage lines (VGH, VGL and so on). Normally these signal and voltage lines are going through the first X-TAB (X1) to right side Gate Driver and the last X-TAB (Xn) to left side of Gate Driver.

When a display problem occurs and suspects it is the T-con board or LCD Panel failure:

1) With T-con Board:

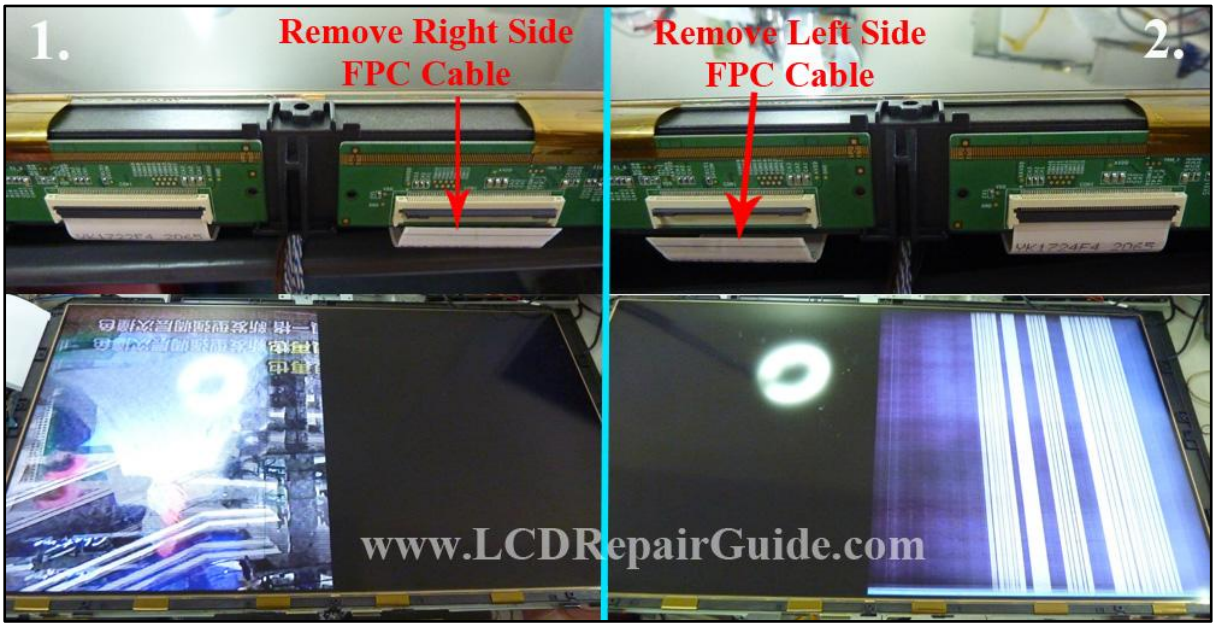
If this LCD Panel has the T-con board, it is easy to do the Cut Off Modification testing. Just remove their FPC cables one by one. For example:

a) First write down the Gate Driver control signals and supply voltage values on the paper.

b) Power off TV, remove one side of FPC cable from T-con board. Now power on TV and see the display screen result. If half of the display normal and another half is blank (or no display) refer to the photo below, that's mean, the problem was in the right side of Panel Gate Driver. And confirm this is a LCD Panel problem. Remember to write down their signals and supply voltage values.

So find the failure Right side of Gate Driver control signals (if that is Double Images problem, Display Jumping, Horizontal bars/lines Jittering and so on), CKV1, 2, 3…, CKVB1, 2, 3…, STVP, VCST, OE and so on. For how to cut off the signal lines please refer to the Part-4: Double Images repair case histories. If the display problem is slow motion on the screen, you need to find their supply voltage lines like VGH (most of the time is this voltage failure),

DVDD, VGL and so on to do the TAB Bypass Modification. If that LCD Panel is without the external Y-TABs, and the voltage values are normal, that's mean this LCD Panel is beyond repair. Because the problem was inside the Gate Driver glass, so nothing we can do for this LCD Panel.



If the result is both side also show failure display on the screen and their voltages recorded were all normal, that's mean this LCD Panel is NOT worth to repair it, if LCD Panel is no Y-TAB on both sides of Gate Driver. If one or both sides have the Y-TABs there, then you need to use the TAB Bonding Machine to replace their Y-TABs to save the LCD Panel. But some time with this situation, about 20% of LCD Panel with above symptom (both sides show bad display) can be repaired. But this LCD Panel is not last long.

If the result is both side also show failure display on the screen and their voltages recorded for T-con board is abnormal, then we can suspect the problem is in the T-con board not the LCD Panel! From here we can isolate the problem is in the T-con or LCD Panel defective!

For big inches LCD Panel with 4 FPC cables, it also uses the same method. Where left side is 2 FPC cables and right is another 2 FPC cables.

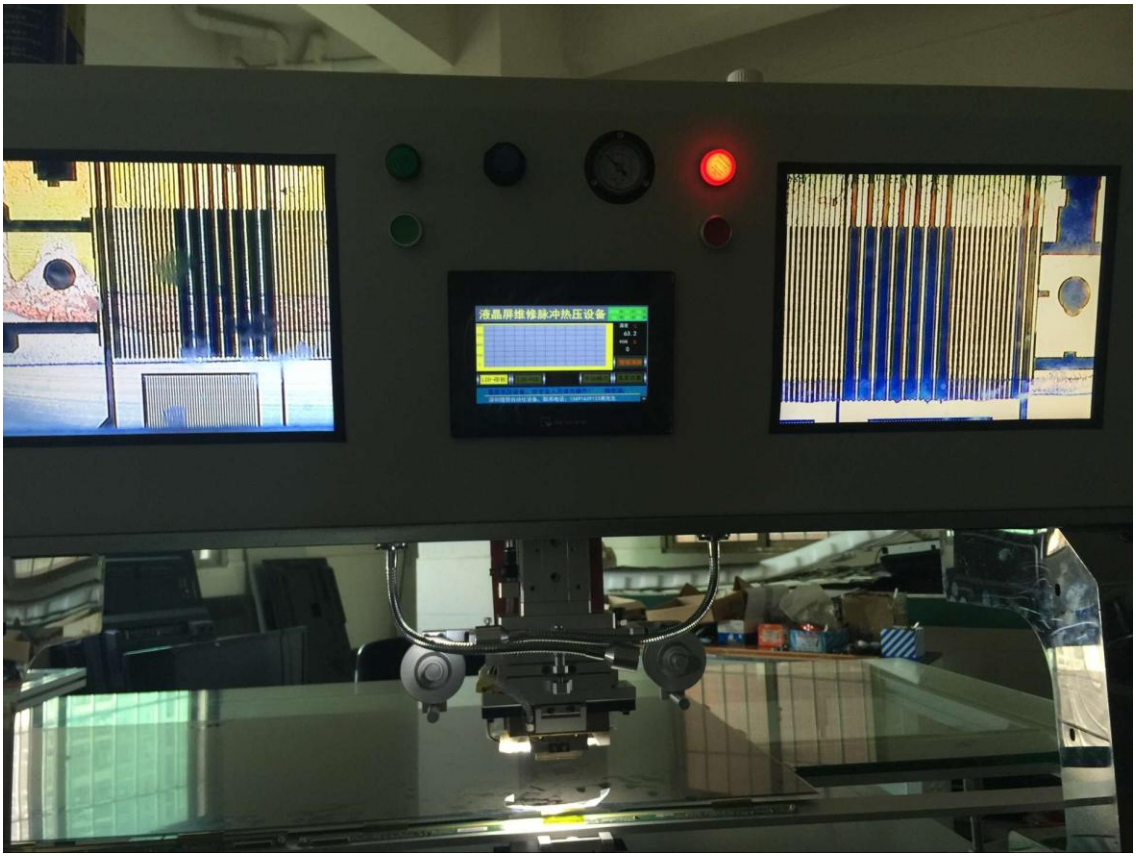
2) Without T-con Board:

For the LCD Panel without T-con board and no any external Y-TABs it is hard to swap testing both sides of Gate Driver. But we still can cut off their Gate Driver supply voltages like VGH, VGL and DVDD (3.3v) for one side first. So the display will show half screen is ok, another half screen is blank/black. So their result will same as “With T-con” method. If the first half display can show a good images but another one is bad images, this LCD Panel can be repair. If both sides also showing bad images, that’s mean this LCD Panel is beyond repair.

To learn how to cut off the signal lines please refer to the “Part-4: Double Images repair case histories” for more details.

TAB Bonding Machine

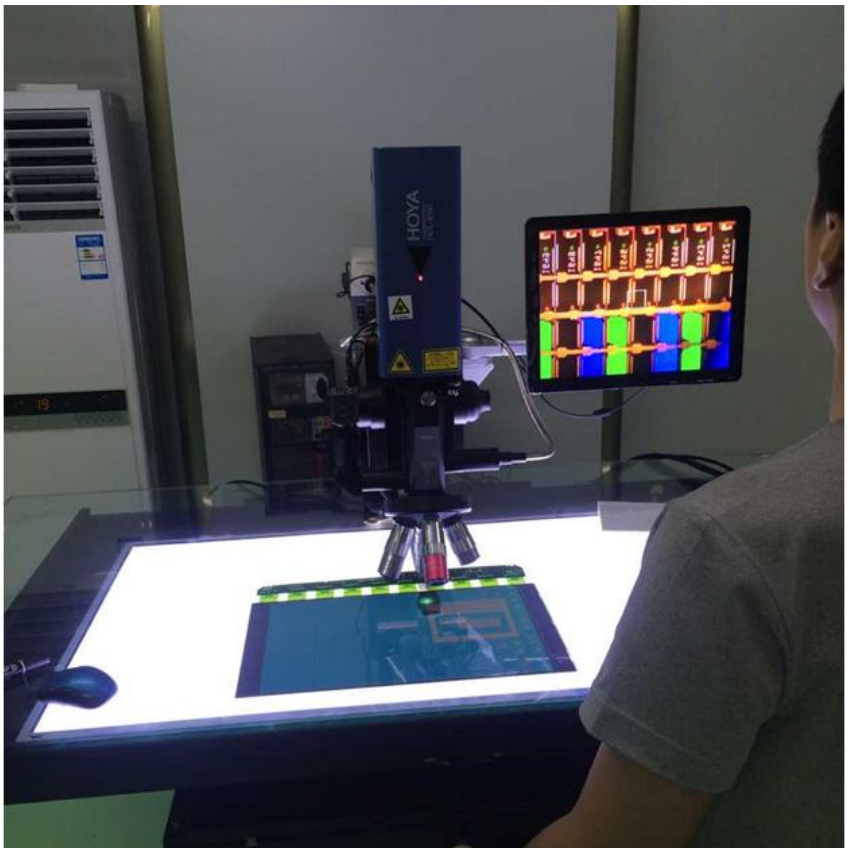
The main purpose of TAB Bonding Machine is to use for bonding the TAB/COF on the LCD Panel only. Is the TAB Bonding Machine is a compulsory tool to repair LCD Panel? My answer is not really. Because it will depends on the repairing business. For example how many quantity of LCD Panel need to repair every month? If your answer is HUGE over 50 or 100 pcs above, I will highly recommend you buy a good TAB Bonding Machine to earn more profit from this field.



The TAB Bonding Machine is not a cheap tool and their cost for the TAB & ACF cleaning chemical, ACF glue and so on is very high. So if your repairing business didn't have this repairing volume on LCD Panel, I will not recommend buying it. But when you buy the TAB Bonding Machine, make sure you're choose a good quality with a good support seller or manufacturer, if not it will waste your money and time!

If you're interesting to buy the TAB Bonding Machine please contact me at: fastrepairguide@gmail.com or http://www.lcdrepairguide.com/tools/

Laser Repair System



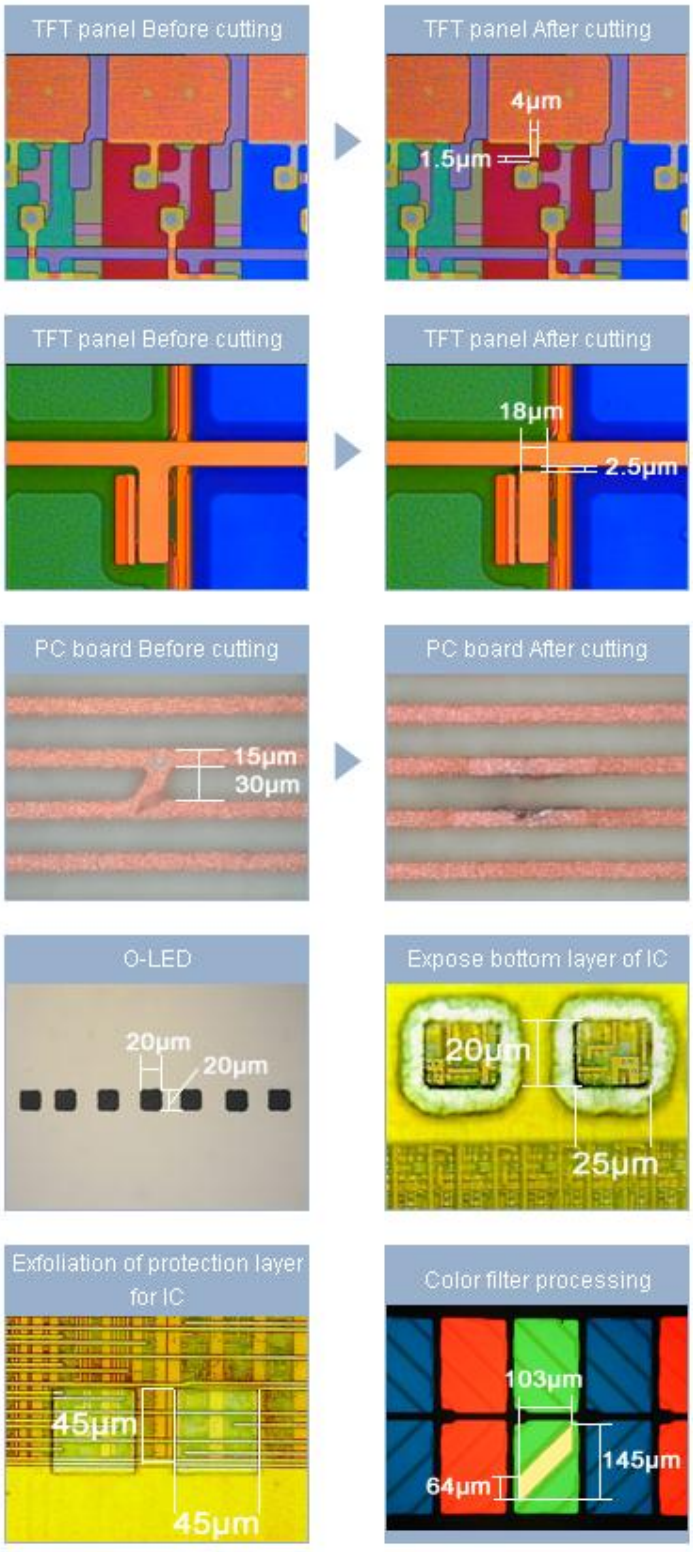
Latest LCD Panel repair equipment is Laser Repair System. This is a new repair machine for LCD Panel repair. The price for this machine is very expensive than TAB Bonding Machine. It is about 10X more expensive than the TAB Bonding Machine! This LCD Panel repair equipment is use by the LCD Panel manufacturer or the LCD Panel Repair manufacturer only. This laser repair system can repair:

1) LCD Panel bright dots on the screen

- Actually they just use this laser system to “turn off” that bright dot only. Where this bright dot after laser machine repair, it will change to “black dot” only. So a one black dot will hard to see or scan by human eyes.

2) It can remove the circuit short (ITO) inside Panel.

3) And so on.



All these troubleshooting & repairing methods will not write again in Part-4 repair case histories to save some pages and file size of this ebook.

Part-4

LCD/LED Screen Panel Repair Case Histories

How to Repair Double Images Problem on Samsung LCD Screen

Nowadays, lots of the TV repairer complaint that this type of screen problem is beyond repair. But I can say NOT ALL. Because the double images screen problem for Samsung brand panel is about 95% is their Panel defective. For other brands Panel maybe is their T-con board or Panel (is about 50-50%).

For Samsung brand Panel, if their Panel without external Y-TAB(COF) (or call it as Gate Driver IC), where their Gate Driver IC (COF) are built inside the Panel left and/or right side, this type of Panel has lower successful rate to repair it.

In the market now, when I search internet and I found that lots of SONY & TOSHIBA TV owner complaint their TV display problem and also frustrated why these branded TV quality so bad? Actually this is because they using Samsung LCD Panel inside their TV! Especially the low end models LCD/LED TV. The Sony TV has a good Mainboard design and good quality in PSU board. Unfortunately it is using the Samsung Panel for their TV.

Why LCD screen occur "Double Images" problem in the Panel? It is because of their Gate Driver control signals are shorted or leakage to each other. So it can happen in T-con board Gate Driver control signal section, ITO line/s inside the Panel, external Gate Driver IC (Y-TAB or Y-COF) shorted internally or internal/built-in Gate Driver IC in the left and/or right side Panel.

So what's the solution to repair Display Double Images problem?

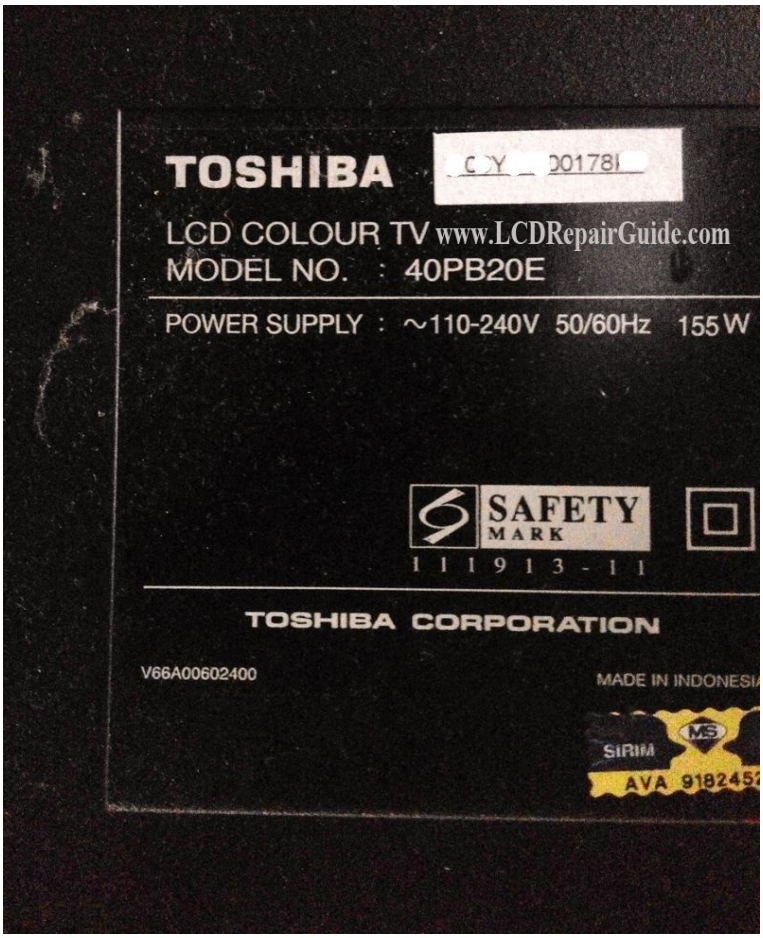
First we need know what and where are the Gate Driver control signal lines. For Samsung LCD Panel, most popular is their CKV (CKV1, 2 &…), CKVB (CKVB1, 2 & …) and STVP control signal lines. Please refer to Part-3: **"LCD Panel Cut Off Modification Method"** for more details.

Below have two repair case of Double Images for Samsung Panel. One has T-con Board with two FPC cable. Another one is without FPC cable and their T-con section is built-in the LCD Panel Source PCB there.

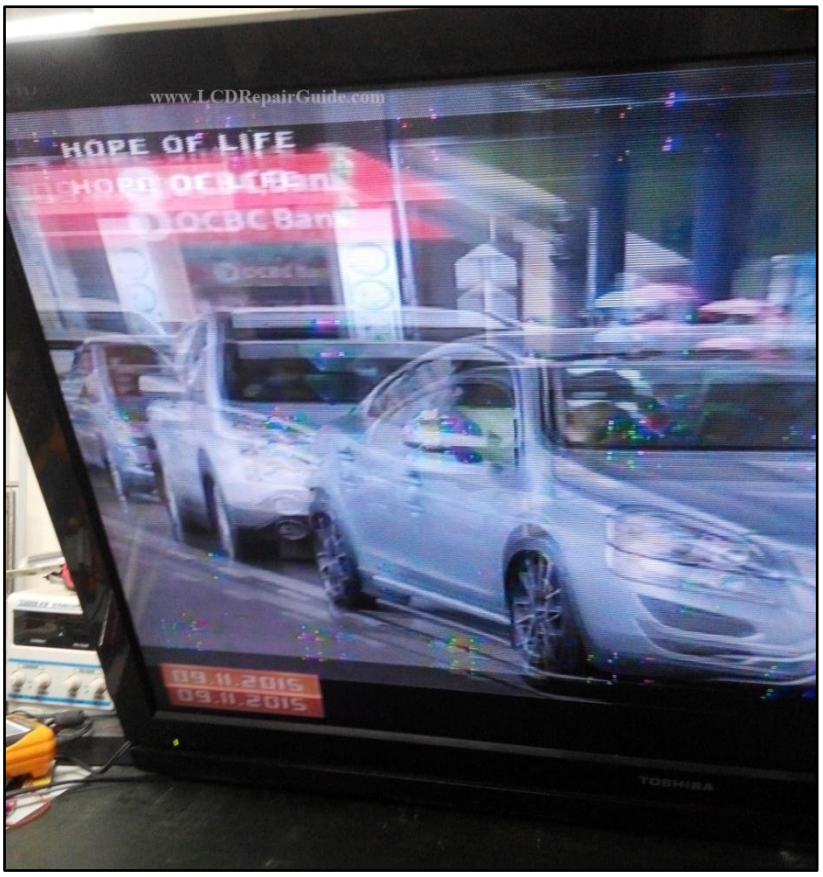
(A) TV Model: Toshiba 40PB20E LCD TV

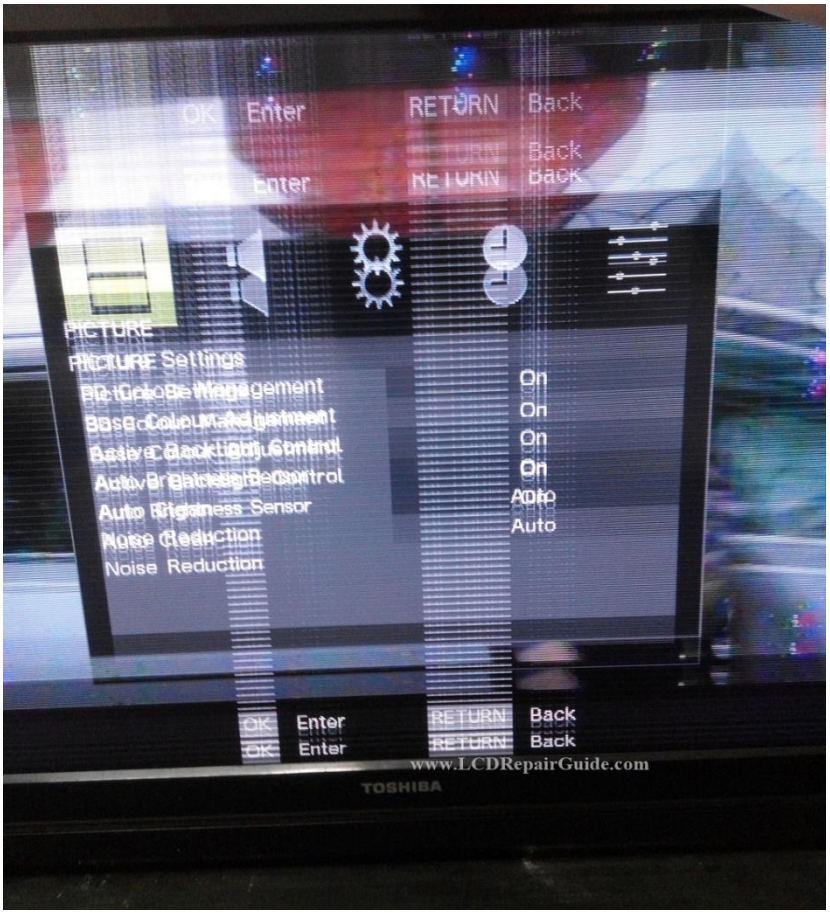
T-con Board: JPN S100FAPC2LV0.2

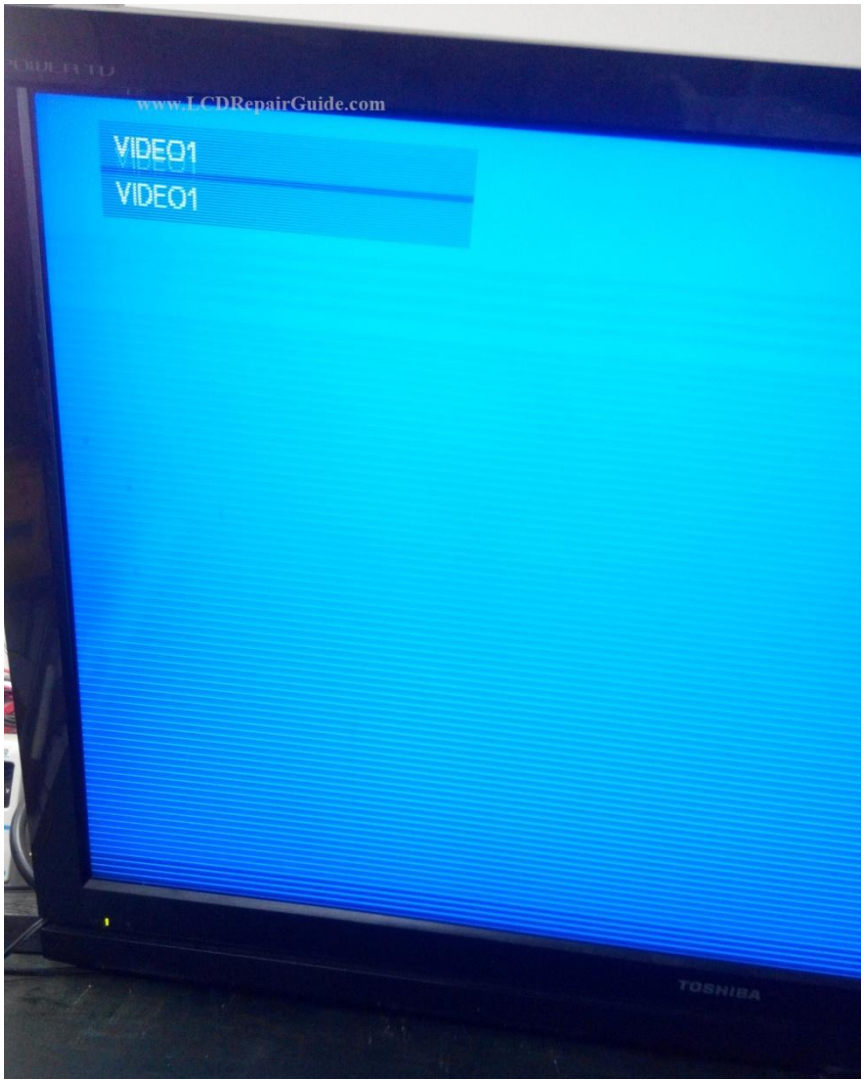
LCD Panel: LTA400HM04

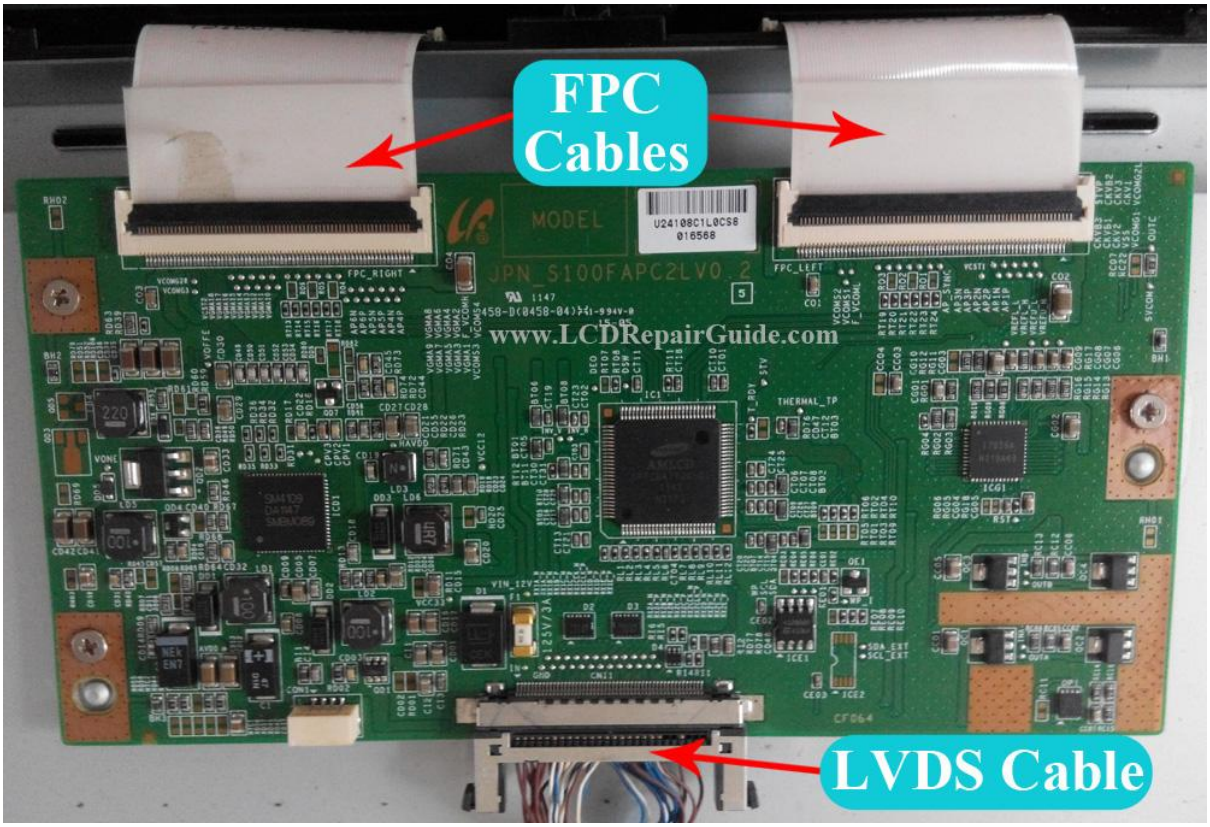


This LCD TV complaint problem was Display Double Images and Jittering problem. Test each video inputs like TV Channel, OSD Menu and the AV modes all same symptom. The TV bottom of 2/3 display has horizontal thin lines there.





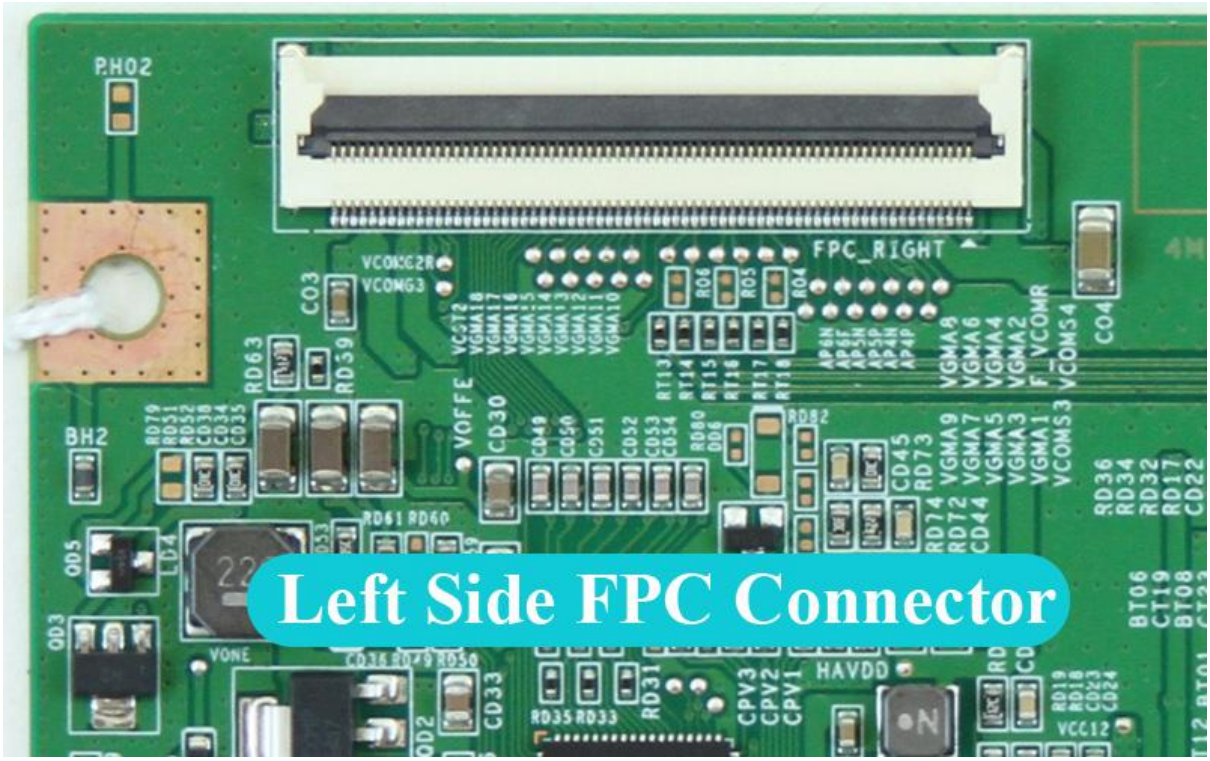




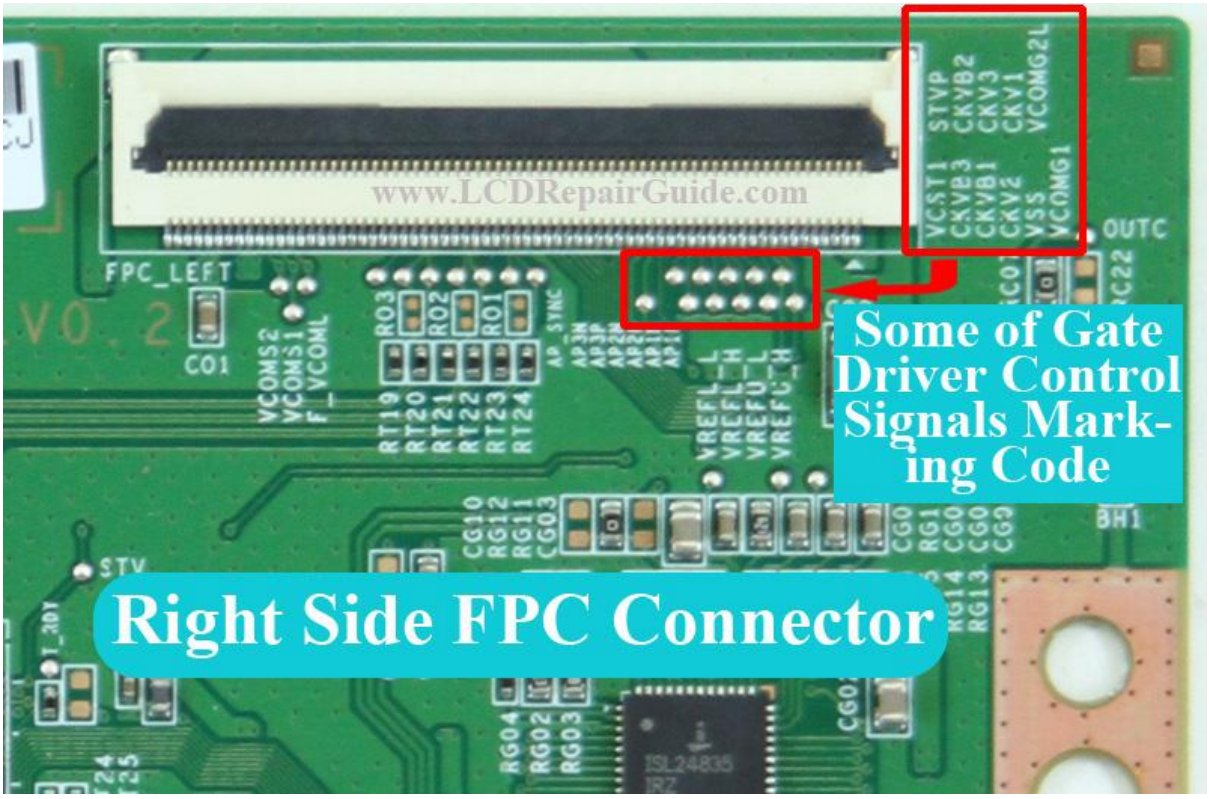
We need know isolate the problem first. Because of this LCD Panel has a T-con with two FPC cables (left & right), so we can took out the FPC cable one by one, not both together. Refer to the “LCD Panel Cut Off Modification Method” for more details in Part-3.

The result is when took out the left side FPC cable, the right side screen can show a good display. But when took out the right side FPC cable, the left side screen show a double images like before. That’s mean the problem is from left side Gate Driver IC control signal lines. From here we know that this LCD Panel can be manual repair!

So we need to find out where are their left side Gate Driver IC control signal lines. Refer to the photos below,



Unfortunately the left side FPC connector didn't have the Gate Driver control signals (or call it as Gate signals) marking code. So we look to another side of FPC connector for the Gate signals (CKV…, CKVB… and STVP).



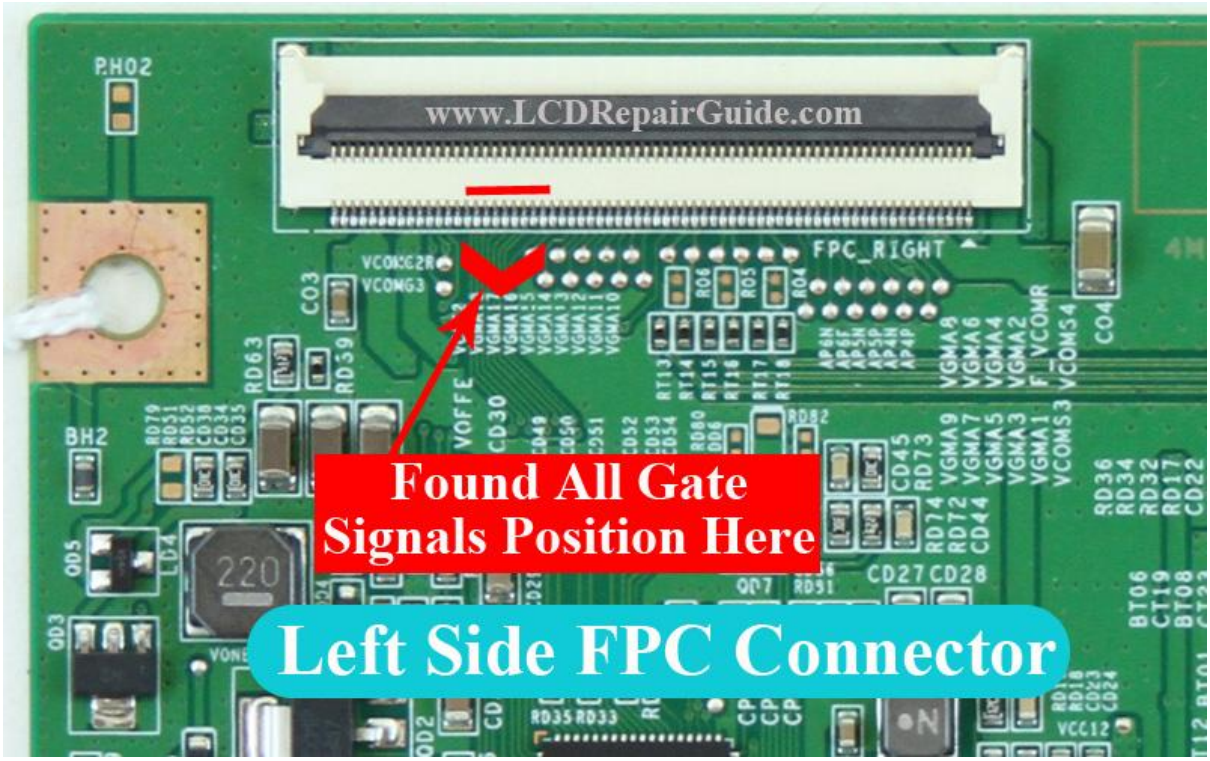
On the right side of FPC connector, around that found the Gate signals like: CKV1, CKV2, CKV3, CKVB1, CKVB2, CKVB3 and STVP. After found their Gate signals, next step is:

a) **If this LCD Panel has the Y-TAB or Y-COF (Gate Driver IC) externally**, you can use TAB Bonding Machine to replace these Y-TABs (or you can check one by one which Y-TAB is defective, normally that's the Y1failure). This method of repair their weakness is cost very high, you need to buy an expensive TAB Bonding Machine, related tools, spare parts like COF IC, ACF and etc. Not only that, you also need to know how to operate the TAB Bonding Machine properly, if not it will waste your time and money. But with this method of repair LCD Panel, the images quality will maintain as their spec.

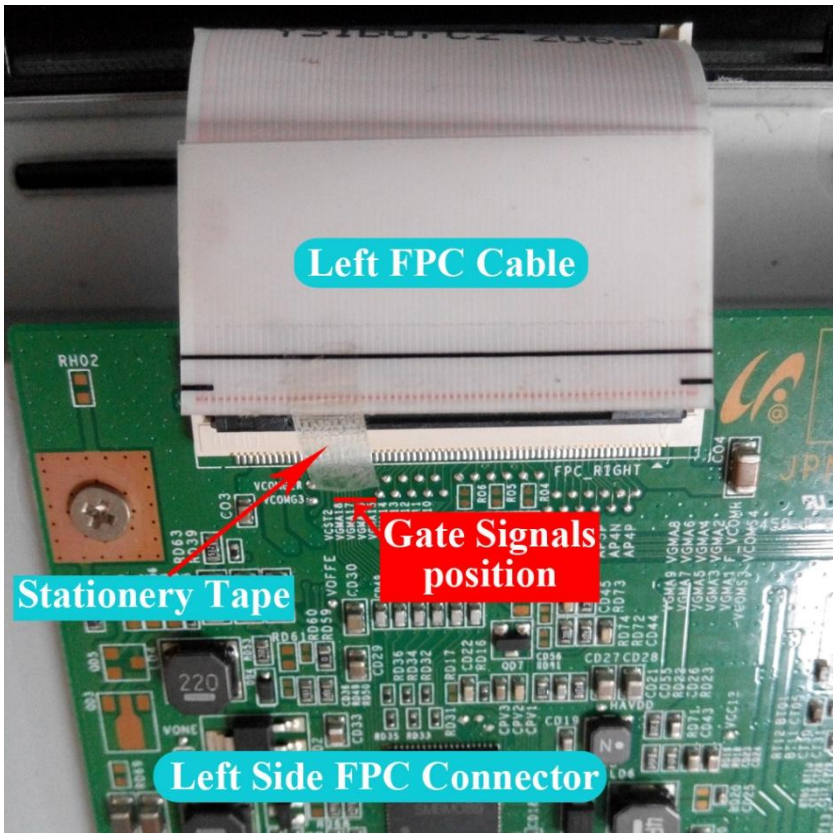
b) **If this LCD Panel didn't have Y-TAB externally** like most of Samsung LCD Panel, you can use "LCD Panel Cut Off Modification Method" to manually repair. Actually this modification method is the lowest cost to TV repairer. But modification weakness is after repair LCD Panel images quality will decrease a bit but acceptable.

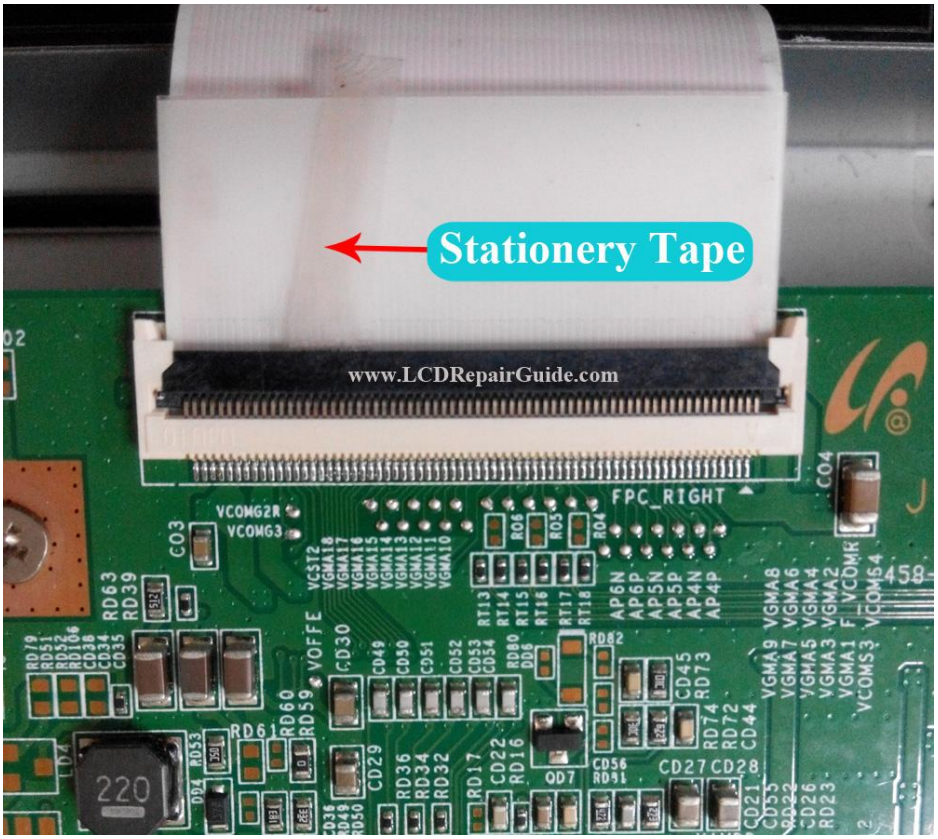
Since this ebook is design to using the manually method to repair LCD Panel, so I will write for this way. After found all the Gate signals on T-con board, is this all Gate signals need to cut off all or just one or two lines only? It will depends on how serious of the shorted or leakage inside LCD Panel. For example, if just cut off the CKV1 and CKVB1 the display images is back to normal, than just cut off these two signal lines is enough. But most of the time, it needs to cut off CKV1, 2, 3 and CKVB1, 2 &3. Also maybe need to cut off another signal line like STVP and so on (like T1, T2, VCST…).

For this repair case, after found the Gate signals, roughly we know where the Gate signals position on that FPC connector is. So we can refer it to the left side of FPC connector as photo below:

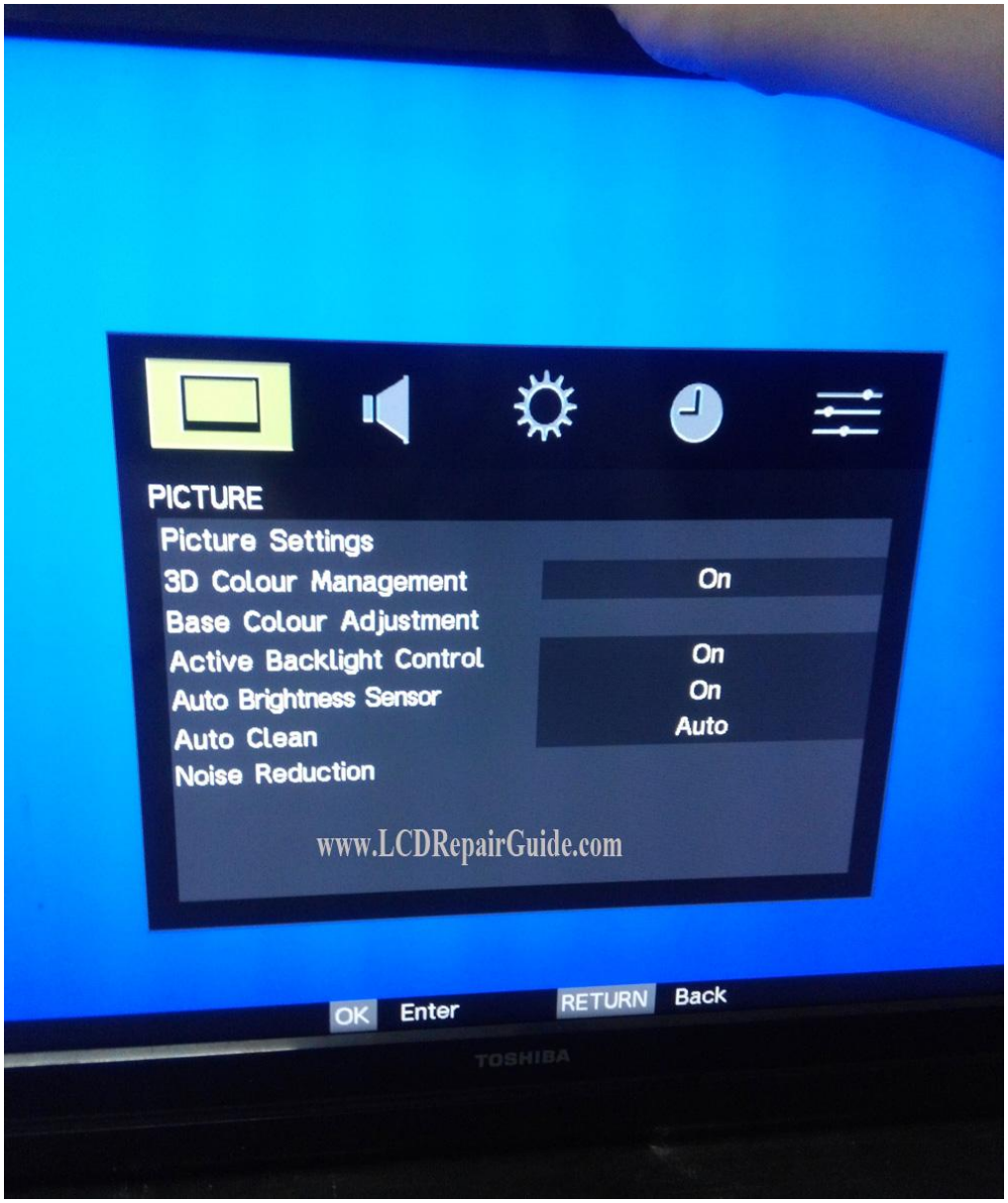


After found the left side FPC connector Gate signals lines position, next step is cut a suitable size of stationery tape for this Gate signals. Refer to the photo below:





Make sure the bottom of FPC contact pins (Gate signals position) was insulated by stationery tape. After that inserted FPC cable into the connector and power on the TV now.



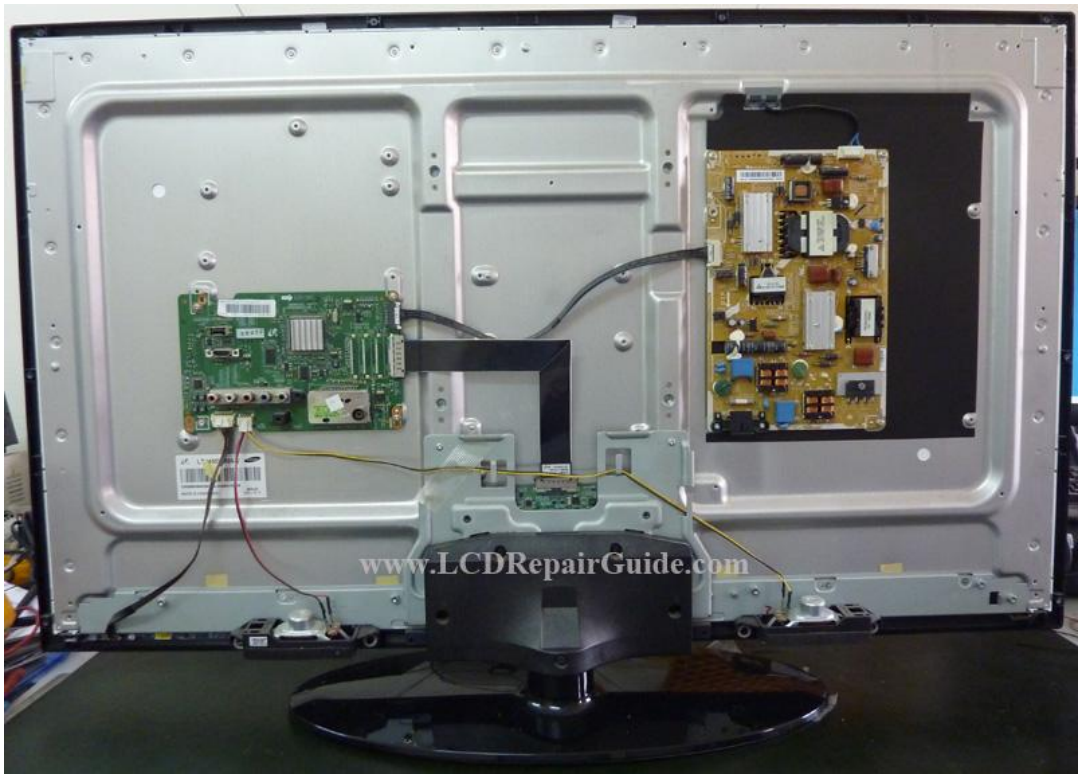
Finally this Samsung LTA400HM04 LCD Panel back to normal now. With this easily method and nearly NO cost to successful repair LCD Panel. Even their images quality not different much and confirm this method is work. Because this TV after repaired over 1 year still in use.

(B) TV Model: Samsung UA40D5003BR LED TV

T-con Board: S100FAPC2LV0.3 (BN41-01678)

LCD Panel: LTJ400HM05-V

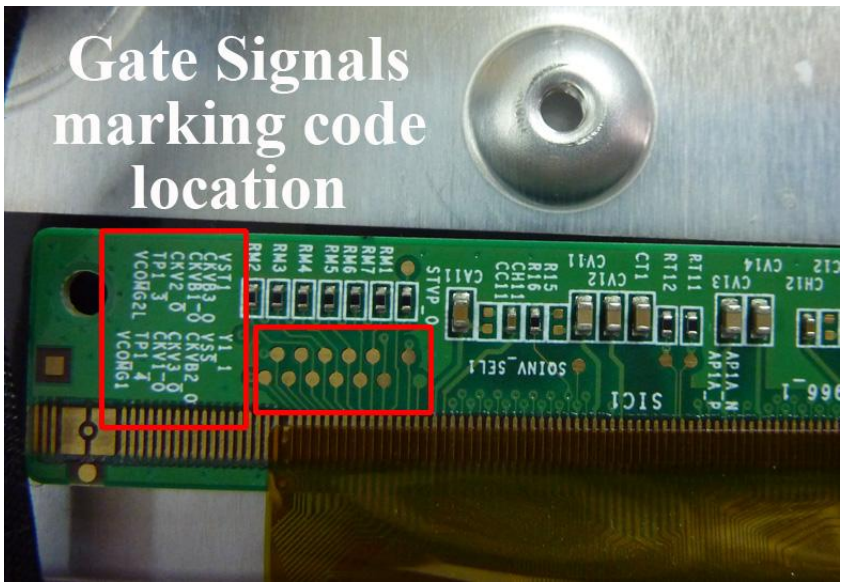
This Samsung 40 inches LED TV came with symptom Double Images, Jittering or Jumping and running horizontal bar on the screen.

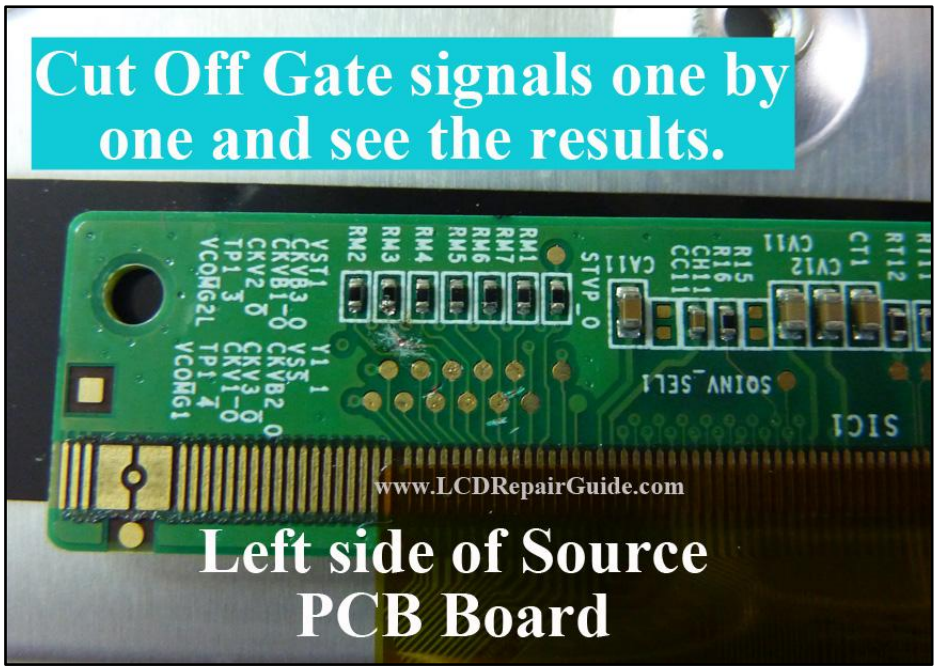


This Samsung LCD Panel comes with T-con board and two FPC cables. Beside the FPC cables to cut off the Gate signals, actually we also can cut off the Gate signals on Source PCB board. Especially the LCD Panel design without T-con Board and the Timing Control section was built in the Source PCB Board. Since I had show the method on how to cut off from FPC cables, so this time is to learn how to cut off from Source PCB Board.

Actually Samsung LCD Panel has many models LCD Panel without T-con board, but this time I can't get one in hand, so I using this LCD Panel as a repair case for LCD Panel without T-con board.

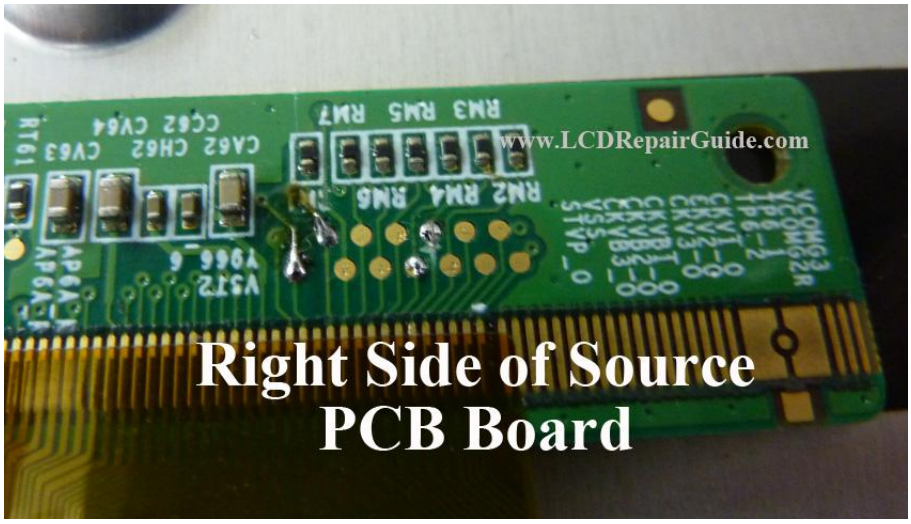
When the LCD Panel doesn't has T-con board, so how to do the cut off modification of this Panel? Actually we can look at the Source PCB board near X-TAB connection there to find the marking code of CKV, CKVB and so on Gate Driver signals. Most of the time, these marking code are located on the first X-TAB and last X-TAB position.





After cut off all left side Gate signals, the screen still same double images problem. So re-solder back all cut off lines, go to the right side find Gate signal lines.

Finally found the right side of Source PCB board Gate Drive signals defective. After cut off, the display is ok now.



The Rules of LCD Panel Cut Off Modification:

1) CANNOT cut off both sides of Gate Driver signals, it will causing the LCD Panel not working or create another problem for this Panel.

2) Don't cut off the circuit line too nearly the X-TAB contact pins there. If not when the line need to re-solder back, it will cause very hard to soldering the line.

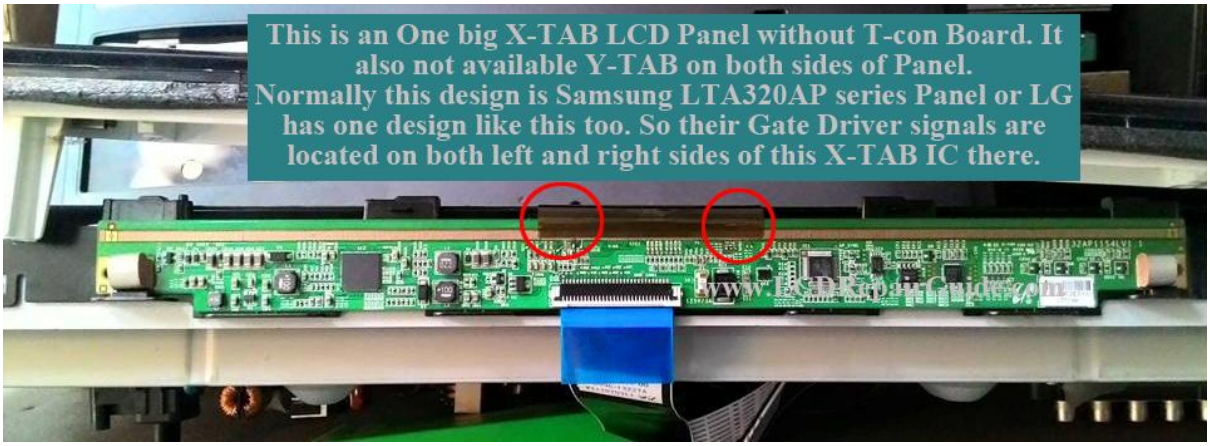
3) Use a good solder and fine tip soldering iron to do the soldering job.

Samsung LTA320AP Series LCD Panel with Double Images Problem Solved

This repair case is share by my member and as a sample to let you learn if the LCD Panel doesn't have T-con board and just one X-TAB only on the Source PCB board. So what to do with this type of LCD Panel? Read this article and remember what you had learned from this ebook. So you will roughly know how to do it.

As usual with this type of Double Images problem, directly go to checking their T-con board. Because of type of LCD Panel design is just has one big X-TAB IC only, and also no any Y-TAB on both sides of Panel.

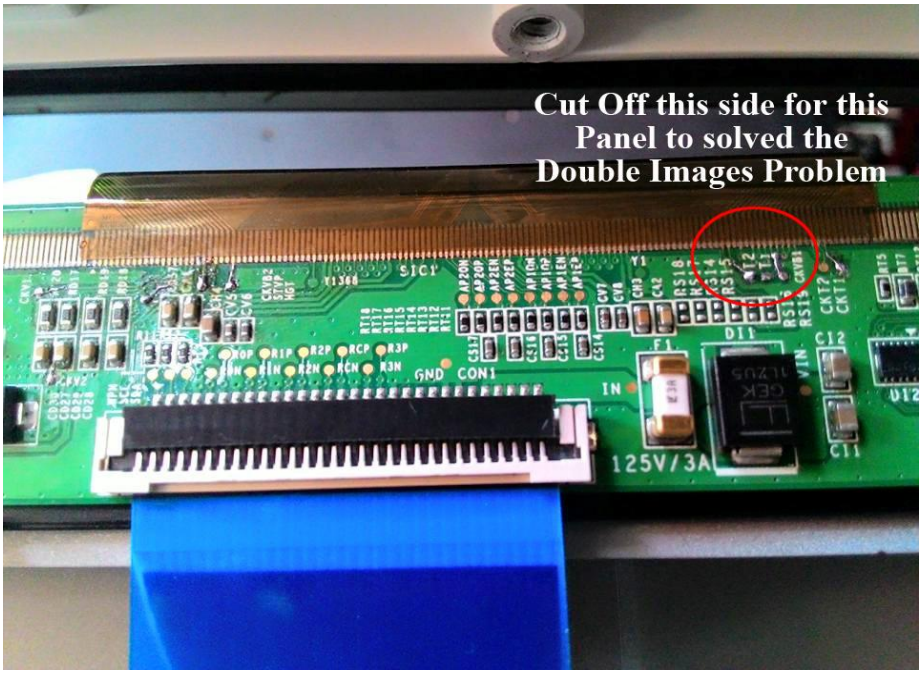
Actually the Gate Driver signal lines are on the both left & right sides of this big X-TAB IC pins as photo below:

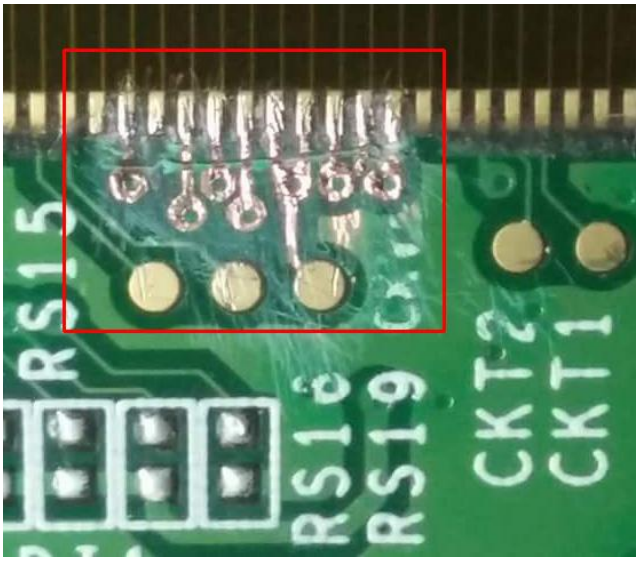


Find out the Gate Driver signal lines in front of this big X-TAB IC. Try to find any marking code for Gate signals, if not, try to checking their voltages about 8V~10V (is stable voltage values). It will depend on inches Panel and design, so their voltage will a bit different.

First try to find out the Gate signals, after that using a small stationery knife carefully to cut off these Gate signals one by one follow to see the display is ok or not. Remember when cut off the lines MUST off the power TV!

If the cut off all the left side Gate signals also same problem, then you need to re-solder back the cut off lines. After that find right side Gate signals lines to do the same thing. After cut off the Gate signals line, the display is change to a bit Ok, continue to cut off other signal lines, until the display is back to normal.





Finally this TV is back to normal now. The display images quality is not perfect but acceptable.

Samsung LCD Panel with Display Problem Causing by Gate Driver Sides

Did you see any dirty or black dot inside the edges of Panel Gate Driver side? An LCD Panel without T-con board and no Y-TAB on both left and right side, also their display problem is causing by Gate Driver side but don't know how to repair it (for example Samsung LTY320AP04 Panel). The Gate Driver side/s symptom for example: horizontal lines/bars with jumping, jittering and so on.

If you're facing this problem before, you need to check the LCD Panel Left and Right sides of the edges Panel there. If you found a dot like photo below, it is confirm dirty dot is a location of shorted or burnt ITO lines inside the Panel glass.

- Remember, if both of the left & right sides of Panel also have this dirty dot inside the glass, so this LCD Panel is beyond repair.

The solution to repair this problem is to use a small saws or related tools to remove the dirty shorted dot on the edges of Panel. Remember to use the magnifier to see more details in it.

WARNING! To repair this type of Panel problem, you will take the risk!

Before do this repair, you MUST ask your customer or the TV owner permission first. Because when fail to remove the shorted dot, the LCD Panel liquid crystal maybe leakage after you use the wrong tools to do it. If the liquid crystal leakage from the Panel, this Panel will beyond repair! Be careful!

TAB Bypass Modification Repair Case Histories

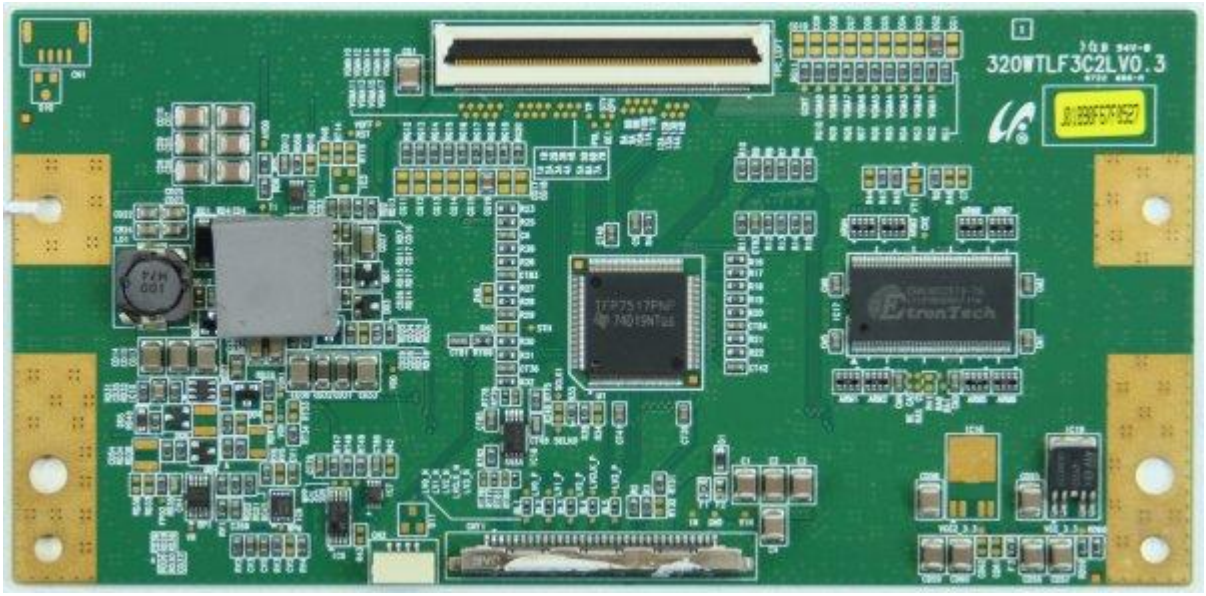
For details of what is TAB Bypass Modification, please refer to Part-3: "**What is TAB Bypass Modification**".

A) LCD Panel: Samsung LTA320WT-L05

T-con Board: 320WTLF3C2LV0.3

Symptom: Display Slow Motion and a bit Darkness

This 32 inches LCD TV display problem is Display Slow Motion and the image is darkness.



As usual check the T-con board voltage and the result as below:

AVDD: 15.3V

VON: 23.8V

VOFF: -7.3V

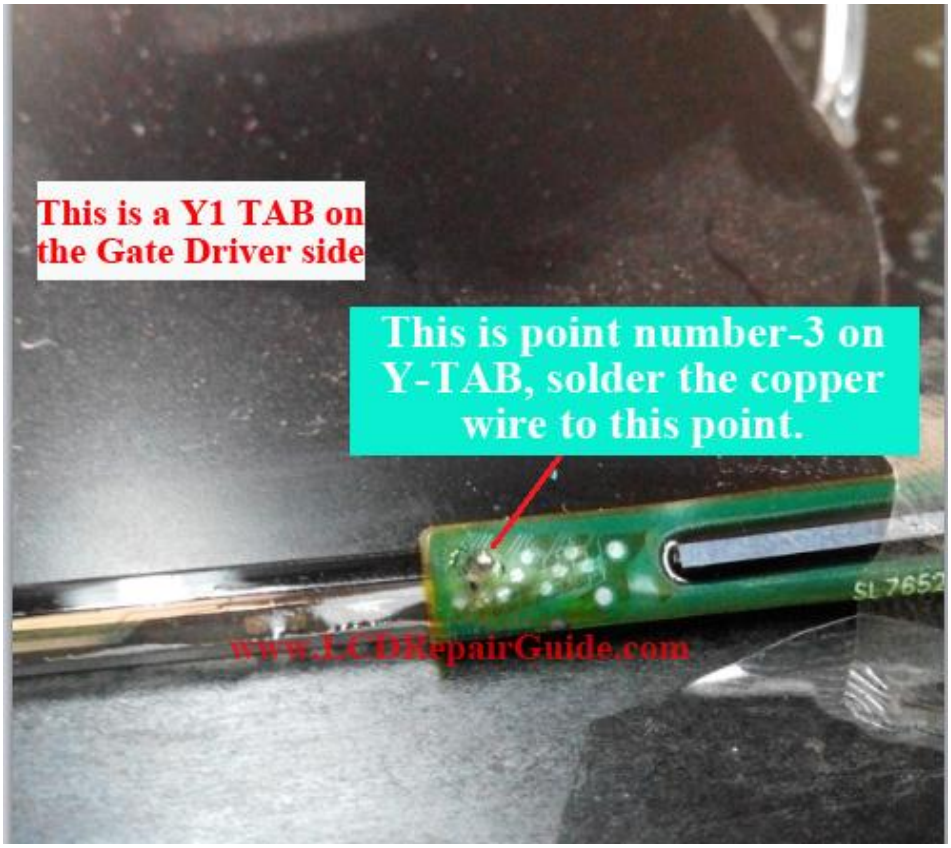
VDD: 3.35V

All the above voltage values are normal. So next step is, from our previous experience when the display problem is slow motion, it is causing by the VGH (VON) voltage missing on Gate Driver side. This LCD Panel has the Y-TAB on Gate Driver side.

Here has a good secret tip for you. When we don't know the TAB/COF which point is what voltage values is. Actually we can use a 10Kohm ¼ resistor to searching each point in TAB film. So with this method it will prevent the higher voltage damage the lower voltage lines on the TAB IC there.

Back to this case, since we don't have this TAB which point is for VON supply. So use a 10Kohm resistor solder with thin copper wire (0.1mm), after that one side wire solder to VON on Source PCB there (This is the VON point we measure it has 23.8V on Source PCB). Another resistor side will go to touching the TAB each point (IMPORTANT not put or touching too long on the TAB point there).

Power on the TV and starting to touch each point on the Y-TAB (Y1 first) film. When touching one point, look on the screen has normal display or not, if not, next point and follow the same steps. After touching on the point-3 the screen can show a normal display. That's mean the point number 3 is the VON supply point!



Now removed the resistor, solder the copper wire to point number 3, another side was solder on the VON Source PCB there already. Power on the TV, the display slow motion problem gone and the screen can show a perfect display now.

B) LCD Panel: HT185WX1-100

TV/Monitor: Lenovo L1961WC LCD Monitor

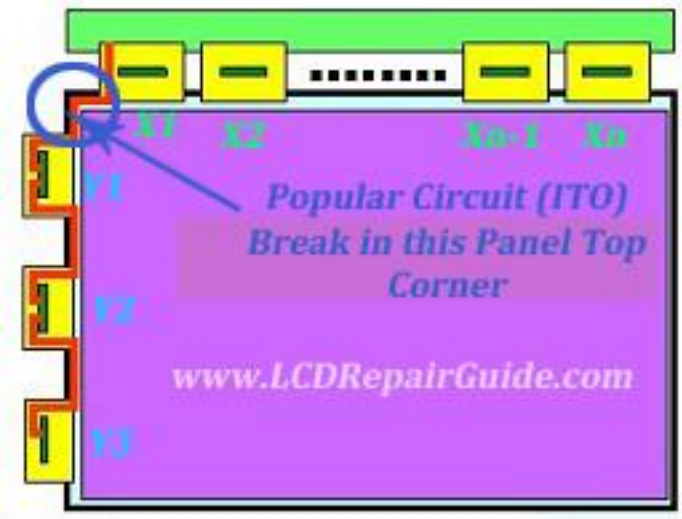
Symptom: Monitor White Screen, Washed Out Picture, Display Slow Motion and Full Screen of Horizontal Thin Lines.

This LCD Monitor after power on, it is white screen, after several seconds change to wash out picture and display slow motion. This LCD Monitor screen also full of thin horizontal lines. As usual, first step is to measure their VGH and VGL voltage on T-con board. Found all voltages looks normal, the VGH is 27V and VGL is -5V. Next step is to testing the Gate Driver Y-TAB film point's voltages. Can't any VGH voltage there and this part number of TAB is not available in the TAB Bypass List. So use a resistor to find out which is the VGH voltage point now. Finally found that VGH point and solder a copper wire to this TAB point and another side of wire will solder on T-con VGH point. This LCD Monitor is working perfectly now.

Note:

From the previous experience that LCD Panel top corner of X1 (X-TAB) and Y1(Y-TAB IC) their circuit lines (ITO) easily circuit break on this area. Second is the X1 ACF contact pins dry joint occur there. That's why the TAB Bypass Modification most of the time is connects from Y1 to X-Board (Source PCB).

Another tips is, X1 and Y1 is the top failure rate of COF IC in LCD Panel. Because these two IC is responsible for the supply voltage like VGH, VGL and DVDD go through it.

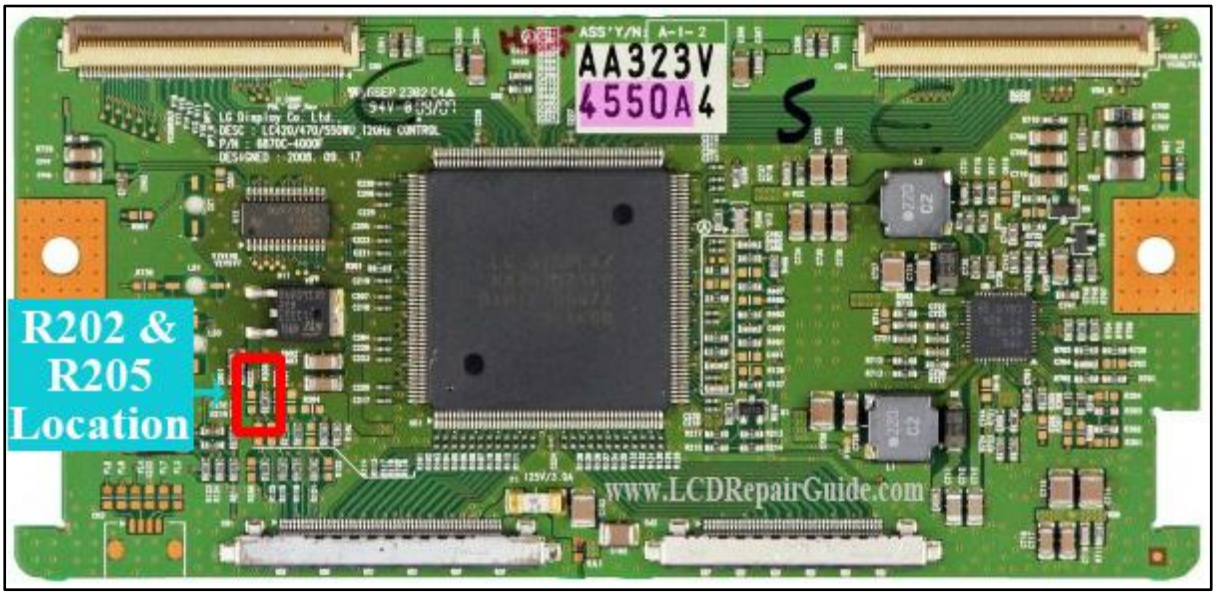


How to Solve LG LCD Panel Display Upside Down Problem

(A) T-con Board: 6870C-4000F

LCD Panel: LG LC550WUD-SBA1

Desc: LC420/470/550WU_120Hz



When the TV display is upside down problem or display is in wrong/abnormal position, try to remove R205 to R202. If your T-con board R205 location is empty and R202 is present the resistor there, just removed the R202 resistor to R205 position (exchanged).

If the above methods also not solve the problem, then you can try to remove both R202 & R205 resistors and give it a try. If still the same problems then try to put both R202 & R205 with same spec resistor and try it again.

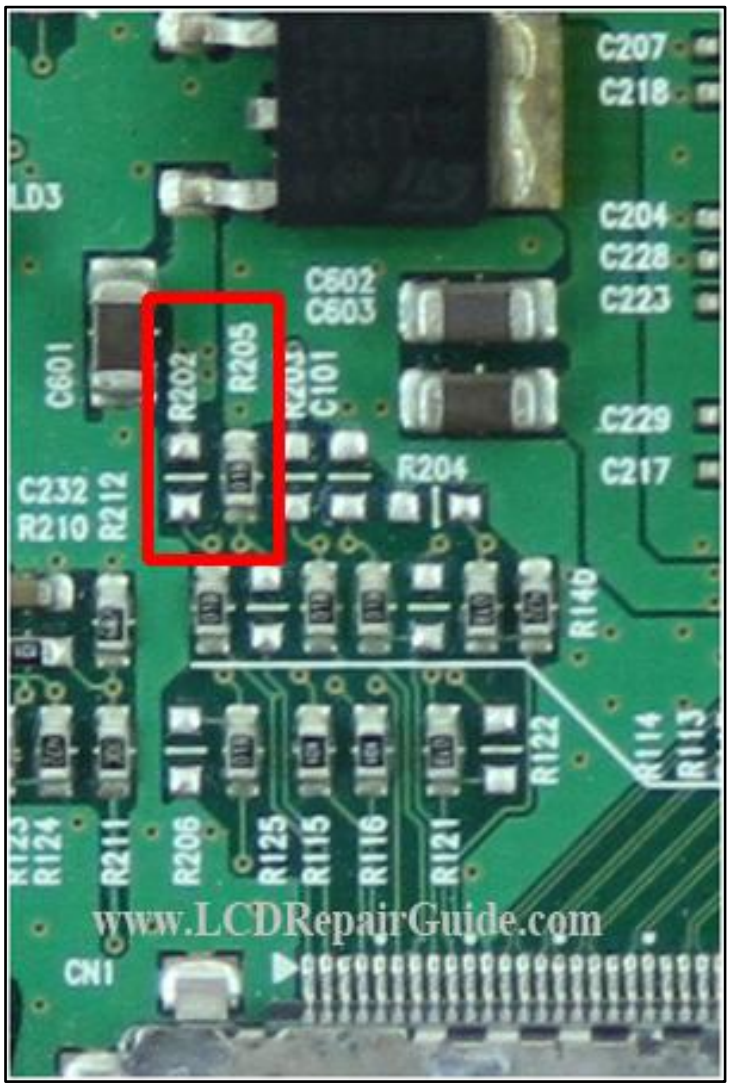
(B) T-con Board: 6870C-4000H

LCD Panel: LG LC320WUF SBN1, LC420WUF SBA1, LC420WUFSBB1, LC420WUD SBA1, LC470WUF SBN1, LC550WUD SBA1

Desc: LC320/420/470/550WU_120Hz

When the TV display is upside down problem or display is in wrong/abnormal position, try to remove R205 to R202. If your T-con board R205 location is empty and R202 is present the resistor there, just removed the R202 resistor to R205 position (exchanged).

If the above methods also not solve the problem, then you can try to remove both R202 & R205 resistors and give it a try. If still the same problems then try to put both R202 & R205 with same spec resistor and try it again.



Note：How this display rotation method helps to us?

* Sometime after replaced LCD/LED TV Mainboard, T-Con Board or Panel, it will affect their display position on the TV screen. It is because of the

Mainboard firmware is not match/compatible with their Panel. Or the T-con board is not match/compatible with the Panel.

1) When the LCD/LED TV complaint problem is about display upside down symptom but without replace any PCB board inside the TV:

Normally this symptom is causing by their Mainboard setting or their memory IC firmware was abnormal. Or their T-con board EEPROM memory data was abnormal. With this type of symptom, first thing to do is login to their Factory Setting to do the adjustment for their display. If still not help, we can try to update their firmware into the Mainboard or re-programmed their EEPROM data to the T-con board. But both methods you need to get the correct model, same version and working firmware to do it with ISP Programmer. If not, you can try to use the "Display Rotation Method" above to repair it.

* If the Mainboard and T-con board firmware after updated also same problem, then you should check the R202 or R205 SMD resistor for bad solder point or dry join.

2) After replaced Mainboard, the display position was changed to abnormal position:

This type of display problem was because of Mainboard model number is same but their firmware version is not correct and not match with their current TV T-con board (Panel). Because some of the TV manufacturer, their Mainboard can using in different TV model and TV sizes. So their different is just the firmware version inside the flash memory.

With this type of problem, we need to find their correct firmware version and using the ISP Programmer to programming their memory IC. For the branded TV, it is hard to get their invert (upside down) version firmware. If that's the Universal Mainboard, they will provide the firmware to choose.

3) After replaced a LCD/LED Panel, the display is upside down:

Some LCD/LED Tv their T-con board location was on the top of the Panel. But some of the T-con board location was on the bottom of Panel. So when the LCD/LED Panel is broken and need to replace with a different model & brands Panel, we need to do some modify to it. For example to find a long LVDS cable

to fit in new LCD Panel. Or rotate LCD Panel to fit in old TV cover/holder. So the TV repairer if using the above method also can't solve the problem, so they can try to manually rotate that LCD Panel and modify their cable/s. Even this is a stupid method, but I saw some of the repairer they also using this method to solve their display upside down problem! ☺

How to Solve BOE HV320WXC-200 Panel Upside Down Problem

Panel p/n: BOE HV320WXC-200-X-PCB-X0.0

This LCD Panel was replaced a new T-con strip (this T-con board was attached with the Panel) with the TAB Bonding Machine. But the display is upside down. Normally this problem can solve by changing their mainboard firmware (upside down type) or login to the Service Menu to adjust their Mirror mode. Because of didn't have the upside down type firmware for their mainboard and the Service Menu also didn't have the Mirror mode, so will try other method to repair it.

Try to replace the old T-con board EEPROM IC to the new T-con board there, but still no help.

Finally found that it same as the LG T-con board, it has a special place to modify their setting through hardware method. That is to change their resistor position as change their T-con board setting. Refer to photo below:

- Original resistor position (Display Upside Down):
  R459, R458, R451, R455, R453

- After changed resistor position (Display back to normal position):
  R459, R458, R452, R455, R454

After changed these SMD resistors position, the TV display was back to normal now.

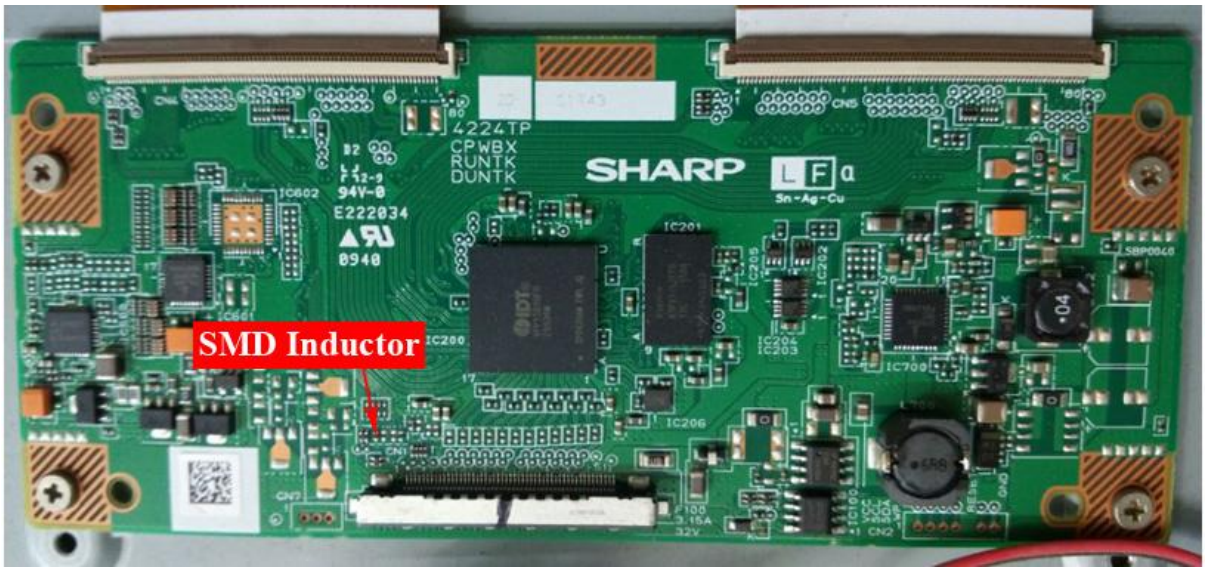
Display Left Right Reverse Problem Solved

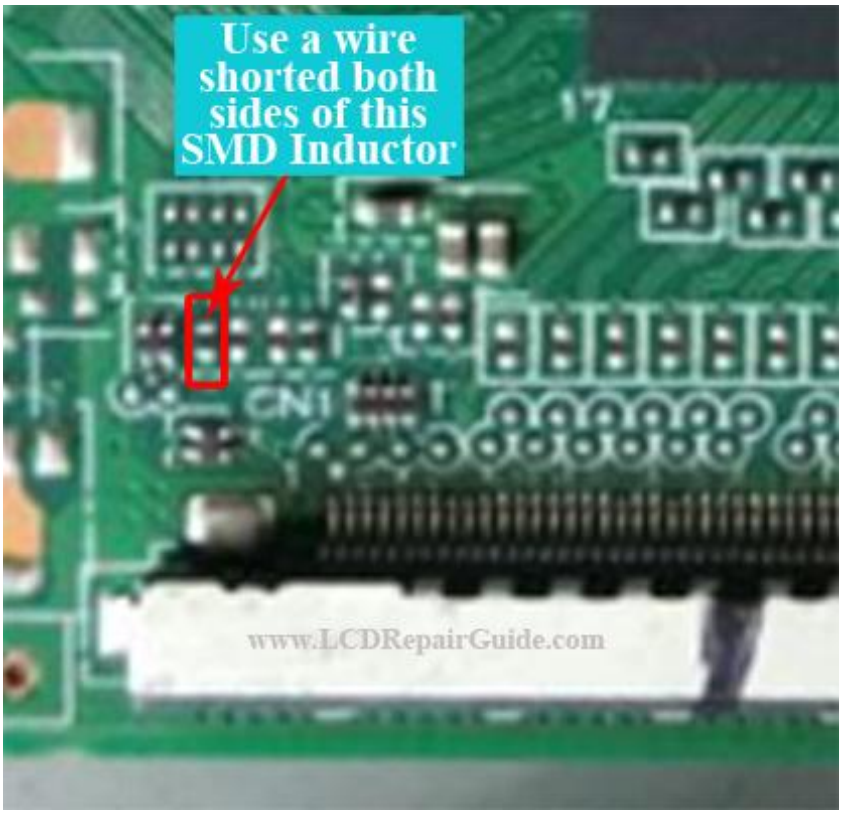
T-con Board: Sharp 4224TP CPWBX RUNTK DUNTK

Panel: Sharp 42 inches Panel

This Sharp LCD Panel has a common fault of display left half and right half was reversed. Please refer to the photos above. This TV even re-programming their Mainboard firmware also can't solve the problem. So confirm the problem was in the T-con board there. But this part number of T-con board EEPROM firmware is not available. So it is hard to repair it or maybe need to replace a new or working T-con board to give it a try.

Fortunately found this model of T-con board (Panel) has a common fault of this symptom. And the manufacturer also created the solution or service bulletin to repair this T-con board. The method is easy just solder a wire to shorted the smd inductor nearby the LVDS connector. Please refer to the photos below. After that this TV display problem solved!



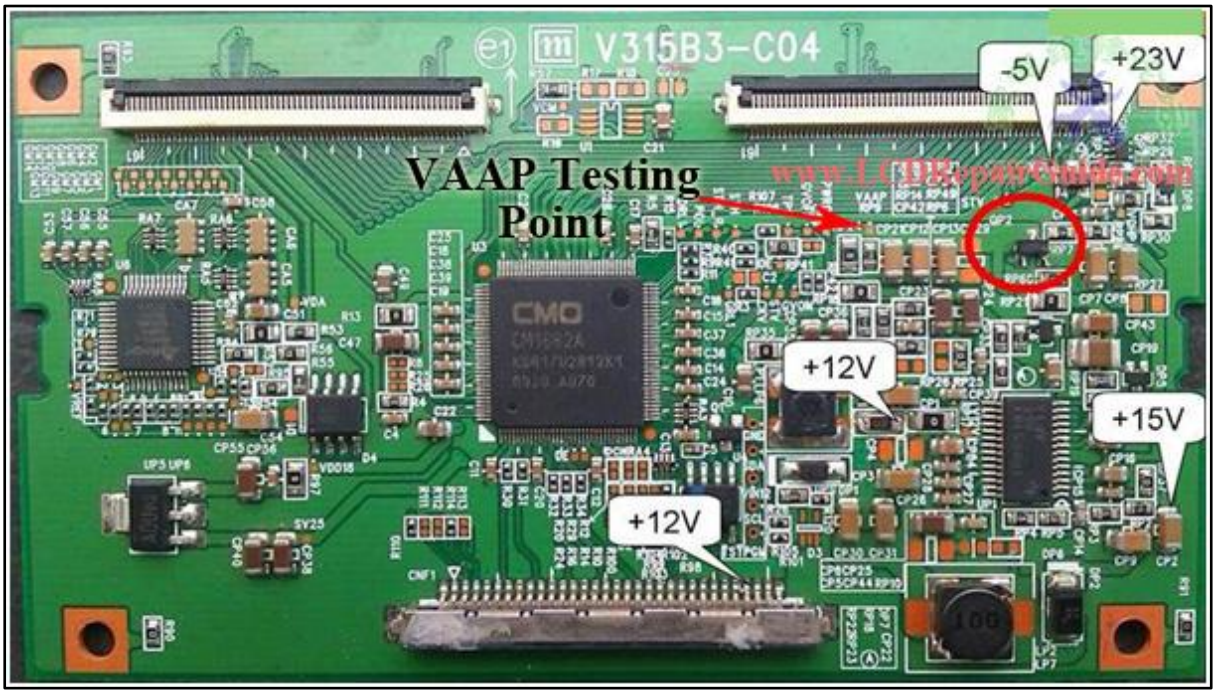


White Screen Problem on V315B3-C04 T-con Board

T-con Board: V315B3-C04

Panel Model: V315B3-L04

This T-con board has using in lots of brands and model LCD Tv, for example Sony, Hisense, Konka and etc.

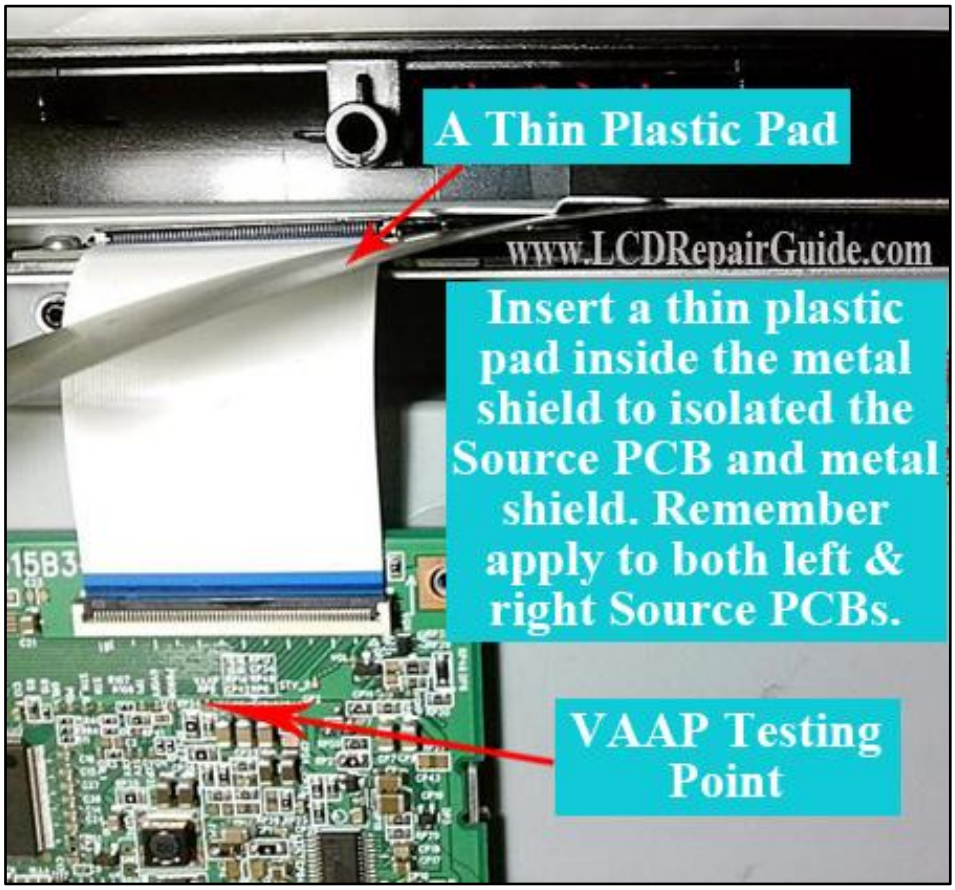


This LCD Panel V315B3-L04 has a common fault that is “White Screen’ problem. This is because of the V315B3-C04 T-con Q2 (A18E, P-channel MOS) was shorted. When this LCD Panel with white screen problem measures their VAAP (or calls it as VDA) is 0V. Power of the TV, using Ohm meter to measure the VAAP point to GND is about 2 ohm only! That’s mean some of the VAAP circuit component/s is shorted. After checking VAAP circuit found the Q2 was short circuit.

Remember! Please don’t direct replace the Q2 and power on the TV. Because it maybe will short or burn the Q2 or maybe take some time it will come back again with the same symptom. This is because of their LCD Pane l design bug! Their Source PCB and above metal shield not put an isolated pad in between

them. So it will easily Source PCB components touch the metal shield and shorted T-con board.

So insert a thin plastic pad or any insulated material to isolate the Source PCB and their above metal shield. Remember to put insulated of both left and right side Source PCB. After modify, this LCD Panel can last long to use.



Note: This T-con board VAAP to Ground good ohm values is about 26Kohm or above.

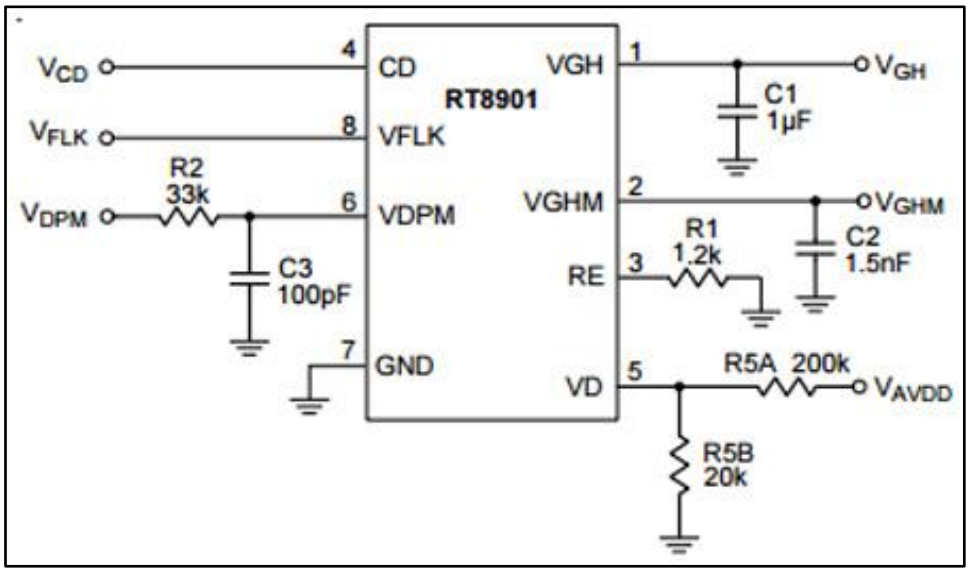
No Display or Grey Screen - Common Fault on LG 370WX4-SLA1_(6870C-0158A)

Panel: LG 370WX4-SLA1

T-con Board: 6870C-0158A

Symptom: No display or grey screen (no display but backlight lit)

This LG 370WX4-SLA1 has a common fault in its T-con board. The common fault symptom is No Display or Grey Display (because the backlight is lit). After checked the T-con board found that VHGM no voltage, but VGH has about 26V.



Found the U7 IC has VGH voltage input, but their VGHM is no output. After replaced U7 (RT8901), the TV No Display problem solved.

AUO T460HB01 V0 (46T12-C01) T-con Board with Randomly No Display Problem

T-con Board: AUO T460HB01 V0 / 46T12-C01

Tv Model: TCL LE468810 LED TV

This T-con Board has a common fault as randomly no display. Actually this type of symptom is very hard to troubleshoot. Unless we have all the working PCB boards use one by one to swap and test. Finally found the problem was their T-con board defective.

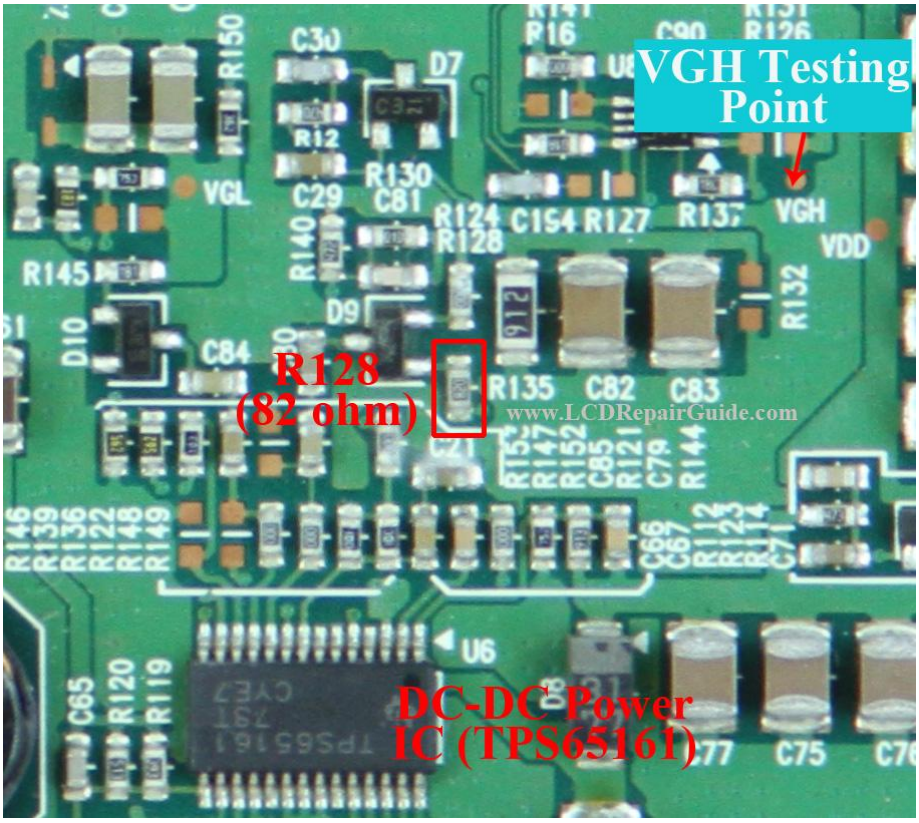
When the TV no display, checking their T-con and found that Q201 pin S (Source) is about 15.5v. Pin G (Gate) is 13.2v, but the pin D (Drain) is 0v, no output! After replaced this Q201 with AO3041A on T-con board, this TV is back to working now.

LG 470WU5-SLA1(6870C-0140B) No Display Problem Solved

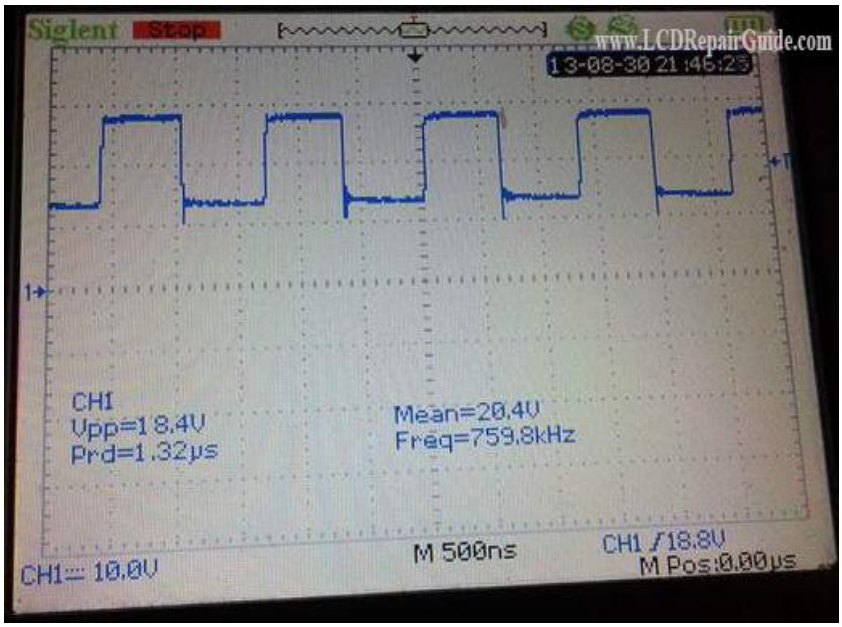
T-con Board: 6870C-0140B

LCD Panel: LC470WU5-SLA1

A 47 inches LCD TV came with complaint no display problem. After power on the TV, TV sound ok and backlight lit. So suspect the T-con board problem. After checked the T-con, found their VGH voltage abnormal just about 2V only.



Trace the VGH circuit line and found the SMD R128 (82ohm) was opened circuit. After replaced this resistor, the Tv can show the display perfectly. Below is the VGH waveform for this T-con.



How to Solve Samsung LCD TV Oil Painting Display Problem

The customer bought in a LCD TV with the symptom like display oil painting. You can refer to the photo below:

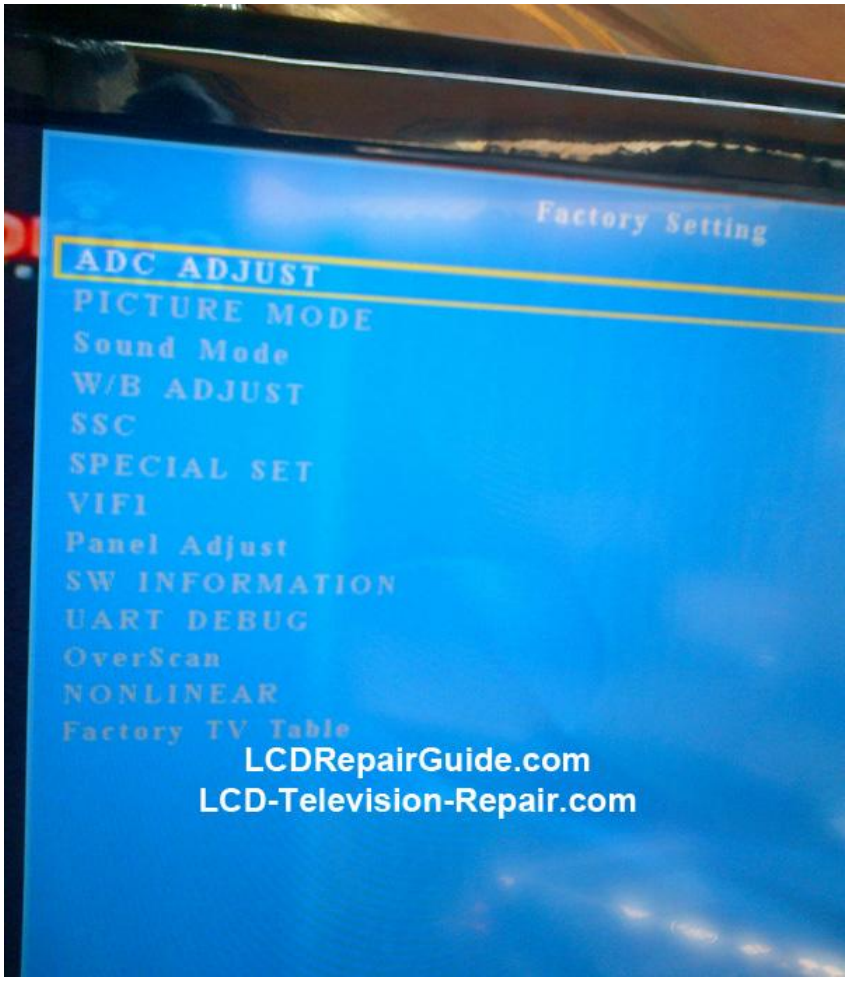
This LCD TV didn't have any logo in front of the TV cover and the rear cover also no any tv manufacturer details or the model too. But the customer said it is a Samsung LCD TV. After dismantle this LCD TV, their PCBs are use as photo below:

This LCD TV is using a Universal LCD/LED TV Mainboard, not the Samsung mainboard as usual we look inside the Samsung Tv. This mainboard part number is: VS.T811_V2.1. The photo of this universal mainboard:

This universal mainboard was using in many OEM brands LCD & LED TV. But this mainboard has a common fault it was the symptom of “Oily Painting Display” problem or Display Distortion problem on the screen.

Normally this symptom was causing by the TV Panel setting problem. Because of this universal mainboard(VS.T811_V2.1) can support several model panels for LCD/LED TV, so it has panel setting inside their Factory Setting.

Use the Universal Mainboard TV remote control and press the “SOURCE” button, after that press buttons 2, 0, 8 (within 3 seconds) and it will show the Factory Setting page on the screen.



Choose the "**Panel Adjust**" button, inside there to select "**Ti Map** 10 Bit T-=1". Exit the factory setting and restart the TV. The TV is back to normal now.

Yes! This Tv is showing the Samsung logo on the screen. This is a clone or copycat Samsung LCD TV!

This universal mainboard is using in many OEM LCD/LED TV. So you can learn this method to repair different OEM brands LCD/LED TV now.

How to Repair LCD TV Symptom with Blue Screen and Vertical Bars

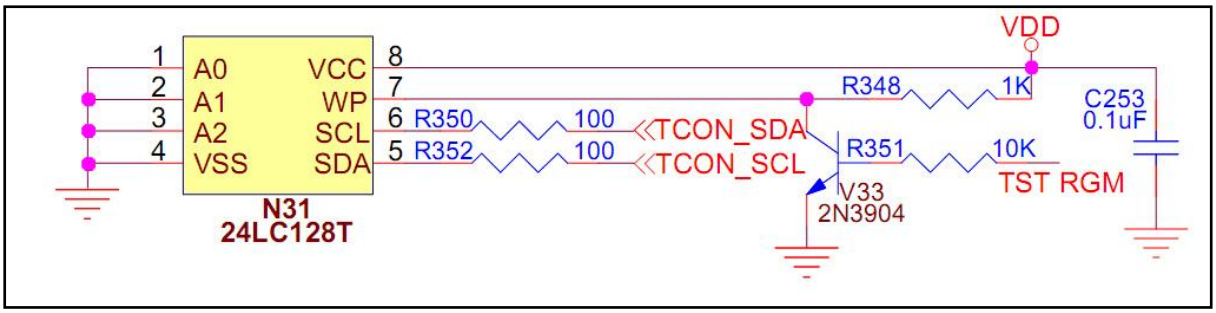
Brand: Hisense TLM-3233D LCD TV

Symptom: No Display but Blue Screen with Two Vertical White Bars

When power on this lcd tv, the screen show no display but blue screen with two vertical white bars. The two vertical white bars will flash but no any content inside. The LCD TV can hear the sound and remote control to change channel properly. Try other video signals input like AV and PC also same results. Even try to call out the OSD menu also same problem too.

Since the LCD TV cannot show the OSD menu and the TV got sound and change channel properly, so that the mainboard is normal. After observation this lcd tv, found that the problem could be in the T-CON board or LCD panel.

Check LVDS and FPC cables, they are show as normal, then check the T-CON board voltages. All voltages in T-CON board are ok, so that i will suspect the T-CON board mainchip (N39) or their memory chip (N31) defective. I got the junk T-CON board with same part number, but their DC-DC chip was burnt. So the mainchip and memory IC can be use.



Because of the N39 (CM2681) have many pins and the memory IC N31 (24LC128) only have 8 pins, so that I choose to replace the N31 first. After replace the N31, I try to power on the TV, and it was show display perfectly!

Since this N31 is a memory IC, does that mean IC itself damage or just the firmware corrupt and caused this problem happen? To find out this answer, I use my programmer to copy the working memory IC firmware and write it into the original memory IC. Do you guess what has happen? Yes, the LCD TV working perfectly too! So the problem solved and it was causing by the firmware corrupted.

The T-CON board memory chip or their firmware corrupt also can cause the screen problem. So that we need to save their firmware and must prepare some junk boards of T-con board, mainboard and inverter board for future use.

How to Repair the Display Washed Out Screen Problem

Model: Samsung LA-37A550P1RXXM LCD TV

LCD Panel: T370HW02 V.4

T-Con Board: T370HW02

When power on the tv, the screen is normal. But after about 10 seconds, it becomes blurring or nearly white screen/washed out. Like the picture below:

From the previous experience it is the T-con board problem. As usual, first check their T-con board top 5 voltages and other related voltages:

Vcc input= 11.63V

VGH= 27.01V

VGHC= 25.89V

VGL= -6V

AVDD= 15.61V

Vcom= 6.33V

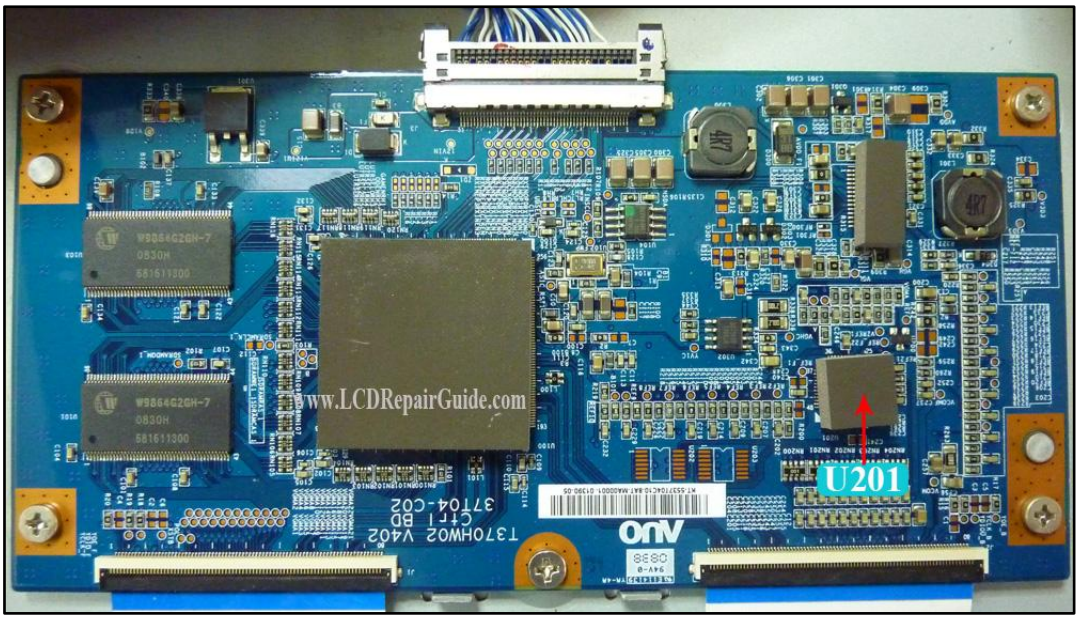
VGMA_REF= 15.56V

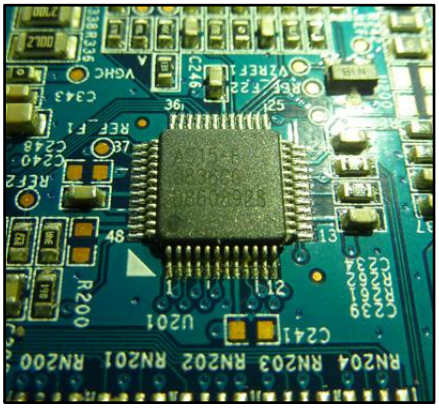
So the above voltages are normal. So next will checking the Gamma section.

*Below is the Gamma Voltage on T-con Board testing result:

No.	Marking Code	Bad Values	Good Values
1.	VGMA22	0.362v	0.365v
2.	VGMA21	0.419v	0.42v
3.	VGMA20	0.544v	0.545v
4.	VGMA19	2.903v	2.905v
5.	VGMA18	3.574v	3.578v
6.	VGMA17	4.37v	4.37v
7.	VGMA16	4.84v	4.84v
8.	VGMA15	5.06v	5.07v
9.	VGMA14	6.31v	6.31v
10.	VGMA13	6.6v	6.6v
11.	VGMA12	6.64v	6.64v
12.	VGMA11	13.75v	7.91v
13.	VGMA10	13.78v	7.96v
14.	VGMA9	13.84v	8.31v
15.	VGMA8	14.23v	9.83v
16.	VGMA7	14.27v	10.1v
17.	VGMA6	14.36v	10.66v
18.	VGMA5	14.98v	11.62v
19.	VGMA4	15.5v	12.43v
20.	VGMA3	15.54v	15.28v
21.	VGMA2	15.54v	15.43v
22.	VGMA1	15.55v	15.5v

From the above table, found the VGMA3~VGMA12 are abnormal. Because it is not a smooth ascending or descending voltage values for a Gamma voltages. Suspect their Gamma IC failure. After remove the heat pad and saw that's a "popular" Gamma IC, AS-15F (U201)! So highly confident after replace this Gamma IC, it can cure the white screen problem from this TV.

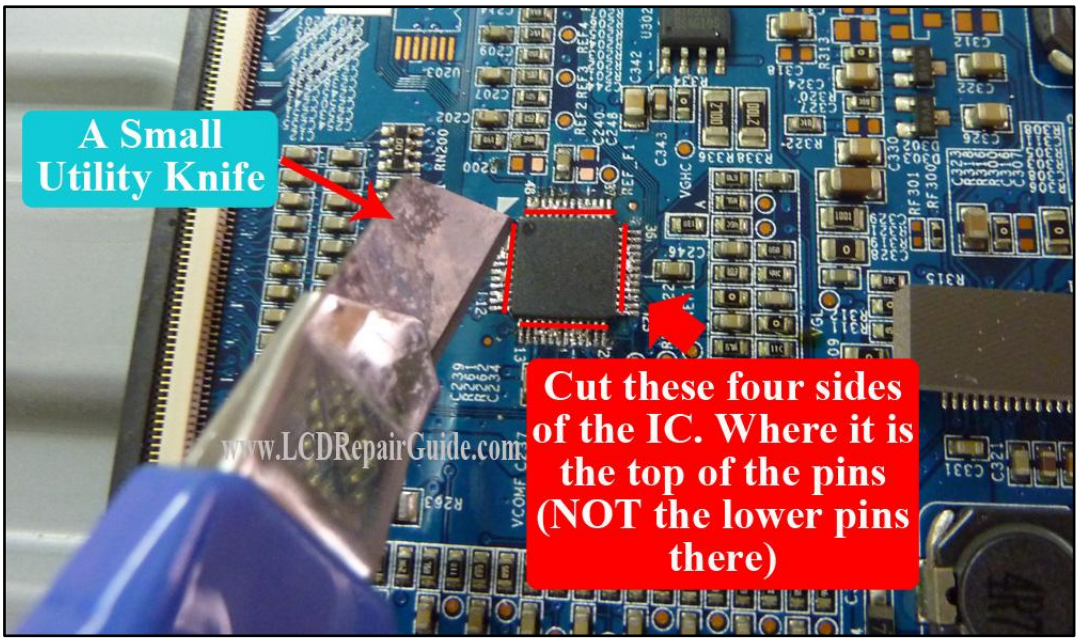




How to Easily Remove AS-15F IC without 3 Minutes

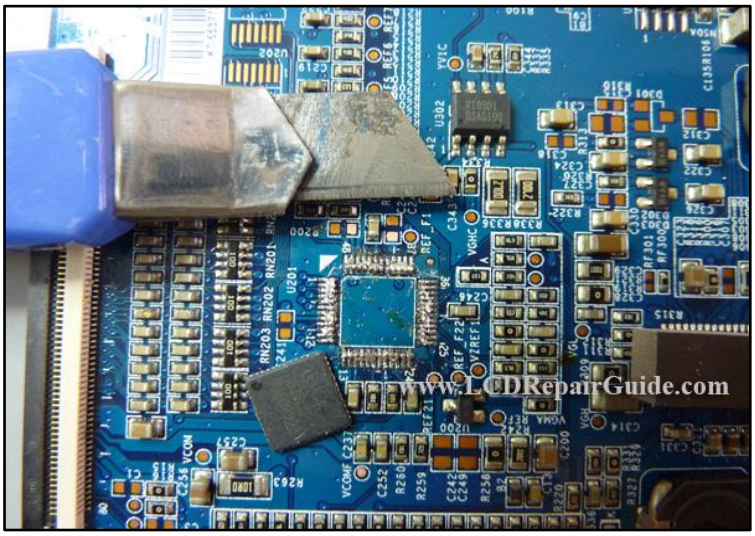
Here has a question, how to remove this AS-15F spider IC easily? Because lots of the repairer facing a problem is hardly to remove this IC even using their soldering reworks station!

This method you just need to use a utility knife and a normal soldering iron can easily remove this IC! Yes, within 3 minutes you can do it. But make sure you're trying many time before. ☺

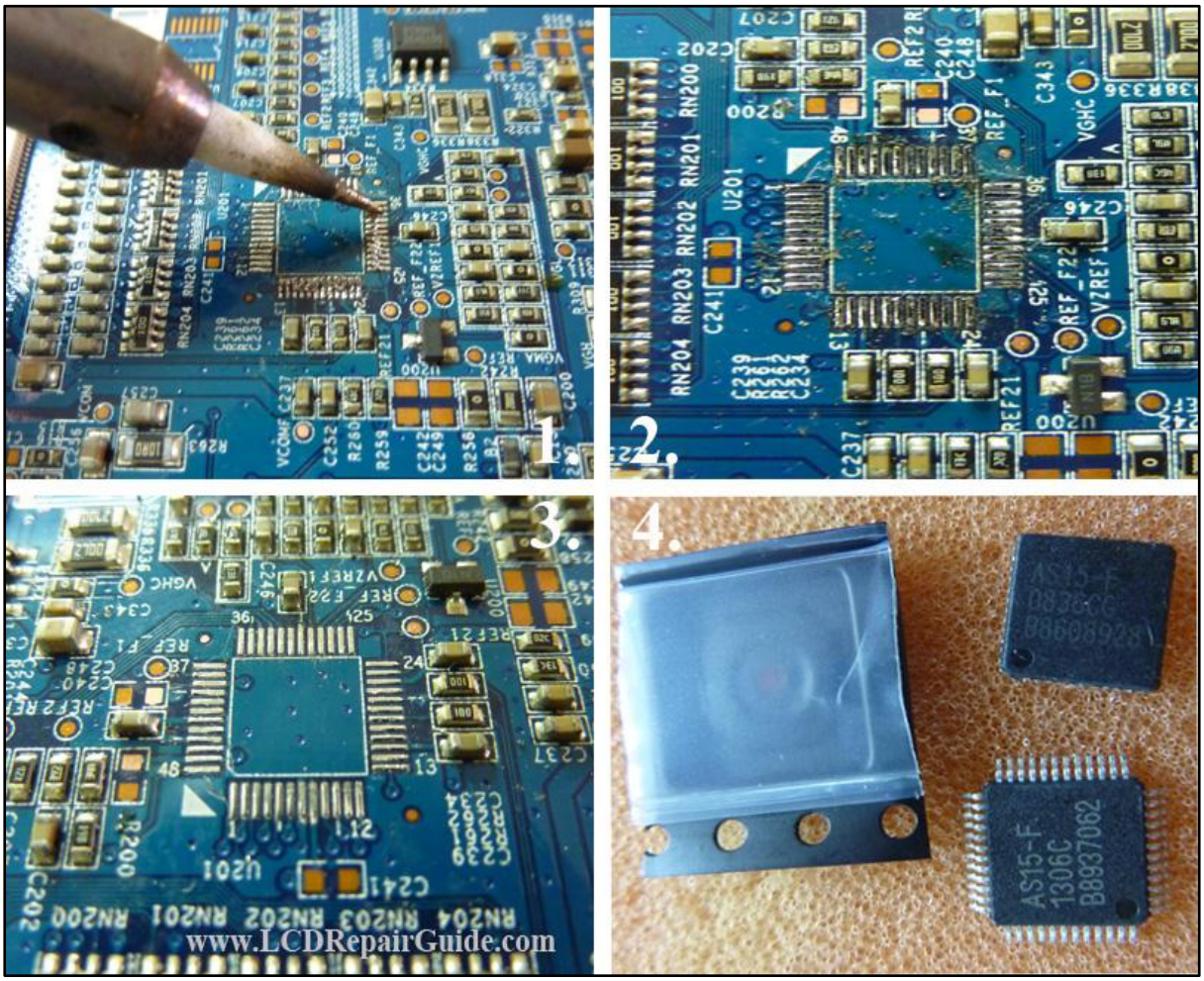


Use a small utility knife, put on the top of their IC pins, move the knife with one way only! Please don't move the knife two ways, because it will hard to cut the pins and easy to damage the PCB board circuit line. One side of IC pins just moves 3~4 times and then next side. The strength and pressure to move the knife will depend by you to adjust it. After cut out four sides of IC pins, you can feel that IC can take out from the PCB.

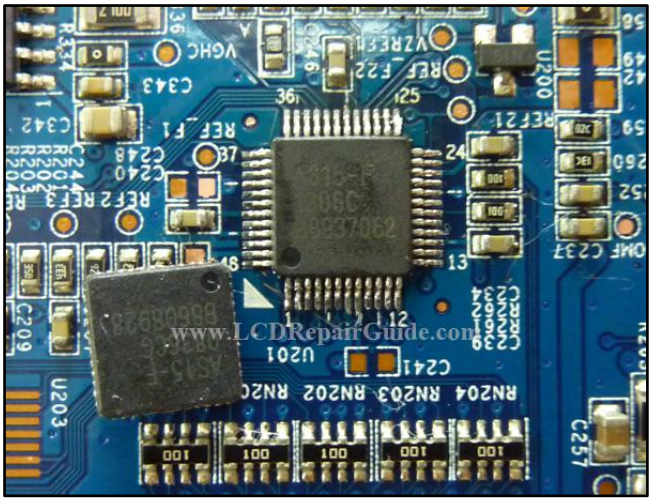
For your information, if the Gamma IC is AF-15HF or AS-15HG type, below or bottom of the IC has a ground or heat zinc solder on PCB there. So this type of IC is very hard to remove from PCB if using the rework station or hot air gun. But with this method it is easily to take out the IC. After cut out four sides of IC pins, use a flathead screwdriver to take (tilt) out the IC! So it is not a problem to remove this IC from T-con board.



After removed the IC, use soldering iron, flux, goot wick and alcohol to clean it up.



When need to solder new IC on the T-con board, first solder one pin of each side of the IC to make sure IC pins on the right position. After that we can solder all the IC pins.



Before power on the Tv, please double check the Gamma IC AF-15F on the T-con board. Is it any pin/s short together or any dirty solder on the pins there or not? If everything ok, power on the TV. Finally this TV is ok now.

Note:

After replaced the AS-15F IC, if you found that LCD Display show a bit darkness than a normal display, that's mean your AS-15F IC not soldering properly. You also can use the finger to press down a bit of this AS-15F IC, if the display quality can change a bit, that's mean the AS-15F not soldering properly. So you need to re-solder this IC again.

Part-5

All Good LCD/LED Screen Panel Repairing Information and Bonuses

TAB/COF IC Equivalent List

This equivalent list is to let you easily find out a replacement TAB or COF IC when the original TAB/COF is not available or no stock. It is a common issue for the TAB Bonding Machine owner. Even they have the expensive TAB Bonding Machine in their workbench, if the failure COF IC is not available or no stock, it will quite frustration. Because we use lots of time to bring in this TV, dismantle the TV cover, PCB board and troubleshooting time, but the part is not available or no stock. So the repairer will waste lots of time and money or even reduce the repair income too.

So this TAB/COF Equivalent List is to let repairer easily to find out the suitable replacement TAB/COF IC for their Panel repair.

No.	TAB/COF IC Part Numbers	Equivalent Part Number/s
1.	8031-DCBKO	NT39962H-C5107A
2.	8031-DCV17	VSN21074A
3.	8033-GCY07	NT39658H-C1294A
4.	8154-ECBL6	NT39935H-LS206B
5.	8159-CCBQ1	8159-ACBPU
6.	8656F-COYB	NT39538H-1272A
7.	D10D4558310-CFOC2LX	CLS085201-(3LX)
8.	D160407NL-056 Note: Actually full part number is: UPD160407NL-056	D160407NL-055-C1
9.	D160418ANL-051	RM9216FB-OAN
10.	D160418NL-054	RM92165FC-OCC
11.	D160975NL-051	D160975ANL-051
12.	D160987NL-052	S6C2A72-52U D160987NL-055
13.	D160994NL-054	D160994NL-051 NT39931H-C02F7A
14.	D160998NL-053-C1	D160998NL-054-C1 RM92150FB-095
15.	D160998NL-038	RM92122FA-058 NT39921H-C02B7H D160974ANL-051
16.	LH16DD07	NT39990-C6003A
17.	LS08S6HH3-C2LX	LS08S6HT1-C2LX

18.	LS08S6HTI-C2LX	LS08S6HT3A-C3LX
19.	MC10558385-04M	SW9804A-04M
20.	MT3197B-VA	MT3197B-VC
21.	MT3725VB	LS0610BT1-C2LX
22.	MT3728VC	LS08S6HTI-C2LX LS08S6HT3A-C3LX LS08S6H73A-L32X
23.	NT39386H-C0265A	D160962NL-051
24.	NT39935H-C5213A	NT39935H-C5226A
25.	NT39941H-C0217B	RM92150FB-095
26.	NT39962H-C5107A	8031-DCBKO
27.	NT39980H-C5256A	8159-CCBQ1
28.	NT39981H-C20T5C	NT39981H-C20T1C
29.	NT39985H-C02M9A	RM92161FD-OAS
30.	RM92120FA-038	RM92122FA-058 NT39921H-C02B7H D160974ANL-051
31.	RM92150FB-095	NT39941H-C0217B
32.	RM92160FE-OAD	NT39981H-C02J5C NT39981H-C02J1C
33.	RM92161FA-OAM	RM92161FB-OAN
34.	RM92161FB-OAN	NT39985H-C02P1A
35.	RM92161FB-OAS	RM92161FE-OBO

36.	RM92161FD-OAS	RM92161FF-OCO NT39985H-C02M9A
37.	RM92312FC-80D	RM92312FC-80B
38.	S6C2B91-63	S6C2B94-61
39.	S6C27A7-51V	NT39812H-C1261A
40.	S6C2709-51D	S6C2709-51B
41.	S6C2732-51H	S6C2732-61
42.	S6C2732-52	S6C2732-52G
43.	SS8310-C1LX	LS08S2M7-C3LX
44.	SSD3258UR1	LH16DD07

Notes:

- If after replaced the TAB or COF, the display show something abnormal, for example one of the Y1 COF (Gate Driver side) replaced. But the display showing half horizontal top more brighter than the half horizontal bottom, in this case, you need to replace another Y2 and Y3 (If their Y COF IC have Y1, Y2 & Y3). Also same as the X TAB (Source Driver Board) too.

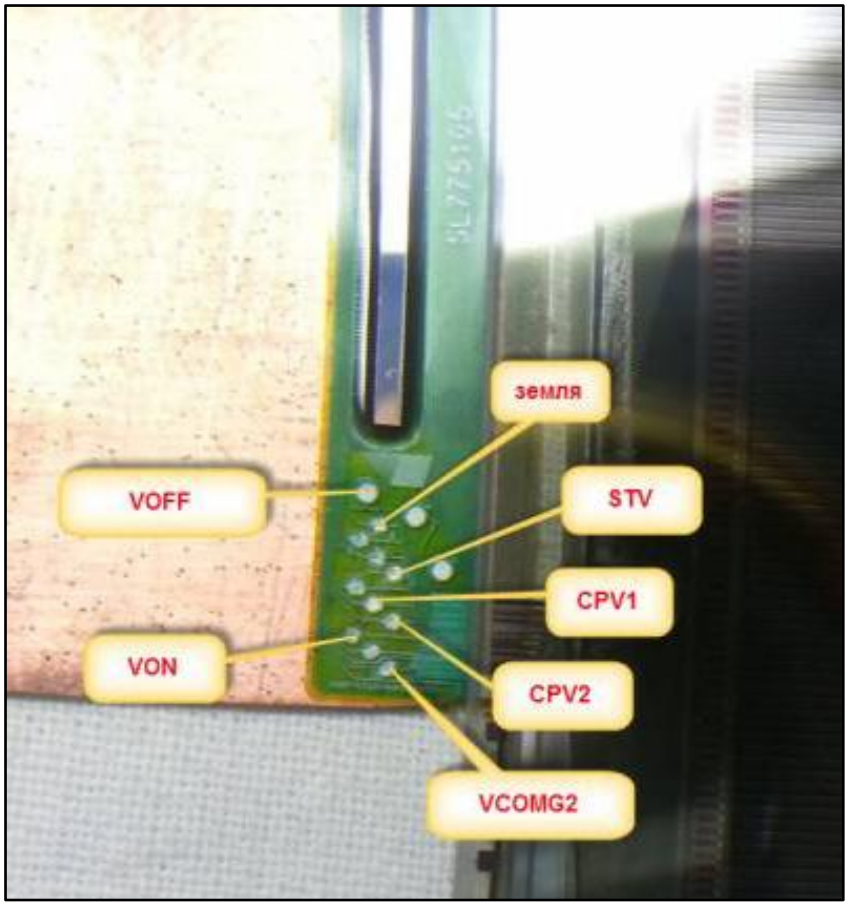
- If the equivalent TAB IC is a bit bigger than the original, you need to cut out some unused area before bonding the TAB into glass & PCB board.

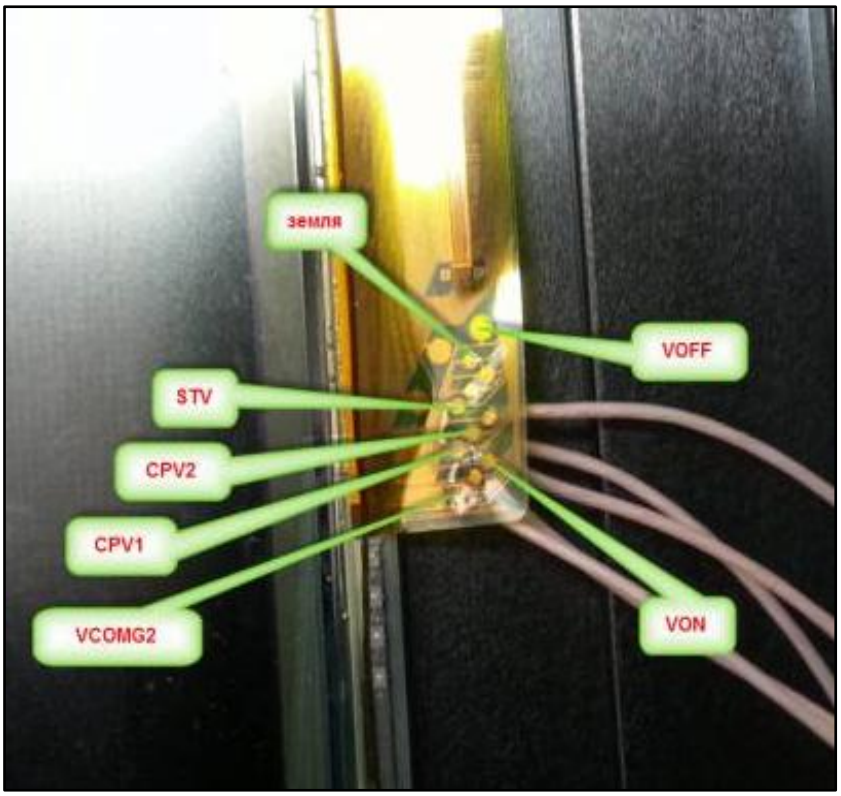
TAB/COF Bypass List

1) TAB p/n: Unknown

Panel p/n: LTZ400HA03

T-con Board: 400HASR2LV0.1 (Sony KDL-40W2000)

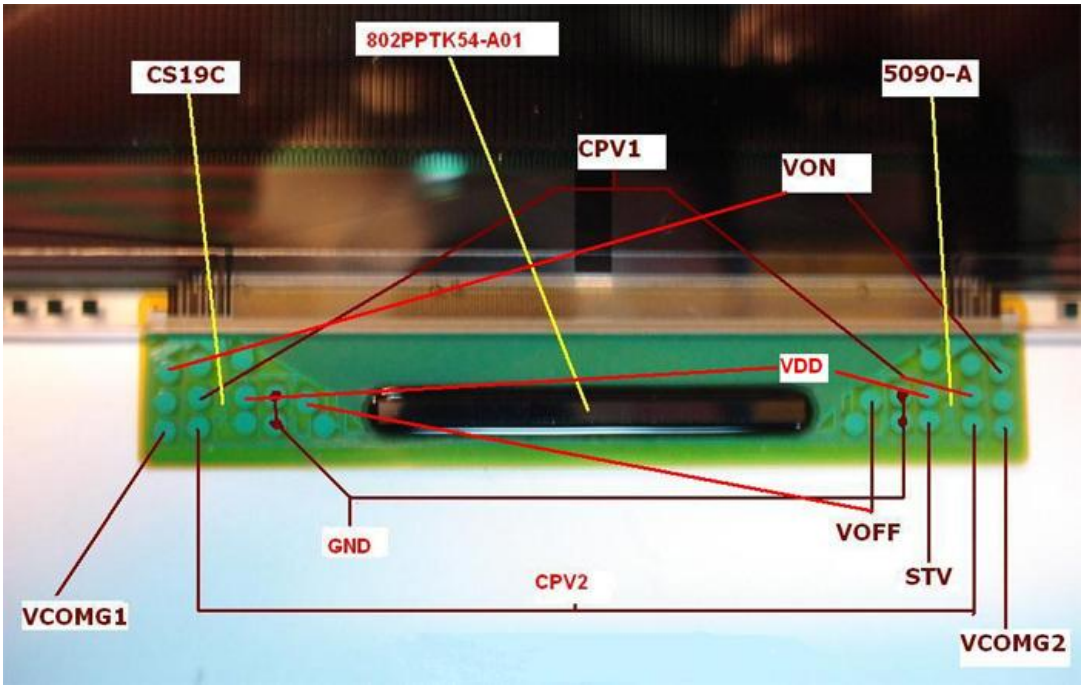


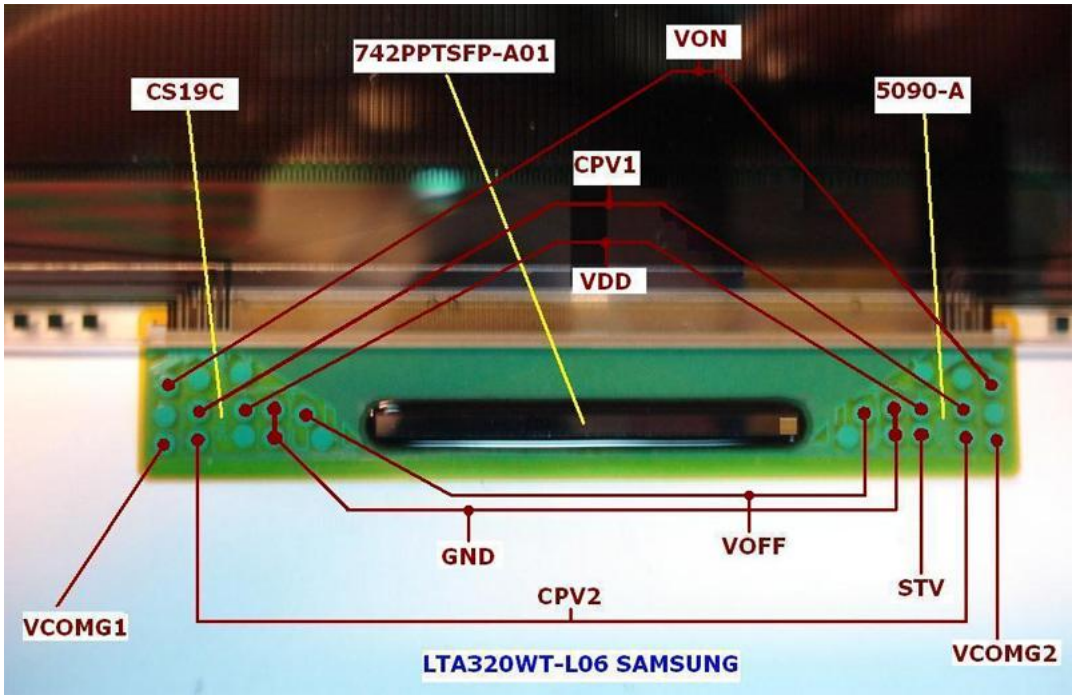


2) TAB p/n: 5090-A CS19C (802PPTK54-A01, 742PPTSFP-A01)

Panel p/n: LTA320AA03, LTF320AA01, LTA320WT-L06(Panel)

T-con Board: 320WTS2LV2.7, 320WTC2LV3.7(TCON)_320WTS2LV2.6 (Source PCB)

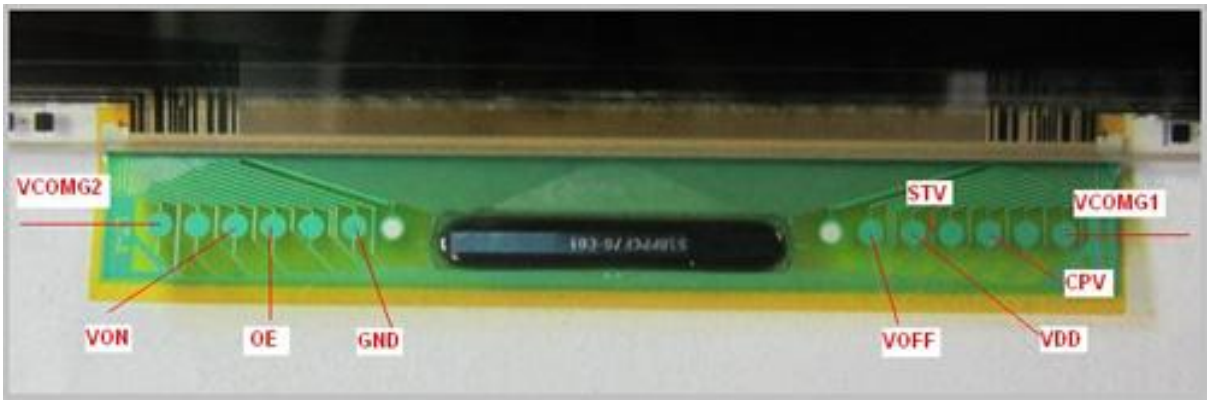




3) TAB p/n: 8632CS02A

Panel p/n: LTY320W2-L02

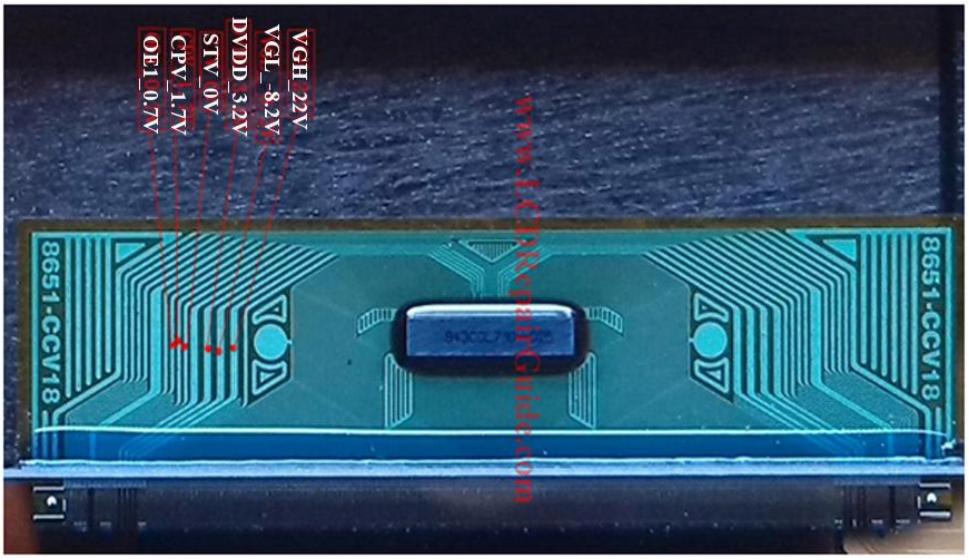
T-con Board: 320W2SL4LV0



4) TAB p/n: 8651-CCV18

Panel p/n:

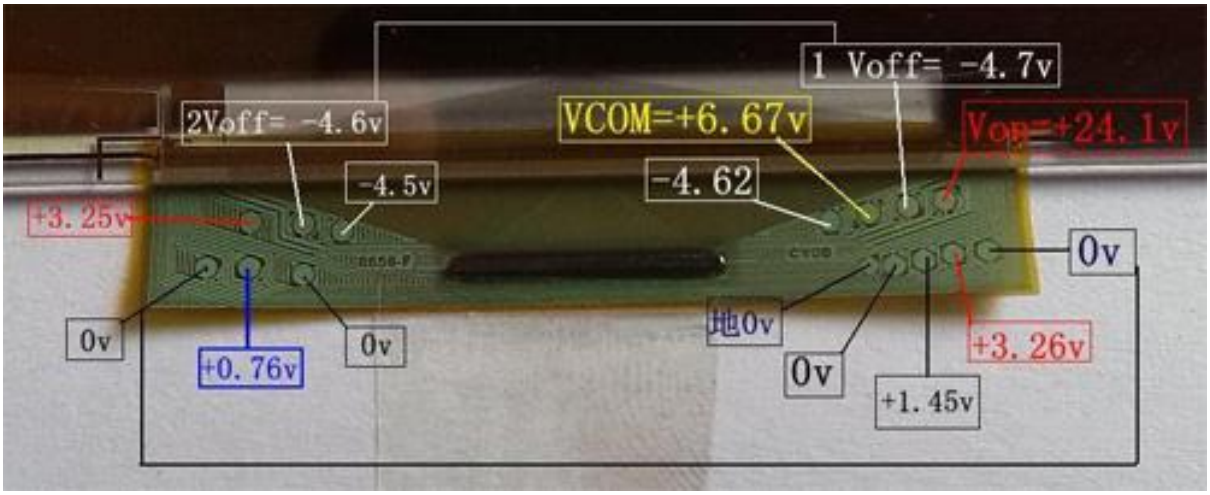
T-con Board:



5) TAB p/n: _8656-F CYOB

Panel p/n: HV320WX2-201

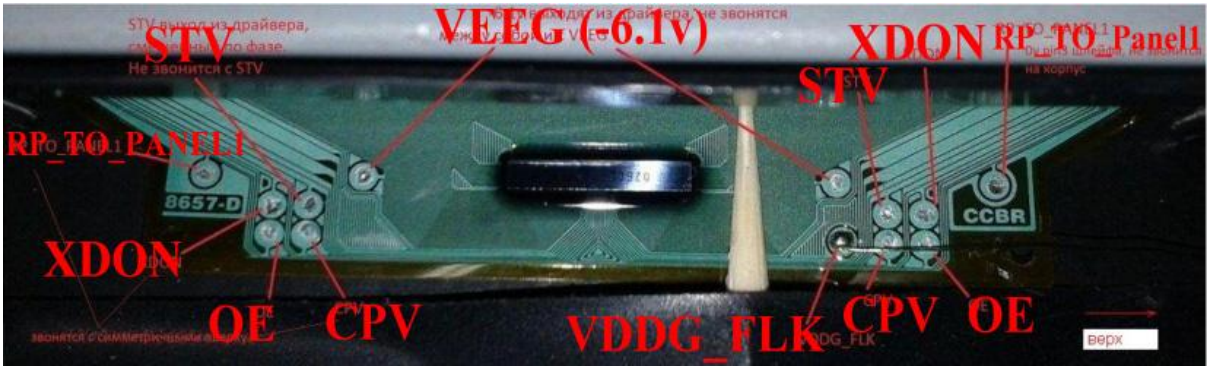
T-con Board:



6) TAB p/n: 8657D-CCBR

Panel p/n: CLAA215FA01

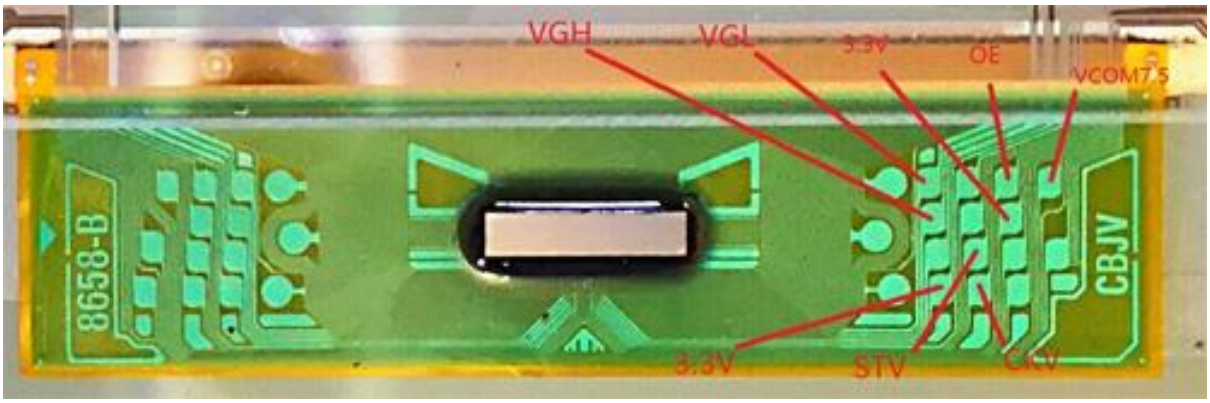
T-con Board: 215FA01CS



7) TAB p/n: 8658-B CBJV

Panel p/n: V315B6-L01

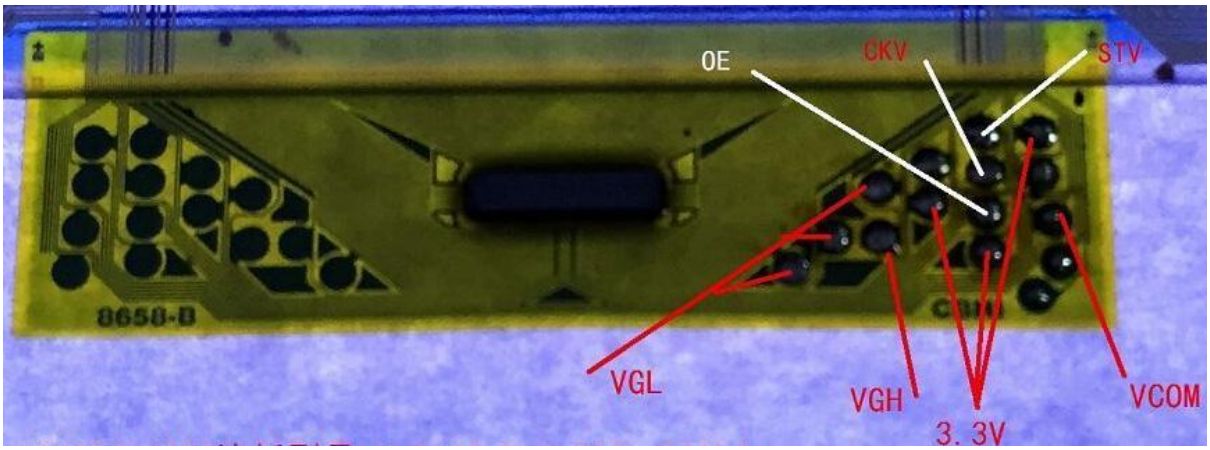
T-con Board:



8) TAB p/n: 8658-B

Panel p/n: V260B2

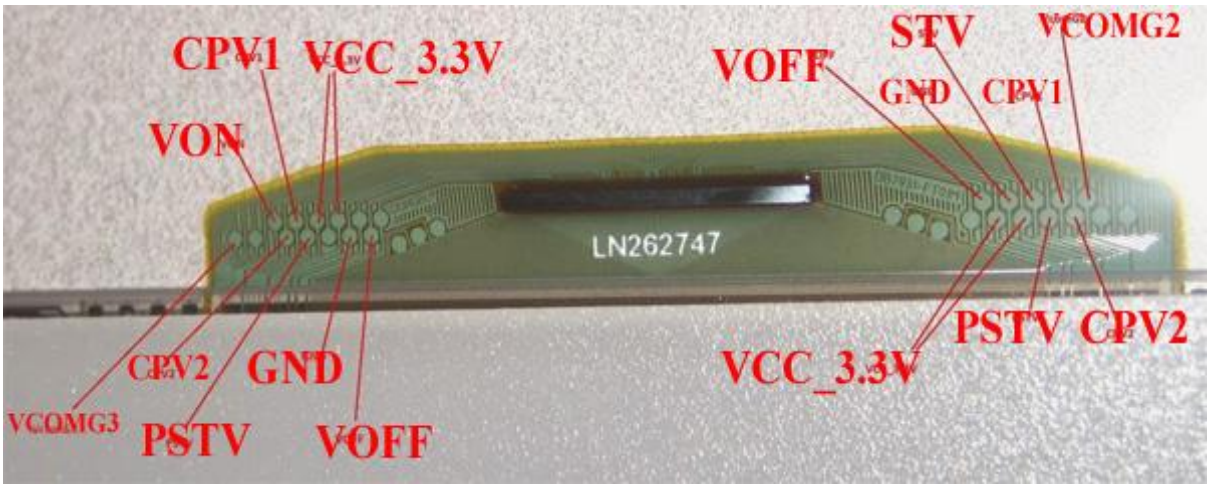
T-con Board:



9) TAB p/n: DB7931-FT01M (LN262747)

Panel p/n: LTA460HW04 (Toshiba 46ML963RB)

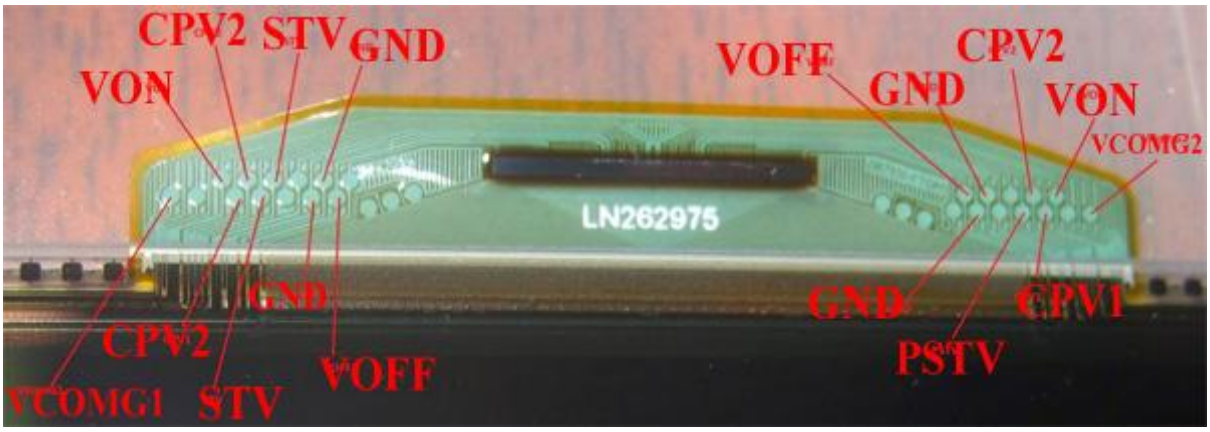
T-con Board:



10) TAB p/n: DB7931-FT01M (LN262975)

Panel p/n: LTA460HW04_Toshiba 46ML963RB-1

T-con Board:



11) TAB p/n: 943ST65

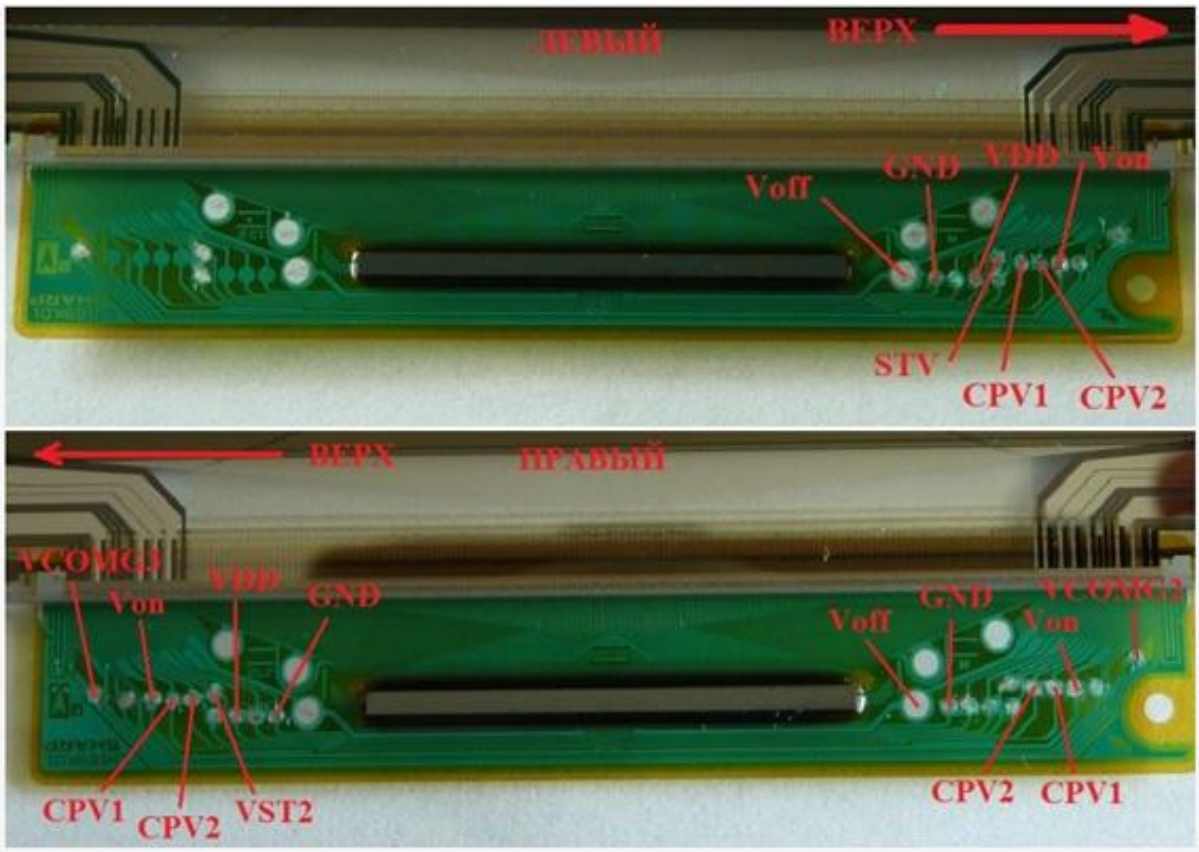
Panel p/n: LC420WUL-SBM2

T-con Board:

12) TAB p/n: LH169K01

Panel p/n: LTY460HH-LH2

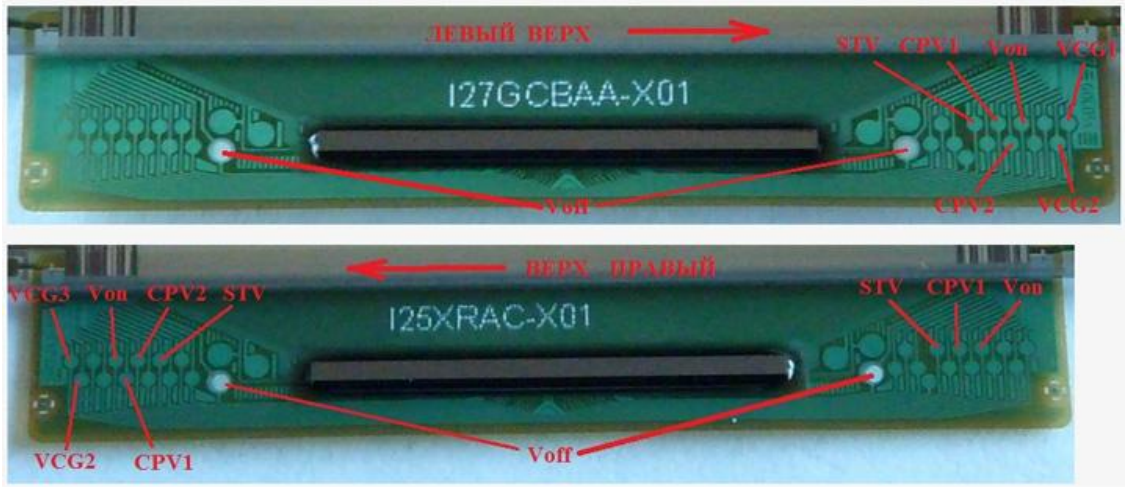
T-con Board:



13) TAB p/n: I27GCBAA-X01, I25XRAC-X01

Panel p/n: LTA460HB07

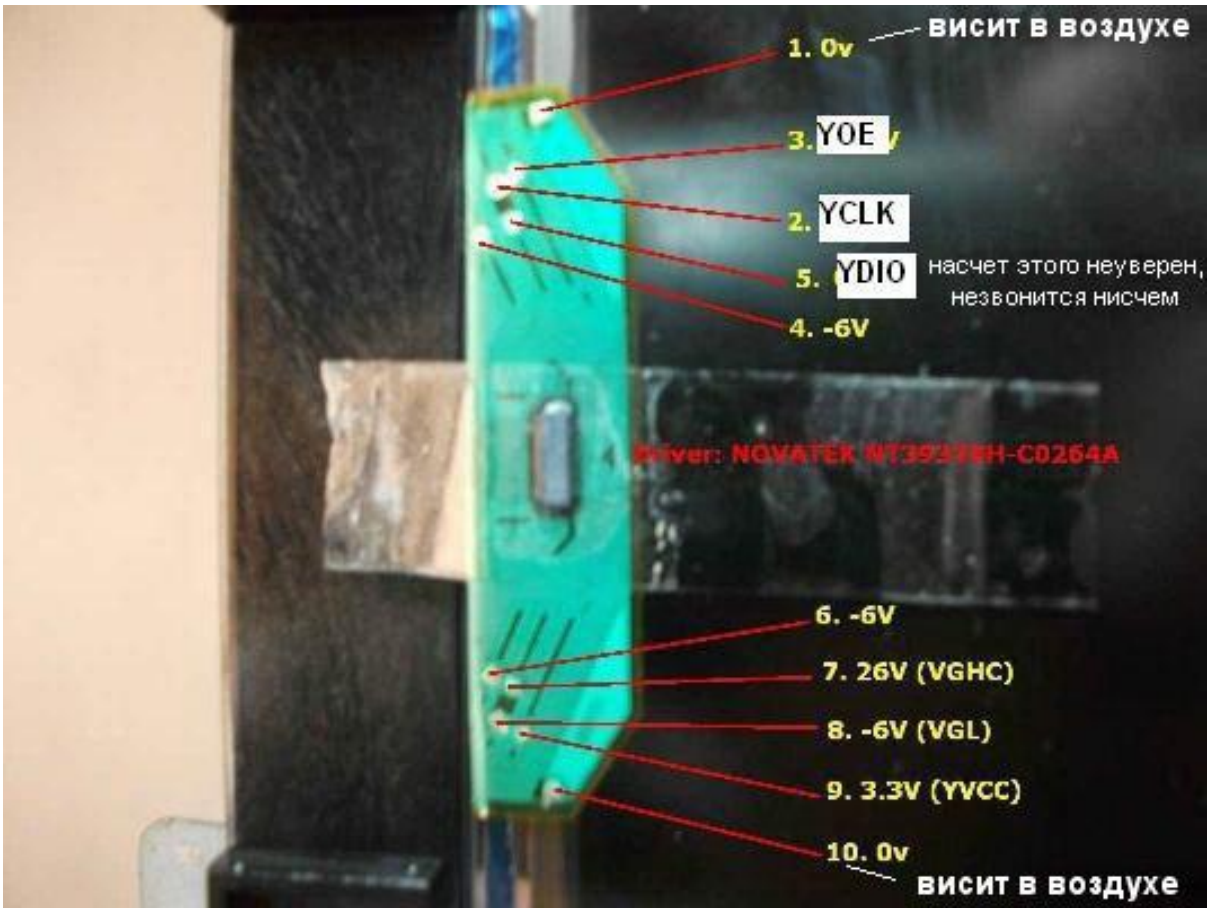
T-con Board:



14) TAB p/n: NT39329-C0264A

Panel p/n: (Samsung LE46A558P3F)

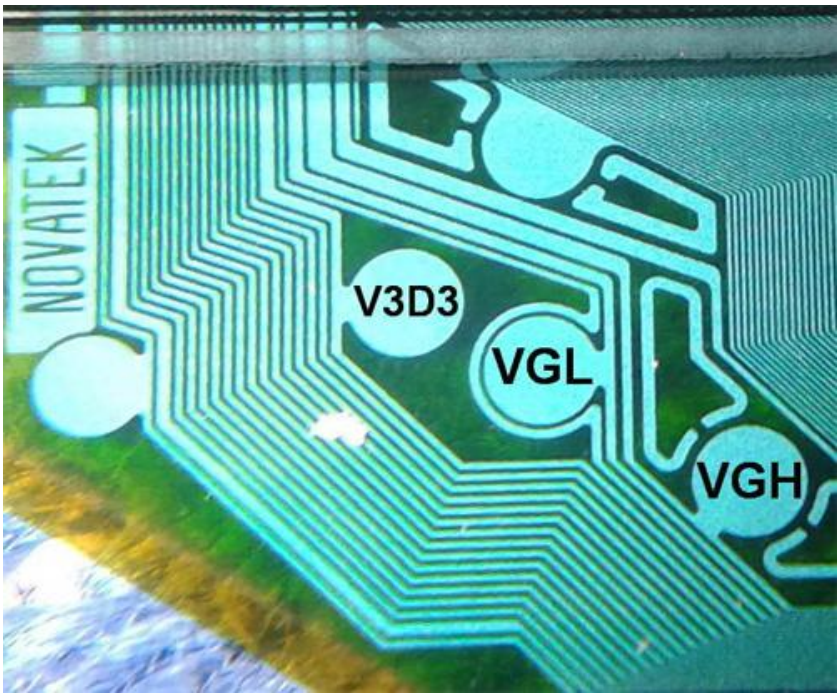
T-con Board: T460HW02 V0

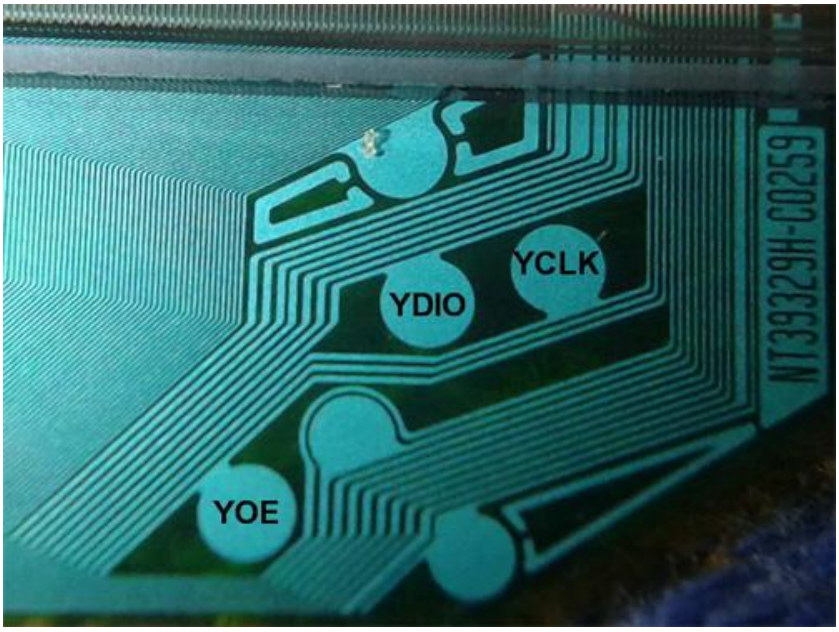


15) TAB p/n: NT39329H-C0259

Panel p/n: T230XW01V1

T-con Board:

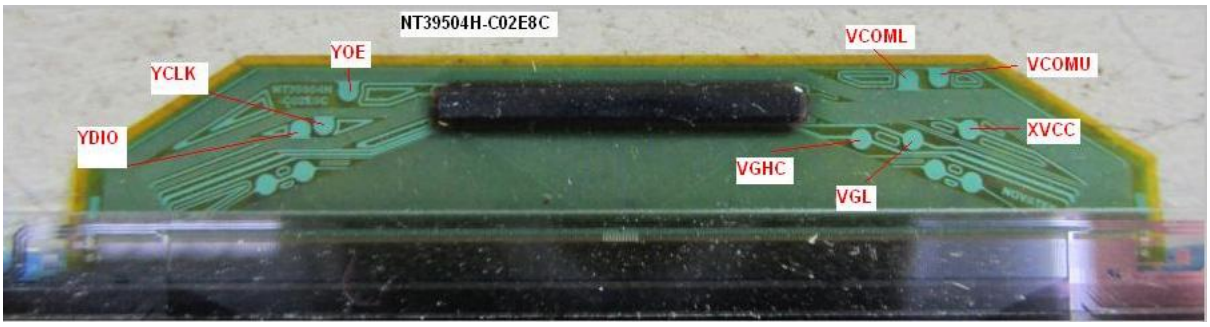




16) TAB p/n: NT39504H-C02E8C

Panel p/n:

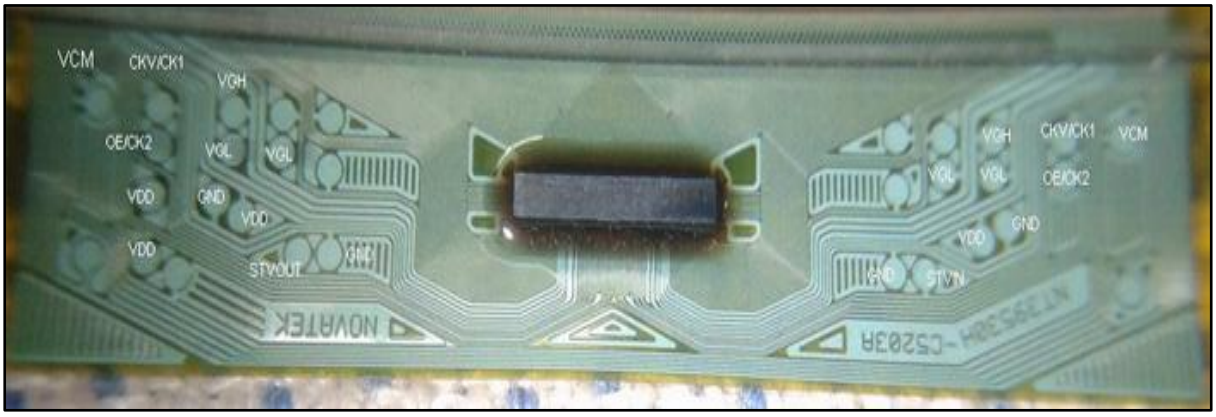
T-con Board:



17) TAB p/n: NT39530H-C5203A

Panel p/n: V315B5-CE3

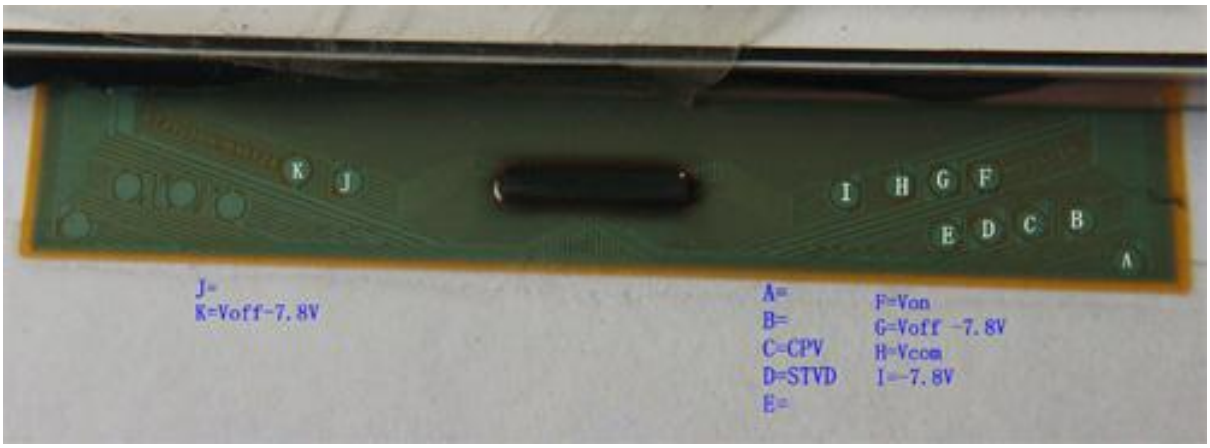
T-con Board:



18) TAB p/n: NT39538H-C1272

Panel p/n:

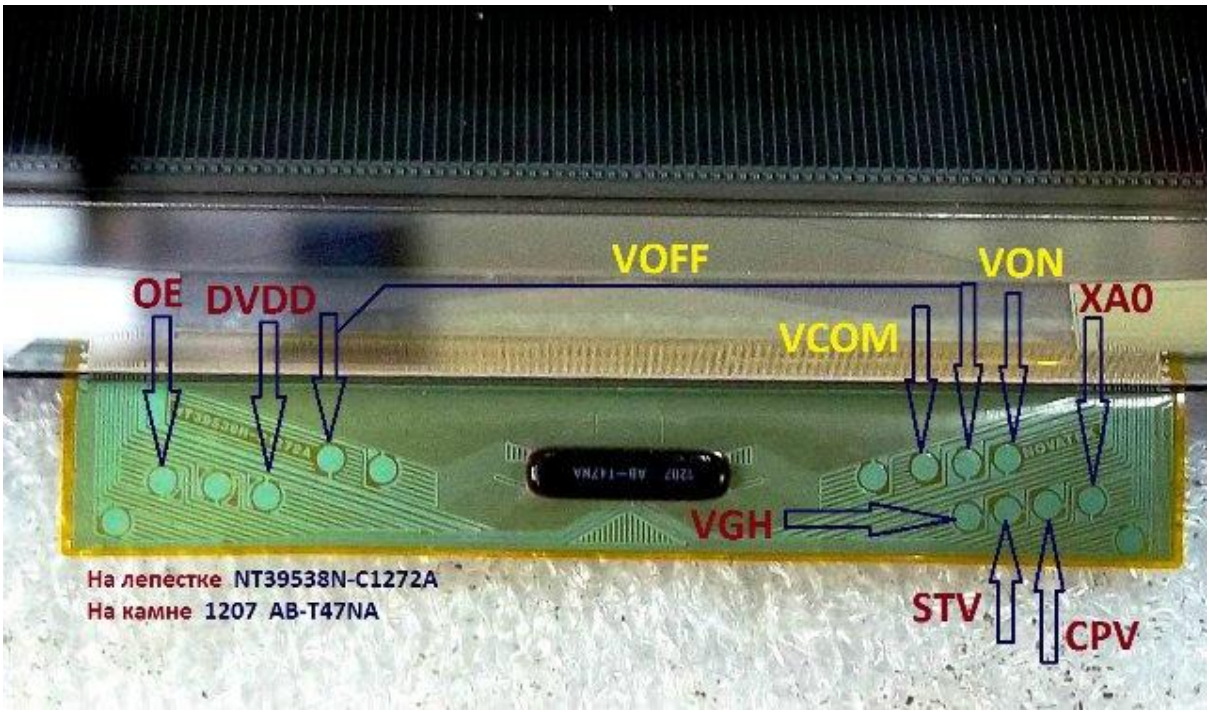
T-con Board:



19) TAB p/n: NT39538N-C1272A

Panel p/n: T315CK07-BW2, HV320WX2-201

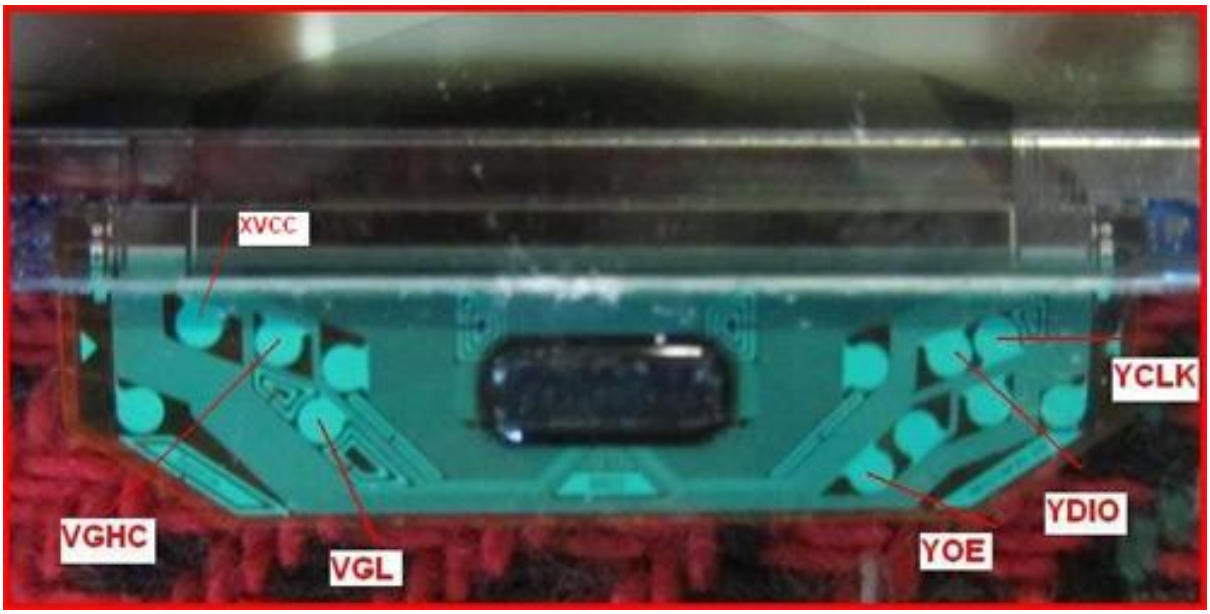
T-con Board:



20) TAB p/n: RM7611WFDO-006

Panel p/n: T315XW02 VL

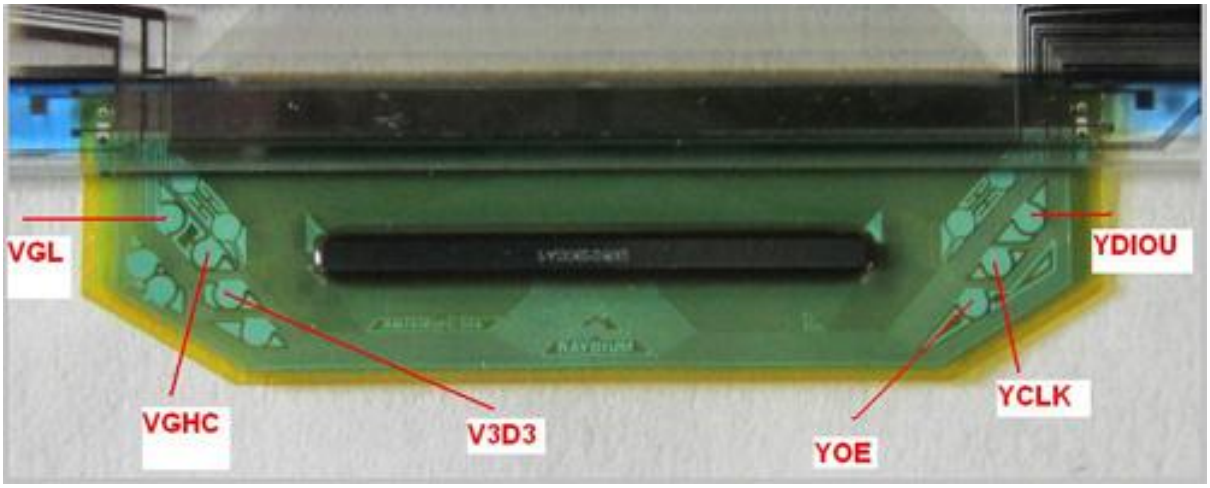
T-con Board: 8A9006CEA9 (Source PCB)



21) TAB p/n: RM76180FC-086

Panel p/n: T260XW04 V.3

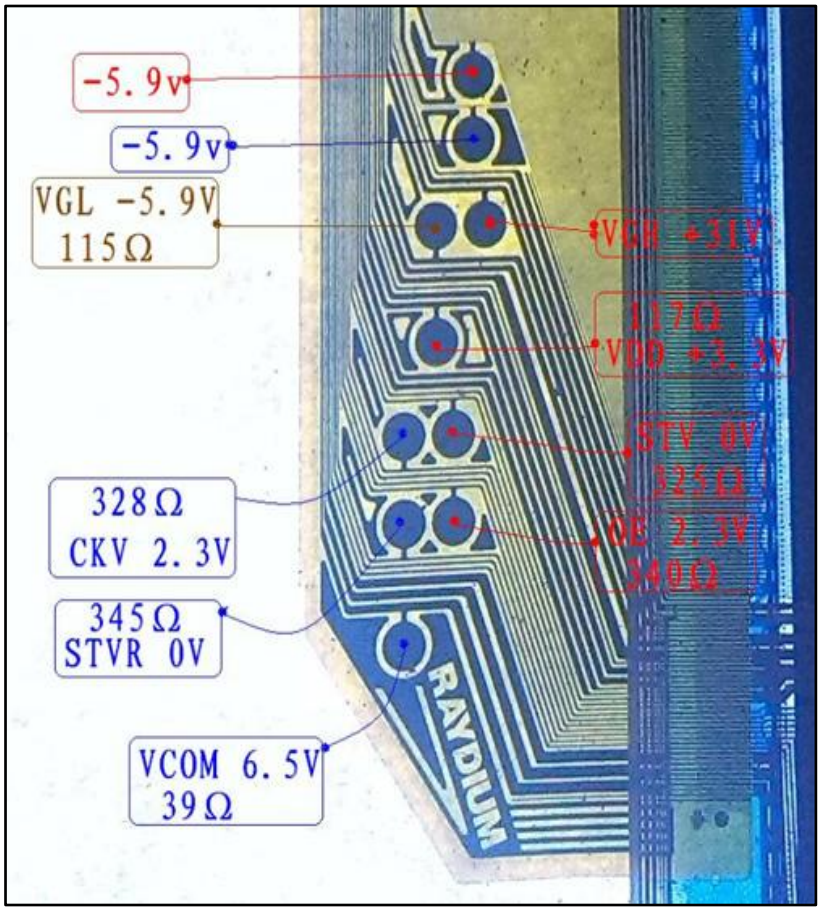
T-con Board:



22) TAB p/n: RM76311FC-805

Panel p/n: ST3151A04-1

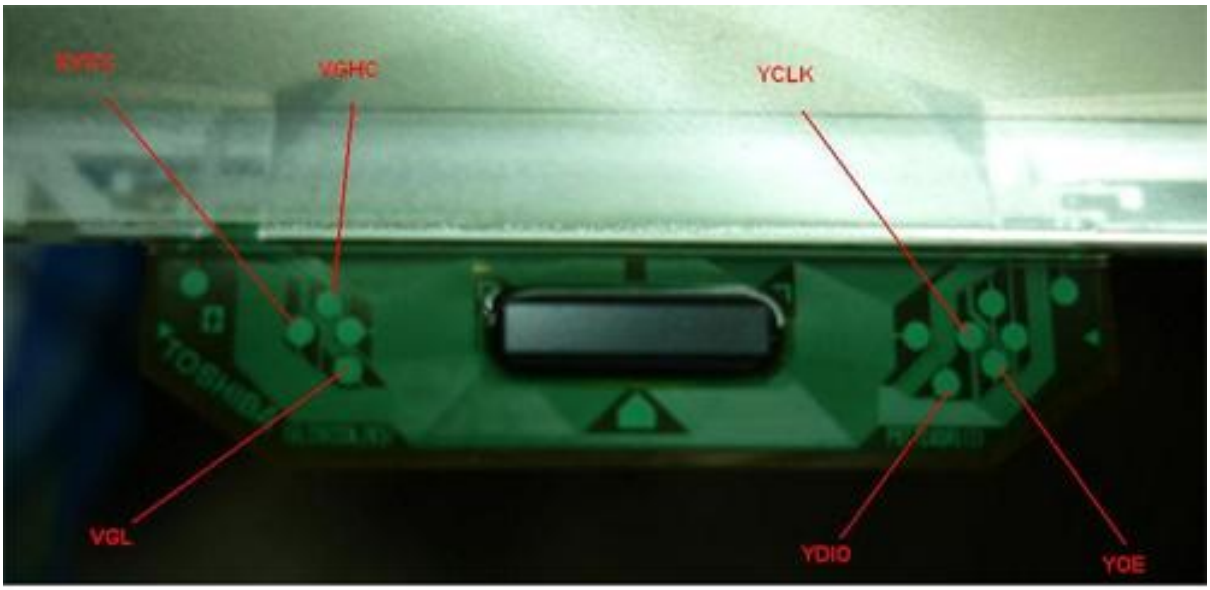
T-con Board:



23) TAB p/n: T6LC9(CCN.2KS) PBT7C40A1

Panel p/n: T315XW02 VB

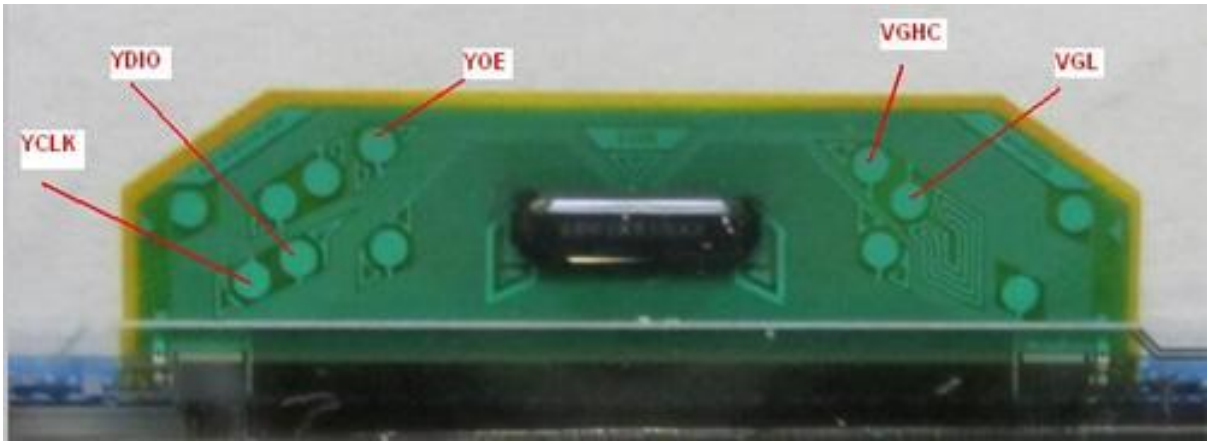
T-con Board:



24) TAB p/n:

Panel p/n: T260XW02

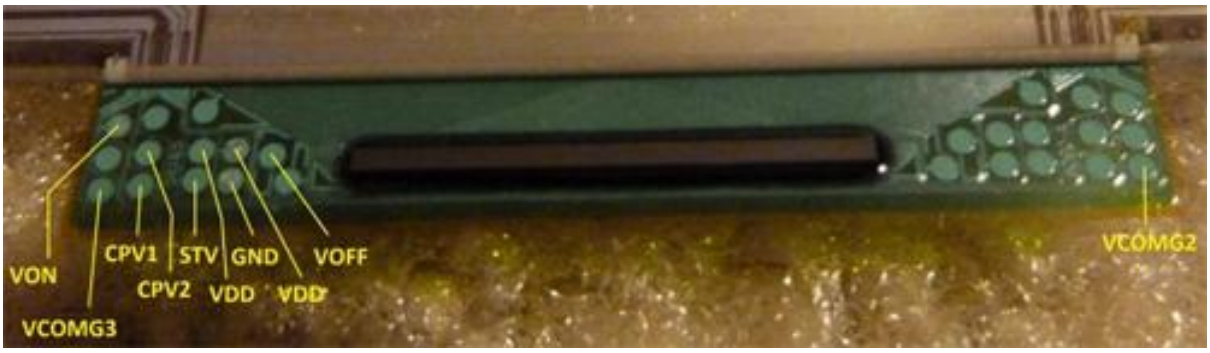
T-con Board:

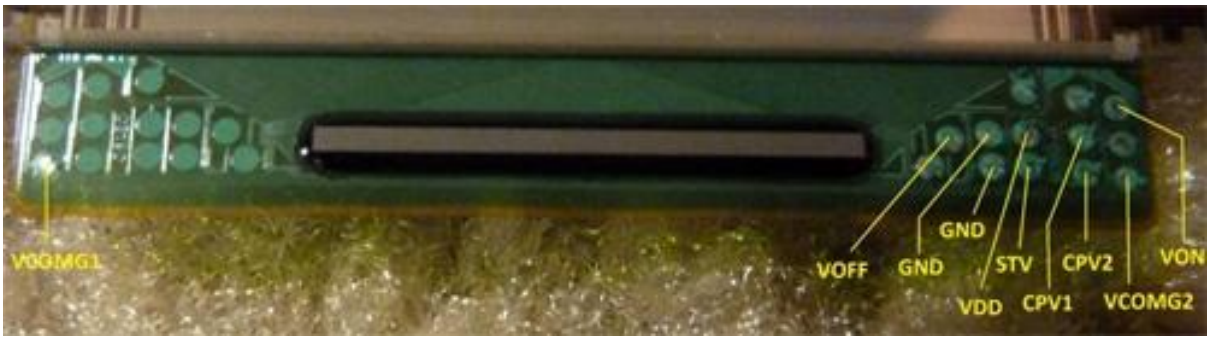


25) TAB p/n: 5090 A-CS19C

Panel p/n: LTY460HB08

T-con Board: 460HBSL2LV1.1

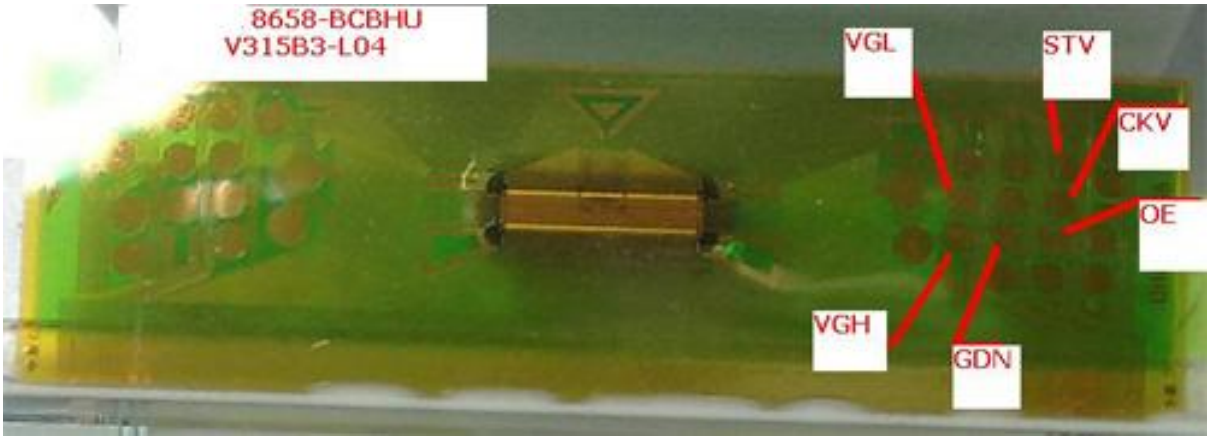




26) TAB p/n: 8658-BCBHU

Panel p/n: V315B3-L04

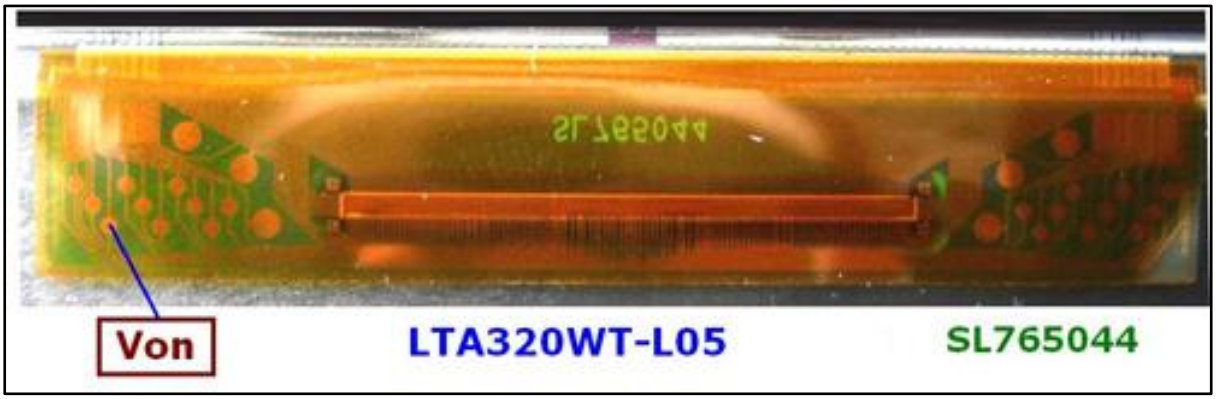
T-con Board:



27) TAB p/n: SL765044

Panel p/n: LTA320WT-L05

T-con Board:



28) TAB p/n: LH169K01

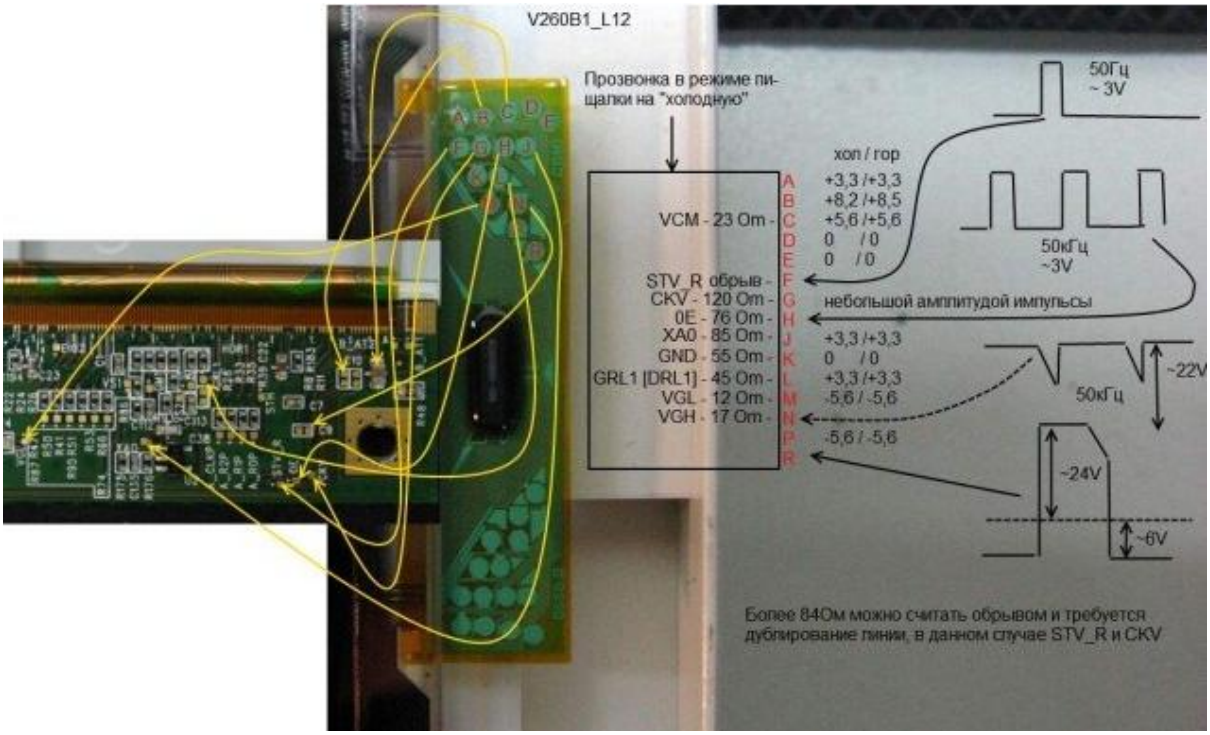
Panel p/n: LTA400HH-L01

T-con Board:

29) TAB p/n:

Panel p/n: V260B1-L12

T-con Board:



30) TAB p/n: 8658-ACBFV

Panel p/n: V400H1-L03

T-con Board:

How to Login to the Universal LCD/LED TV Mainboard Factory Setting

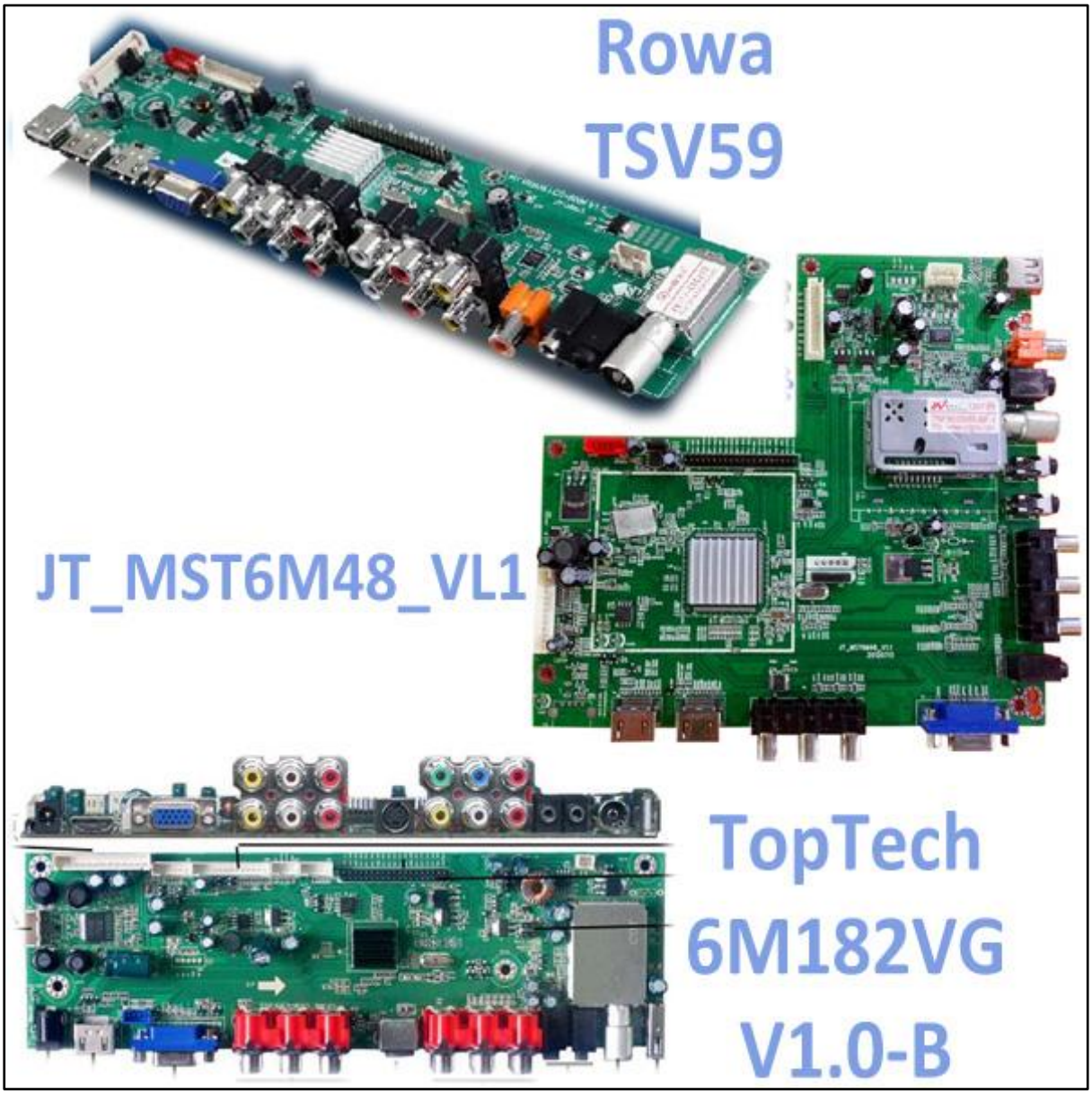
Nowadays found that lots of the universal mainboard using in the OEM LCD & LED TV now. Since this type of mainboard can support a wide range of Panel types, like sizes and resolution. So their firmware was design to match wide range of the LCD/LED Panel types. It can just control or adjust through their firmware setting to match the LCD/LED Panel install with it. At the same time, it wills also easy causing the Mainboard setting run away. If the firmware settings run away, it will cause common problem in universal mainboard like:

- **Display Distortion (Display Oily Painting problem)**
- **Display Upside Down**

So we need to logging in to their Factory Setting and make a correct adjustment to solve this type of display problem.

They have lots of Universal Flat TV Mainboard manufacturer in market now. Most of them are from China. But their universal mainboard part number quite confusion to us. For example, just V59 series of Universal Mainboard, they have several mainboard manufacturers using this name as their PCB board part number. But their firmwares are NOT compatible to each other! So you need to find out their correct Universal Mainboard part number to get the correct version firmware for this type of mainboard.

The models and part numbers of these Universal TV Mainboard like: V29 series, V39 series, V59 series, 6M48 series, 6M181 series, 6M182 series, T.VST59 series and so on.



Steps to login to Universal LCD/LED Mainboard Factory Setting:

- Using their original Universal Mainboard remote control and follow the instruction below to press:

Example:

Press: **MENU + 2580**

- Using their original universal mainboard remote control and press the MENU button, the OSD Menu will present. After that press 2, 5, 8 & 0 buttons without stop or waiting not over 2 seconds. Or do this step within 3 seconds. Their Factory Setting display will pop up.

1) 6M48 series Universal Mainboard

Press: MENU + 8202

2) CTV 6M48 - 6M182 - 6M30 series Universal Mainboard

Press: MENU + 1147

3) HX6M181X V8 Universal Mainboard

Press: MENU + 9527

4) JVI series Universal Mainboard

Press: MENU + 2580

5) KR2660TVN Universal Mainboard

Press: Change to AV mode with blue screen, after that press 2,0,0,8.

6) MST6E18-V3.0 Universal Mainboard

Press: MENU + 1234

7) QT553M V0.3 Universal Mainboard

Press: SOURCE + 2580

8) V29- 6M16-TSUX6V2.0-G (Chipset) series Universal Mainboard

Press: MENU + 1234

9) V59 series Universal Mainboard

Press: MENU + 1147

10) TOPTECH V59 series Universal Mainboard

Press: MENU + 2580

11) T482_V1 (MST6M48RHS-LF-Z1-SJ) series Universal Mainboard

Press: MENU + 2580

12) TSU59V2-LCD Universal Mainboard

Press: MENU + 9527

13) T.VST29.03 series Universal Mainboard

Press: MENU + 1147

14) VS.T811_V2.1 Universal Mainboard

Press: SOURCE + 208

15) HX or HOXI series Universal Mainboard

Press: MENU + 9527

Press: MENU + 1147

16) ROWA series Universal Mainboard

Press: MENU + 1147

Press: MENU + 1234

Press: MENU + 2508

Press: MENU + 2580

17) TOPTECH series Universal Mainboard

Press: SOURCE + 1973

Press: SOURCE + 2580

Press: Adjust the VOLUME to “0”, after that press 1,9,6,9 (Refer to MST6M48RVS chipset)

Press: MENU + 1234

18) TSU59V2-LCD Universal Mainboard

Press: MENU + 9527

19) Unknown Models China Made Universal Mainboard

- Press: MENU + 3867
- Press: MENU + 5451
- Press: MENU + 6087
- Press: MENU + 6480

The above steps must finish within 3 seconds.

Notes:

If you’re facing the problem on how to login to China Made Universal LCD/LED TV Mainboard, but their model or part number is not listed above, you can try all the above password number. Because these password looks like similar and most of them will using the same password, even they are different brands and mainboard model part number.

How to Solve Display Distortion (Oily Painting Display) Problem in Universal LCD/LED TV Mainboard

1) T.VST29.03 / T.VST59S81 Series Universal Mainboard

After login to the Factory Setting menu, go to "**Panel Config**". After that, select the "**LVDS MAP**" and change its values from 0 ~15 until the screen display back to normal. After change the LVDS MAP setting and logout Factory Setting. The TV Display Distortion (Oily Painting Display) problem solved.

2) 6M48/ 6M182/6M30 Series Universal Mainboard

As usual, after login to their Factory Setting, go to select "**Panel Adjust**" and then select "**LVDS MAP**".

Change the **LVDS MAP** values from 0~15 through control the remote controller left & right buttons, until the normal or good display present. Normally for AUO55LED & AUO65LED using LVDS MAP “0 or 15” is ok. ChiMei(CMO) 65LED panel is using “9 or 10” is ok. Other brands panel manufacturer, you can try to check one by one.

3) MST6M18-V2 Universal Mainboard

After successfully login to the Factory Setting, select "**Special Set**" and select "LVDS TI MODE". Press the Left and Right arrow buttons to adjust or change their setting. If still not help, then go to select their "**LVDS Swap Polarity**" to change to 6 Bits, 8 Bits or 10Bits mode till the display back to normal (Especially the display also has Ghosting problem).

Notes:

If the above TV setting after changed is back to normal display, but after restart the TV, it's still same problem like before. Then you need to checking Mainboard EEPROM, Flash Memory IC and their voltage supply (make sure that voltages are normal and stable).

How to Solve Display Upside Down Problem in Universal LCD/LED TV Mainboard

When the TV is complaint upside down (or after replace Universal Mainboard) problem, if this is a Universal Mainboard, they have two methods to solve this problem.

1) Make adjustment in Factory Setting

- Some universal mainboard built in a feature call it as "**Mirror Mode**" or similar function name feature. So we can go there to adjust their setting and the display will back to normal position.

For Example:

6M48/6M182/6M30 Series Universal Flat TV Mainboard

After login in the TV Factory Setting, go to "**Panel Adjust**" and select the "**6M30**". (Refer to 6M182.21B Universal Mainboard)

Inside the 6M30 Adjust menu, found the 6M30 "**MIRROR MODE**" button. This "MIRROR MODE" has 4 selections: 1,2,3,4. Each control Upside Down and Left Right reverses. From here you can choose which one is suit the TV screen position. So the display upside down problem can be solving it easily.

2) Replace or Upgrade their Universal Mainboard Firmware

- Some of the universal mainboard, one model/part number mainboard, but it has two types of firmware. One is normal position firmware, another one is upside down firmware. For example, some of the V59 series universal mainboard. So if you're facing the display upside down problem in universal mainboard but their Factory Setting not provided the Mirror Mode or similar function to control the display position, then you need to find out another same manufacturer and spec firmware, also confirm that is a upside down firmware. After that programmed or upgrade the firmware into the Mainboard or their flash memory IC there.

- With this method, you can solve the Universal Mainboard upside down problem easily. Before that, lots of the TV repairer when they facing these type of Universal LCD/LED TV Mainboard, they don't know how to do it. So they just replaced a whole Mainboard or return back to customer and said that's the panel, not worth to repair it. But when you know how to repairing it, so it will not the problem to repair display upside down problem in Universal Mainboard.

- If the above method also can't solve the display upside down problem, please refer to this ebook Part-3 & 4 of troubleshooting & repairing display upside down problem. Because some of the T-con board/section has design a feature to control the display position.

Notes:

If the above TV setting after changed is back to normal display, but after restart the TV, it's still same problem like before. Then you need to checking

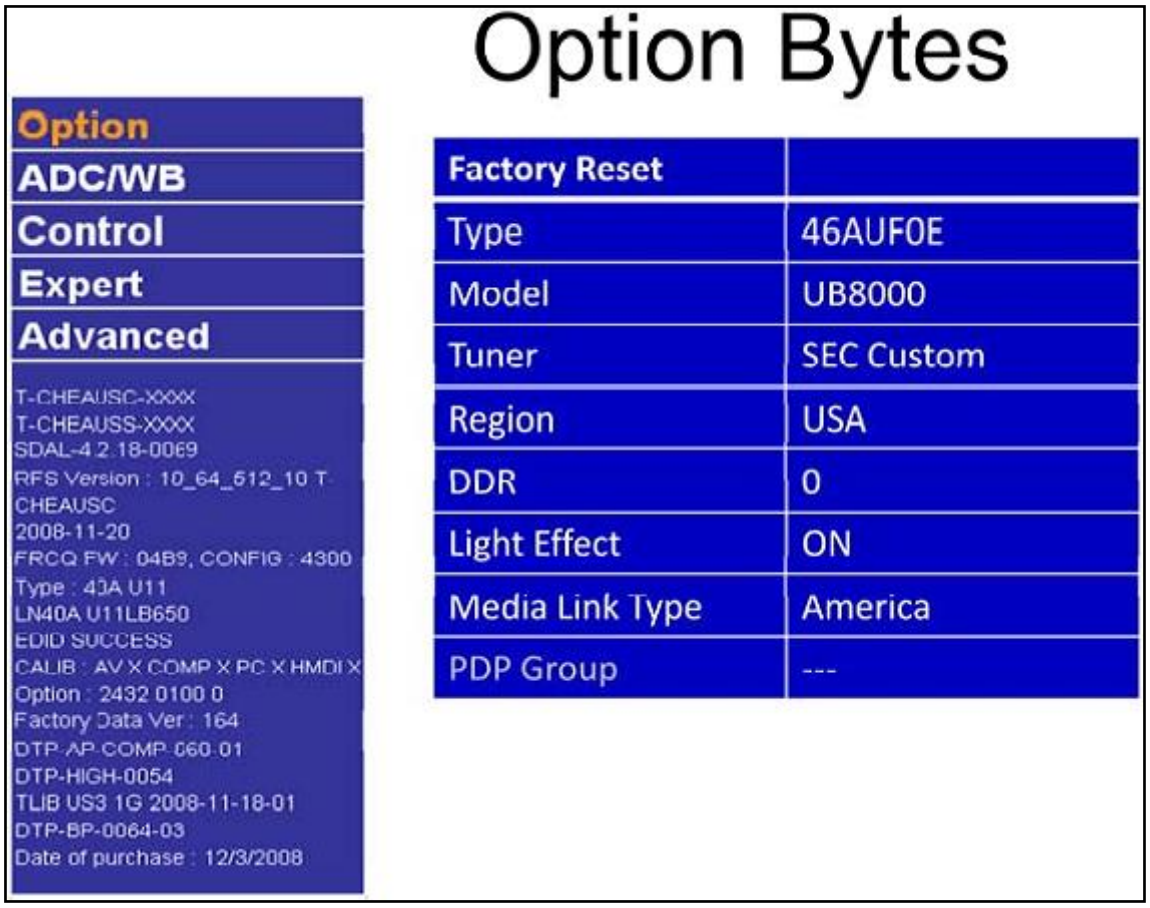
Mainboard EEPROM, Flash Memory IC and their voltage supply (make sure that voltages are normal and stable).

Extra Notes:

Some of the Universal Mainboard built in above 10 types of LCD/LED Panel "Firmware" (not the settings). So this type of Universal Mainboard no need to programmed their firmware when replace different LCD Panel. Some of them can use the USB thumb drive to upgrade their firmware without the ISP Programmer. But if their main firmware corrupted, then you also need to use ISP Programmer to transfer or copy the firmware from a good mainboard EEPROM or Flash IC. So the ISP Programmer is a must have tool to repair TV or other electronic devices.

Samsung Display Distortion (Oily Painting Display) Repair Solution

Many Samsung main boards are designed to support multiple models. Each board comes with a simple set of instructions that will generate a picture. The Option Bytes are programmable to support different screen sizes, different feature sets or even different panel types. If a new main PCB is installed the option bytes must be verified to ensure proper operation.

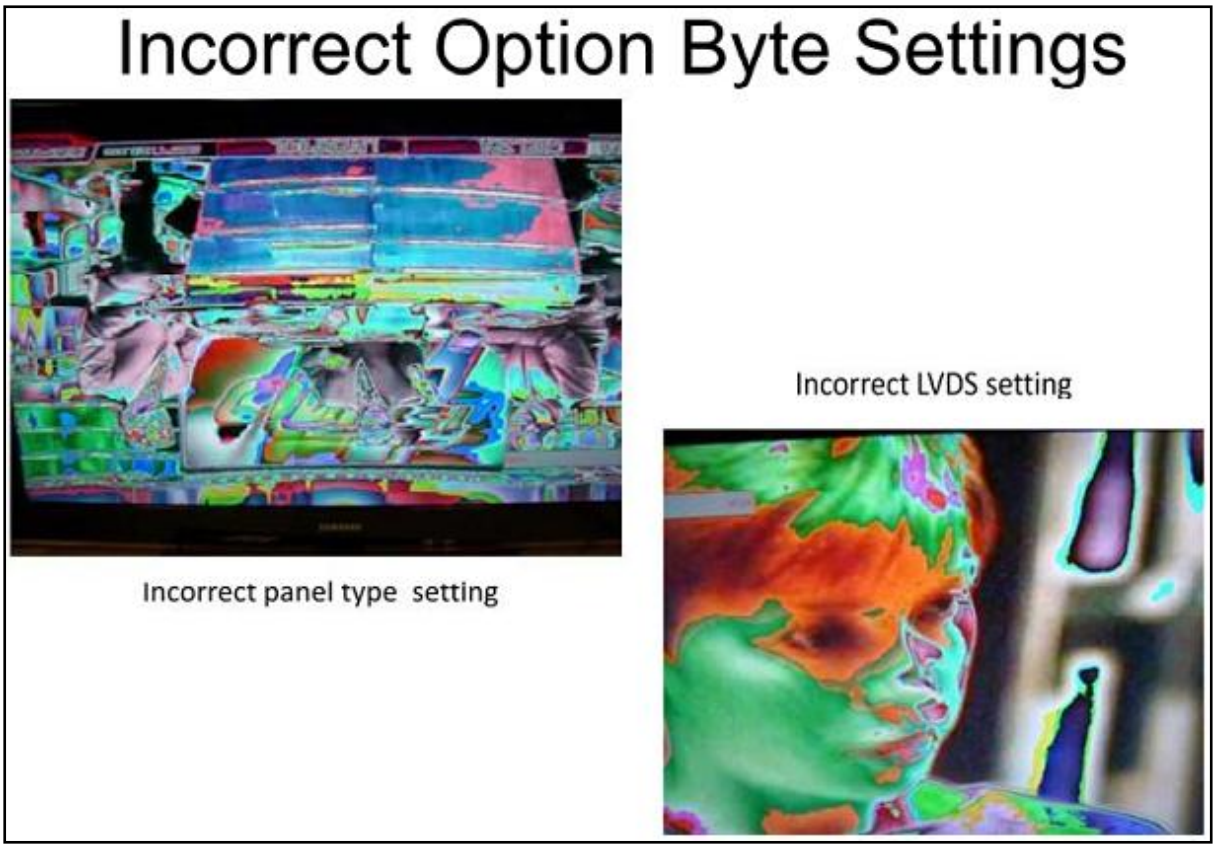


Option Bytes

Item Name		Function	Comments
Type	46AUF0E	This sets the panel size and panel type	An incorrect setting here can cause the picture to be shifted to the left with a black bar on the right
Model	UB8000	This sets the feature set	An incorrect setting here can cause a feature to be missing or incorrectly enable a feature in the menu even though the supporting hardware is not installed
Tuner	SEC Custom	This configures the tuner for USA operation	An incorrect setting here will create tuner problems
Region	USA		
DDR	0		
Light Effect	ON	This controls the light under Logo on the front panel	An incorrect setting here might disable the light effect setting for the customer
Media Link Type	America	This configures the Wiselink port for USA operation	An incorrect setting here might prevent some media from being played
PDP Group	---		Used only for PDP units

Option Bytes data can be obtained from the service manual. Each model and panel type must be matched to ensure proper operation.

These are examples of incorrect option byte settings. The picture on the left not only shows incorrect picture color but the picture is upside down.



The above display problem need to login to their Option Bytes menu to make an adjustment there to repair this display problem. Here are the steps to login:

1) Using the customer remote control enter [MENU] + [1]+[8]+[2]+[POWER]

2) Enter into the Option Bytes menu

There are a variety of test patterns that can be used to isolate panel failures from a Mainboard issue. There are under the FBE or Enhancement sub menu. Here are the steps to login:

1) Using the customer remote control enter [MENU] + [1]+[8]+[2]+[POWER]

2) Enter into the Option Bytes menu

3) Enter the code listed below:

- 540 series and lower 0000 + Exit

- 550 series and higher 0214 + Exit

4) Exit the option byte menu, the grayed out option (FBE3 or Enhancement) should be available now (If the option still isn't available re enter the code).

5) Scroll down and enter the FBE or Enhancement option.

6) PATT SEL should be the first option

7) Scroll through the test patterns

If these test patterns display without error the problem is not with the Panel or T-con/FRC boards.

Note: The patterns are not available on some lower end models TV.

T-con Board Failure Modes

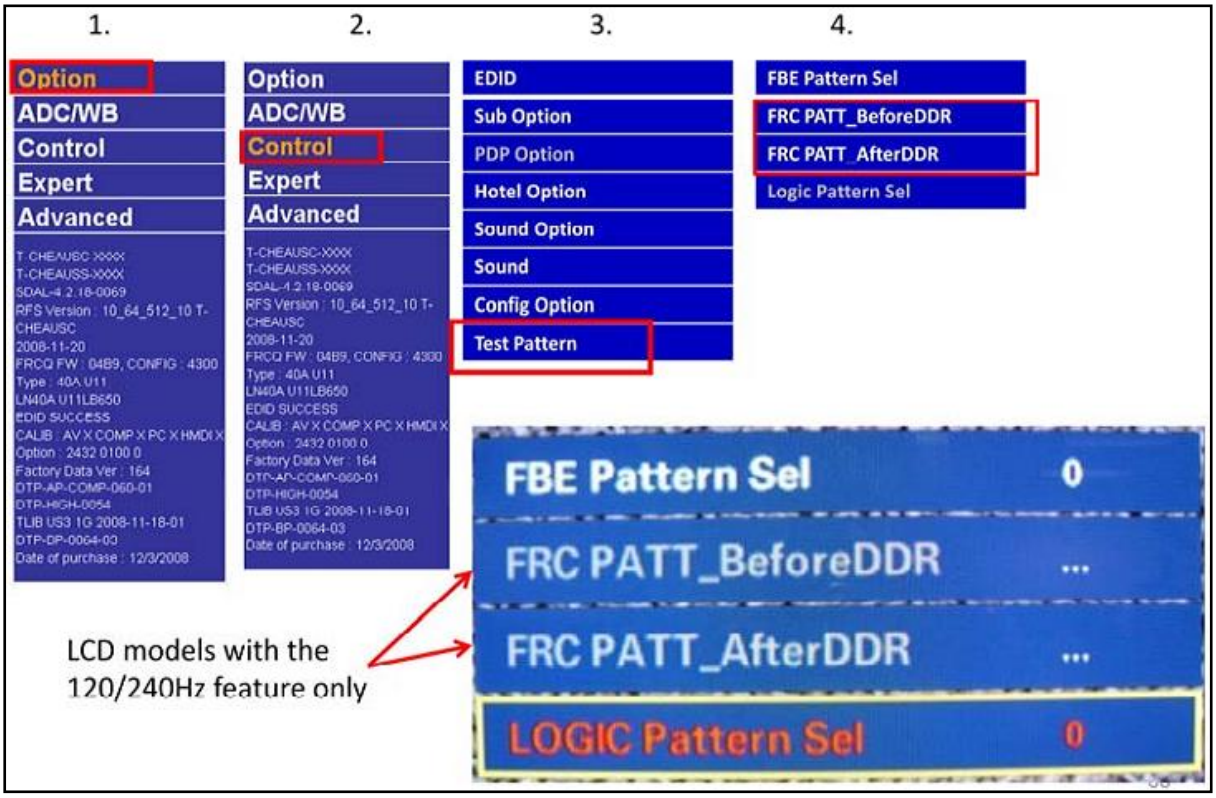
If the T-con board failures can be all over the screen or localized. T-con board failures can cause half the screen to go black of full white. T-con board defects do not go away with content or connection. If the problem disappears when the input s changed it is not the T-con board. If the problem completely disappears with a darker or brighter scene the problem is not the T-con board.

Incorrect Color all over the screen

Missing color all over the screen

FRC Board Troubleshooting

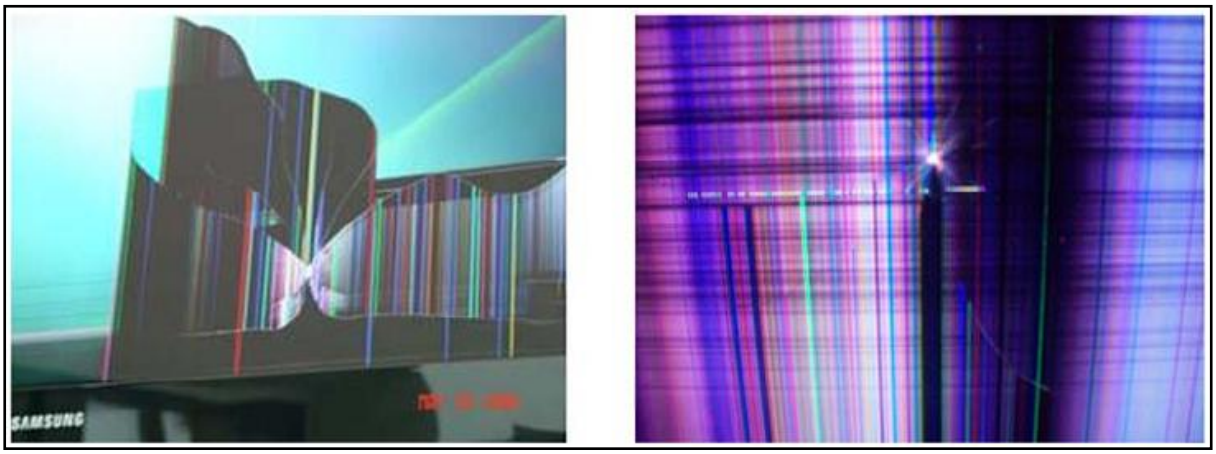
The FRC board can be tested by accessing the FRC Test Pattern under the control submenu of the service mode. Both of the FRC patterns are generated on the FRC Board. If the test patterns are displayed without error the problem is before the FRC board, either the Mainboard or the video source. Additionally if the FRC board cannot communicate with the Mainboard the front panel LED will flash at startup.



This LCD Panel Display Problem is Beyond Repair

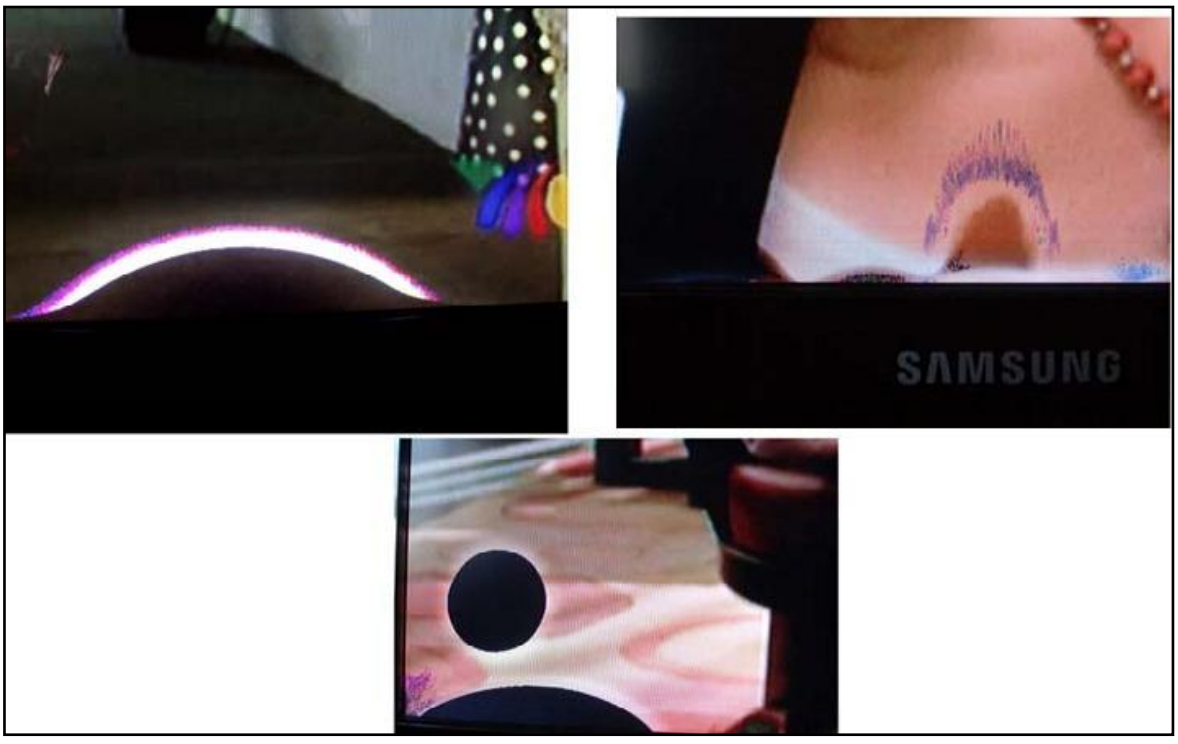
Do you know which type of display problem is can't be repair? Here is the sample of the display problem you can refer:

1) Broken Screen or Screen Crack



Sure the LCD Panel if screen crack is beyond repair. If this is new TV, the TV manufacturer will not cover in their 2 or 3 years guarantee policy.

2) LCD Panel Liquid Crystal was Leakage Inside



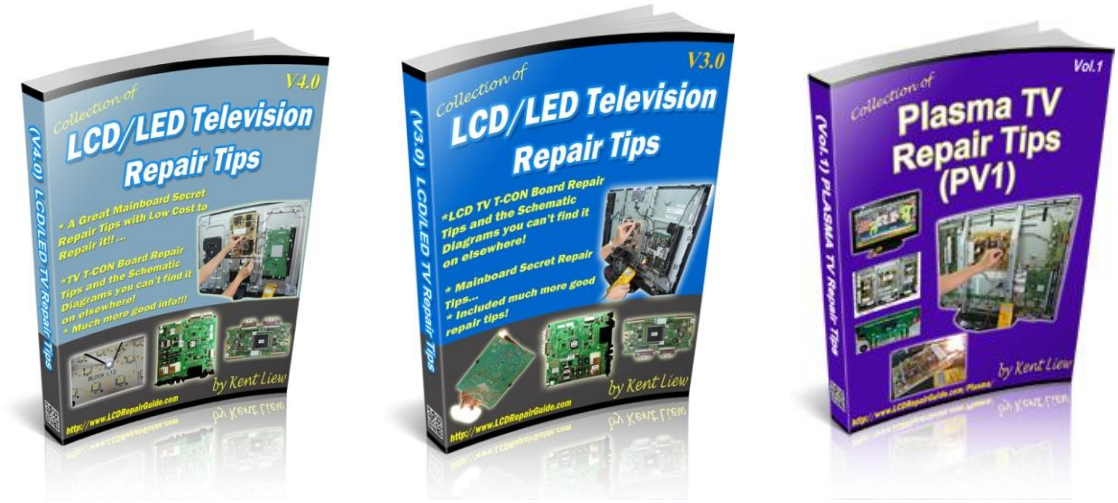
If you want to buy the Test Equipment, Tools and Spare Parts please visit to the page here:

http://www.LCDRepairGuide.com/tools

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

** The other Screen Problem repair tips, please refer to V2.0- LCD TV Repair Tips at: http://www.LCDRepairGuide.com/

Completer Flat Screen TV Troubleshooting & Repairing Ebooks:



*For searching the training manuals, service manuals or schematic diagram, please join the LED/LCD Television repair membership, highly recommended:

Http://www.LCD-Television-Repair.com

Please visit the Resources Page to get more useful repairing information at:

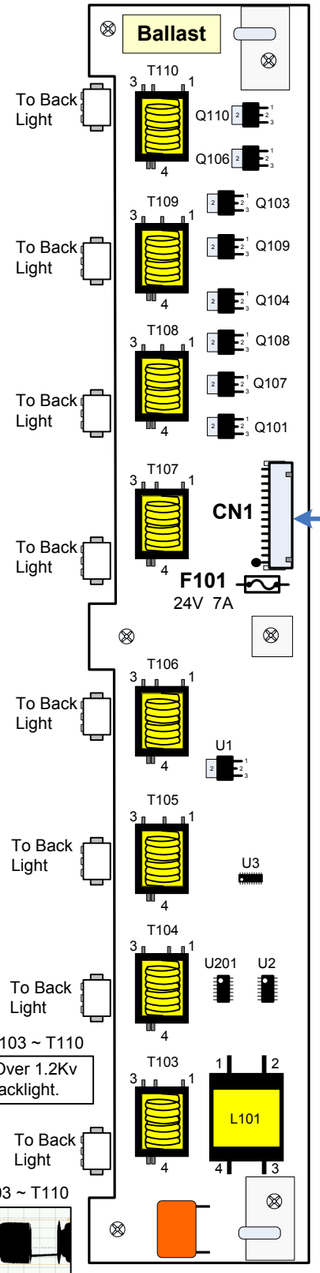
http://www.lcd-television-repair.com/newsletter/Recommend.html

Bonus-A

LG LED/LCD TV Interconnect Schematic Diagrams

T-Con Board Schematic/Circuit Diagrams

32LD350 INTERCONNECT DIAGRAM



VOLTAGES

Q110
Q106 Pin
1) Gnd
2) 9.03V
3) 4.58V

Q103
Q109 Pin
1) 24.16V
2) 9.03V
3) 0V

Q104
Q108 Pin
1) Gnd
2) 9.03V
3) 4.58V

Q107
Q101 Pin
1) 24.16V
2) 9.03V
3) 0V

U1 Pin
1) 0V
2) Gnd
3) 24.07V

Put the 3 screws in on the right side for service position.

P203 "SMPS" to CN1 "Inverter PWB"

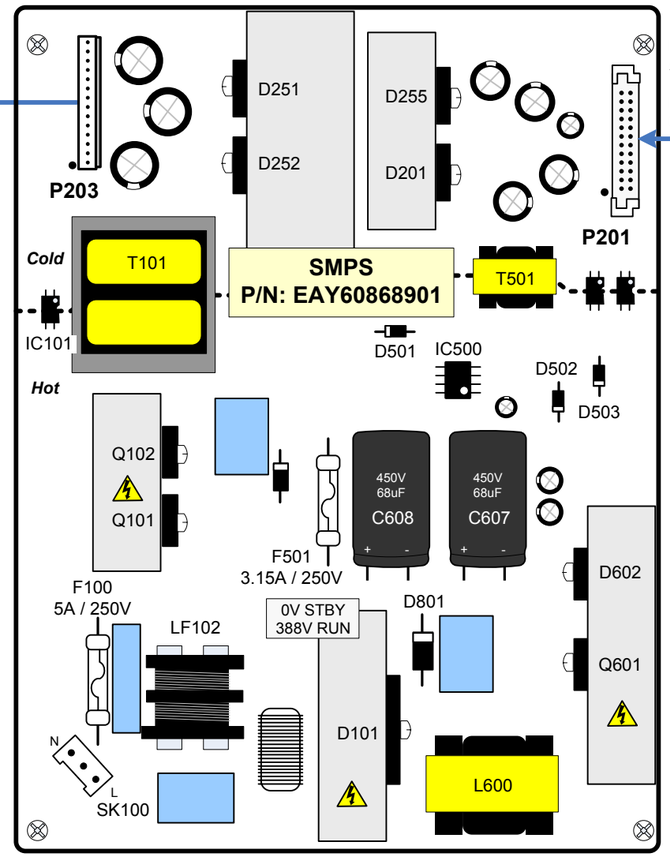
Pin	Label	STBY	Run	Diode
1,2,3,4,5	24V	0V	24.19V	Open
6,7,8,9,10	Gnd	Gnd	Gnd	Gnd
11	(3) Error_Out	0V	0.59V	Open
12	INV_ON	0V	3.31V	Open
13	(4) A-DIM	0V	4.5V	Open
14	(5) P-Dim	0V	2.46V	Open

P201 "SMPS" to P402 "Main PWB"

Pin	Label	STBY	Run	Diode	Pin	Label	STBY	Run	Diode
1	(1) PWR_ON	0V	3.28V	1.16V	18	(2) INV_ON	0V	3.32V	Open
2-4	24V	0V	24.19V	0.73V	19	12V	0V	11.96V	Open
5-8	Gnd	Gnd	Gnd	Gnd	20	(3) Error_Out	0V	0.59V	Open
9-12	3.5V	3.41V	3.4V	Open	21	12V	0V	11.96V	Open
13-16	Gnd	Gnd	Gnd	Gnd	22	(4) A-DIM	0.3V	4.49V	Open
17	12V	0V	11.96V	Open	23	N/C	n/c	n/c	Open
					24	(5) P-Dim	0V	2.46V	Open

CN1 Diode Check
All pins Open Except Gnd

F101 Diode Check
Red lead Open
Blk lead 0.9V



Hot Gnd (Shock Hazard)

Key 1 / 2 Voltage and Resistance Chart with buttons pressed.

Key 1

Resistance	Function	Voltage
17M	Vol +	1.70V
10M	Vol -	1.09V
5.27M	Menu	0.52V
0.98M	Enter	0.10V

Key 2

Resistance	Function	Voltage
17M	CH +	1.70V
10M	CH -	1.09V
5.27M	Power	0.52V
0.98M	Input	0.10V

Voltage and Resistance taken with AC applied to the set.
No Button pressed Resistance is Open and Voltage is 3.4V

SMPS Used in the 32LD350:
EAY60868901 32LD350 AUSWLJR or AUSDLFR or AUSDLUR or AUSDLJR

EAY60869101 32LD350 CUSWLH or CUSDLH or CUSWLHO

(1) **PWR-On** Pin 1:
Turns on 12V, 24V to the Main and 24V to the Inverter P203 Pins 1~5.

(2) **INV-On** Pin 18:
Turns on the Backlights

(3) **Error_Out** Pin 20:
(Silk Screened A-DIM)
Goes high (3.3V) when the backlights are told to come on. Goes back low when they light.
If it goes high again on the 5th attempt to fire the backlights, the set shuts off.

(4) **A-DIM** Pin 22:
(Silk Screened P-DIM)
Is not used .

(5) **P-DIM** Pin 24
(Silk Screened Error_Out) can vary according to incoming video IRE level and OSD Backlight setting Output from the Video Processor IC100. Range 0.65V to 3.25V.

P2401 'Main" to J1 "IR Board"

Pin	Label	STBY	Run	Diode
1	SCL	0V	0V	Open
2	SDA	0V	0V	Open
3	Gnd	Gnd	Gnd	Gnd
4	Key 1	3.4V	3.39V	1.52V
5	Key 2	3.4V	3.39V	1.52V
6	ST_3.3V	3.41V	3.39V	0.9V
7	Gnd	Gnd	Gnd	Gnd
8	LED_B	0V	0V	2.3V
9	IR	2V	1.98V	Open
10	Gnd	Gnd	Gnd	Gnd
11	+3.3V	0.2V	3.3V	0.58V
12	LED_R	2.49V	0V	2.14V

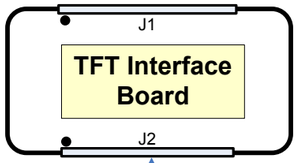
J1 Ft IR

Side (Key) Controls

P3000

Pin 1 Key 1
Pin 3 Key 2
Diode Check Open
Pins 2 and 4 Gnd

TO TFT MODULE PANEL BOARD



1 and 30 are Gnd.

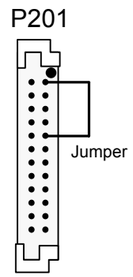
12V Pins 2 ~ 5 and LVDS Video Signals

There is a 12V Fuse on the Panel Board.

Note: STBY 3.5V Must be present when AC applied.

SMPS TEST: To Force Power Supply On.

Disconnect P402 on Main Board.
Jump pin 1 (PWR_ON) to pin 9, 10, 11 or 12 .
This should force the SMPS to the on state. All Voltages should be produced.
(24V and 12V to Main. 24V to Inverter).
The Backlights should come on.



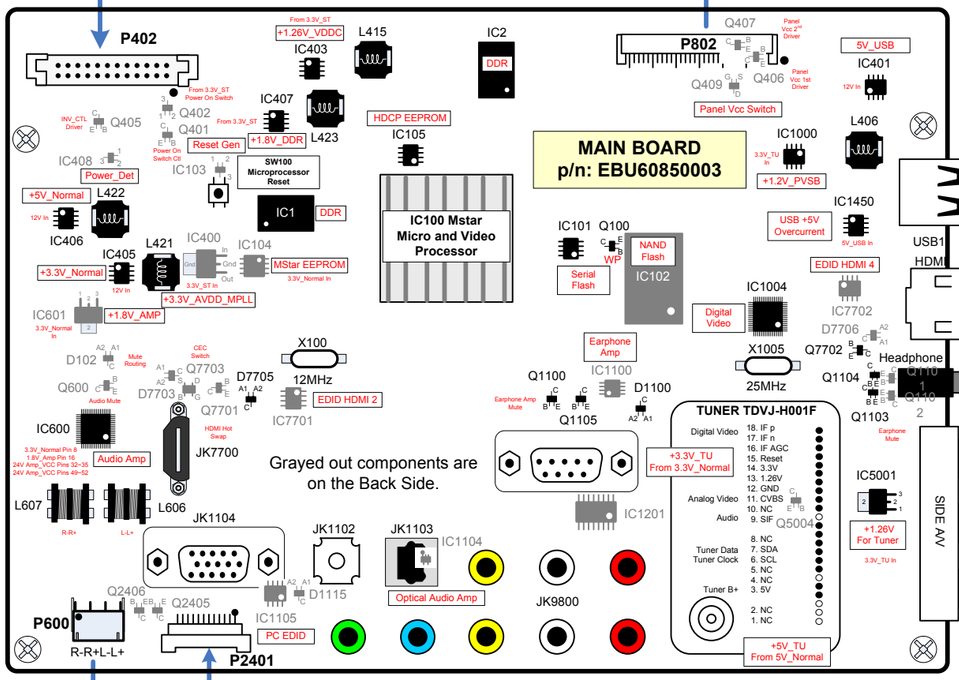
P402 to SMPS P201

Pin	Diode Check
1	2.75V
2-4	Open
5-8	Gnd
9-12	0.91V
13-16	Gnd
17	2.58V
18	1.5V
19	2.58V
20	3.04V
21	2.58V
22	Open
23	Gnd
24	Open

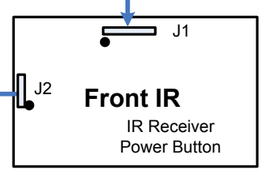
For Voltages See P201 SMPS

12V Pins 27 ~ 30 and LVDS Video Signals

LVDS



Main Boards Used in the 32LD350:
EBU60850009 32LD350 AUSWLJR and AUSDLFR
EBR66049702 32LD350 AUSDLJR
EBU60850010 32LD350 AUSDLUR
EBU60850003 32LD350 CUSDLH
EBU61005102 32LD350 CUSWLH and CUSWLHO



32LD350 MAIN (FRONT SIDE) SIMICONDUCTORS

IC101 Serial Flash Memory

Pin	
[1]	0.05V
[2]	3.28V
[3]	2.26V
[4]	0V (Gnd)
[5]	0V
[6]	0V
[7]	3.28V (B+)
[8]	3.28V (B+)

IC105 HDCP EEPROM

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	3.3V (B+)
[4]	0V (Gnd)
[5]	0V
[6]	3.3V
[7]	0V (Gnd)
[8]	3.28V (B+)

IC401 5V Regulator for USB

Pin	
[1]	11.9V (In)
[2]	5.09V (Out)
[3]	5.09V (Out)
[4]	0V (Gnd)
[5]	3.25V (PWR On/Off1)
[6]	0.8V
[7]	5.05V
[8]	0V (Gnd)

IC403 (+1.26V_VDDC) Regulator

Pin	
[1]	0.79V
[2]	0V (Gnd)
[3]	3.37V (In)
[4]	4.47V
[5]	3.34V
[6]	1.3V (Out)
[7]	1.3V (Out)
[8]	2.96V (PWR On/Off2_1)

IC405 (+3.3V_NORMAL) Regulator

Pin	
[1]	0V (Gnd)
[2]	11.92V (In)
[3]	0V (Gnd)
[4]	0.8V
[5]	0.84V
[6]	2.39V (PWR On/Off1)
[7]	3.35V (Out)
[8]	3.35V (Out)

IC406 (+5V_NORMAL) Regulator

Pin	
[1]	0V (Gnd)
[2]	11.92V (In)
[3]	0V (Gnd)
[4]	0.8V
[5]	0.84V
[6]	2.39V (PWR On/Off1)
[7]	4.98V (Out)
[8]	4.98V (Out)

IC407 (D1.8V) Regulator

Pin	
[1]	0.8V
[2]	0V (Gnd)
[3]	3.38V
[4]	4.79V
[5]	3.35V
[6]	1.76V (Out)
[7]	1.76V (Out)
[8]	2.36V (PWR On/Off1)

IC1000 (+1.2V_PVSB) Regulator

Pin	
[1]	n/c
[2]	3.26V (Enable)
[3]	3.26V (In)
[4]	n/c
[5]	n/c
[6]	1.81V (Out)
[7]	1.21V
[8]	n/c

IC1450 5V Shot Protection for USB

Pin	
[1]	0V (Gnd)
[2]	5V (In)
[3]	5V (In)
[4]	0V (USB-Ctl)
[5]	
[6]	5V (Out)
[7]	5V (Out)
[8]	n/c

IC5001 (+1.26V) for Tuner Regulator

Pin	
[1]	3.3V (In)
[2]	1.26V (Out)
[3]	0V (Gnd)

Q100 Write Protect for IC101

Pin	
B	0V
C	3.3V
E	Gnd

Q1100 Earphone Mute 1st Driver

Pin	
B	0V
C	2.26V
E	Gnd

Q1103-4 EARPHONE MUTE

Pin	
B	0V
C	0V
E	Gnd

Q1105 Earphone Mute 2nd Driver

Pin	
B	0.63V
C	0V
E	Gnd

Q7702 HDMI 4 Det

Pin	
B	0.63V
C	0V
E	Gnd

D1100 5V Routing for IC1100

Pin	
[A1]	0.07V
[A2]	4.98V
[C]	4.37V

D7705 5V Routing for IC7701

Pin	
[A1]	0V
[A2]	4.98V
[C]	4.71V

32LD350 MAIN (BACK SIDE) SIMICONDUCTORS

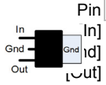
IC103 Reset Generator

Pin	
[1]	Gnd
[2]	0V
[3]	3.39V

IC104 EEPROM Mstar

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	3.31V
[6]	3.31V
[7]	0V (Gnd)
[8]	3.31V

IC400 (+3.3V_AVDD_MPLL) Regulator



Pin	
[In]	3.35V
[Gnd]	Gnd
[Out]	3.34V

IC601 (+1.8V_Amp) Regulator

Pin	
[1]	Gnd
[2]	1.81V
[3]	3.31V

IC408 Power_Det 24V, 12V, 3.5V

Pin	
[1]	3.52V
[2]	3.35V
[3]	Gnd

IC1100 Earphone Amp

Pin	
[1]	2.14V
[2]	0V (Gnd)
[3]	0.02V
[4]	2.19V
[5]	2.19V
[6]	4.37V
[7]	2.19V
[8]	2.18V

IC1104 Optical Audio Amp

Pin	
[1]	1.64V
[2]	3.29V
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	3.29V

IC1105 EDID Data PC

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	4.7V
[6]	4.7V
[7]	4.7V
[8]	4.7V

D7703 3.5V Blocking for Q7703

Pin	
[A1]	0V
[A2]	3.37V
[C]	3.3V

IC1201 RS232 Data Buffer

Pin	
[1]	3.34V
[2]	3.48V
[3]	0V
[4]	0V
[5]	(-5.37V)
[6]	5.39V
[7]	(-5.37V)
[8]	n/c (0V)
[9]	n/c (3.39V)
[10]	n/c (3.35V)
[11]	n/c (0V)
[12]	3.35V
[13]	0V
[14]	5.47V
[15]	0V (Gnd)
[16]	3.37V

IC7701 EDID Data HDMI2

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	4.7V
[6]	4.7V
[7]	4.7V
[8]	4.7V

D7706 5V Routing for IC7702

Pin	
[A1]	4.98V
[A2]	0V
[C]	4.69V

IC7702 EDID Data HDMI4

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	4.69V
[6]	4.69V
[7]	4.69V
[8]	4.69V

Q401 Power On/Off Driver for Q402

Pin	
B	0.64V
C	0V
E	Gnd

Q402 Power On/Off Switch

Pin	
1	3.39V (In)
2	0.89V (Ctl)
3	3.28V (Out)

Q405 Inverter On/Off Switch

Pin	
B	0.06V
C	3.32V
E	Gnd

Q406 PANEL_VCC Control 1st Driver

Pin	
B	0.03V
C	0.69V
E	Gnd

Q407 PANEL_VCC Control 2nd Driver

Pin	
B	0.679V
C	0V
E	Gnd

Q409 PANEL_VCC Switch

Pin	
S	11.97V (In)
G	1.84V (Enable)
D	11.97V (Out)

Q600 AMP_MUTE Pin 25 IC600

Pin	
B	0.08V
C	3.35V
E	Gnd

Q1101-2 EARPHONE MUTE

Pin	
B	0V
C	0V
E	Gnd

Q2405 IR Buffer 1st Driver

Pin	
B	0.6V
C	0V
E	Gnd

Q2406 IR Buffer 2nd Driver

Pin	
B	0V
C	3.3V
E	Gnd

Q5004 Tuner SIF (Sound) Buffer

Pin	
B	0.163
C	Gnd
E	0.85V

Q7701 HDMI 2 Det

Pin	
B	0.63V
C	0V
E	Gnd

Q7703 CEC Remote HDMI CEC

Pin	
[B]	3.39V
[G]	3.32V
[S]	0V
[D]	3.26V

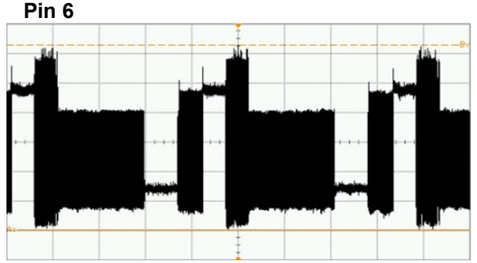
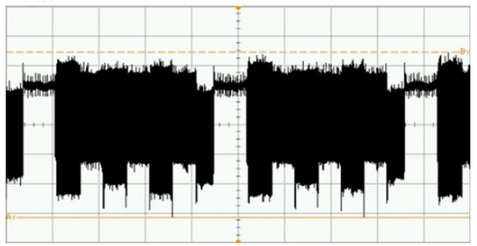
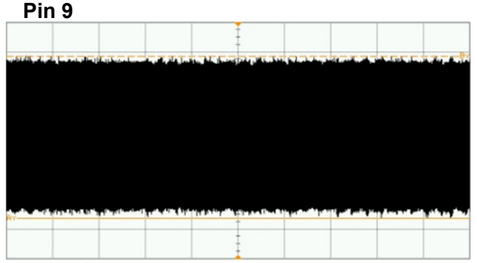
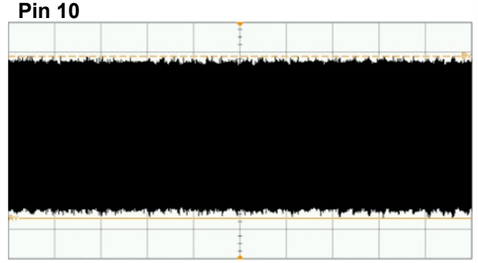
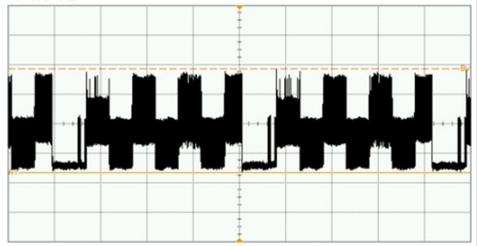
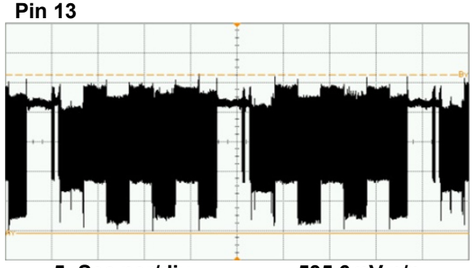
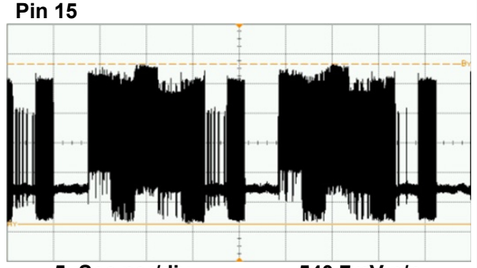
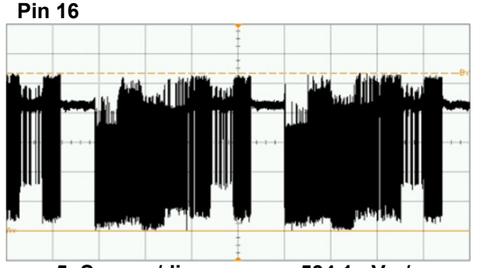
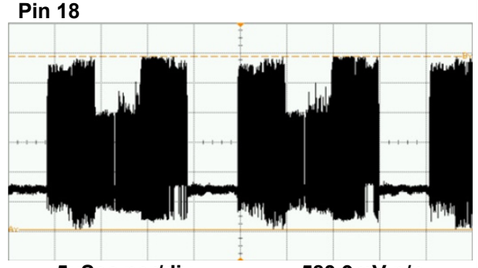
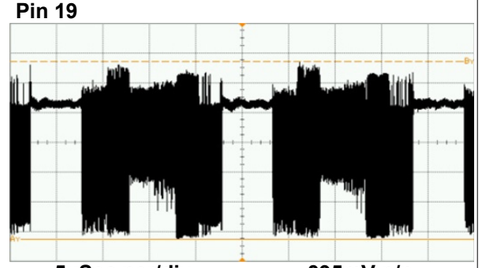
D102 Mute Routing

Pin	
[A1]	0V
[A2]	0V
[C]	0V

D1115 5V Routing for IC7705

Pin	
[A1]	0.03V
[A2]	0V
[C]	4.69V

32LD350 LVDS P802 WAVEFORMS

Pin 6  **5uSec per/div** **625mV p/p**	**Pin 7**  **5uSec per/div** **561mV p/p**	**Pin 9**  **5uSec per/div** **548.5mV p/p** **Clock** (TXAC+)	**Pin 10**  **5uSec per/div** **565.1mV p/p** **Clock (**TXAC-)	**Pin 12**  **5uSec per/div** **349.9mV p/p**
Pin 13  **5uSec per/div** **535.6mV p/p**	**Pin 15**  **5uSec per/div** **540.7mV p/p**	**Pin 16**  **5uSec per/div** **534.1mV p/p**	**Pin 18**  **5uSec per/div** **583.9mV p/p**	**Pin 19**  **5uSec per/div** **395mV p/p**

32LD350 P802 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 100mV and 5uSec per division Time Base related to scope settings.

32LG40 INTERCONNECT DIAGRAM

P203 "SMPS" to MCN1 "Ballast PWB"

Pin	Label	STBY	Run	Diode Check
1	24V	0V	24.52V	0.33V
2	24V	0V	24.52V	0.33V
3	24V	0V	24.52V	0.33V
4	24V	0V	24.52V	0.33V
5	24V	0V	24.52V	0.33V
6	Gnd	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	Gnd	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd	Gnd
11	BR1	0V	1.67V	OL
12	INV On-Off	0V	3.45V	OL
13	PWM-DIM	0V	3.40V	OL
14	ERROR	0V	0V	OL

*PWM-DIM (PDIM) Pin 13 can vary according to OSD Backlight setting. 0.9V 0% to 3.3V 100%

TO TFT MODULE

CN2 CN3

T-CON Board

US2
3) 0.0V
2) 1.8V
1) 3.3V

12V
F1
6.3V/1.5A
CN1

Far left and right pins are not counted, they are ground.

P201 Odd "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
1	16.5V	0V	16V	0.31V
3	Gnd	Gnd	Gnd	Gnd
5	12V	0V	11.8V	1.69V
7	Gnd	Gnd	Gnd	Gnd
9	5.2V	5.15V	5.15V	0.34V
11	5.2V	5.15V	5.15V	0.34V
13	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
17	ERR	0V	0V	1.26V
19	PWR	0V	2.86V	OL
21	BR1	0.1V	1.68V	OL
23	N/C	0V	3.2V	OL

P201 Even "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
2	16.5V	0V	16V	0.31V
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	11.8V	1.69V
8	Gnd	Gnd	Gnd	0V
10	5.2V	5.15V	5.15V	0.34V
12	5.2V	5.15V	5.15V	0.34V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	ACD	5.05V	4.57V	OL
20	INV-On/Off	0V	3.29V	OL
22	PWM-DIM	0V	3.38V	OL
24	N/C	0V	0V	OL

*PWM-DIM (PDIM) Pin 22 can vary according to OSD Backlight setting. 0.9V 0% to 3.3V 100%

Do not run without heat sink attached

Ballast PWB

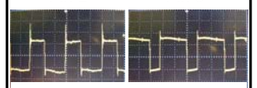
On then Off after ballast fires

LD1 Ballast Drive LED

MCN1

24V F1 8A / 150V

Pin 1 Pin 6



22V p/p 34V p/p

6 1 6 1

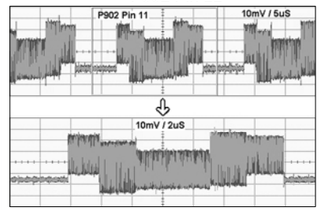
T1 T2

Secondary over 1.2Kv

To Backlight Left Side

To Backlight Right Side

P902 Pin 11



Example Of LVDS Signal

Waveforms for P902 Pins 11 through 20 (All waveforms on back of 11X17 fold out)

P203

P202 Not Used

P201

To Force Power Supply On.
Disconnect P800 on Main PWB.
Jump 5V to pin 19.
Ballast and All voltages should turn on.

Power Supply

3.15A / 250V Rating
334V Actual Reading
F101

5A / 250V
A/C Fuse
F100

L
A/C In
SC100
N

Not Used CN403

CN402

CN401

DVD Drive

CN400

Main (Digital) Board

Q901 Q900 IC809 P902

P800

Reset IC401

IC808 BSM

P901

IC407 Micro

IC400

X400 24 Mhz 1.5V

Q400 IC405

IC805

IC801

P900

P904

LD800 IC802 IC801

IC806

P401

P500 To Speakers

P200 Software Upgrades

IC807

IC803

IC00 BCM

X200 1.5V 1.5V 54 Meg

TUNER

* Grayed Out ICs are located on Back

Side (Key) Controls

P101

Front PWB Assembly (Interface)

J2 J1

IR Receiver Power Button

IC201	USB Power			
PIN	FUNCTION	NAME	STBY	RUN
2	IN	+5V	0V	5V
3	On/Off Control	BCM DDR Power	0V	3.4V
7	OUT	USB_PWR_Out_1	0V	5V
8	OUT	+3.3V	0V	3.1V

IC304	2.6V BCM			
PIN	FUNCTION	NAME	STBY	RUN
3,8	OUT	DDRO_VTT	0V	1.29V
5,6,7	IN	D2.6V_BCM	0V	2.6V
4	On/Off Control	DDRO_VTT	0V	1.29V

IC400	Reset Generator for IC401 3.3V BCM (On Back)			
PIN	FUNCTION	NAME	STBY	RUN
1	IN	D3.3V_BCM	0V	3.4V
2	Gnd	Gnd	Gnd	Gnd
3	OUT	Reset (Lo-Hi)	0V	3.39V

IC405	Reset Generator for Q400 Micro Reset			
PIN	FUNCTION	NAME	STBY	RUN
1	IN	3.3V_MICON	3.41V	3.41V
2	Gnd	Gnd	Gnd	Gnd
3	OUT	Reset (Lo-Hi)	0.6V	0.6V

IC802	+3.3V Regulator (3.3V TMDS_SW)			

IC803	+9V Regulator			
PIN	FUNCTION	NAME	STBY	RUN
1	IN	+12V	0V	12V
2	Gnd	Gnd	Gnd	Gnd
3	OUT	+9V	0V	9V

IC806	D3.3V/A3.3V_BCM Regulator turns on LD800			
PIN	FUNCTION	NAME	STBY	RUN
1	On/Off Control	Power_CTL_3.3V	0V	3.4V
2	IN	+5V_SUB	0.36V	5V
3	Gnd	Gnd	Gnd	Gnd
4	OUT	D3.3V_BCM	0.1V	3.4V

IC807	D3.3V_BCM Regulator (Also A3.3V_BCM)			
PIN	FUNCTION	NAME	STBY	RUN
1	IN	+9V	0V	8.9V
2	On/Off Control	Power_CTL_3.3V	0V	3.4V
3	OUT	+5V	0V	5V
4	n/c	n/c	n/c	n/c
5	Gnd	Gnd	Gnd	Gnd

IC809	D2.6V_BCM Regulator (Also A2.6V_BCM)			
PIN	FUNCTION	NAME	STBY	RUN
6,7,8,10	IN	+5V_SUB	0.36V	4.98V
17	On/Off Control	Power_CTL_2.6V	0V	3.41V
1,2,3,4,5	OUT	D2.6V_BCM	0V	2.66V
14,15	n/c	n/c	n/c	n/c
11,18,19,20	Gnd	Gnd	Gnd	Gnd

Q801	5V Sub Switch			
PIN	FUNCTION	NAME	STBY	RUN
1,3	IN	ST_5V	0V	5V
2,4	On/Off Control	Q802	0V	0.28V
5,6,7,8	OUT	+5V_SUB	0V	5V

Q802	5V Sub Switch Controller for Q801			
PIN	FUNCTION	NAME	STBY	RUN
B	On/Off Control	RL_ON	0V	3.29V
C	Pull Down	ST_5V	0V	5V
E	Gnd	Gnd	Gnd	Gnd

Q400	Reset Generator for MICRO IC407			
PIN	FUNCTION	NAME	STBY	RUN
B	Reset	Reset	0.6V	0.6V
C	Vcc	3.3VVST_MICON	0V	0V
E	Gnd	Gnd	Gnd	Gnd

REGULATORS/ICs ON FRONT

IC401	BCM IC100 Reset			
PIN	FUNCTION	NAME	STBY	RUN
14	IN	D3.3V_BCM	0V	3.41V
1	On/Off Control	Reset from IC400	0V	3.4V
6	OUT	BCM_RESET	0V	3.4V

IC801	+1.8V_NTP Regulator			
PIN	FUNCTION	NAME	STBY	RUN
1	Gnd	Gnd	Gnd	Gnd
2	OUT	+1.8V_NTP	0V	1.8V
3	IN	3.3V_TMDS_SW	0.26V	3.29V

IC805	D1.2V/A1.2V BCM Regulator			
PIN	FUNCTION	NAME	STBY	RUN
6,7,8,10	IN	+5V_SUB	0.38V	5V
17	On/Off Control	Power_CTL_1.2V	0V	3.41V
1,2,3,4,5	OUT	D1.2V_BCM	0V	1.29V
13, 14,15,16	n/c	n/c	0V	0V
11,12,18, 19,20	Gnd	Gnd	Gnd	Gnd

IC808	ST-BY 3.3V DC-DC Converter			
PIN	FUNCTION	NAME	STBY	RUN
2	IN	ST_5V	5V	5V
3	OUT	3.3VST_MICON	3.43V	3.43V
4	Gnd	Gnd	Gnd	Gnd

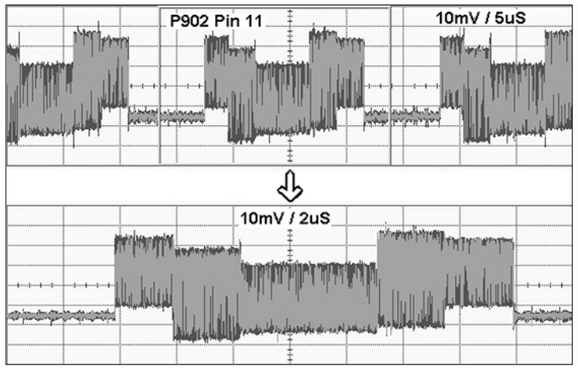
Q900	Controller for LVDS 12V Switch Q901			
PIN	FUNCTION	NAME	STBY	RUN
B	Control	LVDS_PANEL_CTRL	0V	0.75V
C	Pull Down 12V	LVDS Switch Control	0V	0V
E	Gnd	Gnd	0V	0V

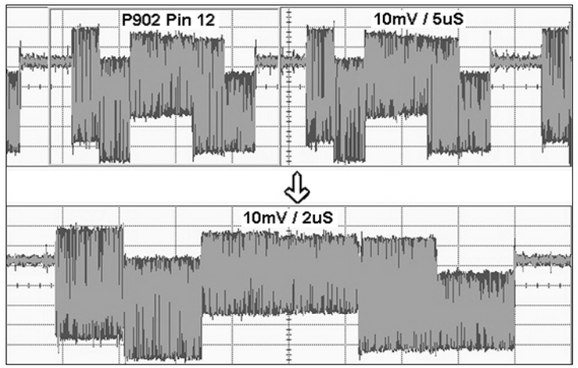
Q901	LVDS 12V Switch			
PIN	FUNCTION	NAME	STBY	RUN
1,3	IN	12V	0V	12.36V
2,4	On/Off Control	Q900	0V	6.16V
5,6,7,8	OUT	LVDS 12V	0V	12.36V

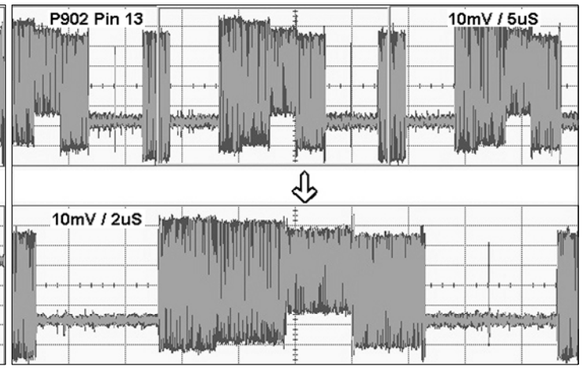
REGULATORS/ICs ON BACK

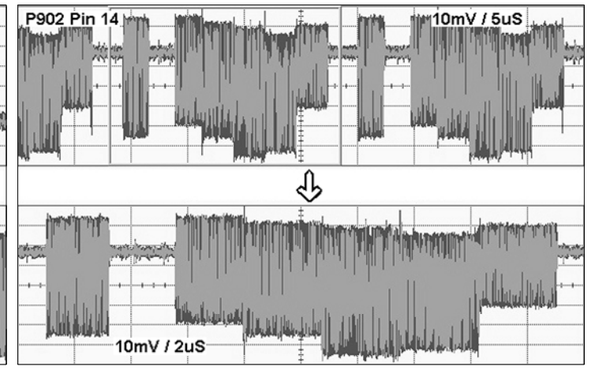
Screen Print for Pin No is incorrect, use IC

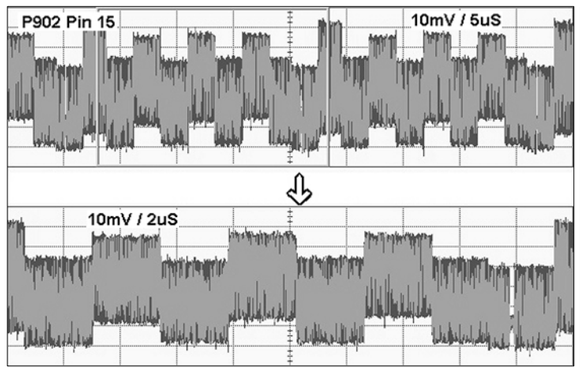
32LG40 LVDS P902 WAVEFORMS

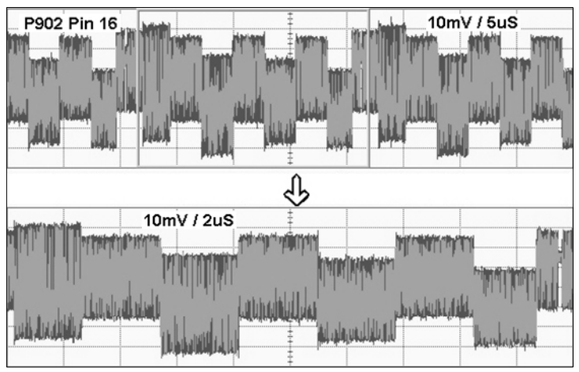


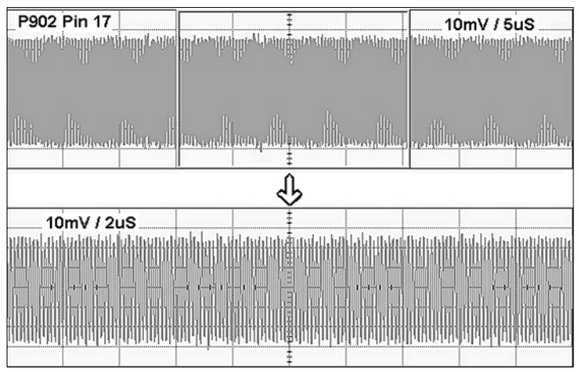


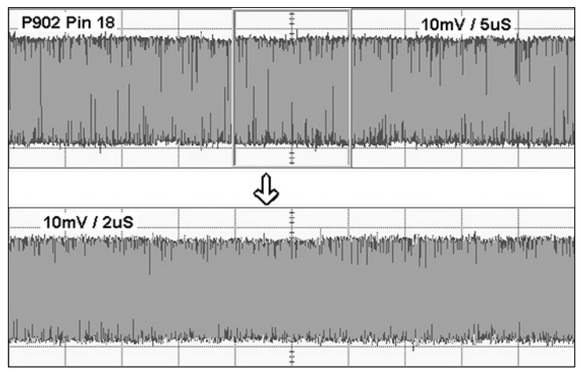


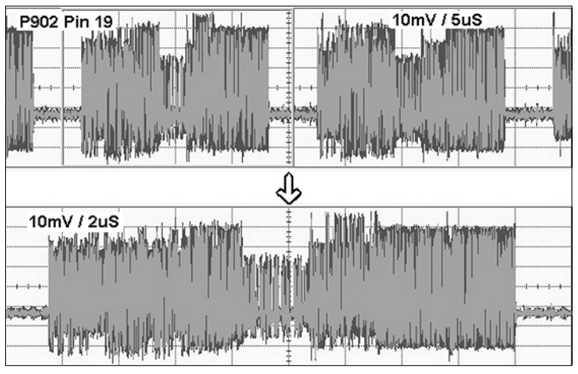


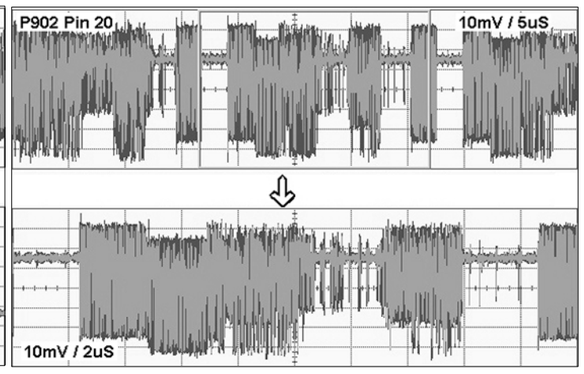








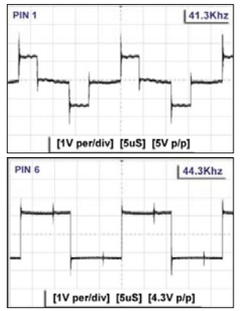




32LG40 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale and Time Base related to scope settings.
Top waveform in each image gives a slower rate.
10mV at 5uS per division.
Bottom waveform shows a blow up sample. 10mV at 2uS per division.

42LG70 INTERCONNECT DIAGRAM

Any Transformer on Ballast



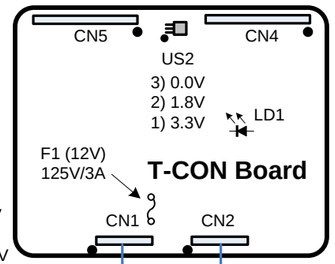
P204 "SMPS" to MCN1 "Ballast PWB"

Pin	Label	STBY	Run	Diode Check
1	24V	0V	24V	0.72V
2	24V	0V	24V	0.72V
3	24V	0V	24V	0.72V
4	24V	0V	24V	0.72V
5	24V	0V	24V	0.72V
6	Gnd	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	Gnd	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd	Gnd
11	BR1	0V	1.7V	OL
12	INV On-Off	0V	3.2V	OL
13	*PWM-DIM	0V	1.4V	OL
14	ERROR	0V	0V	OL

TO TFT MODULE

T-Con PWB under shield. Be sure to reinsert screws before operating set with shield removed.

LD1
Set In Stby: LD1 Off
Anode 0V Cathode 0V
Power On: LD1 Lit
Anode 12V Cathode 0V
Set on: LD1 Off
Anode 12V Cathode 9.6V



Far left and right pins for CN1 and CN2 are not counted, they are ground.

P201 Odd "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
1	16.5V	0V	16.2V	0.49V
3	Gnd	Gnd	Gnd	Gnd
5	12V	0V	12.3V	1.6V
7	Gnd	Gnd	Gnd	Gnd
9	5V	5.1V	5.1V	1.27V
11	5V	5.1V	5.1V	1.27V
13	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
17	Error	0V	0V	0V
19	Power On	0V	2.8V	1.6V
21	BR1	0V	1.7V	0V
23	N/C	0V	0V	0V

P201 Even "SMPS" to P800 "Main PWB"

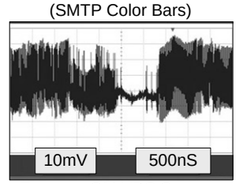
Pin	Label	STBY	Run	Diode Check
2	16.5V	0V	16.2V	0.49V
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	12.3V	1.6V
8	Gnd	Gnd	Gnd	Gnd
10	5V	5.1V	5.1V	1.27V
12	5V	5.1V	5.1V	1.27V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	ACD	5V	5V	2.1V
20	INV-On/Off	0V	3.2V	0V
22	*PWM-DIM	0V	1.4V	0V
24	N/C	0V	0V	0V

LVDS Signals for P1000
Pins 11~22 / Pins 27~38

LVDS Signals for P1001
Pins 1~12 / Pins 15~26

All waveforms on page 2 of 11X17 fold out

P1000 Pin 12
(SMTP Color Bars)



Example Of LVDS Signal

*PWM-DIM (PDIM) Pin 22 can vary according to OSD Backlight setting. 0.9V 0% to 3.3V 100%

Both cables are LVDS Type

Pins 1, 2, 3 and 4 carry LVDS 12V when set is on. B+ for T-Con PWB.

To Backlight Left Side

Secondary over 1.2Kv

T2 T1

1 6 1 6

MCN1

F1 (15A / 65V)

24V

Ballast PWB

Do not run without heat sink attached

6 1 6 1

T4 T3

Secondary over 1.2Kv

To Backlight Right Side

*PWM-DIM (PDIM) Pin 13 can vary according to OSD Backlight setting. 0.9V 0% to 3.3V 100%

P204

P205 Not Used

P201

3.15A / 250V Rating
334V Actual Reading

F101

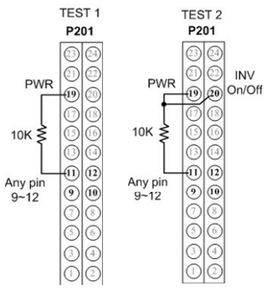
Power Supply

6.3A / 250V A/C Fuse

F100 A/C In SC100 N L

TEST 1: To Force Power Supply On.
Disconnect P800 on Main PWB.
Jump pin 9,10,11 or 12 (5V) to pin 19 using a 10K resistor.
Test Low Voltage Outputs 16V and 12V. Test 24V P204

TEST 2: Jump pin 19 to pin 20 (INV-ON).
Ballast and all voltages should turn on.



For voltages and pin labels, see P201 chart

P800 to P201

Pin	Diode Check	Pin	Diode Check
1	OL	2	OL
3	Gnd	4	Gnd
5	3.1V	6	3.1V
7	Gnd	8	Gnd
9	1.48V	10	1.48V
11	1.48V	12	1.48V
13	Gnd	14	Gnd
15	Gnd	16	Gnd
17	2.86V	18	OL
19	1V	20	1.89V
21	OL	22	OL
23	OL	24	OL

Main (Digital) Board

P1000 P1001

IC1005 IC1007 Q900 IC1006

Q901

P800 IC1003 IC810 IC1004

IC407 Micro

P404 LD803 Q400 IC405

IC805 IC809 IC404 IC400

Q803 IC807 IC802 IC804 Reset BCM

IC501 Audio

IC1000 True Motion Micronas

X1000 20.25Mhz

Software Upgrades

P200 n/c

IC812

IC803

X400 24 Mhz 1.5V

IC100 BCM Broadcom

X200 54 Mhz 1.5V

16 VIF
14 SIF
TUNER
3 (5V)
1

IC812
1 (9V)
2 (3.3V)
3 (5V for Tuner)
4 (n/c)
5 (Gnd)

IC803
1 (12V)
2 (Gnd)
3 (9V)

LD803 Illuminates when IC809 generates 3.3V BCM

P501 To Speakers

* Grayed Out ICs are located on Back

For Regulator Voltages, see back of page.

P404 "Main" to J1

	Pin	Label	STBY	Run	Diode Check
Intelligent Sensor	1	EYEQ-SCL	3.3V	3.3V	2.13V
Intelligent Sensor	2	EYEQ-SDA	3.3V	3.3V	2.13V
	3	Gnd	Gnd	Gnd	Gnd
	4	Gnd	Gnd	Gnd	Gnd
	5	Key1	3.3V	3.3V	1.77V
	6	Key2	3.3V	3.3V	1.77V
	7	3.3V	0V	3.3V	0.55V
STBY 5V	8	5V ST	5V	5V	1.48V
	9	Ready	0V	0V	OL
Remote Sensor	10	IR	3.9V	3.9V	1.24V
Intelligent Sensor	11	EYEQ-Reset	0V	0V	OL
	12	Gnd	Gnd	Gnd	Gnd
	13	Ready	0V	0V	OL
	14	PWB-Buzz	0V	0V	3V
	15	Gnd	Gnd	Gnd	Gnd

Side (Key) Controls

P101

Front PWB Assembly (Interface)

J3 J1

Gnd Lug

IR Receiver Power Button

REGULATORS/ICs ON FRONT

IC405	STBY	RUN	Label
Function:	Micro Reset control		
Pins 1	0V	3.3V	Input 3.3VST-Micom
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to Q400

IC803	STBY	RUN	
Function:	9V Regulator Also source for IC812		
Pins 1	0V	12V	Input
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	9V	Output

IC812	STBY	RUN	Label
Function:	5V-TU Regulator		
Pin 1	0V	9V	Input
Pin 2	0V	3.3V	On/Off Power-CTL 3.3V
Pin 3	0V	5V	Output
Pin 4	n/c	n/c	n/c
Pin 5	Gnd	Gnd	Gnd

Q400	STBY	RUN	Label
Function:	Reset to Micro		
B	0.59V	0.59V	Input from IC405
C	0V	0V	Hi-Lo to IC407 pin 4
E	Gnd	Gnd	Gnd

Q900	STBY	RUN	Label
Function:	LVDS Switch		
Pins 1,3	0V	12V	Input
Pins 2,4	0V	6V	On/Off
Pins 5-8	0V	12V	Output LVDS 12V

Q901	STBY	RUN	Label
Function:	Turns on Q900 LVDS Switch		
B	0V	0.7V	LVDS-Panel-Control
C	0V	0V	On low/Off hi
E	0V	0V	Gnd

REGULATORS/ICs ON BACK

IC102	STBY	RUN	Label
Function:	EEPROM for HDMI HDCP Key		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	3.78V	SDA
Pin 6	0V	3.78V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC400	STBY	RUN	Label
Function:	BCM Reset Generator Drives IC401		
Pins 1	0V	3.3V	Input D3.3V-BCM
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to IC401

IC401	STBY	RUN	Label
Function:	BCM Reset Smitt Trigger		
Pin 1	0V	3.3V	Input Reset
Pin 6	0V	3.3V	BCM Reset
Pin 7	Gnd	Gnd	Gnd
Pin 2,3,5	0V	0V	
Pin 14	0V	3.3V	B+ for IC +3.3V
Pins 8,9,10,11,12,13 not used			

IC403	STBY	RUN	Label
Function:	NV RAM-OLD		
Pins 1,2,3	0V	4.9V	Pull Up
Pins 4	Gnd	Gnd	Gnd
Pin 5	0V	3.4V	SDA
Pin 6	0V	3.4V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

Q803	STBY	RUN	Label
Function:	Controls Q804 +5V Switch		
B	0V	0.72V	Input RL-ON
C	5V	0.02V	Turns on Q804
E	Gnd	Gnd	Gnd

Q804	STBY	RUN	Label
Function:	+5V Switch		
Pins 1,3	0V	5V	Input ST-5V
Pins 2,4	0V	0.3V	On/Off by Q803
Pins 5-8	0V	5V	Output +5V

IC404	STBY	RUN	
Function:	3.3VST-MICON Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	3.3V	3.3V	Output 3.3VST-MICON
Pins 3	5V	5V	Input ST-5V

IC406	STBY	RUN	
Function:	Micro EEPROM		
Pins 1,2,4	Gnd	Gnd	Gnd
Pins 3	3.3V	3.3V	Pull Up
Pin 5	3.3V	3.3V	SDA
Pin 6	3.3V	3.3V	SCL
Pin 7	Gnd	Gnd	Write Protect
Pin 8	3.3V	3.3V	3.3VST-Micom

IC408	STBY	RUN
Pin 1	5V	5V
Pin 2	5V	0.1V
Pin 3,4,5,7	n/c	n/c
Pin 6,8,9	Gnd	Gnd
Pin 10,11	0V	4.78V
Pin 12	0V	0.16V
Pin 13	0V	3.4V
Pin 14	0V	0V
Pin 15	5V	5V
Pin 16	5V	ST-5V

IC602	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	0V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	5V
Pin 6	0V	5V
Pin 7	0V	0V
Pin 8	0V	4.8V

IC1003	STBY	RUN
Pin 1	0V	13V
Pin 2	0.68V	0V
Pin 3	0.6V	0V
Pin 4	0V	1.24V
Pin 5	3.3V	3.3V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	3.4V

IC802	STBY	RUN	Label
Function:	3.3V Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	3.3V	Output
Pins 3	0V	5V	Input

IC701	STBY	RUN	
Function:	EEPROM for HDMI		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	5V	SDA
Pin 6	0V	4.7V	SCL
Pin 7	0V	5V	Write Protect
Pin 8	0V	4.73V	Vcc+5V

IC702	STBY	RUN	
Function:	EEPROM for RS232		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	0.15V	SDA
Pin 6	5V	0.13V	SCL
Pin 7	0V	0.13V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC805	STBY	RUN	Label
Function:	D1.2V-BCM Regulator		
Pin 1	0V	6V	RST
Pin 2	0V	5V	Input
Pin 3	0V	1.2V	Output
Pin 4	0V	0V	Gnd
Pin 5	0V	3.3V	On/Off Power-CTL
Pin 6	0V	1.2V	FB
Pin 7	0V	1V	COMP
Pin 8	0V	0V	Gnd

IC807	STBY	RUN	Label
Function:	1.8V-NTP Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	1.8V	Output
Pins 3	0V	3.3V	Input

IC809	STBY	RUN	Label
Function:	D3.3V Regulator Also Drives LD803		
Pin 1	0V	1.2V	On/Off Power-CTL
Pin 2	0V	5V	Input
Pin 3	Gnd	Gnd	Gnd
Pin 4	0V	3.4V	Output
Pin 5	0V	3.3V	ADJ

IC810	STBY	RUN	Label
Function:	D2.6V Regulator		
Pin 1	0V	2.5V	Input
Pin 2	0V	1.2V	On/Off Pwr-CTL 2.6V
Pin 3	Gnd	Gnd	Gnd
Pin 4	n/c	3.3V	ADJ
Pin 5	Gnd	5V	Output

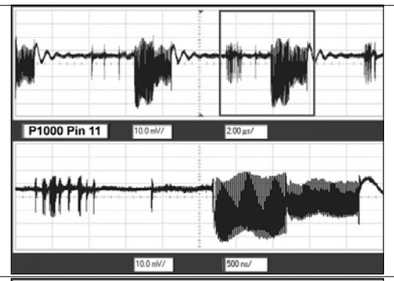
IC1004	STBY	RUN
Pin 1	0V	10V
Pin 2	0.78V	0V
Pin 3	0.7V	0V
Pin 4	0V	1.24V
Pin 5	0V	0V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	1.3V

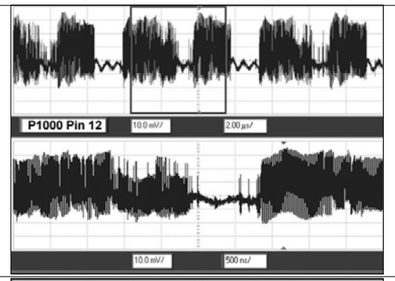
IC1005	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	3.4V
Pin 3	0V	0V
Pin 4	0V	1.4V
Pin 5	0V	1.2V

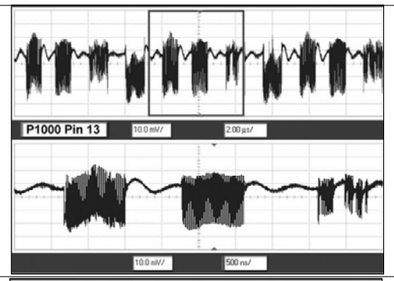
IC1006	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	1.8V
Pin 5	0V	0V

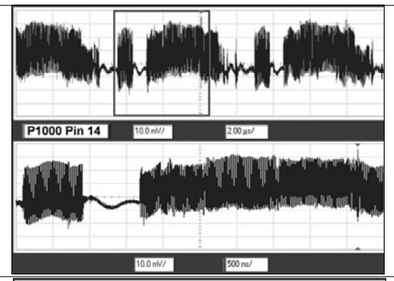
IC1007	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	2.5V

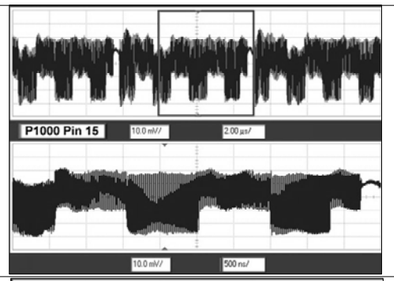
42LG70 LVDS P1000 WAVEFORMS

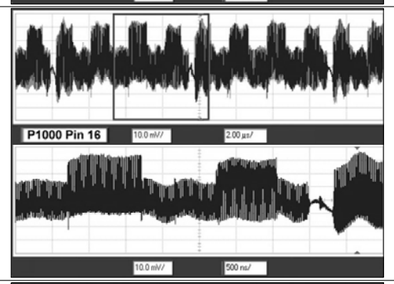


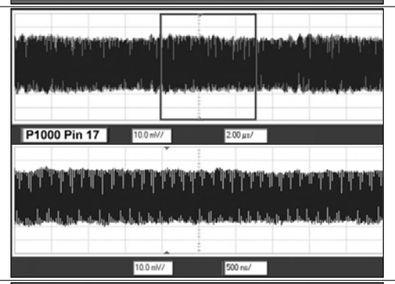


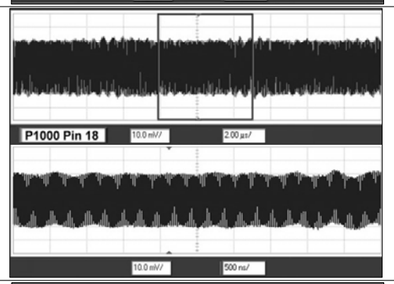


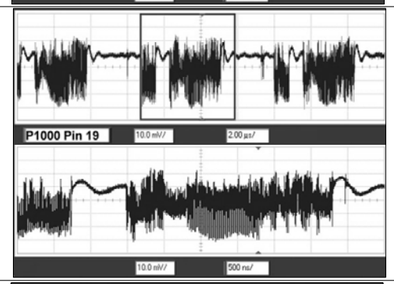


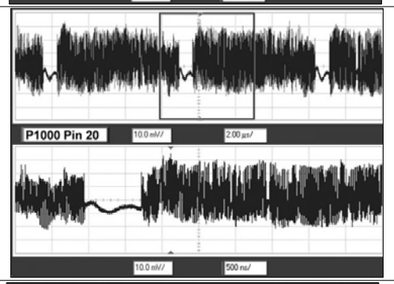


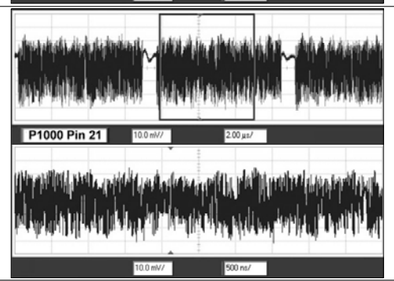


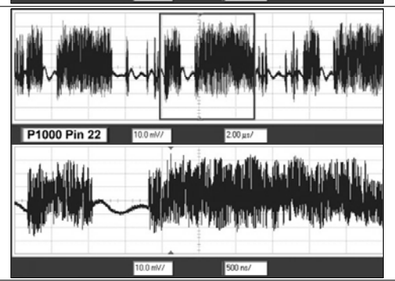


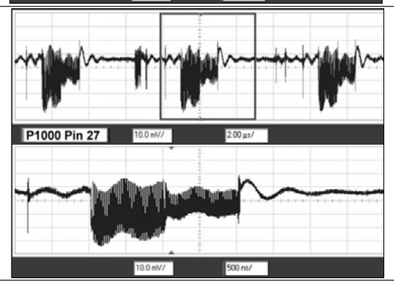


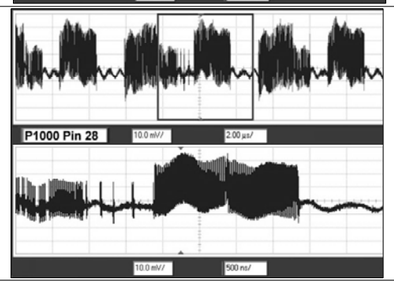


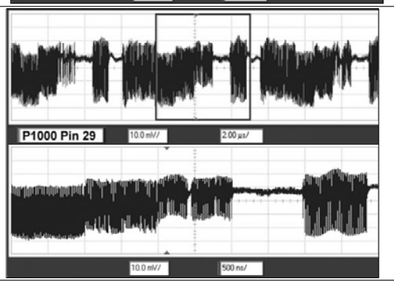


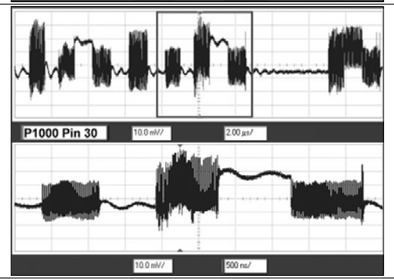


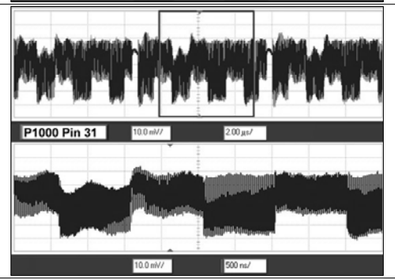


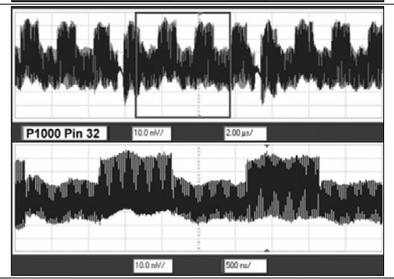


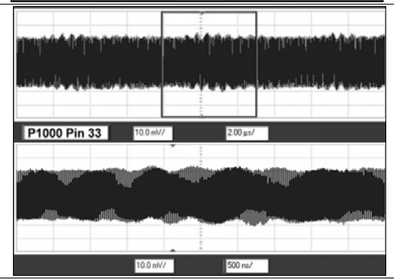


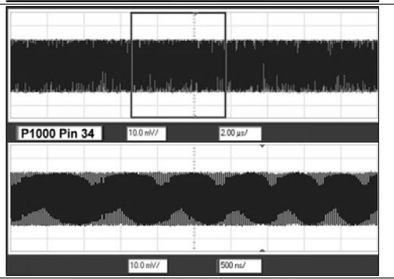


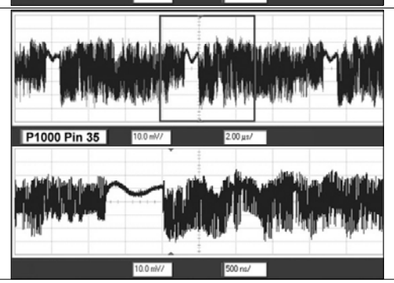


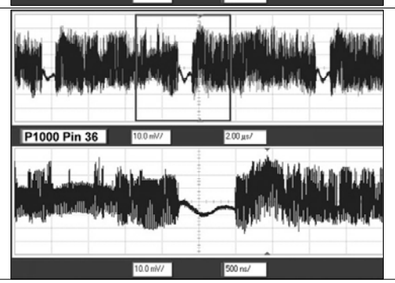


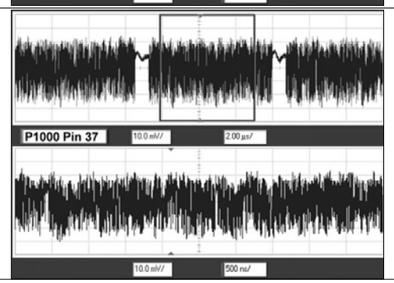


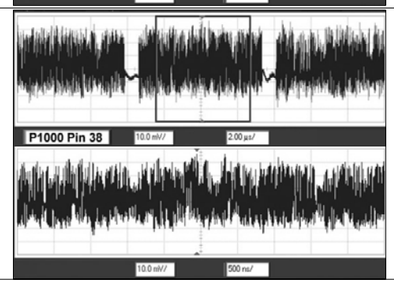






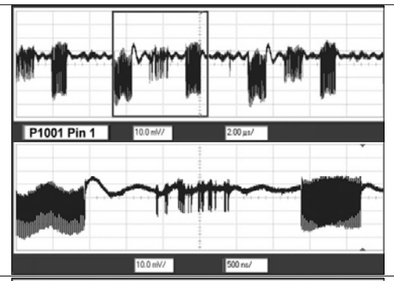


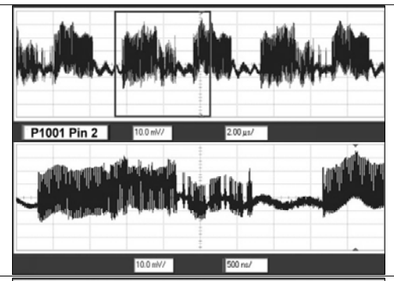


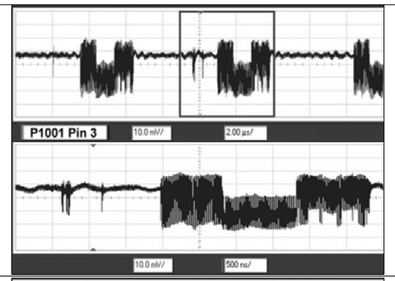


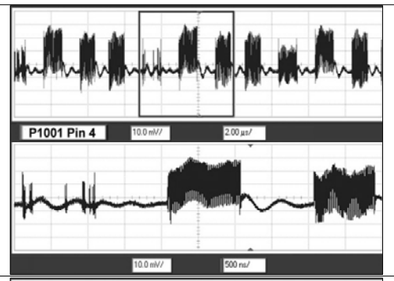
42LG70 P1000 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

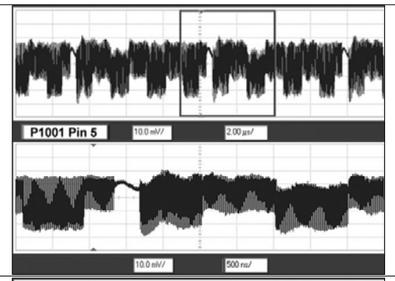
42LG70 LVDS P1001 WAVEFORMS

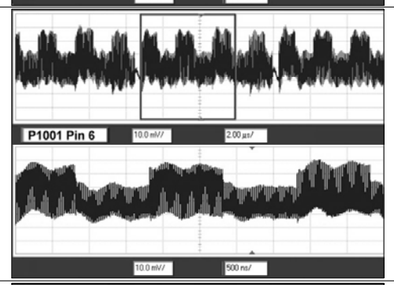


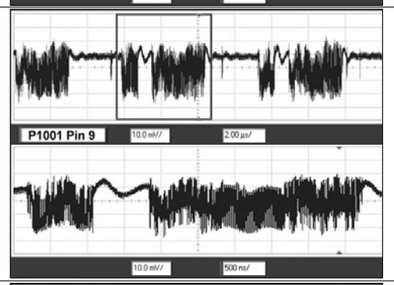


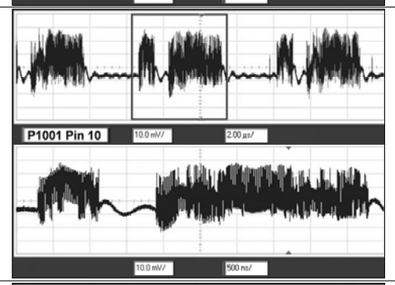


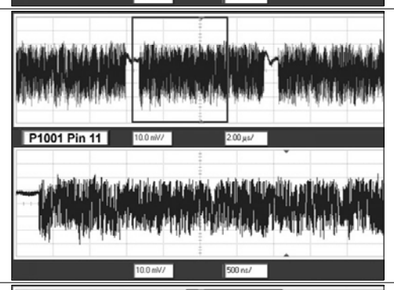


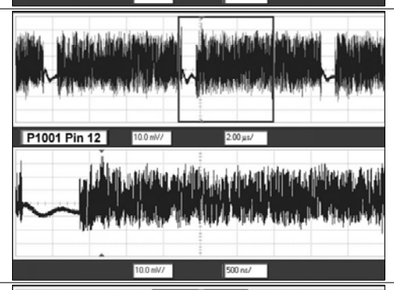


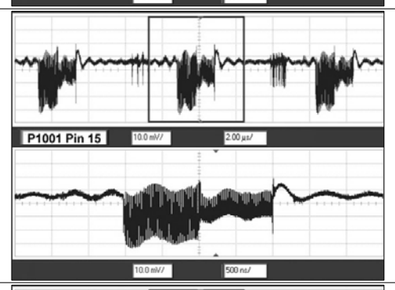


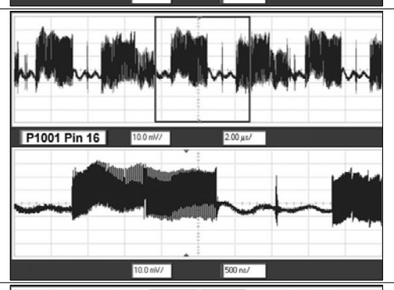


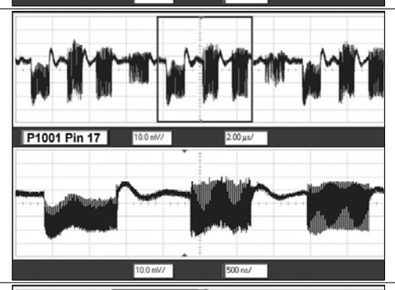


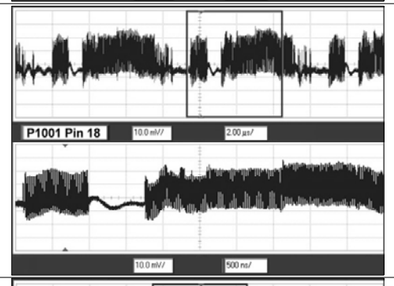


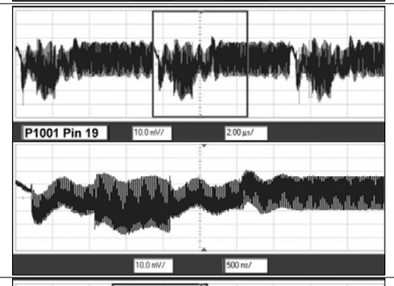


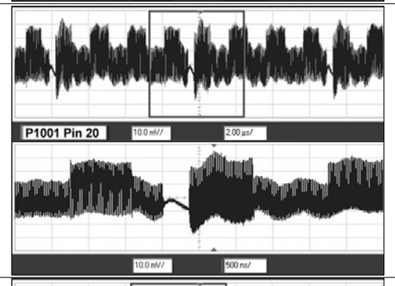


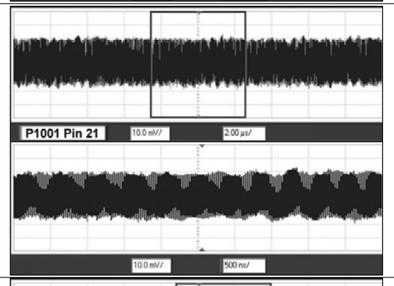


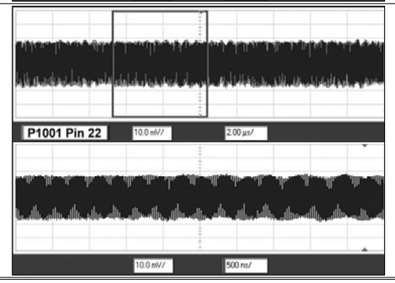


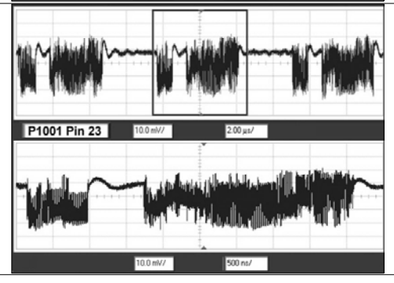


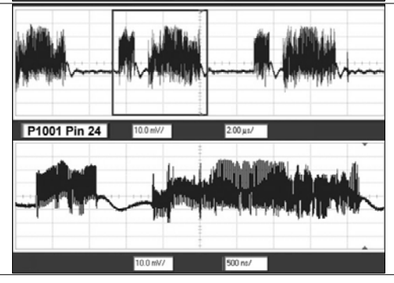


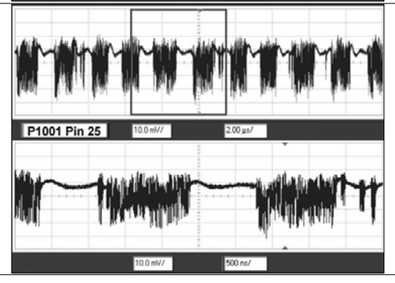


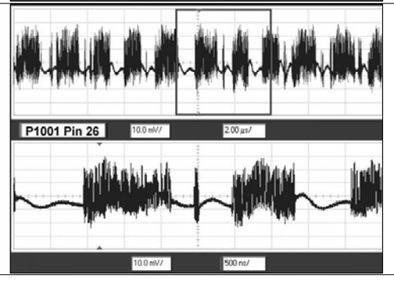








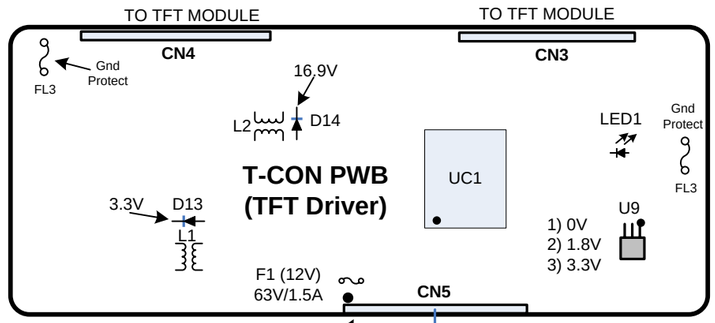




42LG70 P1001 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

42LH20 INTERCONNECT DIAGRAM

Warning:
T-Con PWB under shield. Be sure to reinsert screws
before operating set with shield removed.



See LVDS Video Waveforms On Back of page.

LVDS

LED1
Set In Stby: LD1 Off
Anode 0V Cathode 0V
Power On: LD1 Lit
Anode 3.3V Cathode 0V
Set On: LD1 Off
Anode 3.3V Cathode 1.3V

Far left pins 2, 3, 4 AND 5 for CN5 are
12V from Main PWB LVDS 12V Switch.

P801 "Main" to CN5 "T-CON"

Pin	LABEL	SBY	Run	Diode Check
1	Gnd	Gnd	Gnd	Gnd
2	Gnd	Gnd	Gnd	Gnd
3	*PWM-DIM	0V	3.1V	1.1V
4	OPC-OUT	0V	3.3V	Open
5	Gnd	Gnd	Gnd	Gnd
6	TXA3+	0V	1.2V	1.1V
7	TXA3-	0V	1.2V	1.1V
8	Gnd	Gnd	Gnd	Gnd
9	TXAC+	0V	1.2V	1.1V
10	TXAC-	0V	1.1V	1.1V
11	Gnd	Gnd	Gnd	Gnd
12	TXA2+	0V	1.1V	1.1V
13	TXA2-	0V	1.2V	1.1V
14	Gnd	Gnd	Gnd	Gnd
15	TXA1+	Gnd	1.1V	1.1V

Pin	LABEL	SBY	Run	Diode Check
16	TXA1-	0V	1.2V	1.1V
17	Gnd	Gnd	Gnd	Gnd
18	TXA0+	0V	1.1V	0.8V
19	TXA0-	0V	1.2V	1.1V
20	Gnd	Gnd	Gnd	Gnd
21	OPC-EN	0V	0V	1.1V
22	LVDS-SEL	0V	0V	Open
23	Gnd	Gnd	Gnd	Gnd
24	Gnd	Gnd	Gnd	Gnd
25	Gnd	Gnd	Gnd	Gnd
26	Gnd	Gnd	Gnd	Gnd
27	LVDS 12V	0V	12.1V	1.6V
28	LVDS 12V	0V	12.1V	1.6V
29	LVDS 12V	0V	12.1V	1.6V
30	LVDS 12V	0V	12.1V	1.6V

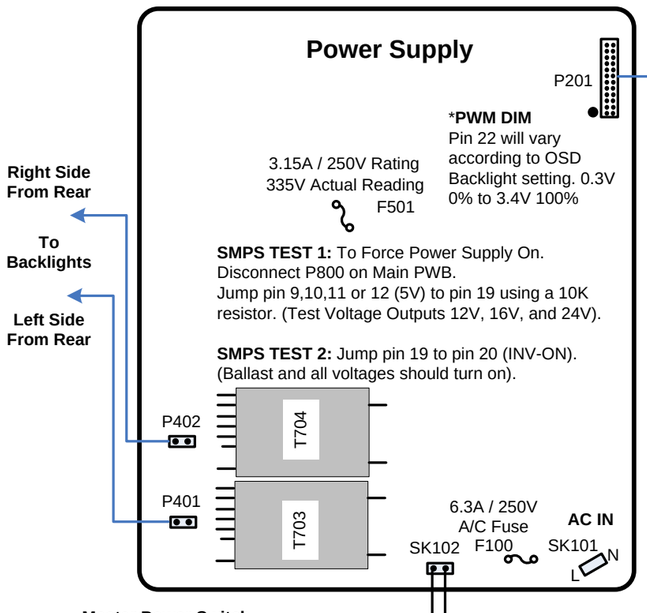
*Pin 3 PWM-DIM 3.15V (Max 100%) to 0.6V (Min 0%) Customer's Menu Backlight setting. However, this is not used on the T-CON PWB

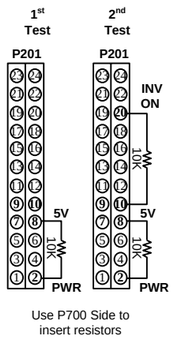
P201 Odd "SMPS" to P700 "Main PWB"

Pin	Label	STBY	Run	Diode Check
23	n/c	n/c	n/c	n/c
21	A.DIM	0V	1.7V	Open
19	n/c	n/c	n/c	n/c
17	24V	0V	21.4V	0.71V
15	Gnd	Gnd	Gnd	Gnd
13	12V	0V	12.3V	0.96V
11	Gnd	Gnd	Gnd	Gnd
9	STBY 5V	5.1V	5.14V	1.67 V
7	STBY 5V	5.1V	5.14V	1.67 V
5	Gnd	Gnd	Gnd	Gnd
3	Gnd	Gnd	Gnd	Gnd
1	n/c	n/c	n/c	n/c

P201 Even "SMPS" to P700 "Main PWB"

Pin	Label	STBY	Run	Diode Check
24	*PWM-DIM	0V	.6V ~ 3.3V	1.68V
22	Err Out	0V	0V	Open
20	INV-On/Off	0V	3.8V	1.6V
18	24V	0V	21.4V	0.71V
16	Gnd	Gnd	Gnd	Gnd
14	12V	0V	12.3V	0.96V
12	Gnd	Gnd	Gnd	Gnd
10	STBY 5V	5.14V	5.14V	1.67 V
8	STBY 5V	5.14V	5.14V	1.67 V
6	Gnd	Gnd	Gnd	Gnd
4	Gnd	Gnd	Gnd	Gnd
2	PWR_ON	0V	4.98V	0.886V



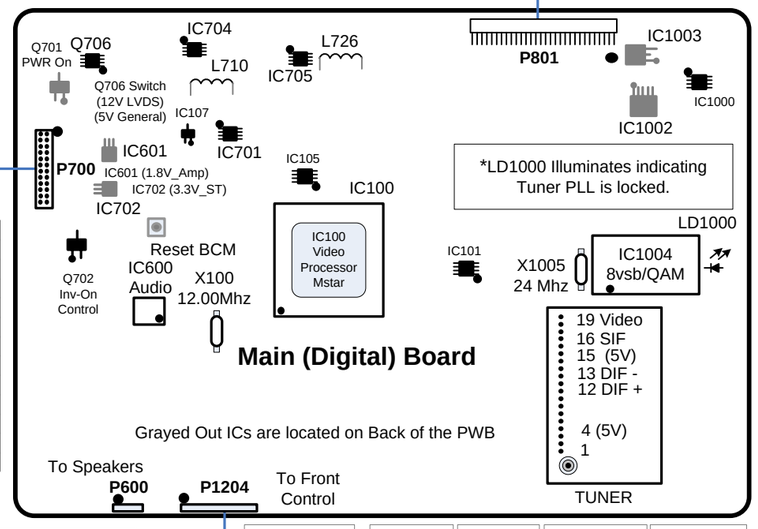


Use P700 Side to insert resistors

P700 "Main" to P201 "SMPS"

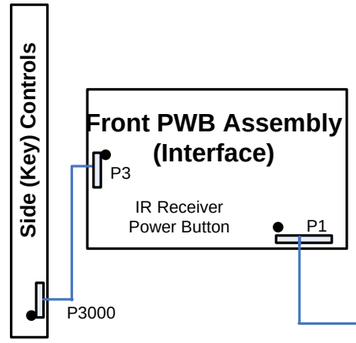
Pin	Label	Diode Check	Pin	Label	Diode Check
1	n/c	n/c	2	PWR_ON	1.87V
3	Gnd	Gnd	4	Gnd	Gnd
5	Gnd	Gnd	6	Gnd	Gnd
7	STBY 5V	1.1 V	8	STBY 5V	1.1 V
9	STBY 5V	1.1 V	10	STBY 5V	1.1 V
11	Gnd	Gnd	12	Gnd	Gnd
13	12V	2.1V	14	12V	2.1V
15	Gnd	Gnd	16	Gnd	Gnd
17	24V	Open	18	24V	Open
19	n/c	n/c	20	INV-On/Off	1.9V
21	A.DIM	2V	22	Err Out	Open
23	n/c	n/c	24	*PWM-DIM	Open

For Stand-By and Run voltages, see P201 Chart



P1204 "Main" to P1 "Front IR/LED"

Pin	Label	STBY	Run	P1204 "Main" Diode Check	P1 "IR/LED" Diode Check
1	SCL	3.3V	3.3V	1.14V	2.4V
2	SDA	3.3V	3.3V	1.14V	2.4V
3	Gnd	Gnd	Gnd	Gnd	Gnd
4	KEY 1	3.3V	3.3V	1.1V	Open
5	KEY 2	3.3V	3.3V	1.1V	Open
6	5V STBY	5.1V	5.1V	1.13V	1.5V
7	Gnd	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd	Gnd
9	IR	4.8V	4.8V	Open	2V
10	Gnd	Gnd	Gnd	Gnd	Gnd
11	3.3V STBY	3.29V	3.29V	1.0V	Open
12	Power On/Off	0V	3.29V	1.0V	2V



P3 "Front IR/LED" P3000 "Side Key"

Pin	Label	STBY	Run	P3 Diode Check	P3000 Diode Check
1	KEY 1	3.3V	3.3V	1.1V	Open
2	Gnd	Gnd	Gnd	Gnd	Gnd
3	KEY 2	3.3V	3.3V	1.1V	Open
4	Gnd	Gnd	Gnd	Gnd	Gnd

IC101 (Flash Memory)
1-2 (0V)
3-4 (0V)
5-6 (0V)
7-8 (3.2V)

IC105 (HDCP EEPROM)
1-2 (Gnd)
3 (5V)
5-6 (0V)
4-7 (Gnd)
6 (1.2V)
7 (0.8V)
8 (5V)

IC107 (Power Det)
1 (Gnd)
2 (Reset) .3V
3 (3.28V)

IC601 (1.8V Amp)
1 (3.2V)
2 (1.8V)
3 (0V)

Q701 (PWR ON)
1 (0V)
2 (5V)
3 (5V)

IC701 1.8V_DDR
1 (N/C)
2 (3.18V)
3 (3.18V)
4-5 (N/C)
6 (1.87V)
7 (0.8V)
8 (Gnd)

IC702 (3.3V_ST)
1 (5V)
2 (3.3V)
3 (0V)

IC704 (3.3V-FE)
1 (0.78V)
2 (Gnd)
3 (5V)
4 (7.4V)
5 (2.12V)
6 (3.28V)
7 (3.28)
8 (5V)

Q702 (INV ON)
1 (0.6V)
2 (3.82V)
3 (Gnd)

IC705 (1.26V_VDDC)
1 (0.78V)
2 (Gnd)
3 (5V)
4 (5.9V)
5 (5V)
6 (1.3V)
7 (1.3V)
8 (3.16V)

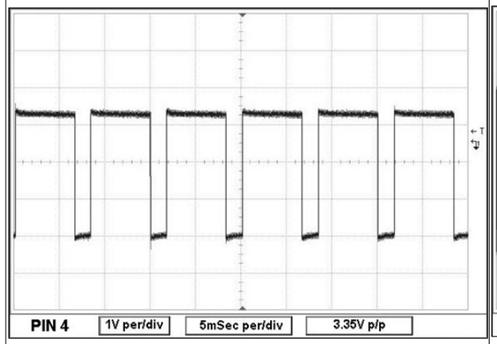
Q706 Switch (12V LVDS) (5V General)
1 (5V)
2 (0.48V)
3 (0.48V)
4 (6V)
5-6 (12.3V)
7-8 (5V)

IC1000 (1.2V_PVSB)
1 (N/C)
2 (3.2)
3 (3.2V)
4-5 (N/C)
6 (1.2V)
7 (0.8V)
8 (Gnd)

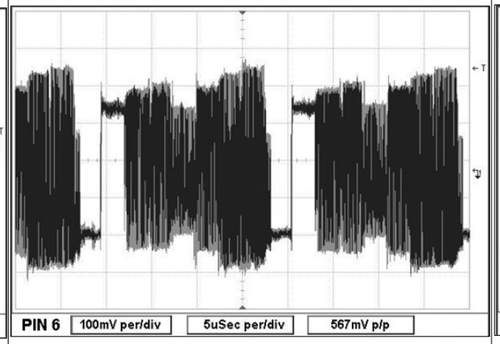
IC1003 (5V-Tuner source)
1 (12V)
2 (Gnd)
3 (8.94V)

42LH20 LVDS P801 WAVEFORMS

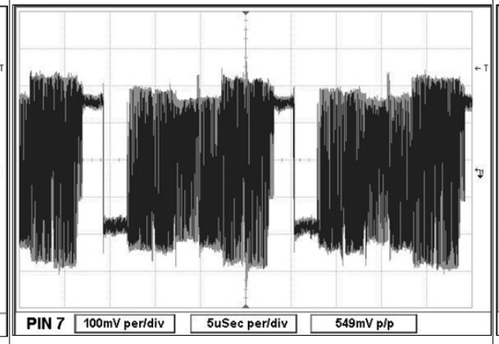
LVDS P801 PIN 4 (OPC-Out)



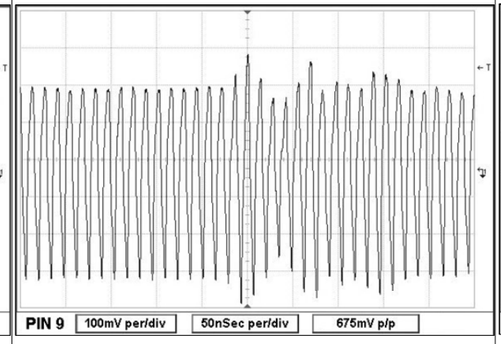
LVDS P801 PIN 6 (TXA3+)



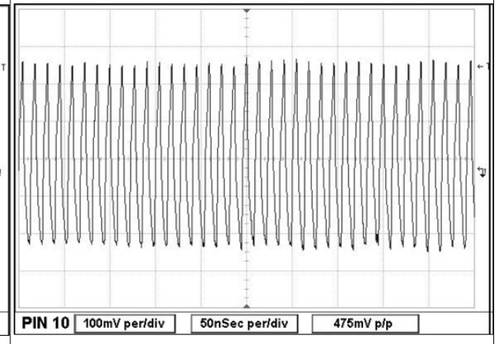
LVDS P801 PIN 7 (TXA3-)



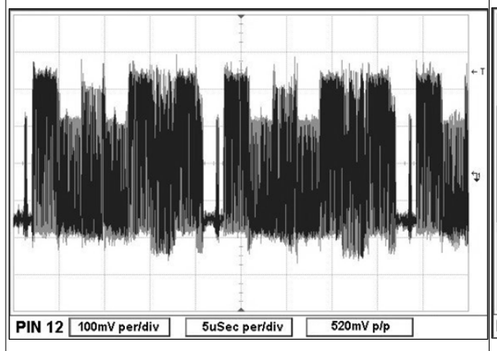
LVDS P801 PIN 9 (TXAC+)



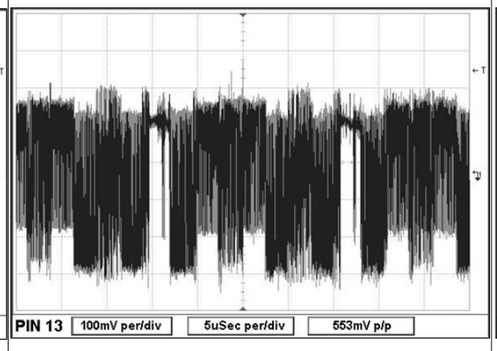
LVDS P801 PIN 10 (TXAC-)



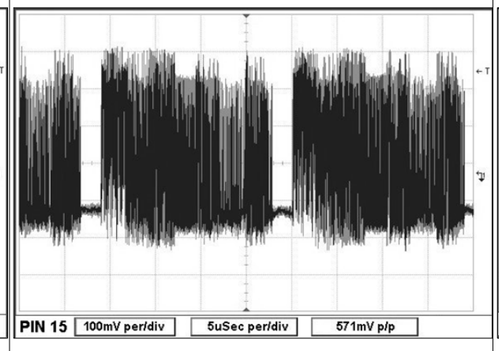
LVDS P801 PIN 12 (TXA2+)



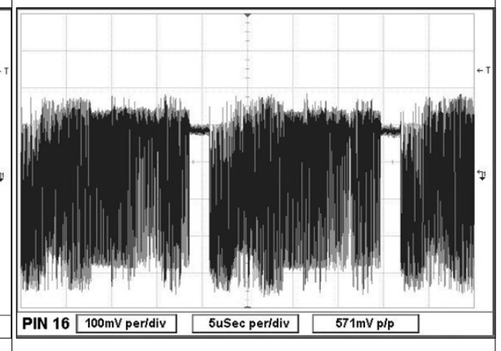
LVDS P801 PIN 13 (TXA2-)



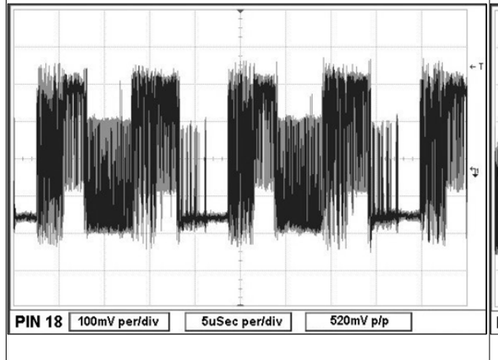
LVDS P801 PIN 15 (TXA1+)



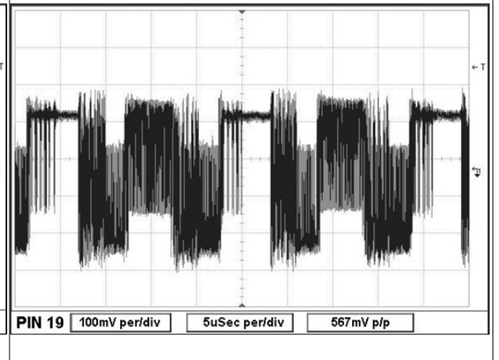
LVDS P801 PIN 16 (TXA1-)



LVDS P801 PIN 18 (TXA0+)



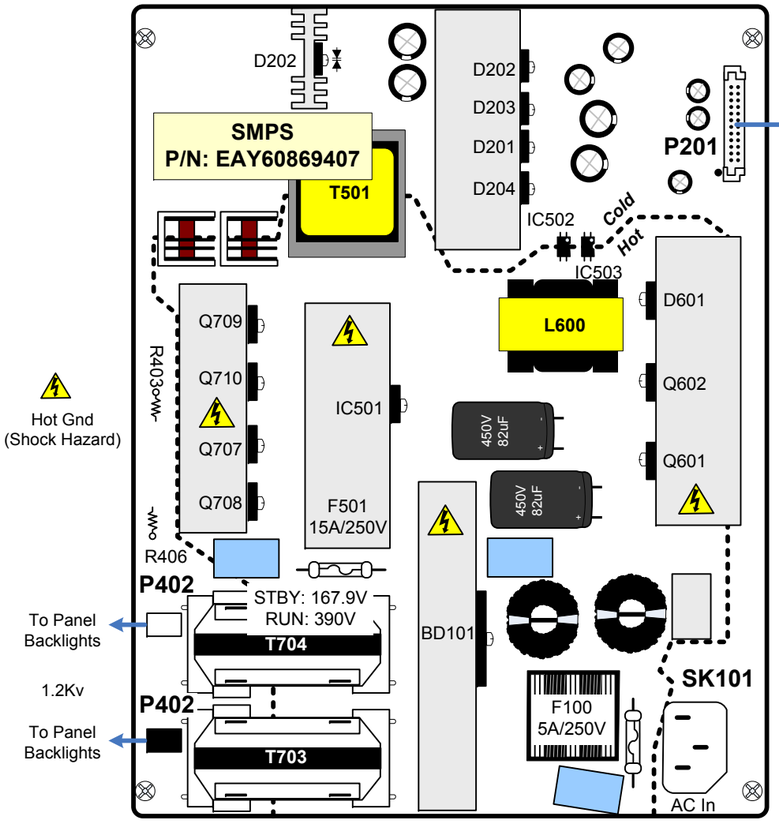
LVDS P801 PIN 19 (TXA0-)



42LH20 P801 LVDS CABLE WAVEFORMS:
Waveforms taken using NTSC Color Bar RF input.

42LK520 INTERCONNECT DIAGRAM

(1) **PWR-On** Pin 1: Turns on 12V, 20V to the Main and 390V to the on board Ballast circuit.
(2) **INV-On** Pin 18: Turns on the Backlights
(3) **Error_Out** Pin 24: Goes high (3.3V) when the backlights are told to come on. Goes back low when they light. If it goes high again on the 5th attempt to fire the backlights, the set shuts off.
(4) **A-DIM** Pin 20: Is not used .
(5) **P-DIM** Pin 22 can vary according to incoming video IRE level and OSD Backlight setting Output from the Video Processor IC100. Range 0.34V to 3.2V.

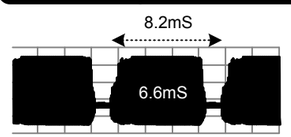


Hot Gnd
(Shock Hazard)

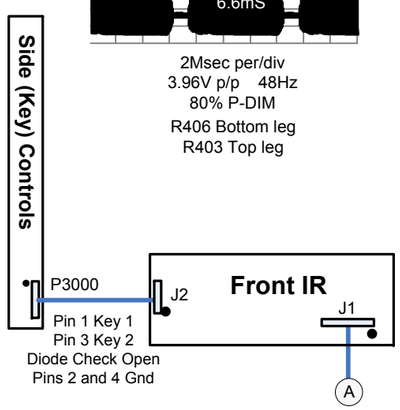
To Panel Backlights

1.2Kv

To Panel Backlights

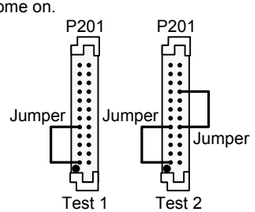


2Msec per/div
3.96V p/p 48Hz
80% P-DIM
R406 Bottom leg
R403 Top leg

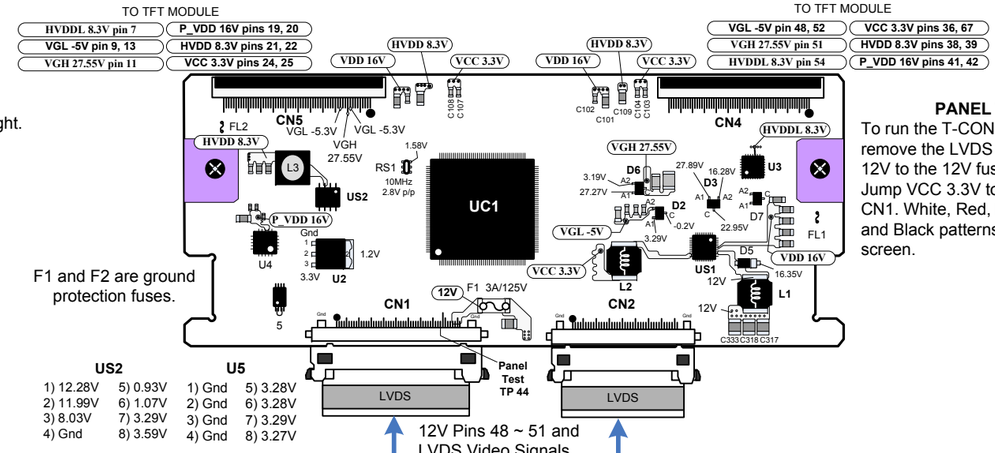


SMPS TEST 1 : Forcing SMPS On.
Remove AC Power.
Disconnect P401 on Main Board.
Jump pin 1 (PWR_ON) to pin 9, 10, 11 or 12 .
Apply AC Power. This should force the SMPS to the on state. All Voltages should be produced.
(20V and 12V to Main). Backlights are not on. The Backlights should come on. Disconnect AC Power.

SMPS TEST 2 : Forcing Backlights On.
Leave first connector in place.
Jump pin 18 (INV_ON) to pin 9, 10, 11 or 12.
Apply AC Power. This should force the Backlights to come on.



Note: STBY 3.5V Must be present when AC applied.



F1 and F2 are ground protection fuses.

US2

1) 12.28V	5) 0.93V
2) 11.99V	6) 1.07V
3) 8.03V	7) 3.29V
4) Gnd	8) 3.59V

U5

1) Gnd	5) 3.28V
2) Gnd	6) 3.28V
3) Gnd	7) 3.29V
4) Gnd	8) 3.27V

12V Pins 48 ~ 51 and LVDS Video Signals

PANEL TEST
To run the T-CON "Panel Test", remove the LVDS cables. Jump 12V to the 12V fuse.
Jump VCC 3.3V to pin 44 on CN1. White, Red, Blue, Green and Black patterns show on screen.

P201 "SMPS Board" To P401 "MAIN Board"

Pin	Label	STBY	Run	Diode Check
24	ERROR	0V	0.02V	Open
23	n/c	n/c	n/c	Open
22	P-DIM	0V	0.34V~3.2V	Open
21	12V	0V	12.39V	Open
20	A-DIM	n/c	1.71V	Open
19	12V	0V	12.39V	Open
18	INV-ON/OFF	0V	2.98V	Open
17	12V	0V	12.39V	Open
16	Gnd	Gnd	Gnd	Open
13-15	Gnd	Gnd	Gnd	Gnd
9-12	3.5V (Stby)	3.41V	3.39V	Open
5-8	Gnd	Gnd	Gnd	Gnd
2-4	20V	0V	21.22V	0.82V
1	PWR_ON	0V	3.18V	0.9V

12V Pins 1 ~ 4 and LVDS Video Signals

See waveforms on Page 2 of Interconnect Diagram

P2401 "MAIN Board" To J1 "IR Board"

Pin	Label	Stby	Run	Diode	J1 Diode
12	LED_R	0V	0V	OL	OL
11	+3.3V_Normal	0V	3.29V	0.57V	OL
10	Gnd	Gnd	Gnd	Gnd	Gnd
9	IR	3.33V	3.27V	OL	OL
8	LED_B	0V	2.69V	OL	OL
7	Gnd	Gnd	Gnd	Gnd	OL
6	3.V_ST	3.41V	3.35V	1.17V	Gnd
5	KEY 2	2.73V	2.68V	1.89V	OL
4	KEY 1	3.41V	3.34V	1.89V	0.93V
3	Gnd	Gnd	Gnd	Gnd	Gnd
2	SDA	3.41V	3.34V	OL	OL
1	SCL	3.41V	3.34V	OL	OL

Key 1 & Key 2 Voltage and Resistance Chart with buttons pressed.

Key 1 Resistance	Key 1 Function	Key 1 Voltage	Key 2 Resistance	Key 2 Function	Key 2 Voltage
9.9K	Vol +	1.65V	9.9K	CH +	1.47V
4.7K	Vol -	1.06V	4.7K	CH -	0.99V
1.8K	Menu	0.51V	1.8K	Power	0.49V
269Ω	Enter	0.09V	269Ω	Input	0.09V

Voltage and Resistance taken with AC applied to the set.
No Button pressed Resistance is Open
Voltage for Key 1 is 3.41V/3.34V. For Key 2 is 2.73V/2.68V

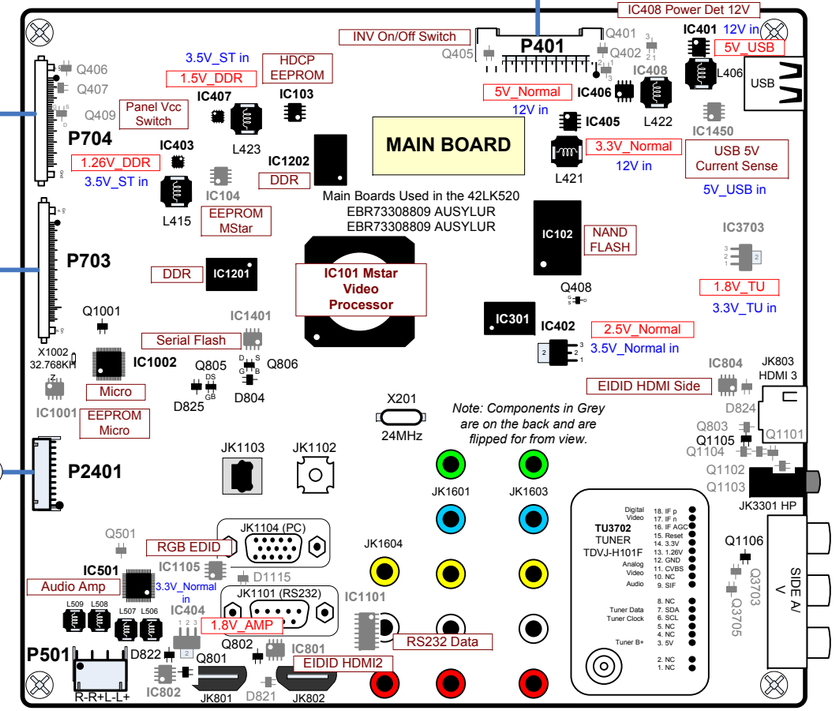
LVDS Video Signals

See DC Voltages on Page 3 of Interconnect Diagram

P402 to SMPS P201

Pin	Diode
1	OL
2-4	OL
5-8	Gnd
9-12	1.17V
13-16	Gnd
17	1.67V
18	OL
19	1.67V
20	OL
21	1.67V
22	OL
23	OL
24	Gnd

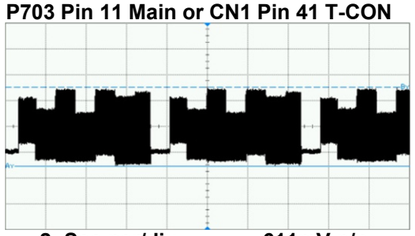
For Voltages See P201 SMPS



To all Speakers
All pins 10.58V
Diode Test = OL

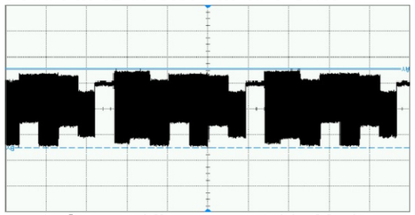
42LK520 LVDS P703 WAVEFORMS

P703 Pin 11 Main or CN1 Pin 41 T-CON



2uSec per/div 611mV p/p

P703 Pin 12 or CN1 Pin 40 T-CON

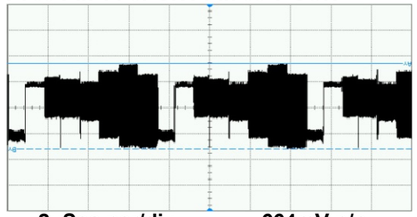


2uSec per/div 611mV p/p

P703 Pin 13 or CN1 Pin 39 T-CON

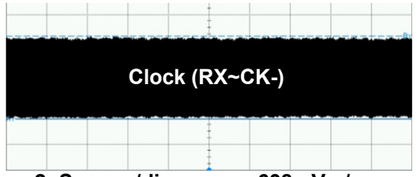
2uSec per/div 664mV p/p

P703 Pin 14 or CN1 Pin 38 T-CON



2uSec per/div 664mV p/p

P703 Pin 16 or CN1 Pin 36 and
P703 Pin 32 or CN1 20 T-CON

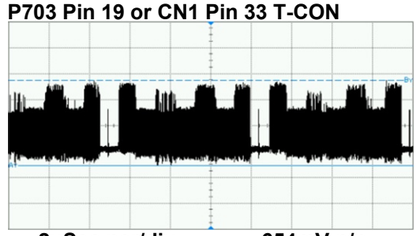


2uSec per/div 638mV p/p

P703 Pin 17 or CN1 Pin 33 and
P703 Pin 33 or CN1 19 T-CON

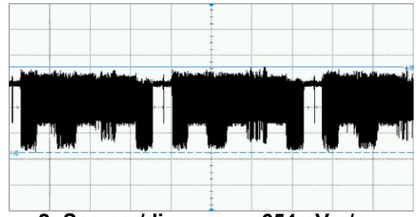
2uSec per/div 638mV p/p

P703 Pin 19 or CN1 Pin 33 T-CON



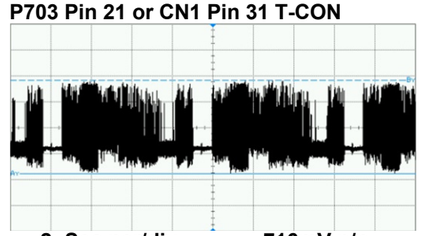
2uSec per/div 654mV p/p

P703 Pin 20 or CN1 Pin 32 T-CON



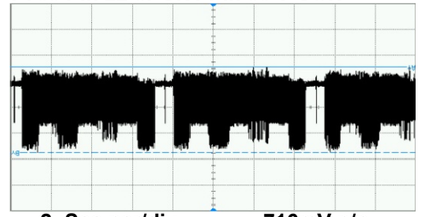
2uSec per/div 654mV p/p

P703 Pin 21 or CN1 Pin 31 T-CON



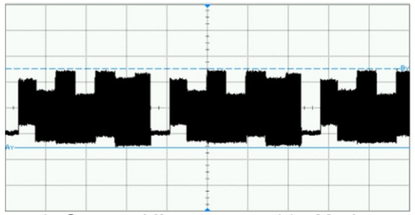
2uSec per/div 716mV p/p

P703 Pin 22 or CN1 Pin 30 T-CON



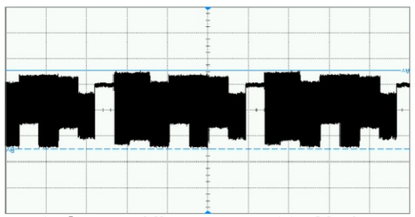
2uSec per/div 716mV p/p

P703 Pin 23 or CN1 Pin 29 T-CON



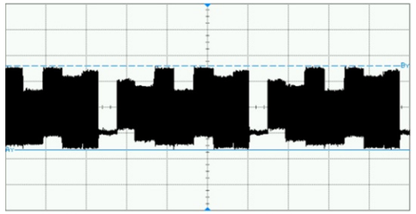
2uSec per/div 793mV p/p

P703 Pin 24 or CN1 Pin 28 T-CON



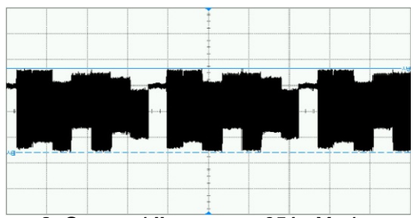
2uSec per/div 793mV p/p

P703 Pin 27 or CN1 Pin 24 T-CON



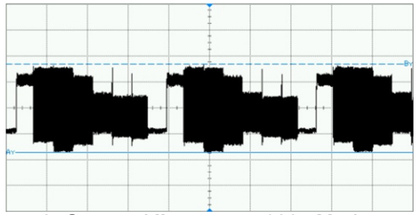
2uSec per/div 651mV p/p

P703 Pin 28 or CN1 Pin 23 T-CON



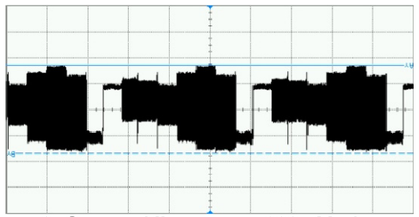
2uSec per/div 651mV p/p

P703 Pin 29 or CN1 Pin 22 T-CON



2uSec per/div 682mV p/p

P703 Pin 30 or CN1 Pin 21 T-CON

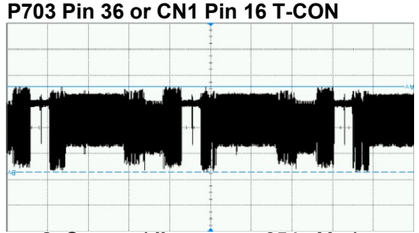


2uSec per/div 682mV p/p

P703 Pin 35 or CN1 Pin 17 T-CON

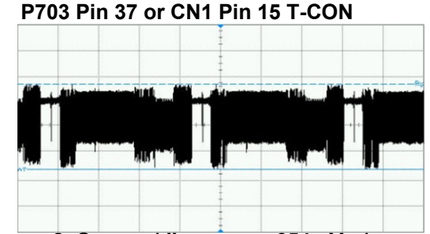
2uSec per/div 654mV p/p

P703 Pin 36 or CN1 Pin 16 T-CON



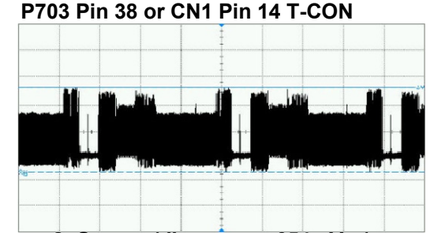
2uSec per/div 654mV p/p

P703 Pin 37 or CN1 Pin 15 T-CON



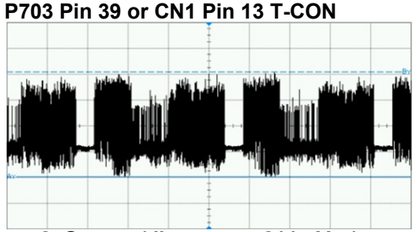
2uSec per/div 654mV p/p

P703 Pin 38 or CN1 Pin 14 T-CON



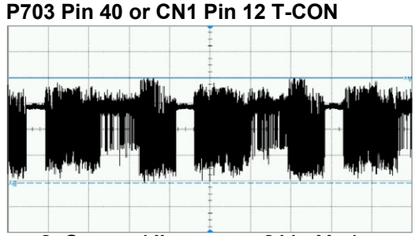
2uSec per/div 654mV p/p

P703 Pin 39 or CN1 Pin 13 T-CON



2uSec per/div 811mV p/p

P703 Pin 40 or CN1 Pin 12 T-CON



2uSec per/div 811mV p/p

Note: P704 waveforms are not shown, but they are very similar to P703

LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 200mV and 2uSec per division Time Base related to scope settings.

42LK520 MAIN (FRONT SIDE) SIMICONDUCTORS

IC103 HDCP EEPROM

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	3.29V (B+)
[4]	0V (Gnd)
[5]	0V
[6]	3.29V
[7]	0V (Gnd)
[8]	3.29V (B+)

IC401 5V Regulator for USB

Pin	
[1]	0V (Gnd)
[2]	12.24V (In)
[3]	0V (Gnd)
[4]	0.8V
[5]	0.8V
[6]	3.3V (PWR On/Off2_1)
[7]	4.99V (Out)
[8]	4.99V (Out)

IC402 (+2.5V_Normal) Regulator

Pin	
[1]	3.29V (In)
[2]	0V (Gnd)
[3]	2.5V (Out)

IC403 (+1.26V_VDDC) Regulator

Pin	
[1]	3.28V (In)
[2]	3.28V (In)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	0V (Gnd)
[6]	0.8V
[7]	0.86V
[8]	0.54V
[9]	1.75V
[10]	1.33V (Out)
[11]	1.33V (Out)
[12]	1.33V (Out)
[13]	4.72V
[14]	n/c
[15]	3.29V
[16]	3.28V (In)

IC405 (+3.3V_NORMAL) Regulator

Pin	
[1]	0V (Gnd)
[2]	12.23V (In)
[3]	0V (Gnd)
[4]	0.8V
[5]	0.87V
[6]	3.32V (PWR On/Off1)
[7]	3.34V (Out)
[8]	3.34V (Out)

IC406 (+5V_Normal) Regulator

Pin	
[1]	0V (Gnd)
[2]	12.23V (In)
[3]	0V (Gnd)
[4]	0.8V
[5]	0.86V
[6]	3.32V (PWR On/Off1)
[7]	5V (Out)
[8]	5V (Out)

IC407 (+1.5V_DDR) Regulator

Pin	
[1]	3.32V (In)
[2]	3.32V (In)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	0V (Gnd)
[6]	0.83V
[7]	0.7V
[8]	0.51V
[9]	1.93V
[10]	1.52V (Out)
[11]	1.52V (Out)
[12]	1.52V (Out)
[13]	4.87V
[14]	n/c
[15]	3.31V
[16]	3.32V (In)

Q408 (+1.5V_FRC_DDR) Switch

Pin	
G	3.3V (PWR On/Off2_1)
S	1.51V (In)
D	1.52V (Out)

Q801 HDMI 2 Hot Swap

Pin	
B	0.63V
C	0V
E	Gnd

Q802 HDMI 1 Hot Swap

Pin	
B	0.63V
C	0V
E	Gnd

Q805 CEC Remote HDMI CEC

Pin	
[B]	3.17V
[G]	0V
[S]	0V
[D]	0.06VV

Q806 CEC Remote HDMI CEC

Pin	
[B]	3.17V
[G]	0V
[S]	3.28V
[D]	3.29V

Q1001 EDID Write Protect

Pin	
B	0V
C	4.7V
E	Gnd

Q1105 Head Phone MUTE

Pin	
B	2.82V
C	0V
E	3.34V

Q1106 Head Phone Mute Driver

Pin	
B	0V
C	2.82V
E	Gnd

D804 Source Bias Q806

Pin	
[A1]	0V
[A2]	3.27V
[C]	3.17V

D822 5V Routing for IC802

Pin	
[A1]	5V
[A2]	0V
[C]	4.7V

D825 Source Bias Q805

Pin	
[A1]	0V
[A2]	0.06V
[C]	3.17V

42LK520 MAIN (BACK SIDE) SIMICONDUCTORS

IC104 Micro Mstar

Pin	
[1]	0V (n/c)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	3.29V (SDA)
[6]	3.29V (SCL)
[7]	0V (Gnd)
[8]	3.29V (B+)

IC404 (+1.8V_Amp) Regulator

Pin	
[1]	Gnd
[2]	1.79V (Out)
[3]	3.29V (In)

IC408 Power_Det 24V, 12V, 3.5V

Pin	
[1]	0V (Gnd)
[2]	3.30V (Reset)
[3]	3.33V (In)

IC801 EDID Data HDMI1

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	4.7V (SDA)
[6]	4.7V (SCL)
[7]	4.7V (WP)
[8]	4.7V (Vcc)

IC802 EDID Data HDMI2

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	4.7V (SDA)
[6]	4.7V (SCL)
[7]	4.7V (WP)
[8]	4.7V (Vcc)

IC804 EDID Data HDMI4

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	4.7V (SDA)
[6]	4.7V (SCL)
[7]	4.7V (WP)
[8]	4.7V (Vcc)

IC1001 Micro EEPROM

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	3.3V (B+)
[4]	0V (Gnd)
[5]	3.3V (SDA)
[6]	3.3V (SCL)
[7]	0V (Gnd)
[8]	3.3V (B+)

IC1101 RS232 Data Buffer

Pin	
[1]	3.3V
[2]	5.4V
[3]	0V
[4]	0V
[5]	(-5.4V)
[6]	0V
[7]	n/c (0V)
[8]	n/c (0V)
[9]	n/c (3.3V)
[10]	n/c (0V)
[11]	n/c (3.3V)
[12]	3.3V
[13]	0V
[14]	(-5.4V)
[15]	0V (Gnd)
[16]	3.3V

IC1105 EDID Data PC

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	4.7V (SDA)
[6]	4.7V (SCL)
[7]	4.7V (WP)
[8]	4.7V (Vcc)

IC1401 Serial Flash Memory

Pin	
[1]	0.0V
[2]	3.3V
[3]	3.3V
[4]	0V (Gnd)
[5]	0V
[6]	0V
[7]	3.3V (B+)
[8]	3.3V (B+)

IC1450 5V Short Protection for USB

Pin	
[1]	0V (Gnd)
[2]	4.98V (In)
[3]	4.98V (In)
[4]	3.3V (USB-En)
[5]	4.96V
[6]	4.98V (Out)
[7]	4.98V (Out)
[8]	n/c (0V)

IC3703 (+1.2V_TU) Regulator

Pin	
[1]	0V (Gnd)
[2]	1.26V (Out)
[3]	3.3V (In)

Q401 Power On/Off Driver for Q402

Pin	
B	0.65V (RL_ON)
C	0V
E	Gnd

Q402 Power On/Off Switch

Pin	
1	3.3V (In)
2	0.8V (Ctl)
3	3.16V (Out)

Q405 Inverter On/Off Switch

Pin	
B	0.0V
C	3.0V (INV_On)
E	Gnd

Q406 PANEL_VCC Control 1st Driver

Pin	
B	0.0V
C	0.68V
E	Gnd

Q407 PANEL_VCC Control 2nd Driver

Pin	
B	0.68V
C	0V
E	Gnd

Q409 PANEL_VCC Switch

Pin	
S	12.2V (In)
G	1.84V (Enable)
D	12.2V (Out)

Q501 AMP_MUTE Pin 25 IC600

Pin	
B	0.0V
C	3.35V
E	Gnd

Q803 HDMI 4 Hot Swap

Pin	
B	0.65V
C	0V
E	Gnd

Q1101 Head Phone MUTE

Pin	
B	0V
C	0V
E	Gnd

Q1102 Head Phone MUTE

Pin	
B	0V
C	0V
E	Gnd

Q1103 Head Phone MUTE

Pin	
B	0V
C	0V
E	Gnd

Q1104 Head Phone MUTE

Pin	
B	0V
C	0V
E	Gnd

Q3703 Tuner CVSB (Video) Buffer

Pin	
B	3.4V
C	Gnd
E	4.1V

Q3705 Tuner SIF (Sound) Buffer

Pin	
B	0.2V
C	Gnd
E	0.9V

D821 5V Routing for IC801

Pin	
[A1]	0V
[A2]	5.0V
[C]	4.7V

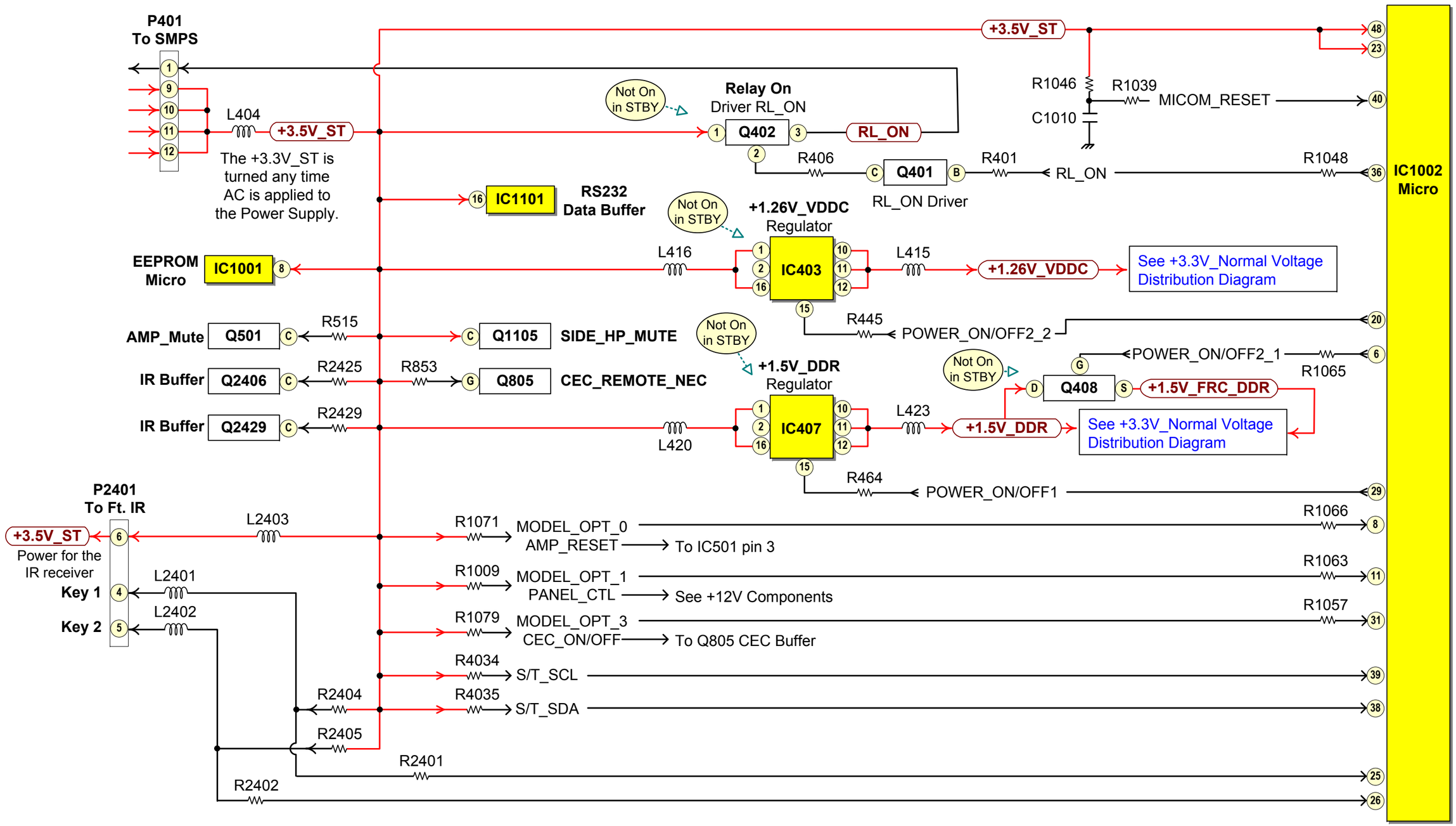
D824 5V Routing for IC804

Pin	
[A1]	0V
[A2]	5V
[C]	4.7V

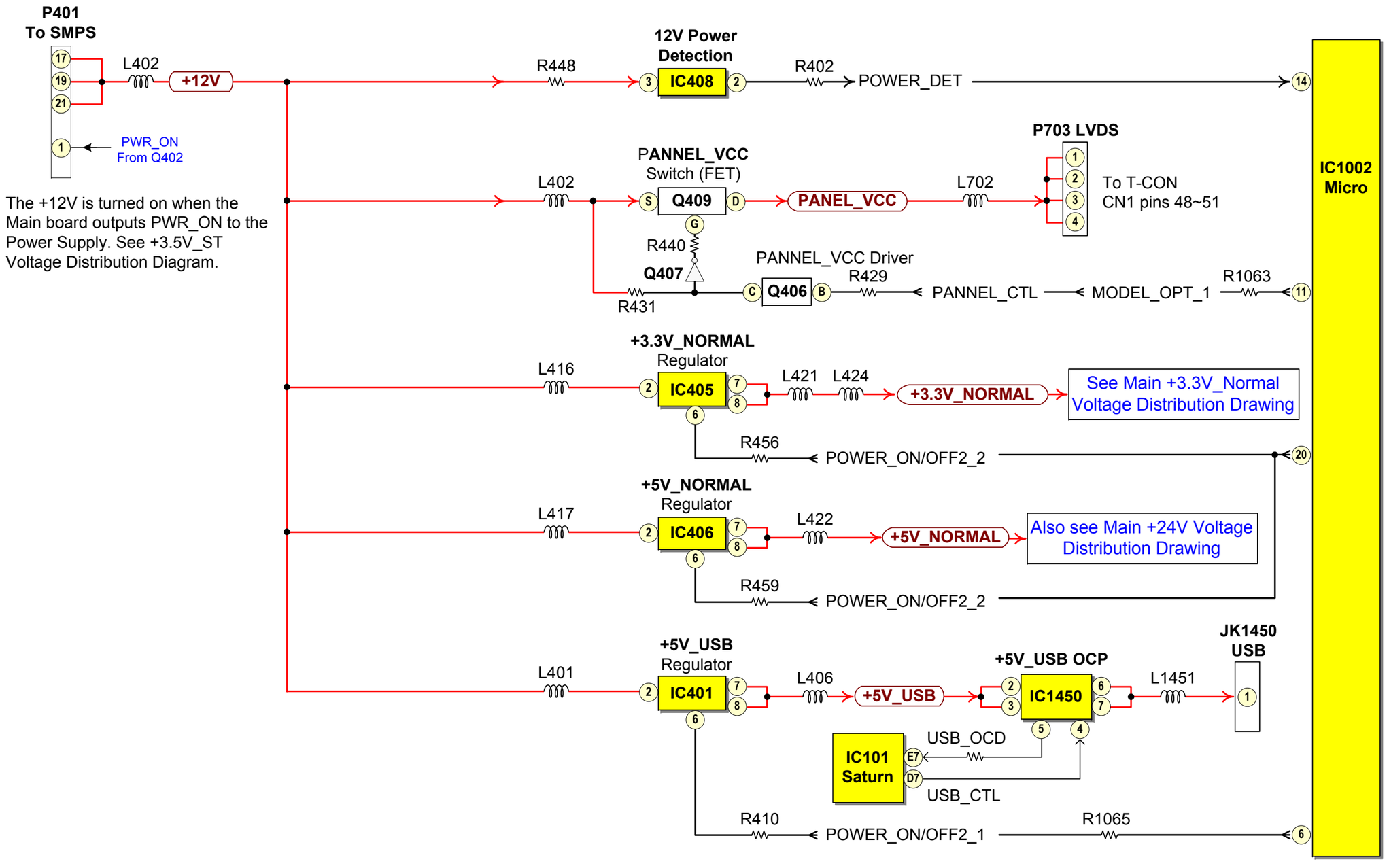
D824 5V Routing for IC1105

Pin	
[A1]	0.0V
[A2]	5V
[C]	4.7V

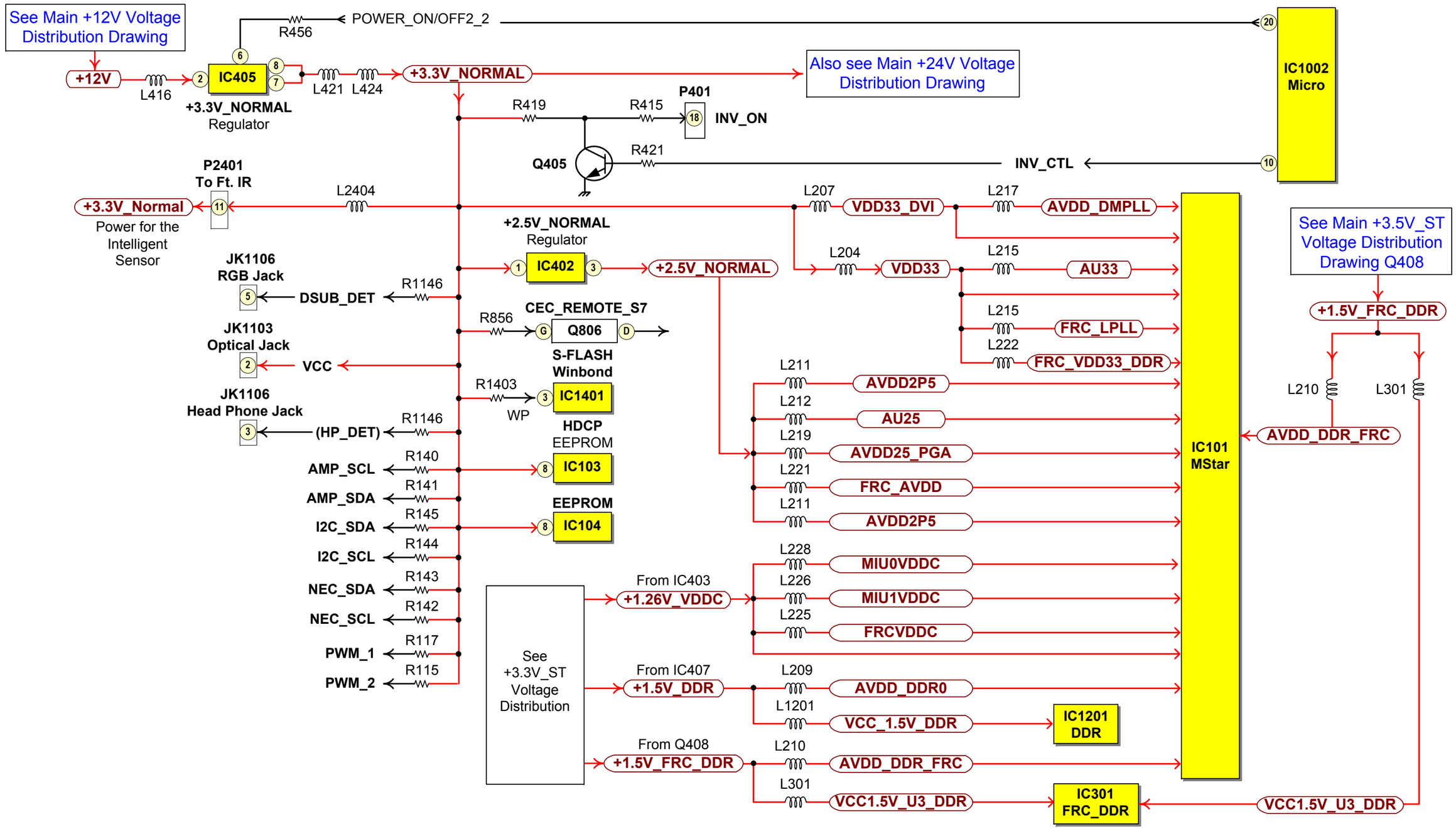
42LK520 +3.5V_ST Voltage Distribution Drawing



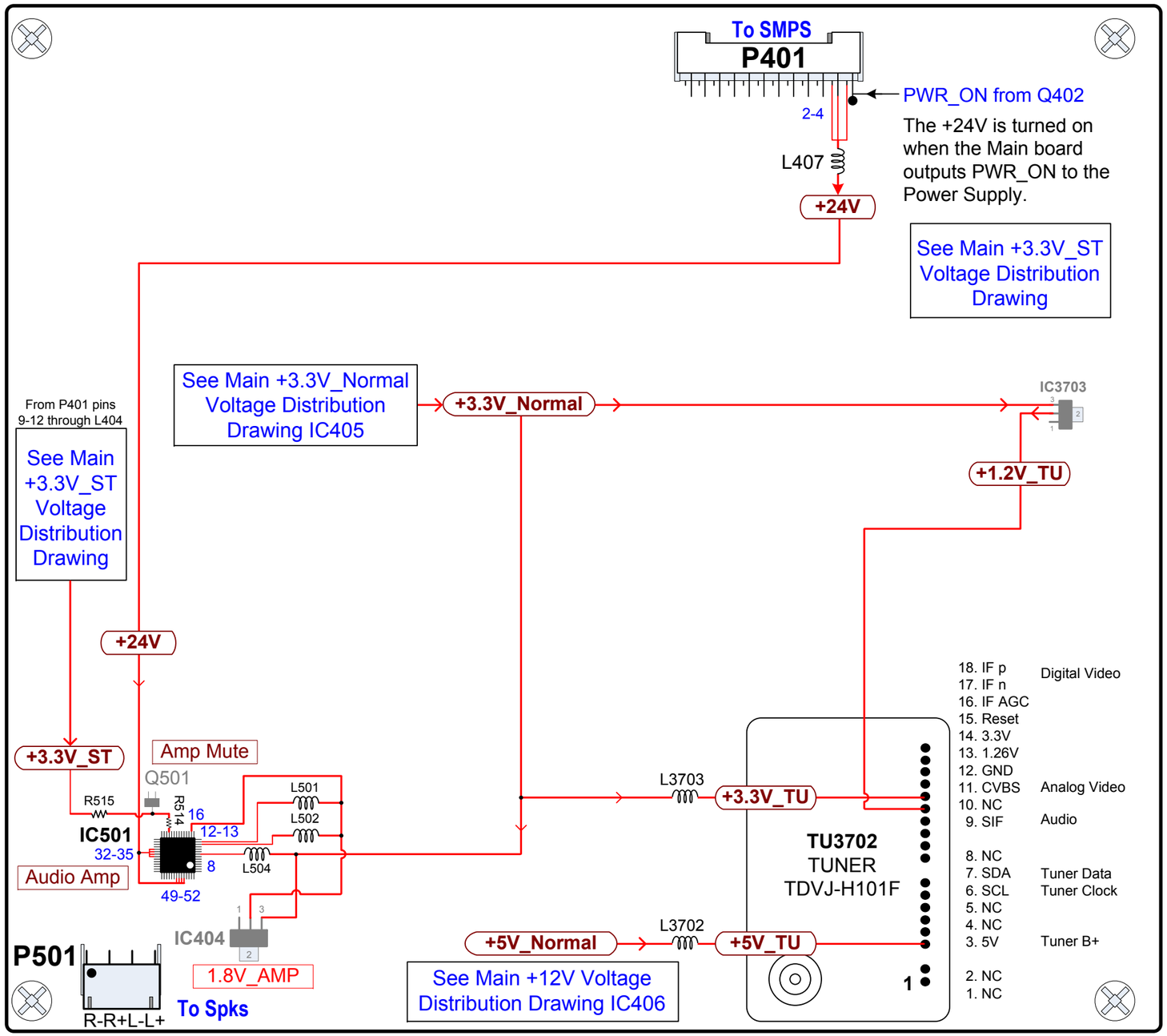
42LK520 Main +12V Voltage Distribution Drawing



42LK520 Main +3.3V_Normal Voltage Distribution Drawing



42LK520 Main +24V Voltage Distribution Drawing



42SL80 INTERCONNECT DIAGRAM

MC1 To Top 6 and Bottom 6 bulbs

PANEL BACKLIGHT CONNECTIONS

Black To Center 13 bulbs

*I-C is Inverter On
*P-DIM is not used on this pin.

Inverter A

U101 & U1 are DC-AC Inverter Control ICs

U101 U1 Do Not Adjust

C43 35V 680 µF C8 35V 680 µF

CN2 CN3 CN1

Q104 Q102 Q2 Q4 Q106 Q103 Q3 Q6

F1 65V/ 12A

T101 T1

CN5

To Backlights 1.2K

P204 "SMPS" to CN1 "Inverter A"

Pin	Label	STBY	Run	Diode Check
1,2,3,4,5	24V	0V	24.7V	0.42V
6,7,8,9,10	Gnd	Gnd	Gnd	Gnd
11	A-DIM	0V	1.7V	Open
12	*I-C	0V	4.3V	Open
13	*PWM-DIM	0V	N/C	Open
14	ERROR	0V	0V	Open

P205 "SMPS" to CN501 "Inverter B"

Pin	Label	STBY	Run	Diode Check
1,2,3,4,5	24V	0V	24.7V	0.42V
6,7,8,9,10	Gnd	Gnd	Gnd	Gnd
11	A-DIM	0V	1.7V	Open
12	*I-C	0V	4.3V	Open

CN2 "Inverter A" to CN3 "T-CON" T-CON Side

Pin	Label	STBY	Run	Diode Check	Diode Check
4	Gnd	Gnd	Gnd	Gnd	Gnd
3	Scan 2	0V	0.67V-2.4V	Open	0.98V
2	Scan 1	0V	0.67V-2.4V	Open	0.98V
1	n/c	n/c	n/c	Open	0.98V

Pin 1 T101/T1 29.2V p/p 48kHz

Pin 6 T101/T1 30V p/p 48kHz

F1 STBY 170V RUN 188.5V

Power Supply

P204 P205 P201 D222 D221 IC252 IC251 MC201 T102 T101 IC102 T501 IC502 IC103 Q503 Q501 IC501 Q502 Q111 Q110 F1 3.15A/250V C611 C612 39uF/450V C616 C615 C614 C613 L102 CX104 L103 CX103 L101 CX105 CX102 CX101 R103 BD101 F100 6.3A/250V P101 SK100 Q101 RL101 L600 L601 D602 Q605 D603 Q606

SMPS TEST 1

P201 STBY 5V PWR ON 100Ω 24V 12V Gnd 12V Light Bulb

SMPS TEST 2

P201 NO-ANI STBY 5V 100Ω 100Ω 24V 12V Gnd 12V Light Bulb

Indicates Hot Ground

P201 "SMPS" to P400 "Main"

Pin	Label	STBY	Run	Diode Check
1	N/C	N/C	N/C	Open
2	PWR-ON	0V	4.9V	1.6V
3-6	Gnd	Gnd	Gnd	Gnd
7-10	5.2V	5.14V	5.14V	Open
11-12	Gnd	Gnd	Gnd	Gnd
13-14	12V	0V	11.9V	0.27V
15	Gnd	Gnd	Gnd	Gnd
16	A-Gnd	Gnd	Gnd	Gnd
17-18	24V	0V	24.7V	0.42V
19	N/C	N/C	N/C	Open
20	I-C	0V	4.3V	Open
21	*A-DIM	0V	1.6V	Open
22	ERR OUT	0V	0V	Open
23	N/C	N/C	N/C	Open
24	*P-DIM	N/C	N/C	Open

*PWM-DIM (P-DIM) is open on the Main board, n/c.

*A-DIM is fixed and does not move.

SMPS TEST 1: To Force Power Supply On. Disconnect P800 on Main board. Load the 5V line using a 12V light bulb. Jump pins 7,8,9 or 10 (5V) to pin 2 using a 100Ω resistor. (Test Voltage Outputs 12V, 24V to Main and 24V to both Inverters).

SMPS TEST 2: Jump pins 7,8,9 or 10 (5V) to pin 20 (INV-ON). The Backlights should turn on.

T-CON BOARD (TFT Driver)

(VGL) Pin 59 -5V (VGH_M) Pin 57 26V TO TFT MODULE CN5

(VDD_LCM) Pin 3,4,5 16V (VCC) Pin 7,8 3.3V 3.3V 16.3V C303 C304 C301 C302

(VDD_LCM) Pin 56,57,58 16V (VCC) Pin 53,54 3.3V 16.3V 3.3V C307 C308 C306 C305 TO TFT MODULE CN4

(VGL) Pin 2 -5V (VGH_M) Pin 4 26V

U12

1) 6.9V 2) 13.7V 3) 15.7V 4) 13.7V 5) 13.0V 6) 12.0V 7) 10.9V 8) Gnd 9) 16.0V 10) 10.1V 11) 8.2V 12) 7.7V 13) 3.3V 14) 3.3V 15) 3.3V 16) Gnd 17) Gnd 18) Gnd 19) 5.8V 20) 5.0V 21) 3.9V 22) 2.9V 23) 6.0V 24) Gnd 25) 2.2V 26) 0.3V 27) 2.2V 28) 6.9V

U12 U11 UC1 FL3 Gnd Protect 1) Gnd 2) 1.8V 3) 3.3V U10 1~4) Gnd 5) 0V 6) 3.3V 7) 3.3V 8) 3.3V F1 (12V) (CN1) Pin 48-51 125V / 3A CN3 CN1 CN2

VCC 3.3V VGL -5V Gnd FL2 U13 D9 27V L2 D7 -2.4V 20.5V D10 14.25V 3.8V P/P 9.97Mhz 3.3V Gnd 12V U5 26V VGH_M R704 R705 R706 C 3.3V L1 Q1 B 2.78V E 3.3V D8 C744 R721 16V VDD U5 B+ 12V 16V

Gnd Protect

12V to T-CON Pin 48~51.

CN3 "Inverter A" To CN203 "Inverter B" "A" "B"

Pin	Label	STBY	Run	Diode Check	Diode Check
11	DUTY_M1	0V	0.71V-2.4V	OPEN	OPEN
10	GND	GND	GND	GND	GND
9	DUTY_M2	0V	0.71V-2.4V	OPEN	OPEN
8	FB_S1	0V	0.96V	2.9V	2.9V
7	ON/OFF	0V	4.3V	OPEN	OPEN
6	STB	0V	3.2V	OPEN	OPEN
5	VREF	0V	1.0V	OPEN	OPEN
4	FB_M1	0V	1.0V	2.9V	2.9V
3	SRT	0V	1.4V	OPEN	OPEN
2	SS	0V	2.9V	OPEN	OPEN
1	CT_SYNC_IN	0V	1.5V	1.7V	1.7V

LVDS

See second page of Interconnect Diagram for Main board DC Voltages

See pages 3/4 of Interconnect Diagram for LVDS Waveforms

MAIN BOARD

IC406 Q406 Q408 Q407 Q405 Q604 Q400 Q605 P400 Q401 IC605 IC400 L406 L412 IC402 IC401 P800 12V LVDS Pins 1~4 P801 IC800 X800 25Mhz IC801 Tru-Motion IC801 Operates at high temperature IC2 DDR IC901 DDR IC900 DDR P803 N/A L422 IC404 IC405 L424 USB IC1000 HDMI 4 IC503 IC504 IC501 IC500 TU500 Tuner TDVW-H103F (1) (19) Q500 Q501 P100 P1000 IC300 IC1 DDR IC602 IC606 D1003 Q1000 A1 A2 X600 12Mhz IC600 Mstar Micro/Video Processor Mstar Grayed Out Components are on the Back Side Q600 IC601 IC604 NAND FLASH P300 To Spks L305 L304 R- R+ L- L+ D600 IC301 Q300 Q603 Q602 IC1200 D200 Q200 D129 SW600 Q101 PC RS232 D500 IC102 IC502 IC100 HDMI 3 HDMI 2 HDMI 1 IC101 PC Audio Video L R X500 25Mhz Y Pr Pb L R Audio

(4) Tuner 5V_TU
(8) Data
(9) Clock
(12) Dig DIF+
(13) Dig DIF-
(16) SIF
(19) Analog Video

P101 Side A/V

P1000 "Main" to P100 "Front IR"

Pin	Label	STBY	Run	Diode Check
9	IR	4.18V	4.18V	Open
10	Gnd	Gnd	Gnd	Gnd
11	3.3V_ST	3.31V	3.31V	0.67V
12	PWR_ON	0V	3.29V	Open

P100 "Main" to P101 "Side A/V"

Pin	Label	STBY	Run	Diode Check
8	Gnd	Gnd	Gnd	Gnd
7	AV_R_IN	0V	0V	Open
6	Gnd	Gnd	Gnd	Gnd
5	AV_L_IN	0V	0V	Open
4	Gnd	Gnd	Gnd	Gnd
3	AV_DET	0V	0V	Open
2	CVBS_IN	0V	0V	0.07V
1	Gnd	Gnd	Gnd	Gnd

P101 "Side A/V" to P100 "Main"

Pin	Label	STBY	Run	Diode Check
1	Gnd	Gnd	Gnd	Gnd
2	AV_R_IN	0V	0V	Open
3	Gnd	Gnd	Gnd	Gnd
4	AV_L_IN	0V	0V	Open
5	Gnd	Gnd	Gnd	Gnd
6	AV_DET	0V	0V	Open
7	CVBS_IN	0V	0V	Open
8	Gnd	Gnd	Gnd	Gnd

To Top 6 and Bottom 6 bulbs SC1

PANEL BACKLIGHT CONNECTIONS

To Center 13 bulbs Black

Inverter B

U201 & U301 are DC-AC Inverter Control ICs

U201 U301

CN201 C243 35V 680uF C208 35V 680uF F1 65V/ 12A 24V CN203

Q202 Q204 Q304 Q302 Q203 Q206 Q306 Q303

T201 T301

CN205

Pin 1 T201/T301 29.2V p/p 48kHz

Pin 6 T201/T301 30V p/p 48kHz

To Backlights 1.2K

Front IR

IR Receiver
Intelligent Sensor

P100 P101

J2 Front "Soft Switch" Keys

P1000 "Main" to P100 "Front IR"

	Pin	Label	STBY	Run	Diode Check
Intelligent Sensor	1	SCL	0V	3.2V	1.6V
Intelligent Sensor	2	SDA	0V	3.2V	1.6V
	3	Gnd	Gnd	Gnd	Gnd
	4	Key1	3.26V	3.26V	1.0V
	5	Key2	3.26V	3.26V	1.3V
Stand-by 5V	6	5V_ST	5.1V	5.1V	1.1V
	7	Gnd	Gnd	Gnd	Gnd
	8	Warm_ST	Gnd	Gnd	Gnd

42SL80 MAIN (FRONT SIDE) SIMICONDUCTORS

IC300 — +1.8V AMP Regulator

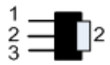
Pin	
[1]	Gnd
[2]	1.8V
[3]	3.3V

IC400 — +1.8V_DDR Regulator

Pin	
[1]	n/c
[2]	3.2V
[3]	3.2V
[4]	n/c
[5]	n/c
[6]	1.8V
[7]	0.8V
[8]	Gnd

IC404 — +1.8V_MEMC Regulator

Pin	
[1]	0.8V
[2]	Gnd
[3]	4.92V
[4]	6.5V
[5]	4.8V
[6]	1.8V
[7]	1.8V
[8]	4.8V



IC406 — +3.3V_ST Regulator

Pin	
[1]	0V
[2]	3.3V
[3]	5.0V

IC500 — 9V Reg to IC501 Tuner 5V

Pin	
[1]	12V
[2]	Gnd
[3]	8.9V

IC504 — +3.3V_PVSB Regulator

Pin	
[1]	4.94V
[2]	4.94V
[3]	Gnd
[4]	3.4V
[5]	1.25V

IC602 — HDCP EEPROM

Pin	
[1]	Gnd
[2]	Gnd
[3]	5.0V
[4]	Gnd
[5]	3.3V
[6]	3.3V
[7]	5.0V
[8]	5.0V

IC605 — Reset Gen for Power_Det

Pin	
[1]	Gnd
[2]	3.5V
[3]	3.3V

Q406 — 5V Switch Control

Pin	
B	0.6V
C	0V
E	Gnd

Q408 — +5V/12VLVDS Switch

Pin	
[1]	5.1V
[2]	0.29V
[3]	11.9V
[4]	5.99V
[5]	11.98V
[6]	11.98V
[7]	5.06V
[8]	5.06V

Q500 — Tuner Video Buffer

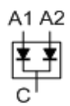
Pin	
B	1.7V
C	0V
E	2.3V

Q1000 — Moving LED Inverter

Pin	
B	0V
C	3.3V
E	Gnd

D500 — Speed Up Reset IC502

Pin	
C	3.4V
A	3.38V



D1003 — Moving LED Routing

Pin	
A1	0V
C	0.1V
A2	0V

IC403 — +1.6V_MEMC Regulator

Pin	
[1]	0V
[2]	0.8V
[3]	1.2V
[4]	1.2V
[5]	1.8V
[6]	5.0V
[7]	1.2V
[8]	5.0V

42SL80 MAIN (BACK SIDE) SIMICONDUCTORS

IC100 — RS232 Rx/Tx

Pin	
[1]	3.3V
[2]	5.56V
[3]	0.02V
[4]	0.03V
[5]	5.5V
[6]	5.5V
[7]	5.5V
[8]	0V
[9]	3.29V
[10]	3.24V
[11]	n/c
[12]	3.31V
[13]	0V
[14]	5.5V
[15]	Gnd
[16]	3.29V

IC102 — RGB EEPROM

Pin	
[1]	Gnd
[2]	Gnd
[3]	Gnd
[4]	Gnd
[5]	3.3V
[6]	3.3V
[7]	3.18V
[8]	0V

IC405 — +5V EXT Regulator

Pin	
[1]	0.8V
[2]	Gnd
[3]	12V
[4]	9.6V
[5]	5V
[6]	4.97V
[7]	4.97V
[8]	1.9V

IC503 — +1.2V_PVSB Regulator

Pin	
[1]	0V
[2]	3.3V
[3]	3.4V
[4]	0V
[5]	0V
[6]	1.2V
[7]	0.8V
[8]	0V

IC606 — Micro IC600 EEPROM

Pin	
[1]	Gnd
[2]	Gnd
[3]	Gnd
[4]	Gnd
[5]	3.24V
[6]	3.24V
[7]	0V
[8]	3.24V

IC603 — Reset Gen for IC600

Pin	
[1]	0V
[2]	0V
[3]	3.3V

Q401 — INV_ON Inverter

Pin	
B	0.05V
C	4.35V
E	Gnd

Q603 — Power_On_ Delay Switch

Pin	
B	0V
C	0.04V
E	Gnd

IC101 — SPIF Optical Audio

Pin	
[1]	0.03V
[2]	0V
[3]	0V
[4]	0V
[5]	0V

IC401 — +1.26V_VDDC Regulator

Pin	
[1]	8.0V **Oscilloscope ONLY**
[2]	Gnd
[3]	5.0V
[4]	6.0V
[5]	4.9V
[6]	0V
[7]	0V
[8]	3.2V

WARNING Measure Pin 1 with O-scope ONLY

IC402 — +3.3V_MEMC Regulator

Pin	
[1]	8.0V **Oscilloscope ONLY**
[2]	Gnd
[3]	4.98V
[4]	7.6V
[5]	4.9V
[6]	3.3V
[7]	3.3V
[8]	0V

WARNING Measure Pin 1 with O-scope ONLY

IC501 — +5V_TU for Tuner

Pin	
[1]	8.92V
[2]	1.88V
[3]	5.04V
[4]	0V
[5]	Gnd

IC504 — +1.26V_PVSB Regulator

Pin	
[1]	0.8V
[2]	0V
[3]	11.8V
[4]	9.6V
[5]	5.0V
[6]	5.0V
[7]	5.0V
[8]	0.9V

IC601 — Serial Flash for Boot

Pin	
[1]	0.04V
[2]	3.2V
[3]	2.5V
[4]	0V
[5]	0V
[6]	0V
[7]	3.2V
[8]	3.2V

IC800 — SPI Flash IC801 Memory

Pin	
[1]	0V
[2]	0.8V
[3]	3.2V
[4]	0V
[5]	0V
[6]	0.09V
[7]	3.2V
[8]	3.2V

IC1000 — USB +5V Switch

Pin	
[1]	4.95V
[2]	Gnd
[3]	3.21V
[4]	4.95V
[5]	0V
[6]	4.95V

Q101 — IR RS232 Buffer

Pin	
B	0.634V
C	0V
E	0V

Q200 — HDMI CEC

Pin	
[1]	3.2V
[2]	3.2V
[3]	0V
[4]	0V
[5]	0V
[6]	3.16V

Q300 — Audio Mute Switch

Pin	
B	0.62V
C	0.01V
E	Gnd

Q400 — PWR On/Off Switch

Pin	
B	2.9V
C	5V
E	5V

Q405 — 12V LVDS Switch Control

Pin	
B	0.05V
C	0.65V
E	Gnd

Q407 — 12V LVDS Source

Pin	
B	0.65V
C	0.0V
E	Gnd

Q501 — Tuner SIF Buffer

Pin	
B	2.4V
C	0V
E	3.0V

Q600 — Write Protect for IC601

Pin	
B	0V
C	2.5V
E	Gnd

Q602 — S5/S6 Reset Switch for Mstar

Pin	
B	0V
C	3.28V
E	0V

Q604 — Power_Det Switch

Pin	
B	0V
C	3.3V
E	Gnd

Q605 — Power_Det +12V Side

Pin	
B	0.65V
C	0.0V
E	Gnd

D129 — 5V Routing for IC1200

Pin	
A1	0.03V
C	4.5V
A2	5.1V

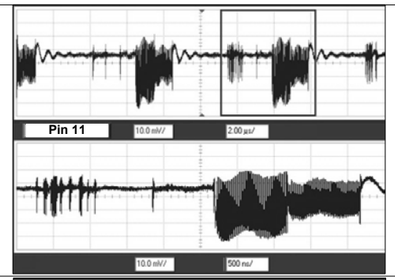
D200 — Shunt for Q200

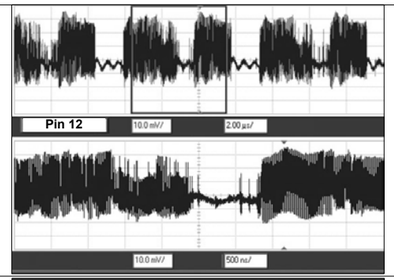
Pin	
A1	0V
C	3.1V
A2	3.2V

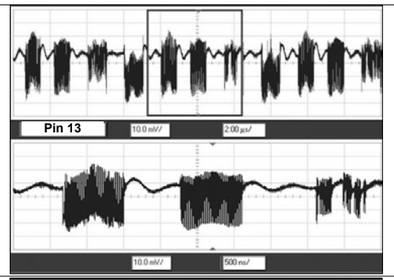
D600 — Audio Mute Routing

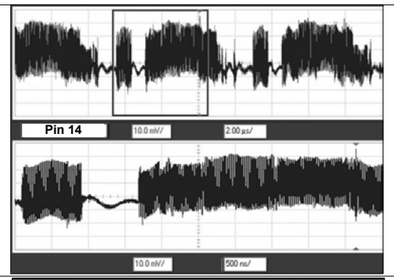
Pin	
A1	0.01V
C	2.7V
A2	3.29V

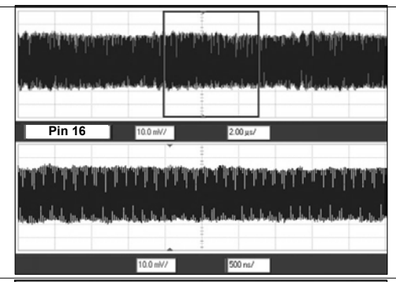
42SL80 LVDS P800 WAVEFORMS

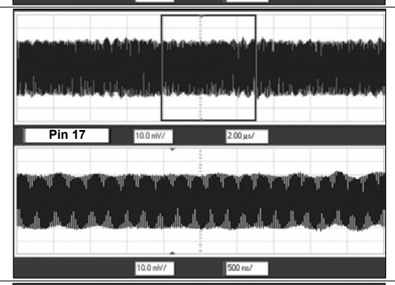


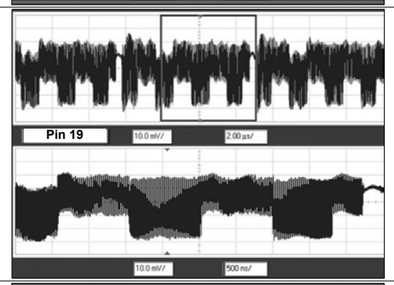


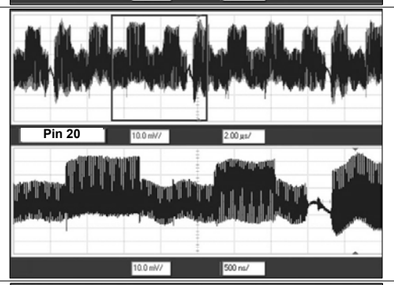


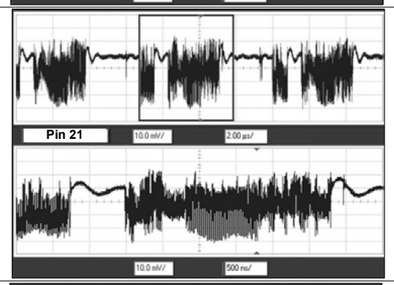


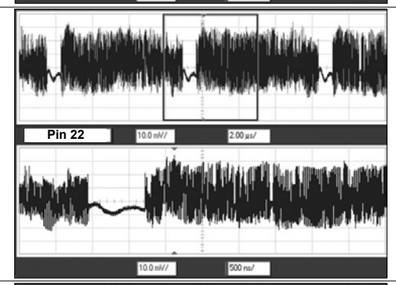


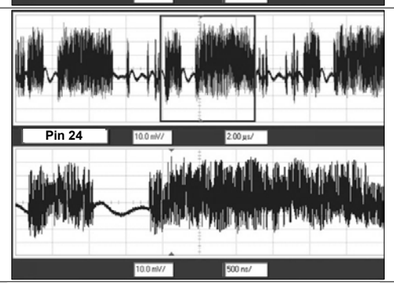


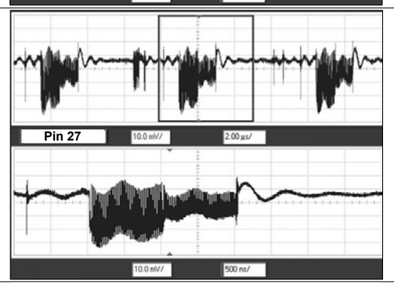


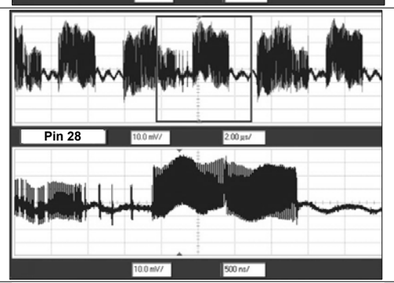


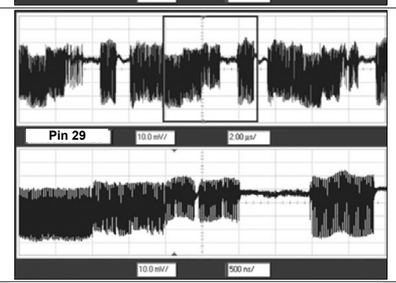


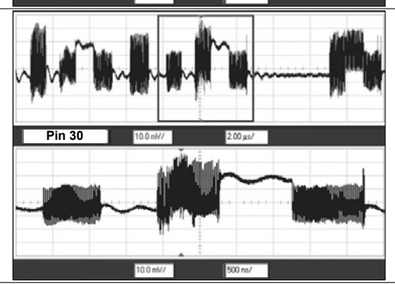


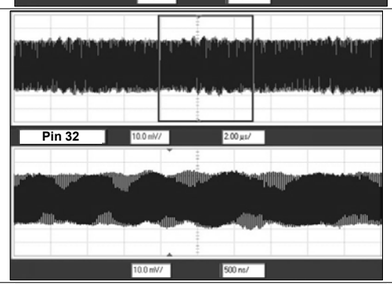


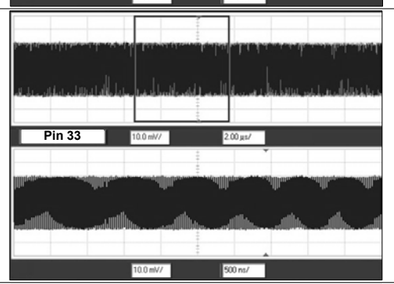


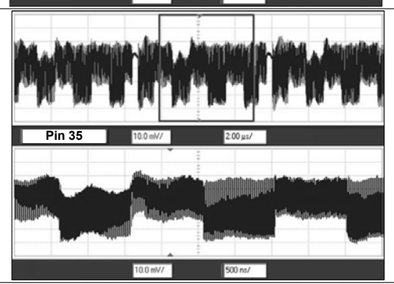


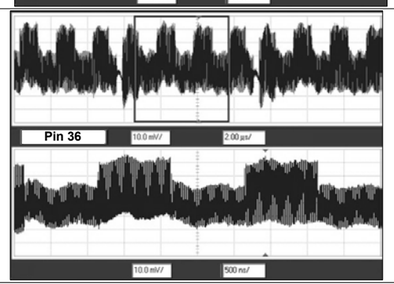


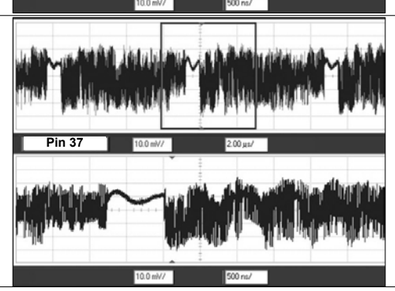


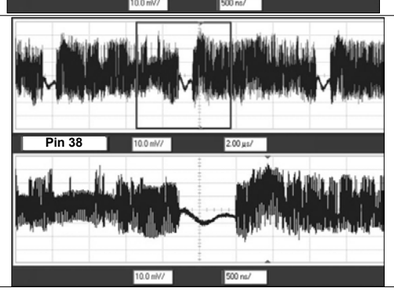


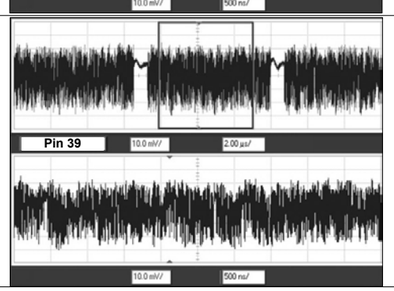


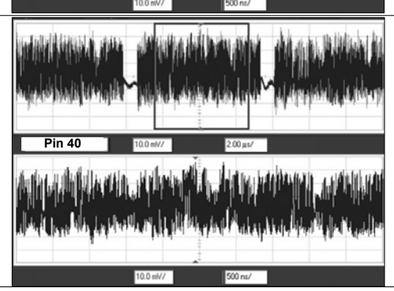






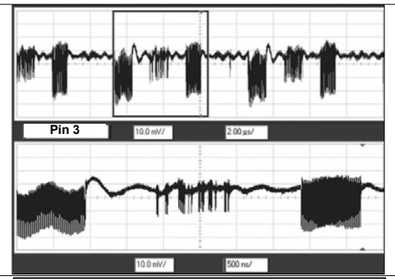


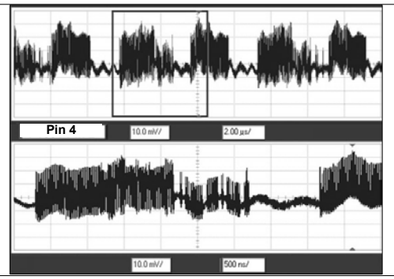


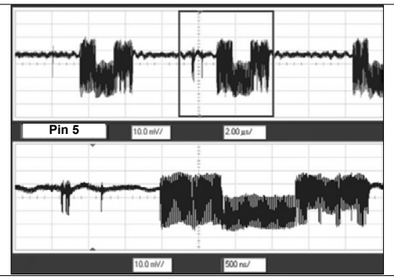


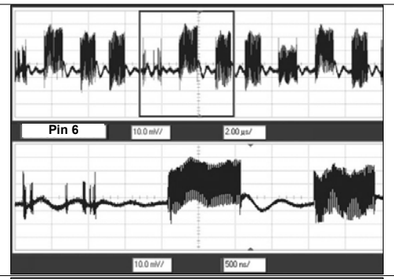
42SL80 P800 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

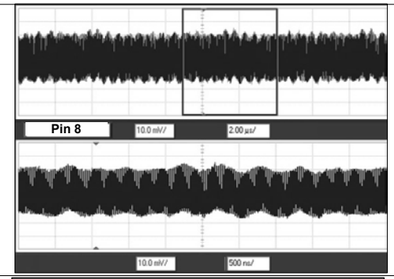
42SL80 LVDS P801 WAVEFORMS

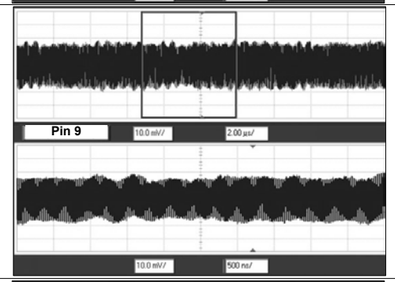


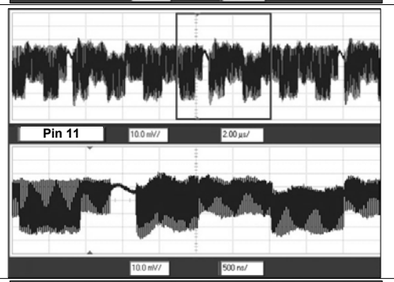


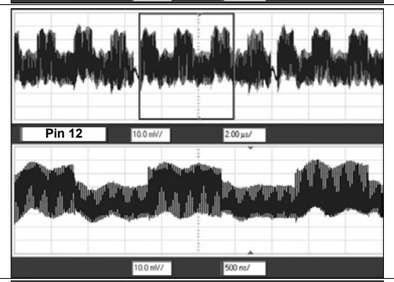


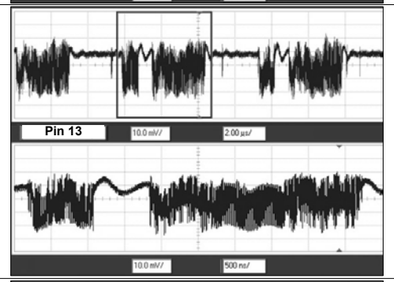


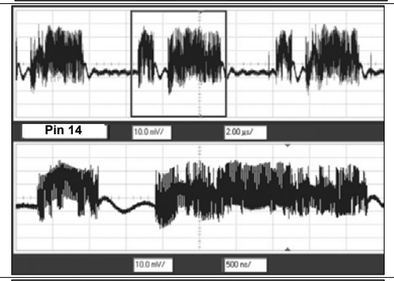


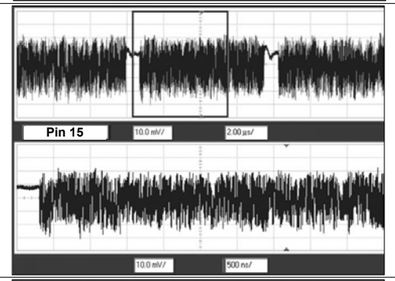


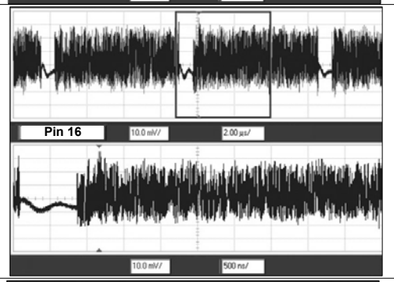


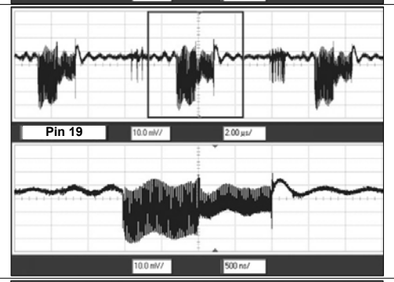


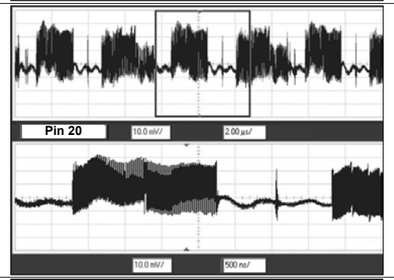


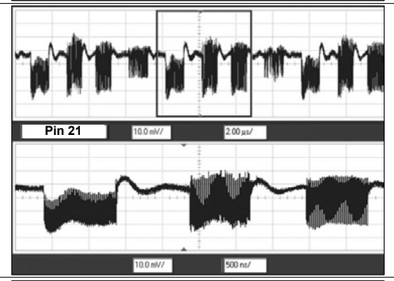


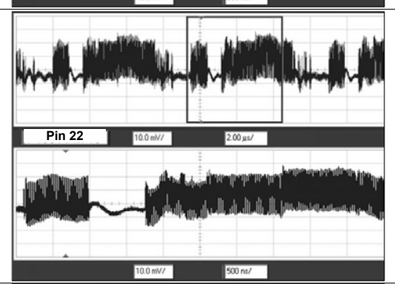


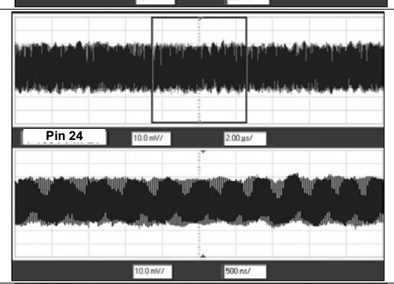


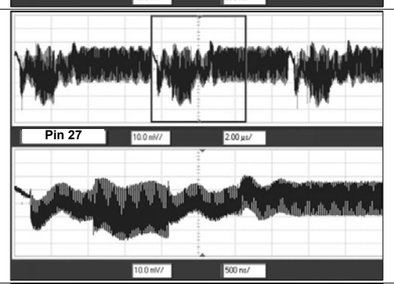


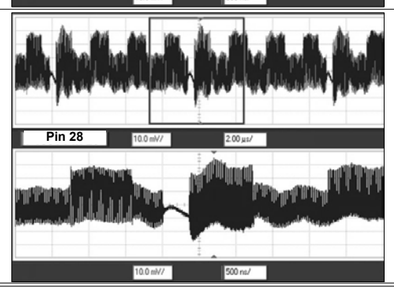


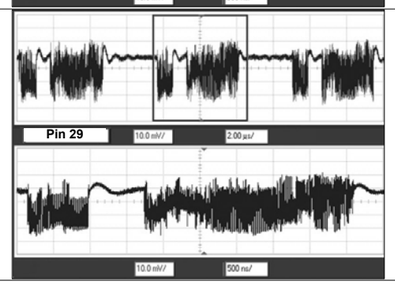


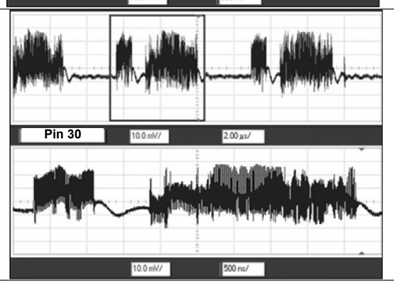


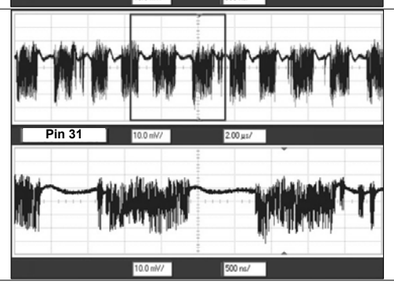


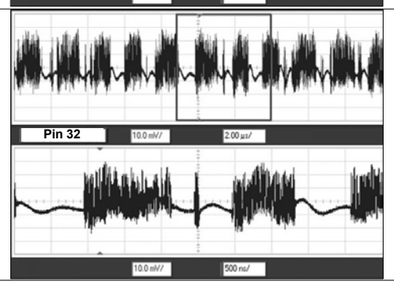










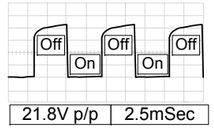


42SL80 P801 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

47GA6400 INTERCONNECT DIAGRAM

Note: If a particular area is exhibiting a dimmer backlight level than other areas or the overall brightness seems dim, be sure to first check the customer's Menu setting for Backlights. Raise the percentage and see if the overall brightness returns to normal. If not,
1st: Check the P-DIM level, it should rise with the percentage shown on screen.
100% = 3.25V. Follow the P-DIM signal from the Main to the T-CON, then to the Inverter board.
With power off, unplug CN4 on the Inverter, turn power on and check backlights. If OK, investigate P_DIM.

DIM OR DARK PICTURE AREA (LED SINGLE BLOCK TEST):
Turn the Brightness, Contrast and Backlights all the way up. Confirm 71V CN3 pin 1.
Confirm P-DIM is approx. 3V. Using a 220Ω resistor, jump any of the blocks grounding pin on LED 1~6 or CN3 (3~8) while observing the picture and each block should turn on maximum.



21.8V p/p | 2.5mSec

LED Drive Signal 50% Backlights

LED1 ~ LED6

PANEL p/n: EAJ62270801

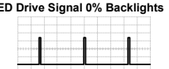
Note: Backlight power is 24.51V with PWR_ON arrives, (no backlights) it goes to 71V when DRV_ON arrives, Backlights On).

P201 "SMPS Board" to P2301 "MAIN Board"

PIN	LABEL	STBY	RUN	Diode Check
17-18	Gnd	Gnd	Gnd	Gnd
16	N/C	n/c	n/c	n/c
13-15	12V	0V	12.08V	1.44V
11-12	Gnd	Gnd	Gnd	Gnd
9-10	24V	0V	24.96V	1.07V
7-8	Gnd	Gnd	Gnd	Gnd
6	A-DIM	0V	1.12V	OL
5	3.5V_ST	3.56V	3.53V	OL
4	P-DIM	0V	0.15V~3.25V	OL
3	3.5V_ST	3.56V	3.53V	OL
2	DRV_ON	0V	3.50V	OL
1	PWR_ON	0V	3.40V	1.21V

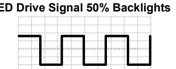
Scan 1-3 From the T-CON to the Inverter board (120Hz) For Dimming.

LED Drive Signal 0% Backlights



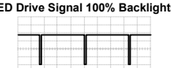
3.48V p/p | 2.5mSec

LED Drive Signal 50% Backlights



3.52V p/p | 2.5mSec

LED Drive Signal 100% Backlights



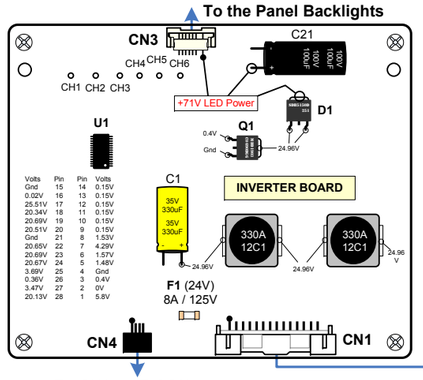
3.72V p/p | 2.5mSec

Comes on the Panel

Inverter Board

CN3 "INV Board" to "Panel"

PIN	LABEL	RUN	Diode
1	VLED	71V	1.07V
2	N/C	n/c	n/c
3	CH6	0.82V~20.32V	OL
4	CH5	0.82V~20.32V	OL
5	CH4	0.82V~20.32V	OL
6	CH3	0.82V~20.32V	OL
7	CH2	0.82V~20.32V	OL
8	CH1	0.82V~20.32V	OL



No Local Dimming In the Model.

CN4 "INV Board" to "T-CON" CN2

PIN	LABEL	RUN	Diode Check
1	Gnd	Gnd	Gnd
2	Scan 3	0.14V~3.23V	OL
3	Scan 2	0.14V~3.23V	OL
4	Scan 1	0.14V~3.23V	OL

Note: Used for Dimming, See P-DIM.
Pins are inverted on T-CON

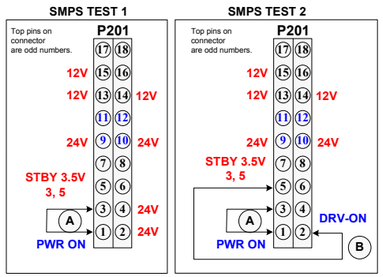
P202 "SMPS Board" to "Backlight Driver"

PIN	LABEL	RUN	Diode Check
1-5	24V	24.72V	1.07V
6-10	Gnd	Gnd	Gnd
11	n/c	n/c	n/c
12	DRV_ON	3.5V	OL
13	A-DIM	1.13V	OL
14	P-DIM	0.15V~3.25V	OL

Note: A-DIM, (Fixed Voltage).

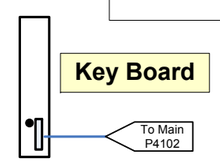
SMPS TEST 1: To Force Power Supply On without the Main Board.
Disconnect the P2301 on the Main board.
(A) Jump pin 3 (3.5V) to pin 1. Test Voltage Outputs 12V, 24V to Main and 24V to the Inverter. Remove AC power. Leave the jumper in place. No Backlights at this time. Backlight B+ will be 24.55V at this time.
Test 1 LED Ground Return Line (0.98V). (No Backlights).

SMPS TEST 2: (Turning on the Backlights) Leave Test 1 jumper in place. Disconnect CN4 on the Inverter Board. (If CN4 is not removed, no backlights).
(B) Jump pin 5 (3.5V) to pin 2 (DRV-ON). Apply AC power, the Backlights should turn on. Note, the LED B+ will now jump to 71.3V. During Test 2, the Test 2 LED Ground Return Line is (0.71V).

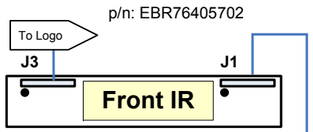


66 Total LEDs
1 Board (Strips)

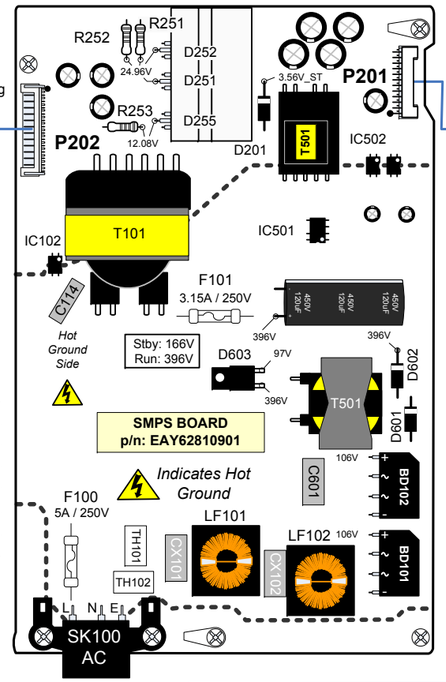
6 Total Blocks
10 LEDs per/block



p/n: EBR76384101



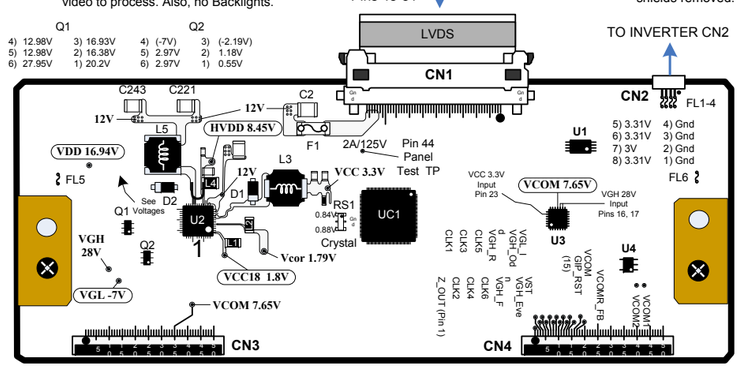
p/n: EBR76405702



Note: Pin 1 (RL_ON): Normally off in STBY, however, if "Quick Start" is turned on in the "Option" menu, it will be 3.4V for 2 hours, keeping all voltages to the Main alive. 24V to the Inverter is also available, but the backlights are not on. Starts 12V, 24V and 24.51V LED Power. No Backlights.
Note: Pin 2 (DRV_ON): is INV_ON from Main. Starts the Backlights. Baclight Power 71V.
Note: Pin 4 (PWM_DIM): Not Used. (P-DIM is Actually routed out the Main to the T-CON).
Note: Pin 6 (A_DIM): Not Used.

SMPS BOARD p/n: EAY62810901

Note: Concerning Quick Start
If Quick Start is turned on in the Options Menu, T-CON 12V will be available during STBY, but there will be no video to process. Also, no Backlights.



CN2 Global Dimming

Pin	Label
1)	Scan1
2)	Scan2
3)	Scan3
4)	Gnd

Note: pins are inverted on Inverter

Additional Voltages from U3 to the Panel with no silk screen labels:

U10 pin 1 (7.76V) CN4 pin 48 CN5 pin 3
U10 pin 2 (7.74V) CN4 pin 47 CN5 pin 4
U10 pin 3 (7.75V) CN4 pin 46 CN5 pin 5
U10 pin 4 (7.74V) CN4 pin 45 CN5 pin 6
U10 pin 5 (7.76V) CN4 pin 44 CN5 pin 7
U10 pin 6 (7.74V) CN4 pin 43 CN5 pin 8
U10 pin 8 (27.9V) CN4 pin 42 CN5 pin 9
U10 pin 9 (-6.97V) CN4 pin 41 CN5 pin 10
U10 pin 10 (-6.95V to 27.9V) CN4 pin 40 CN5 pin 11
U10 pin 11 (-6.95V to 27.9V) CN4 pin 39 CN5 pin 12

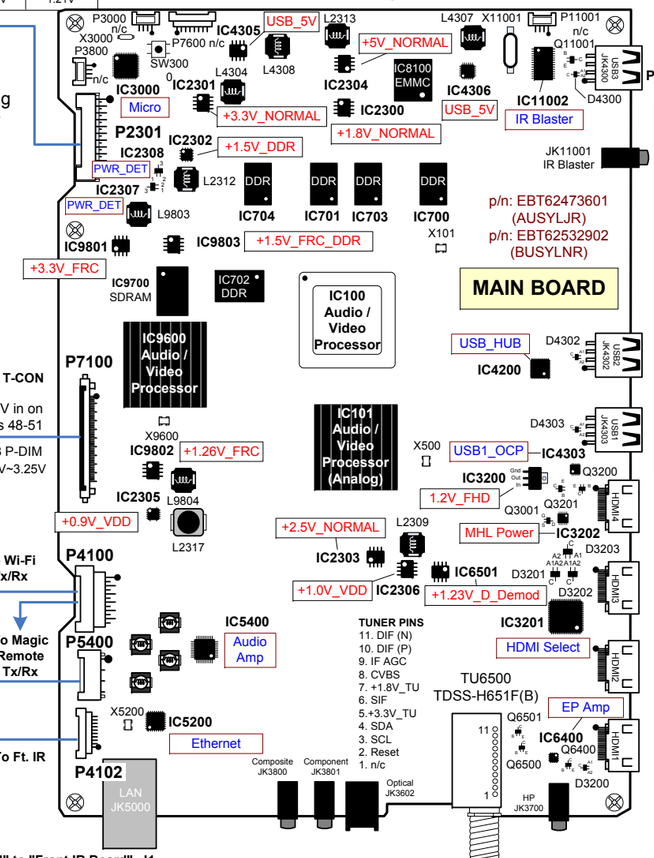
T-CON BOARD

Comes the Panel

For LVDS Waveforms see Page 4 of the Interconnect diagram.

For Main Board DC voltages for Main board components, see Page 2, 3 and 4 of the Interconnect diagram.

For Main Board Back Side Components, see Page 5 of the Interconnect diagram.



P2300 "MAIN Board" To P201 "SMPS Board"

Pin	Diode Check
17-18	Gnd
16	n/c
13-15	OL
11-12	Gnd
9-10	OL
7-8	Gnd
6	0.78V
5	OL
4	0.78V
3	OL
2	1.63V
1	OL

For DC voltages See P201 Chart

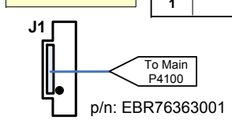
PANEL TEST
To run the T-CON "Panel Test", remove the LVDS cable CN1. Jump 12V to the 12V fuse. Jump VCC 3.3V to pin 44 on CN1. White, Red, Blue, Green and Black patterns show on screen.

P4102 "MAIN" to "Front IR Board" J1

PIN	LABEL	STBY	RUN	Diode Check
8	Gnd	Gnd	Gnd	Gnd
7	IR	3.52V	3.47V	OL
6	Logo_Light	1.37V	1.32V	OL
5	Gnd	Gnd	Gnd	Gnd
4	3.5V_ST	3.56V	3.50V	OL
3	Key2	3.56V	3.50V	OL
2	Key1	3.56V	3.50V	OL
1	Gnd	Gnd	Gnd	Gnd

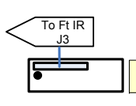
P4100 "MAIN Board" To "Wi-Fi and Motion Board"

PIN	LABEL	STBY	RUN	Diode Check
1	+3.5V_ST_Wake	0V	3.47V	1.97V
2	+3.5V_Normal	0V	3.34V	0.52V
3	WiFi_DM	0V	0.04V	1.36V
4	RTS	0V	3.37V	OL
5	WiFi_DP	0V	0.03V	1.35V
6	M_Remote_Rx	0V	3.34V	1.06V
7	Gnd	Gnd	Gnd	Gnd
8	M_Remote_Tx	0V	3.32V	0.78V
9	WiFi_PWR_On	0V	0.02V	2.08V
10	RF_Reset	0V	3.32V	0.78V
11	Gnd	Gnd	Gnd	Gnd
12	CTS	0V	0V	OL



p/n: EBR76363001

Magic Remote Tx/Rx

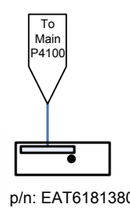


Glued to Ft Frame

LOGO Board

p/n: EBR76382002

Wi-Fi Tx/Rx



p/n: EAT61813801

47GA6400 Main Board (ICs) Component Voltages

IC2300

Pin	+1.8V_NORMAL Regulator
[1]	0.3V n/c
[2]	0.3V n/c
[3]	0.3V n/c
[4]	0.3V n/c
[5]	3.33V
[6]	3.33V
[7]	0.8V
[8]	3.33V (Vcc In)

IC2301

Pin	+3.3V_NORMAL Regulator
[1]	Gnd
[2]	12V (Vcc In)
[3]	Gnd
[4]	0.8V
[5]	1.3V
[6]	3.5V On/Off
[7]	3.3V (Out)
[8]	3.3V (Out)

IC2302

Pin	+1.5V_DDR Regulator
[1]	3.5V_ST in
[2]	3.5V_ST in
[3]	Gnd
[4]	Gnd
[5]	Gnd
[6]	0.83V
[7]	0.68V
[8]	0.51V
[9]	1.85V
[10]	1.53V (Out)
[11]	1.53V (Out)
[12]	1.53V (Out)
[13]	5.06V
[14]	n/c
[15]	3.5V
[16]	3.5V_ST in

IC2303

Pin	+2.5V_NORMAL Regulator
[1]	3.3V_Normal in
[2]	n/c
[3]	5V_Normal in
[4]	3.5V On/Off
[5]	Gnd
[6]	4.7V
[7]	0.8V
[8]	2.5V (Out)

IC2304

Pin	+5V_NORMAL Regulator
[1]	3.4V On/Off
[2]	0.8V
[3]	3.4V
[4]	5.4V
[5]	Gnd
[6]	5V (Out)
[7]	10V
[8]	12V (Vcc In)

IC2305

Pin	+0.9V_VDD Regulator
[1]	0.5V
[2]	Gnd
[3]	Gnd
[4]	12.04V (Vcc In)
[5]	12.04V (Vcc In)
[6]	12.04V (Vcc In)
[7]	0.6V
[8]	0.4V
[9]	1.8V
[10]	3.5V (En)
[11]	0.95V (Out)
[12]	0.95V (Out)
[13]	7.76V
[14]	0.4V (n/c)

IC2306

Pin	+1.0V_VDD Regulator
[1]	Gnd
[2]	12.04V (Vcc In)
[3]	Gnd
[4]	0.8V
[5]	1.3V
[6]	3.5V On/Off
[7]	1.1V (Out)
[8]	1.1V (Out)

IC2307

Pin	Power_Det 12V side
[1]	Gnd
[2]	3.8V (Out)
[3]	3.7V (12V Sense)

IC2308

Pin	Power_Det 24V side
[1]	Gnd
[2]	3.7V (Out)
[3]	3.8V (24V Sense)

IC3200

Pin	1.2V_FHD Regulator
[Gnd]	Gnd
[Out]	1.2V
[In]	3.3V

IC3202

Pin	5V_HDMI_4 MHL Regulator
[1]	Gnd
[2]	5V (5V_Normal In)
[3]	5V (5V_Normal In)
[4]	Gnd
[5]	0V On/Off
[6]	0.25V
[7]	0V
[8]	0V (5V_HDMI4 Out)
[9]	0V (5V_HDMI4 Out)
[10]	0V On/Off

IC4303

Pin	+5V_USB1 OCP
[1]	Gnd
[2]	5.0V (Vcc In)
[3]	5.0V (Vcc In)
[4]	Gnd
[5]	3.3V On/Off
[6]	0.4V
[7]	0.4V
[8]	5.0V (Out USB1)
[9]	5.0V (Out USB1)
[10]	0V (OCP)

IC4305

Pin	+5V_USB1 Power
[1]	11V
[2]	24.7V In
[3]	3.5V On/Off
[4]	1.8V
[5]	0.8V
[6]	0.5V
[7]	Gnd
[8]	5.10V (Out USB1)

IC6400

Pin	Headphone Amp
[1]	0V (L HP In)
[2]	Gnd
[3]	Gnd
[4]	0V (R HP In)
[5]	0V (R HP Out)
[6]	3.3V
[7]	3.3V
[8]	0V
[9]	0V
[10]	Gnd
[11]	0V
[12]	0V
[13]	0V (HP Mute)
[14]	3.3V_Normal In
[15]	Gnd
[16]	0V (L HP Out)

IC6501

Pin	+1.23V_D_Demod Regulator
[1]	0.2 n/c
[2]	1.9V
[3]	3.0V (TU In)
[4]	5V (5V_Normal In)
[5]	0.2 n/c
[6]	1.2V (Out)
[7]	0.6V
[8]	Gnd

IC9801

Pin	+3.3V_FRC Regulator
[1]	3.4V (On/Off)
[2]	0.7V
[3]	5.5V
[4]	5.5V
[5]	Gnd
[6]	3.3V Out
[7]	8.7V
[8]	12.04V (Vcc In)

IC9802

Pin	+1.26V_FRC Regulator
[1]	3.2V (On/Off)
[2]	0.8V
[3]	5.5V
[4]	5.5V
[5]	Gnd
[6]	1.2V Out
[7]	6.8V
[8]	12.04V (Vcc In)

IC9803

Pin	+1.5V_FRC_DDR Regulator
[1]	3.3V_FRC In
[2]	0.5V n/c
[3]	3.3V_FRC In
[4]	3.3V On/Off
[5]	Gnd
[6]	3.2V
[7]	0.8V
[8]	1.5V Out

47GA6400 Main Board (Transistors and Large Flat Pack ICs) Component Voltages

Q11001 IR Blaster Data Buffer

Pin	
B	0V
C	0V
E	Gnd

Q3001 CEC (Consummer Electronic Control)

Pin	
[G]	3.5V
[S]	3.4V
[D]	**3.4V**

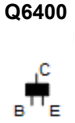
Q3200 MHL Detection Switch Ctl

Pin	
[B]	0V
[C]	3.5V
[E]	Gnd

Q3201 MHL Detection Switch

Pin	
[B]	3.5V
[C]	0V
[E]	3.5V

Q6400 HP Amp Mute



Pin	
[B]	0.7V
[C]	0V
[E]	Gnd

Q6500 TUNER_SIF Buffer

Pin	
[B]	0.1V
[C]	Gnd
[E]	0.8V

Q6501 Tuner (Analog) Video Buffer

Pin	
[B]	1.5V
[C]	Gnd
[E]	**2.2V**

D3200 DDC_SCL_1 Pull_Up

Pin	
[A1]	5V
[A2]	0V
[C]	5V

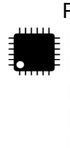
D3201
D3202 DDC_SCL_2, 3, 4 Pull_Up
D3203

Pin	
[A1]	**5V**
[A2]	0V
[C]	4.9V

D4300
D4301
D4302 USB1, 2, 3 5V Clamp

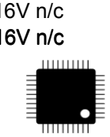
Pin	
[A1]	0V
[A2]	0V
[C]	Gnd

IC4306 USB Power USB 2 and 3



Pin	
[1]	3.5V On/Off
[2]	**0.6V**
[3]	2.2V n/c
[4]	6.2V n/c
[5]	3.3V
[6]	3.3V
[7]	3.3V
[8]	3.3V
[9]	5.0V (Out USB3)
[10]	Gnd
[11]	Gnd
[12]	5.0V (Out USB2)
[13]	5.0V (5V USB In)
[14]	5.0V (5V USB In)
[15]	5.0V (5V USB In)
[16]	5.0V (5V USB In)
[17]	**5.0V (5V USB In)**
[18]	11V
[19]	Gnd
[20]	Gnd
[21]	12V (Vcc In)
[22]	12V (Vcc In)
[23]	Gnd
[24]	6.2V (On/Off)

IC3000 Micro Processor



Pin		Pin	
[1]	3.3V	[25]	0V
[2]	3.3V	[26]	0V
[3]	0.3V	[27]	2.5V
[4]	1.9V	[28]	0V
[5]	0V	[29]	0V
[6]	3.5V	[30]	0V
[7]	3.5V	[31]	3.5V
[8]	3.5V	[32]	3.5V
[9]	**3.5V**	**[33]**	**3.5V**
[10]	3.5V	[34]	3.5V
[11]	3.5V	[35]	0V
[12]	3.5V	[36]	0V
[13]	0V	[37]	0.3V n/c
[14]	3.8V	[38]	0V
[15]	3.5V	[39]	3.5V
[16]	0V	[40]	3.5V
[17]	3.5V	[41]	0.7V
[18]	3.5V	[42]	0.2V
[19]	3.5V	[43]	0V n/c
[20]	3.3V	[44]	0.3V n/c
[21]	3.3V	[45]	0.3V n/c
[22]	0V	[46]	2.1V
[23]	0.16V n/c	[47]	Gnd
[24]	**0.16V n/c**	**[48]**	**3.5V**

IC4200 USB HUB

Pin		Pin	
[1]	0V	[19]	0V n/c
[2]	0V	[20]	0V n/c
[3]	0V	[21]	0V n/c
[4]	0V	[22]	0V
[5]	3.3V_Normal	[23]	3.3V_Normal
[6]	0V n/c	[24]	0V
[7]	0V n/c	[25]	3.3V
[8]	0V n/c	[26]	3.3V
[9]	**0V** n/c	**[27]**	**3.3V**
[10]	3.3V_Normal	[28]	3.3V
[11]	Gnd	[29]	3.3V_Normal
[12]	3.3V	[30]	0V
[13]	3.3V	[31]	0V
[14]	1.3V	[32]	0.3V
[15]	3.3V	[33]	0.64V
[16]	3.3V	[34]	1.2V
[17]	2.4V	[35]	1.2V
[18]	0V n/c	[36]	3.3V_Normal

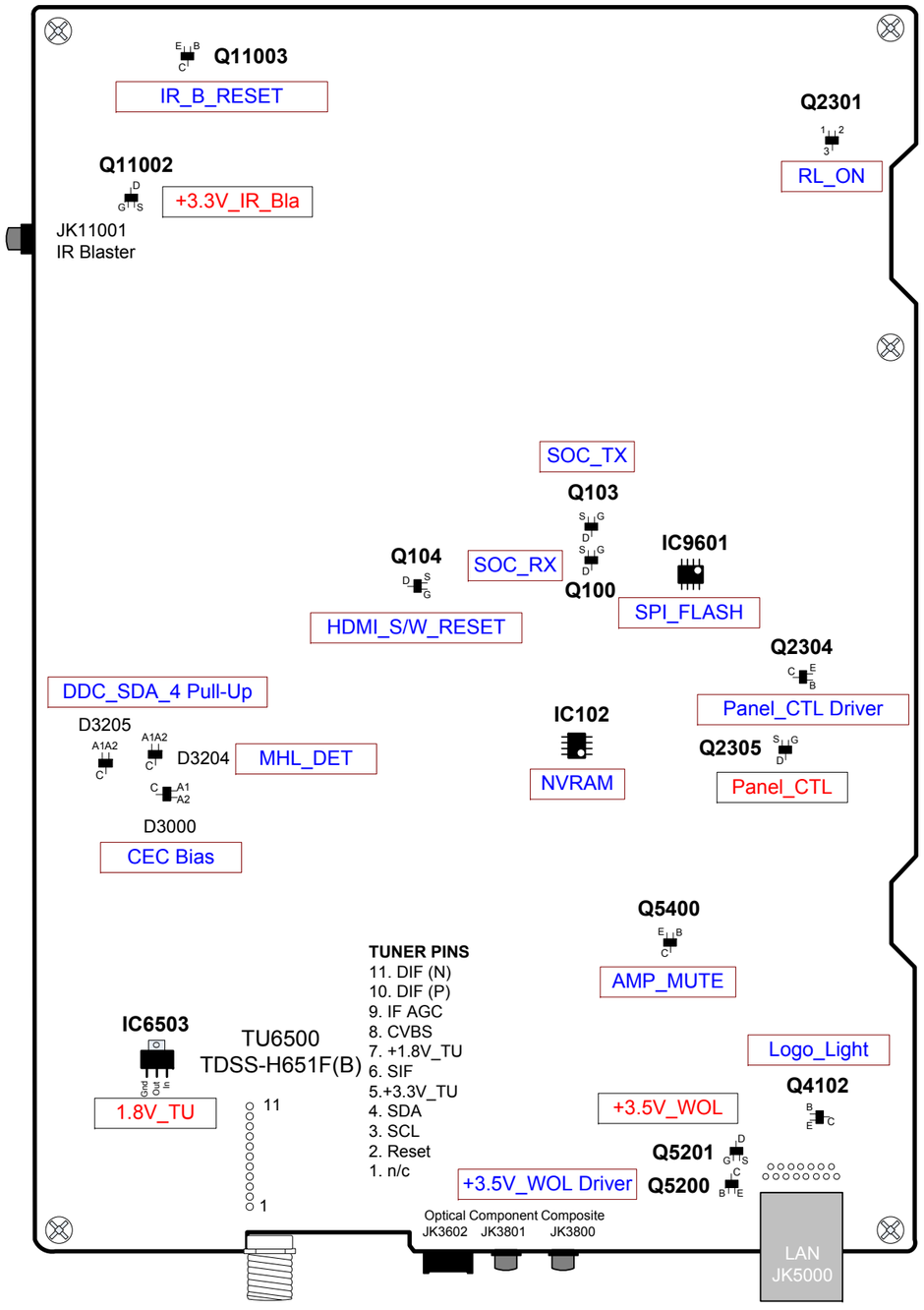
IC4306 USB 5V USB 2 and 3

Pin		Pin	
[1]	3.51V (EN)	[13]	5V (In)
[2]	0.64V	[14]	5V (In)
[3]	n/c	[15]	5V (In)
[4]	n/c	[16]	5V (Out)
[5]	3.33V	[17]	5V (Out)
[6]	3.33V	[18]	11.14V
[7]	3.33V	[19]	Gnd
[8]	3.33V	[20]	Gnd
[9]	**5V (Out USB 3)**	**[21]**	**12.04V (In)**
[10]	Gnd	[22]	12.04V (In)
[11]	Gnd	[23]	Gnd
[12]	5V (Out USB 2)	[24]	6.27V

IC5200 Ethernet Realtek

Pin		Pin	
[1]	0.64V	[17]	0V
[2]	1.1V	[18]	0V n/c
[3]	1.1V	[19]	0V n/c
[4]	1.1V	[20]	0V
[5]	**1.1V**	**[21]**	**3.3V**
[6]	1.1V	[22]	1.7V
[7]	3.5V_WOL	[23]	3.5V
[8]	0V	[24]	0V
[9]	0V	[25]	3.4V
[10]	0V	[26]	0V
[11]	0V	[27]	0V
[12]	0V	[28]	0V
[13]	0V n/c	[29]	1.0V
[14]	3.5V_WOL	[30]	3.5V_WOL
[15]	1.2V	[31]	0.7V
[16]	0V	[32]	0.7V

47GA6400 Main Board (Rear) Component Layout



47GA6400 Main Board (Rear) Component Voltages

IC102

Pin	NVRAM Memory
[1]	Gnd
[2]	Gnd
[3]	Gnd
[4]	Gnd
[5]	**3.33V**
[6]	3.33V
[7]	0V
[8]	3.33V (Vcc In)

IC6503

Pin	1.8V_TU Regulator
[Gnd]	0V (Gnd)
[Out]	1.8V (Out)
[In]	3.33V (In)

IC9601

Pin	NVRAM Memory
[1]	0V n/c
[2]	3.3V
[3]	**3.3V**
[4]	Gnd
[5]	0V
[6]	0V
[7]	3.3V
[8]	3.33V (Vcc In)

Q100

Pin	SOC_RX Buffer
[S]	3.3V
[G]	5.0V (5V_Normal)
[D]	3.3V

Q103

Pin	SOC_TX Buffer
[S]	**3.3V**
[G]	5.0V (5V_Normal)
[D]	3.3V

Q104

Pin	HDMI_S/W_RESET Buffer
[S]	3.3V
[G]	5.0V (5V_Normal)
[D]	3.3V

Q2301

Pin	RL_On Switch
[1]	3.5V
[2]	2.8V
[3]	3.4V

Q2304

Pin	Panel VCC Switch (Q2407) Control
[B]	0.6V
[C]	0.0V
[E]	Gnd

Q2305

Pin	Panel_VCC Switch
[G]	1.8V (CTRL)
[S]	**12V (In)**
[D]	12V (Out)

Q4102

Pin	Logo Light Driver
B	0V
C	1.3V
E	Gnd

Q5200

Pin	+3.5V_WOL Driver Controls Q5201
[B]	0.7V
[C]	0V
[E]	Gnd

Q5201

Pin	+3.5V_WOL Switch
[S]	3.5V_ST (In)
[G]	0.4V
[D]	3.55V (Out)

Q5400

Pin	AMP Mute
[B]	0V
[C]	3.30V
[E]	Gnd

Q11002

Pin	+3.3V_IR_Bla Switch
[S]	3.3V_Normal
[G]	5V
[D]	3.3V (Out)

Q11003

Pin	IR_B_RESET (Q2407) Control
[B]	0.0V
[C]	3.3V
[E]	Gnd

D3000

Pin	CEC Bias for (Q3001)
[A1]	0V
[A2]	**3.5V**
[C]	3.4V

D3204

Pin	MHL_Det To (IC3202)
[A1]	0V (n/c)
[A2]	0V (Det)
[C]	Out

D3205

Pin	DDC_SDA_4 Pull-Up
[A1]	0.76V (n/c)
[A2]	3.5V (3.5V_ST)
[C]	5V Out

47GA6400 T-CON Board Component Voltages

U3 DC-to-DC

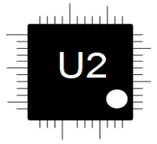
Panel Power
Level Shifter

Pin		Pin	
[1]	7.76V (GCLK1)	[15]	(-6.97) (VGL)
[2]	**7.74V (GCLK2)**	**[16]**	**27.96V (VGH)**
[3]	7.75V (GCLK3)	[17]	27.96V (VGH)
[4]	7.74V (GCLK4)	[18]	7.65V (V_COM)
[5]	7.76V (GCLK5)	[19]	7.65V
[6]	7.74V (GCLK6)	[20]	7.62V
[7]	2.5V	[21]	16.9V
[8]	27.9V (VGH_R)	[22]	Gnd
[9]	(-6.97) (VGH_F)	[23]	3.3V (VCC)
[10]	*(-6.95V to 27.9V) (VGH_ODD)	[24]	0V
[11]	*(-6.95V to 27.9V) (VGH_EVEN)	[25]	0V
[12]	(-6.91) (VST)	[26]	0.7V
[13]	(-6.88) (GIP_RST)	[27]	1.27V
[14]	(-6.97)	[28]	3.24V

* EVERY Second

U2 DC-to-DC

T-CON and Panel Power
DC-to-DC Conv



Pin		Pin	
[1]	1.81V	[25]	4.95V
[2]	**1.86V**	**[26]**	**0.53V**
[3]	Gnd	[27]	3.3V
[4]	3.3V	[28]	3.3V
[5]	1.79V	[29]	4.99V
[6]	1.81V	[30]	1.3V
[7]	Gnd	[31]	16.4V
[8]	3.31V (VCC)	[32]	27.94V
[9]	3.31V (VCC)	[33]	5.69V
[10]	0V	[34]	8.21V
[11]	11.7V (Panel_VCC)	[35]	(-6.98V) (VGL_FB)
[12]	11.7V (Panel_VCC)	[36]	1.19V
[13]	11.7V (Panel_VCC)	[37]	13.86V
[14]	11.7V (Panel_VCC)	[38]	12.85V
[15]	8.45V (H_VDD)	[39]	10.91V
[16]	8.44V (H_VDD_FB)	[40]	6.55V
[17]	Gnd	[41]	4.6V
[18]	Gnd	[42]	3.5V
[19]	Gnd	[43]	7.65V
[20]	11.7V (Panel_VCC)	[44]	7.64V
[21]	11.7V (Panel_VCC)	[45]	7.63V
[22]	16.97V	[46]	7.61V (VCOM_RFB)
[23]	**16.97V (VDD)**	**[47]**	**1.61V**
[24]	Gnd	[48]	Gnd

U1 Buffer

Pin	
[1]	Gnd
[2]	Gnd
[3]	**Gnd**
[4]	Gnd
[5]	3.31V
[6]	3.31V
[7]	3.31V
[8]	3.31V

Q1 VDD Rectifier

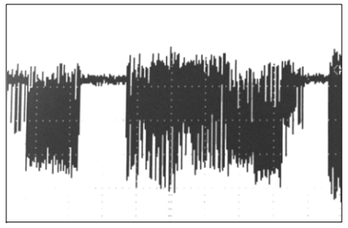
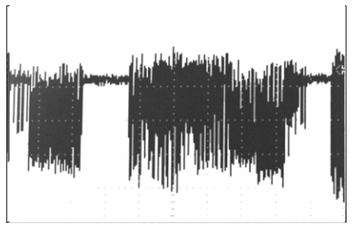
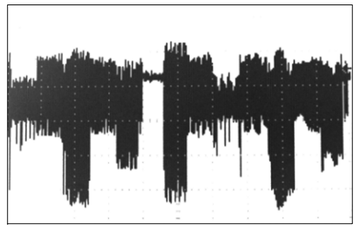
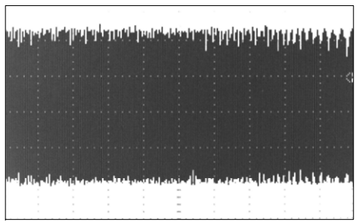
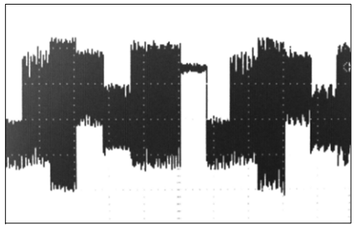
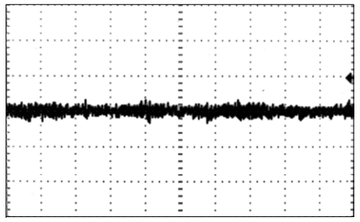
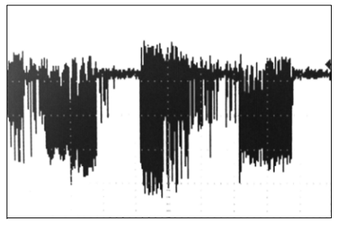
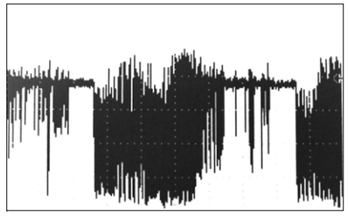
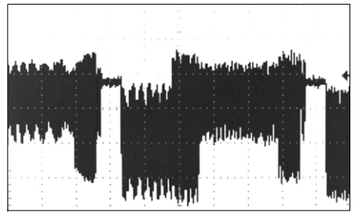
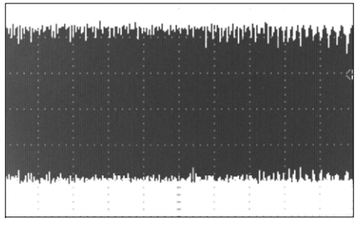
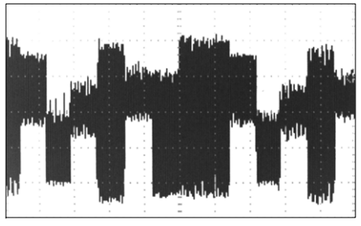
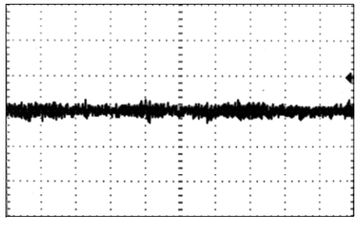
Pin	
[1]	20.2V
[2]	16.38V
[3]	16.93V Output
[4]	12.98V
[5]	12.98V
[6]	12.95V

Q2 VGL Rectifier

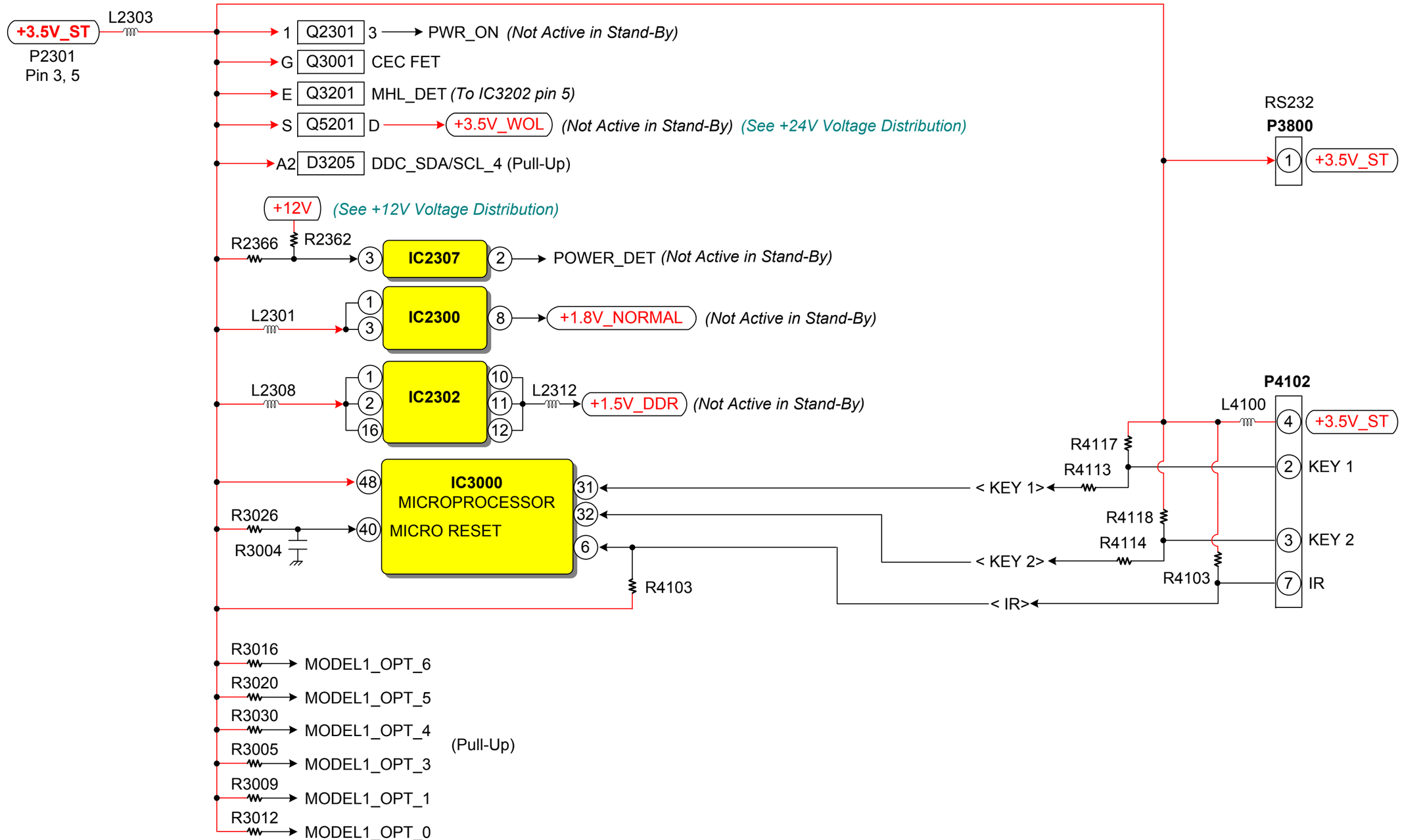
Pin	
[1]	0.56V
[2]	1.18V
[3]	(-2.9V)
[4]	**(-7V) Output**
[5]	2.97V
[6]	2.97V

47GA6400 P7100 LVDS Connector Video Waveforms

All LVDS signals are taken with SMPTE Color Bar signal input (1080P) Component Input.
All LVDS signals are "Differential Pairs". The ones shown are the "Positive" signal of the pair. The Negative signal looks exactly the same but flipped 180^0.
Scope Settings are 100mV per/division, 2.5uSec per/division.

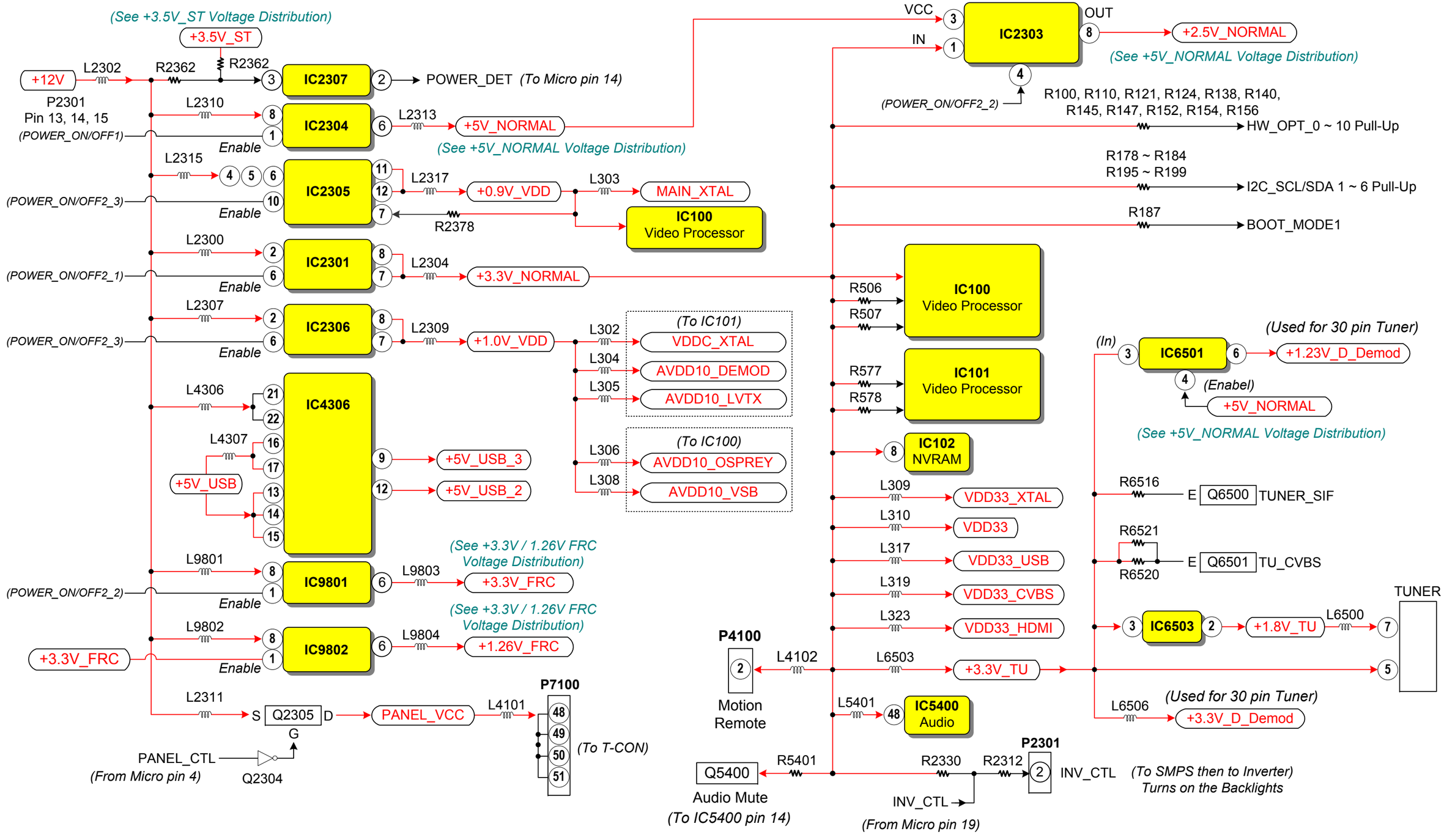
Pin 12	**Pin 14**	**Pin 16**	**Pin 19**	**Pin 22**	**Pin 24**
					
456mV p/p	**476mV p/p**	**484mV p/p**	**464mV p/p**	**444mV p/p**	**56mV p/p**
Pin 13 looks the same but inverted.	**Pin 15 looks the same but inverted.**	**Pin 16 looks the same but inverted.**	**Pin 20 looks the same but inverted.**	**Pin 23 looks the same but inverted.**	**Pin 25 looks the same but inverted.**
Pin 28	**Pin 30**	**Pin 32**	**Pin 35**	**Pin 38**	**Pin 40**
					
456mV p/p	**468mV p/p**	**448mV p/p**	**456mV p/p**	**476mV p/p**	**64mV p/p**
Pin 29 looks the same but inverted.	**Pin 31 looks the same but inverted.**	**Pin 33 looks the same but inverted.**	**Pin 36 looks the same but inverted.**	**Pin 39 looks the same but inverted.**	**Pin 41 looks the same but inverted.**

47GA6400 Main Voltage (+3.5V_ST) Distribution Block Diagram

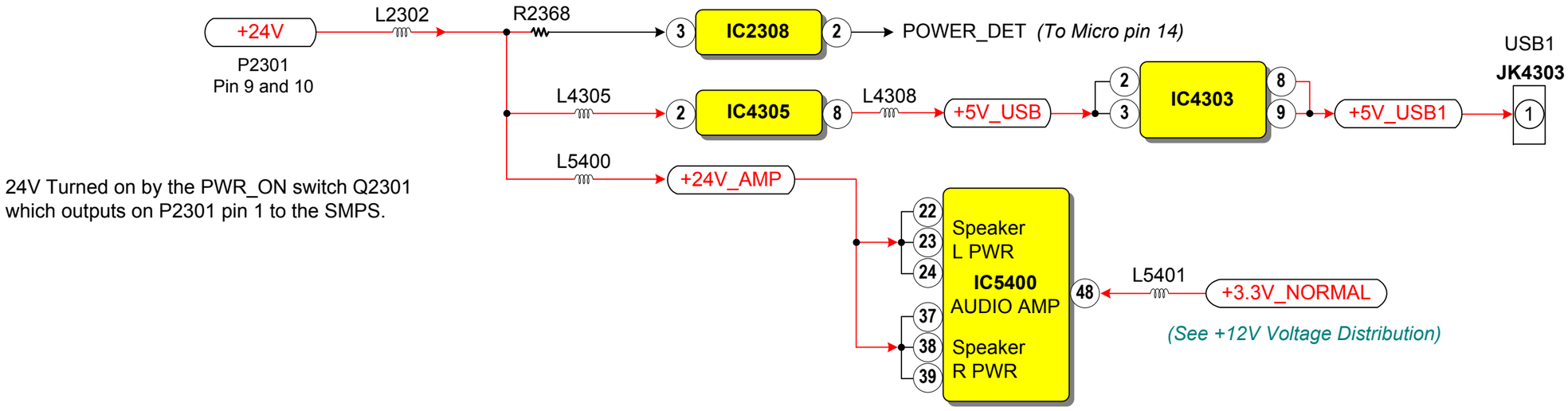


47GA6400 Main Voltage (+12V) Distribution Block Diagram

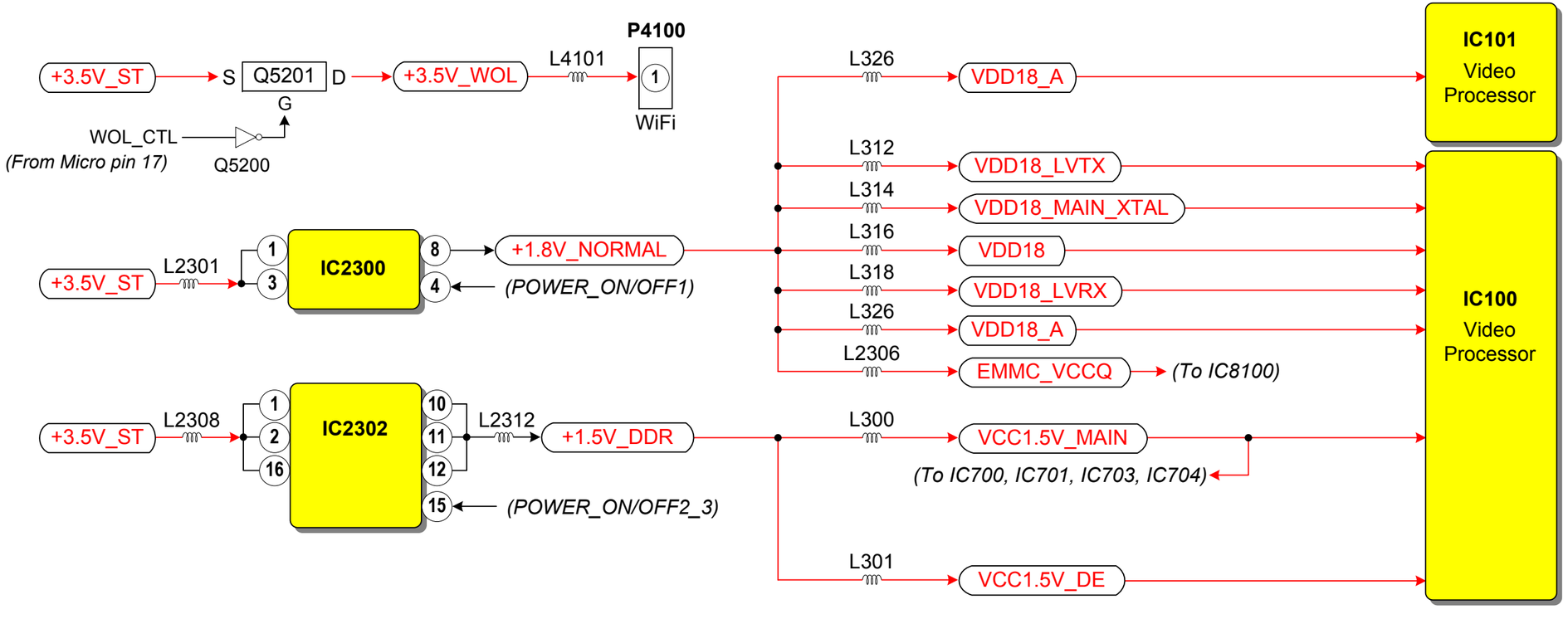
12V Turned on by the PWR_ON switch Q2301 which outputs on P2301 pin 1 to the SMPS.



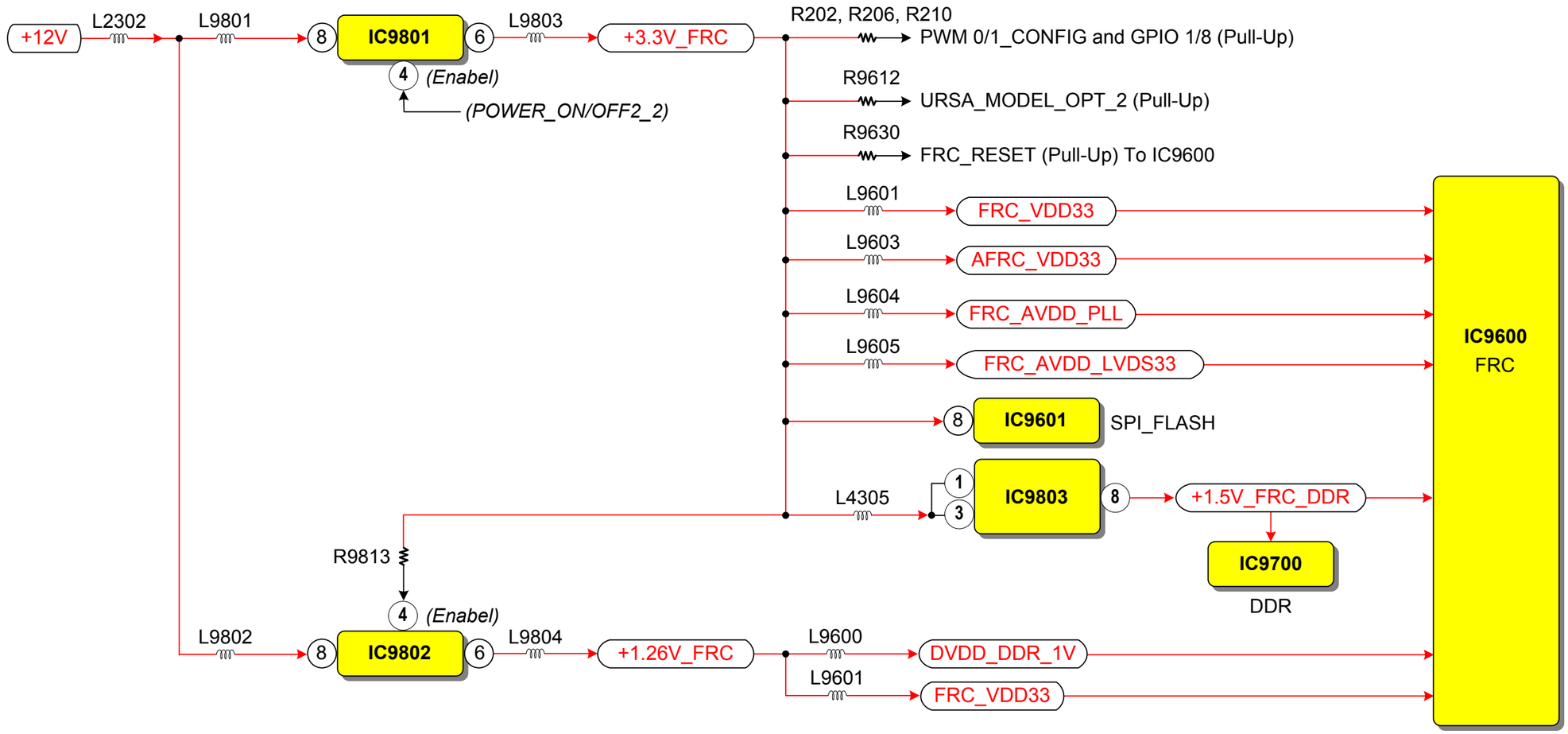
47GA6400 Main Voltage (+24V) Distribution Block Diagram



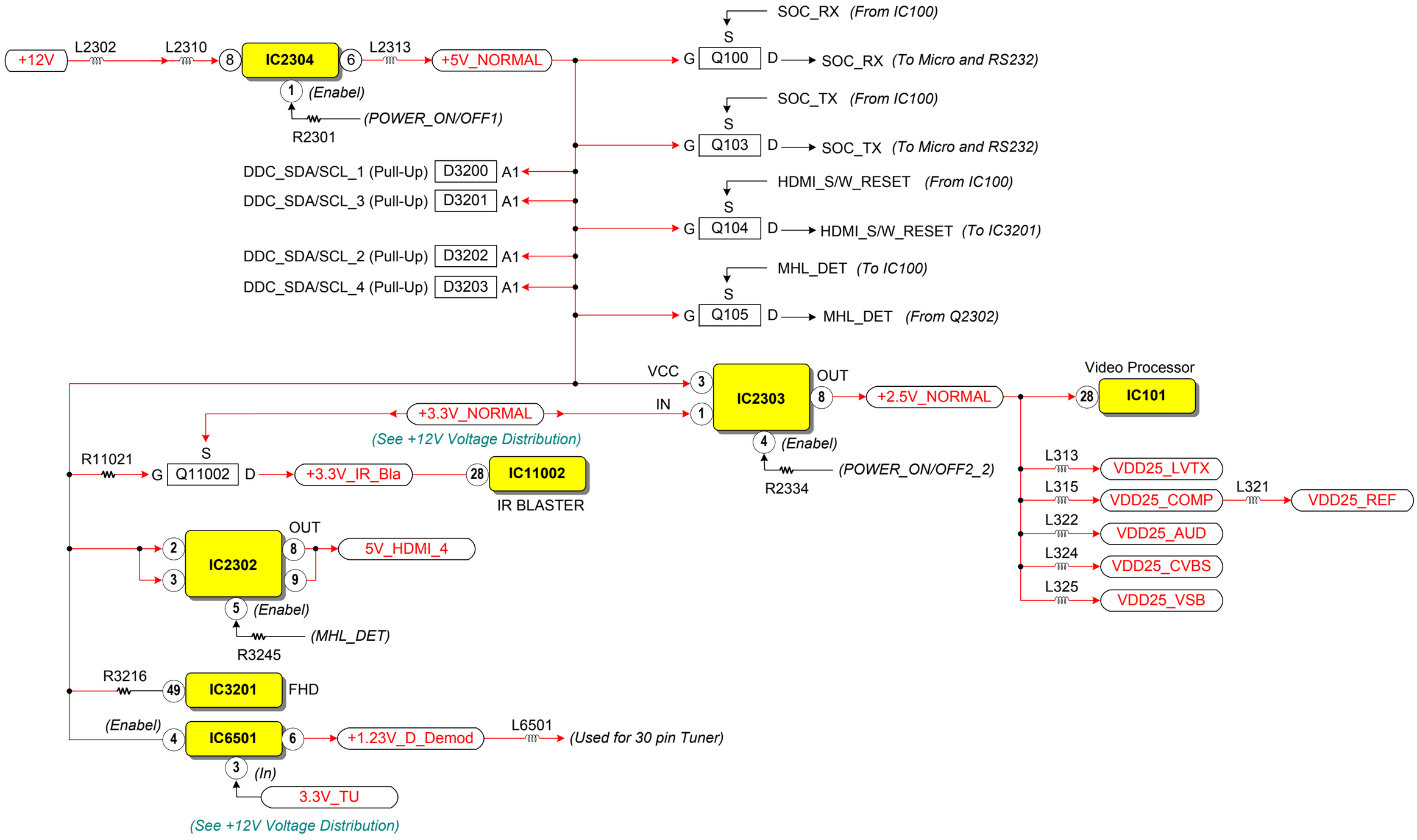
47GA6400 Main Voltage (+1.8V_Normal, +1.5V_DDR) Distribution Block Diagram



47GA6400 Main Voltage (3.3V / 1.26V FRC) Distribution Block Diagram



47GA6400 Main Voltage (5V_NORMAL) Distribution Block Diagram



47LG90 INTERCONNECT DIAGRAM

Warning:
T-Con PWB under shield. Be sure to reinsert screws before operating set with shield removed.

Inverter M

IC11 1) Gnd 2) 3.3V 3) 5V

***PWM-DIM**
*Goes to TCON thru pin 4 as **Ext VBR B**.*

Y1
Signal TP .7V .6V
8.00 Mhz

CN3 Pin 1.2 39.8V (Bottom pins)
CN4 Pin 1.2 39.8V (Bottom pins)
IC10
60Hz Normal
300Hz LED failure
D302
CN304
5V
L5 D9
CN301
N/C
1) 5V 2) 3.3V 3) Gnd

F5
125V 3A
24V

L1 D1 39.5V
F1
125V 6.3A
24V
CN1

***Ext VBR A**
Pin 13 will vary according to OSD Backlight setting.
0.3V 0% to 3.4V 100%

CN5 Pin 1.2 39.8V (Bottom pins)
CN6 Pin 1.2 39.8V (Bottom pins)

IC12
1) Gnd 2) 3.3V 3) 5V

L2 D3 39.5V
F2
125V 6.3A
24V

CN7 Pin 1.2 39.8V (Bottom pins)
CN8 Pin 1.2 39.8V (Bottom pins)

L3 D5 39.5V
F3
125V 6.3A
24V

Inverter M
CN3 – CN10
10. Block 8
9. Block 7
8. Block 6
7. Block 5
6. Block 4
5. Block 3
4. Block 2
3. Block 1
2. B+ 39V
1. B+ 39V

L4 D7 39.5V
F4
125V 6.3A
24V

CN9 Pin 1.2 39.8V (Bottom pins)
CN10 Pin 1.2 39.8V (Bottom pins)

For LED testing see bottom of inverter S drawing.

CN304 INVERTER "M" TO CN8 "T-CON"

CN304 Pin	Label	STBY	Run	Diode Check	CN8 Pin
1,2,3	Gnd	Gnd	Gnd	Gnd	14,15,16
4	EXT_VBR B	0V	.3/3.4V	Open	13
5	Gnd	Gnd	Gnd	Gnd	12
6	AFLC_SPI_EN	0V	0.1V	1.0V	11
7	AFLC_DET	0V	0V	1.1V	10
8	VBR_LAT	0V	0V	Open	9
9	VBR_SIN	0V	0V	Open	8
10	VBR_SCLK	0V	0V	Open	7
11	DRV_XLATO	0V	0V	1.0V	6
12	n/c	n/c	n/c	Open	5
13	DRV_SIN0	0V	1V	1.0V	4
14	DRV_SCLK0	0V	1V	1.0V	3
15	DRV_BLK0	0V	0V	0.9V	2
16	DRV_GSCLK0	0V	1.7V	0.9V	1

NOTE:
Flip the black tab upward to remove the cable.

P204 "SMPS" to CN1 "Inverter PWB"

Pin	Label	STBY	Run	Diode Check
1,2,3,4,5	24V	0V	24V	0.72V
6,7,8,9,10	Gnd	Gnd	Gnd	Gnd
11	BRI	0V	1.7V	Open
12	INV On-Off	0V	3.2V	Open
13	*PWM-DIM	0V	.3/3.4V	Open
14	ERROR	0V	0V	Open

P205 "SMPS" to CN501 "Inverter PWB"

Pin	Label	STBY	Run	Diode Check
1,2,3,4,5	24V	0V	24.6V	Open
6,7,8,9,10	Gnd	Gnd	Gnd	Gnd
11	*BRI	0V	1.7V	Open
12	On/Off	0V	3.2V	Open

Power Supply

P204
***PWM DIM**
Pin 13 will vary according to OSD Backlight setting.
0.3V 0% to 3.4V 100%

P205
P201

3.15A / 250V Rating
331V Actual Reading
F101

TEST 1 P201 — PWR 10K Any pin 9~12
TEST 2 P201 — PWR 10K Any pin 9~12, INV On/Off

***PWM DIM**
Pin 22 will vary according to OSD Backlight setting. 0.3V 0% to 3.4V 100%

6.3A / 250V
A/C Fuse
SC100
F100
N
L

P201 Odd "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
1	16.5V	0V	16.2V	0.49V
3	Gnd	Gnd	Gnd	Gnd
5	12V	0V	12.3V	1.6V
7	Gnd	Gnd	Gnd	Gnd
9	5V	5.1V	5.1V	1.27V
11	5V	5.1V	5.1V	1.27V
13	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
17	Error	0V	0V	0V
19	Power On	0V	2.8V	1.6V
21	BR1	0V	1.7V	0V
23	N/C	0V	0V	0V

P201 Even "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
2	16.5V	0V	16.2V	0.49V
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	12.3V	1.6V
8	Gnd	Gnd	Gnd	Gnd
10	5V	5.1V	5.1V	1.27V
12	5V	5.1V	5.1V	1.27V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	ACD	5V	5V	2.1V
20	INV-On/Off	0V	3.2V	0V
22	*PWM-DIM	0V	*.3/3.4V	0V
24	N/C	0V	0V	0V

***PWM-DIM (PDIM)** Pin 22 will vary according to OSD Backlight setting. 0.3V 0% to 3.4V 100%

SMPS TEST 1: To Force Power Supply On. Disconnect P800 on Main PWB. Jump pin 9,10,11 or 12 (5V) to pin 19 using a 10K resistor. (Test Voltage Outputs 12V, 16V, and 24V).

SMPS TEST 2: Jump pin 19 to pin 20 (INV-ON). (Ballast and all voltages should turn on).

T-CON Board

TO TFT MODULE
CN5 CN4

FL114 GND 0V
Reg 2_5(2) 1) 2.5V 2) 0V 3) 3.3V
U13 FL21 3.3V
UC12 50.00 Mhz Signal TP 1.7V
U91
U12 FL22 3.3V
3.4V L3 D12
FL111 GND 0V
CN9
FL116 GND 0V
CN8
FL118 GND 0V
3.4V L1 D17
FL20 1.6V
FL26 3.3V
FL27 3.3V
L2 D13 16.1V
Reg 2_5(1) 1) 3.3V 2) 0V 3) 2.5V

Technical Note:
If there seems to be no back lights, disconnect CN8 and CN9 reapply power and if backlights return the T-CON may be the root cause.

Reg 1-2(2) 1) 3.3V 2) 0V 3) 1.2V
FL113 GND 0V
N/C
F1 (12V) 125V/3A
FL112 GND 0V
CN7 CN1 CN2
LVDS LVDS

12V to T-CON Pin 1, 2, 3, 4.

NOTE:
Flip the black tab upward to remove the cable from the connector.

CN804 INVERTER "S" TO CN9 "T-CON"

CN9 Pin	Label	STBY	Run	Diode Check	CN804 Pin
14,15,16	Gnd	Gnd	Gnd	Gnd	1,2,3
13	n/c	n/c	n/c	Open	4
12	n/c	n/c	Gnd	Gnd	5
11	AFLC_SPI_EN	0V	0.13V	1.0V	6
10	AFLC_DET	0V	0V	1.1V	7
9	VBR_LAT	0V	0V	Open	8
8	VBR_SIN	0V	0V	Open	9
7	VBR_SCLK	0V	0V	Open	10
6	DRV_XLATO	0V	0V	1.0V	11
5	n/c	n/c	n/c	Open	12
4	DRV_SIN0	0V	1V	1.0V	13
3	DRV_SCLK0	0V	1V	1.0V	14
2	DRV_BLK0	0V	0V	0.9V	15
1	DRV_GSCLK0	0V	1.7V	0.9V	16

Main (Digital) Board

For more regulator voltages, see back of this page.

P1000
IC1005 IC1007 Q900 IC1006
Q901
P800 IC1003 IC810 IC1004
IC407 Micro
X400 24 Mhz 1.5V
P404 LD803 Q400 IC405
IC805
IC809 IC404 IC400
Q803 IC807 IC802 IC804
Reset BCM
IC501 Audio
*LD803 Illuminates when IC809 generates 3.3V BCM
P501 To Speakers

P1001
IC1000 True Motion Micronas
X1000 20.25Mhz
IC100 BCM Broadcom
X200 54 Mhz 1.5V

Software Upgrades
P200 n/c

IC812
1 (9V)
2 (3.3V)
3 (5V to Tuner)
4 (n/c)
5 (Gnd)
IC812

IC803
1 (12V)
2 (Gnd)
3 (9V)
IC803

16 VIF
14 SIF
TUNER
3 (5V)
1

P800 to P201

*For voltages and pin labels, see P201 chart

Pin	Diode Check	Pin	Diode Check
1	OL	2	OL
3	Gnd	4	Gnd
5	3.1V	6	3.1V
7	Gnd	8	Gnd
9	1.48V	10	1.48V
11	1.48V	12	1.48V
13	Gnd	14	Gnd
15	Gnd	16	Gnd
17	2.86V	18	OL
19	1V	20	1.89V
21	OL	22	OL
23	OL	24	OL

Inverter S

IC512 1) Gnd 2) 3.3V 3) 5V

Y501
Signal TP .7V .6V
8.00 Mhz

CN804
D802
60Hz Normal
300Hz LED failure
CN801 N/C
F505 125V 3A 24V
L505 D509 5V
IC510 1) 5V 2) 3.3V 3) Gnd

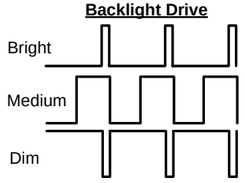
CN510 Pin 1,2 39.8V (Top pins)
CN509 Pin 1,2 39.8V (Top pins)

F504 125V 6.3A 24V
L504 39.5V D507
CN501
CN508 Pin 1,2 39.8V (Top pins)
CN507 Pin 1,2 39.8V (Top pins)

F503 125V 6.3A 24V
L503 39.5V D505
IC12 1) Gnd 2) 3.3V 3) 5V

F502 125V 6.3A 24V
L502 39.5V D503
CN506 Pin 1,2 39.8V (Top pins)
CN505 Pin 1,2 39.8V (Top pins)

Backlight Drive



The drive to the backlights can be affected by the video information, backlight setting or the brightness setting. Check or reset these settings during diagnostics.

F501 125V 6.3A 24V
L501 39.5V D501
CN504 Pin 1,2 39.8V (Top pins)
CN503 Pin 1,2 39.8V (Top pins)

Inverter M CN3 – CN10
10. Block 8
9. Block 7
8. Block 6
7. Block 5
6. Block 4
5. Block 3
4. Block 2
3. Block 1
2. B+ 39V
1. B+ 39V
To LED's

Inverter S CN503 – CN510
1. B+ 39V
2. B+ 39V
3. Block 1
4. Block 2
5. Block 3
6. Block 4
7. Block 5
8. Block 6
9. Block 7
10. Block 8
To LED's

Side (Key) Controls

P101

Front PWB Assembly (Interface)

Gnd Lug
J3
IR Receiver
Power Button
J1

P404 "Main" to J1

Pin	Label	STBY	Run	Diode Check	
1	EYEQ-SCL	3.3V	3.3V	2.13V	Intelligent Sensor
2	EYEQ-SDA	3.3V	3.3V	2.13V	Intelligent Sensor
3	Gnd	Gnd	Gnd	Gnd	
4	Gnd	Gnd	Gnd	Gnd	
5	Key1	3.3V	3.3V	1.77V	
6	Key2	3.3V	3.3V	1.77V	
7	3.3V	0V	3.3V	0.55V	
8	5V ST	5V	5V	1.48V	Stand-by 5V

*Grayed Out ICs are located on Back of the PWB

P404 "Main" to J1

Pin	Label	STBY	Run	Diode Check	
9	Ready	0V	0V	OL	
10	IR	3.9V	3.9V	1.24V	Remote Sensor
11	EYEQ-Reset	0V	0V	OL	Intelligent Sensor
12	Gnd	Gnd	Gnd	Gnd	
13	Ready	0V	0V	OL	
14	PWB-Buzz	0V	0V	3V	
15	Gnd	Gnd	Gnd	Gnd	

LED TESTING:
Remove the connector from the PWB. Use a DC supply set to +30V to +38V (+) connected to the pin labeled (B+) on the cable. Connect the other lead (-) to the pins labeled (Block 1 - 8) one at a time to luminate each block of LEDs one block at a time. Go no higher than 38V across each block. ***Pins are reversed between inverter M and S.**

47LG90 MAIN PWB REGULATOR CHARTS

REGULATORS/ICs ON FRONT

IC405	STBY	RUN	Label
Function:	Micro Reset control		
Pins 1	0V	3.3V	Input 3.3VST-Micom
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to Q400

IC803	STBY	RUN	
Function:	9V Regulator Also source for IC812		
Pins 1	0V	12V	Input
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	9V	Output

IC812	STBY	RUN	Label
Function:	5V-TU Regulator		
Pin 1	0V	9V	Input
Pin 2	0V	3.3V	On/Off Power-CTL 3.3V
Pin 3	0V	5V	Output
Pin 4	n/c	n/c	n/c
Pin 5	Gnd	Gnd	Gnd

Q400	STBY	RUN	Label
Function:	Reset to Micro		
B	0.59V	0.59V	Input from IC405
C	0V	0V	Hi-Lo to IC407 pin 4
E	Gnd	Gnd	Gnd

Q900	STBY	RUN	Label
Function:	LVDS Switch		
Pins 1,3	0V	12V	Input
Pins 2,4	0V	6V	On/Off
Pins 5-8	0V	12V	Output LVDS 12V

Q901	STBY	RUN	Label
Function:	Turns on Q900 LVDS Switch		
B	0V	0.7V	LVDS-Panel-Control
C	0V	0V	On low/Off hi
E	0V	0V	Gnd

REGULATORS/ICs ON BACK

IC102	STBY	RUN	Label
Function:	EEPROM for HDMI HDCP Key		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	3.78V	SDA
Pin 6	0V	3.78V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC400	STBY	RUN	Label
Function:	BCM Reset Generator Drives IC401		
Pins 1	0V	3.3V	Input D3.3V-BCM
Pins 2	Gnd	Gnd	Gnd
Pins 3	0V	0V	Hi then Lo to IC401

IC401	STBY	RUN	Label
Function:	BCM Reset Smitt Trigger		
Pin 1	0V	3.3V	Input Reset
Pin 6	0V	3.3V	BCM Reset
Pin 7	Gnd	Gnd	Gnd
Pin 2,3,5	0V	0V	
Pin 14	0V	3.3V	B+ for IC +3.3V
Pins 8,9,10,11,12,13 not used			

IC403	STBY	RUN	Label
Function:	NV RAM-OLD		
Pins 1,2,3	0V	4.9V	Pull Up
Pins 4	Gnd	Gnd	Gnd
Pin 5	0V	3.4V	SDA
Pin 6	0V	3.4V	SCL
Pin 7	0V	0V	Write Protect
Pin 8	0V	5V	Vcc+5V

Q803	STBY	RUN	Label
Function:	Controls Q804 +5V Switch		
B	0V	0.72V	Input RL-ON
C	5V	0.02V	Turns on Q804
E	Gnd	Gnd	Gnd

Q804	STBY	RUN	Label
Function:	+5V Switch		
Pins 1,3	0V	5V	Input ST-5V
Pins 2,4	0V	0.3V	On/Off by Q803
Pins 5-8	0V	5V	Output +5V

IC404	STBY	RUN	
Function:	3.3VST-MICON Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	3.3V	3.3V	Output 3.3VST-MICON
Pins 3	5V	5V	Input ST-5V

IC406	STBY	RUN	
Function:	Micro EEPROM		
Pins 1,2,4	Gnd	Gnd	Gnd
Pins 3	3.3V	3.3V	Pull Up
Pin 5	3.3V	3.3V	SDA
Pin 6	3.3V	3.3V	SCL
Pin 7	Gnd	Gnd	Write Protect
Pin 8	3.3V	3.3V	3.3VST-Micom

IC408	STBY	RUN
Pin 1	5V	5V
Pin 2	5V	0.1V
Pin 3,4,5,7	n/c	n/c
Pin 6,8,9	Gnd	Gnd
Pin 10,11	0V	4.78V
Pin 12	0V	0.16V
Pin 13	0V	3.4V
Pin 14	0V	0V
Pin 15	5V	5V
Pin 16	5V	ST-5V

IC602	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	0V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	5V
Pin 6	0V	5V
Pin 7	0V	0V
Pin 8	0V	4.8V

IC1003	STBY	RUN
Pin 1	0V	13V
Pin 2	0.68V	0V
Pin 3	0.6V	0V
Pin 4	0V	1.24V
Pin 5	3.3V	3.3V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	3.4V

IC802	STBY	RUN	Label
Function:	3.3V Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	3.3V	Output
Pins 3	0V	5V	Input

IC701	STBY	RUN	
Function:	EEPROM for HDMI		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	5V	SDA
Pin 6	0V	4.7V	SCL
Pin 7	0V	5V	Write Protect
Pin 8	0V	4.73V	Vcc+5V

IC702	STBY	RUN	
Function:	EEPROM for RS232		
Pins 1,2	Gnd	Gnd	Gnd
Pins 3,4	Gnd	Gnd	Gnd
Pin 5	0V	0.15V	SDA
Pin 6	5V	0.13V	SCL
Pin 7	0V	0.13V	Write Protect
Pin 8	0V	5V	Vcc+5V

IC805	STBY	RUN	Label
Function:	D1.2V-BCM Regulator		
Pin 1	0V	6V	RST
Pin 2	0V	5V	Input
Pin 3	0V	1.2V	Output
Pin 4	0V	0V	Gnd
Pin 5	0V	3.3V	On/Off Power-CTL
Pin 6	0V	1.2V	FB
Pin 7	0V	1V	COMP
Pin 8	0V	0V	Gnd

IC807	STBY	RUN	Label
Function:	1.8V-NTP Regulator		
Pins 1	Gnd	Gnd	Gnd
Pins 2	0V	1.8V	Output
Pins 3	0V	3.3V	Input

IC809	STBY	RUN	Label
Function:	D3.3V Regulator Also Drives LD803		
Pin 1	0V	1.2V	On/Off Power-CTL
Pin 2	0V	5V	Input
Pin 3	Gnd	Gnd	Gnd
Pin 4	0V	3.4V	Output
Pin 5	0V	3.3V	ADJ

IC810	STBY	RUN	Label
Function:	D2.6V Regulator		
Pin 1	0V	2.5V	Input
Pin 2	0V	1.2V	On/Off Pwr-CTL 2.6V
Pin 3	Gnd	Gnd	Gnd
Pin 4	n/c	3.3V	ADJ
Pin 5	Gnd	5V	Output

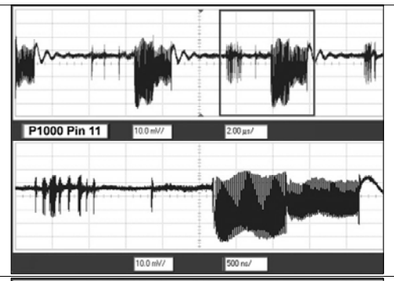
IC1004	STBY	RUN
Pin 1	0V	10V
Pin 2	0.78V	0V
Pin 3	0.7V	0V
Pin 4	0V	1.24V
Pin 5	0V	0V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	1.3V

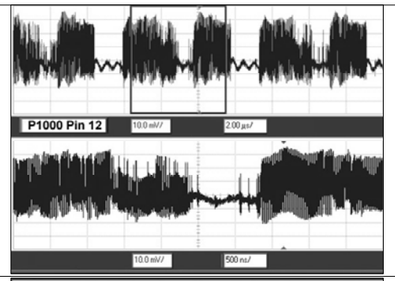
IC1005	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	3.4V
Pin 3	0V	0V
Pin 4	0V	1.4V
Pin 5	0V	1.2V

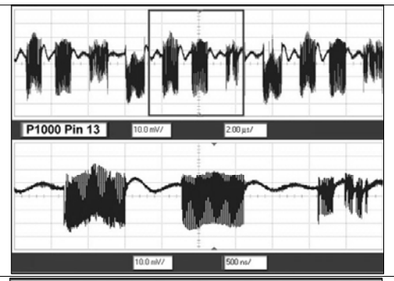
IC1006	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	1.8V
Pin 5	0V	0V

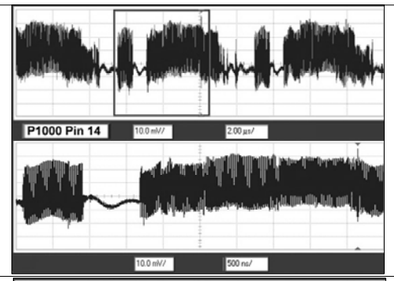
IC1007	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	2.5V

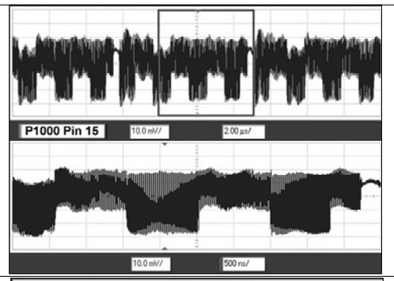
47LG90 LVDS P1000 WAVEFORMS

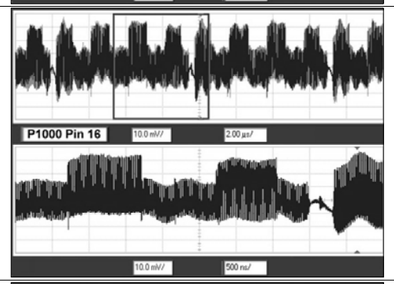


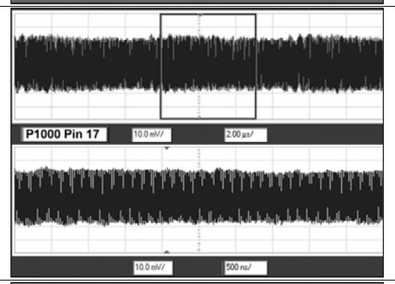


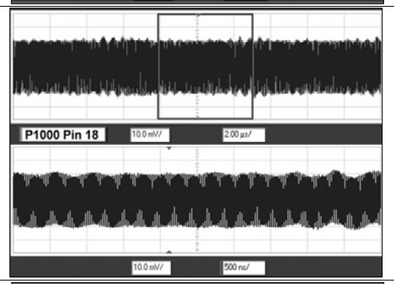


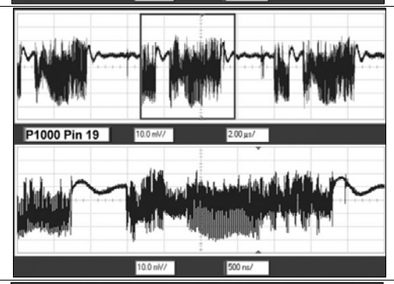


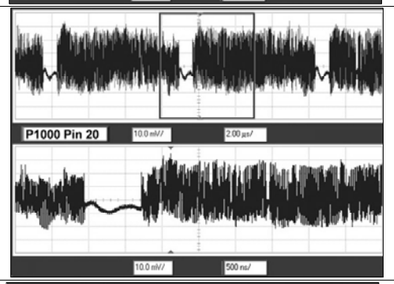


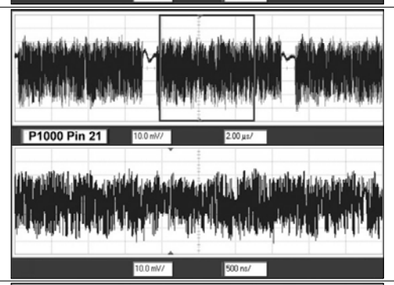


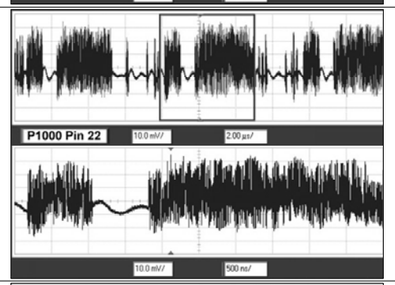


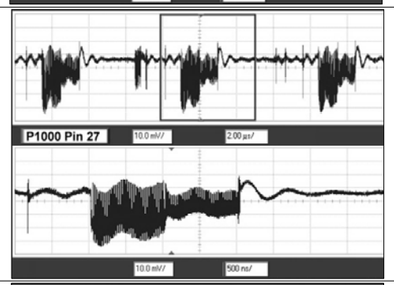


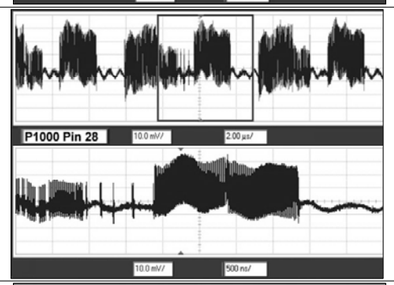


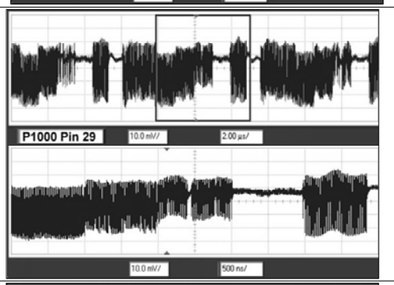


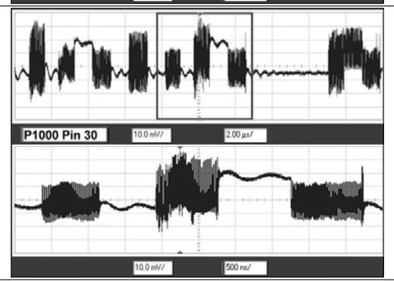


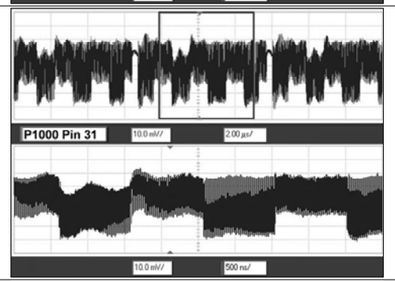


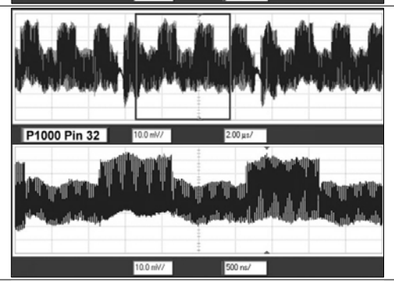


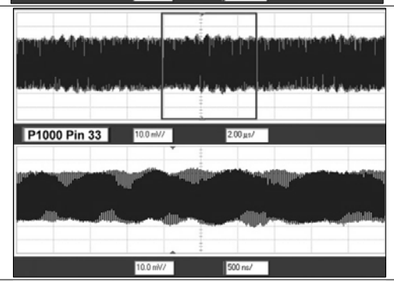


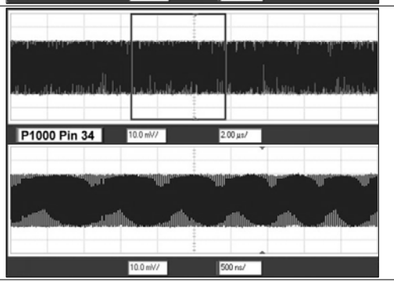


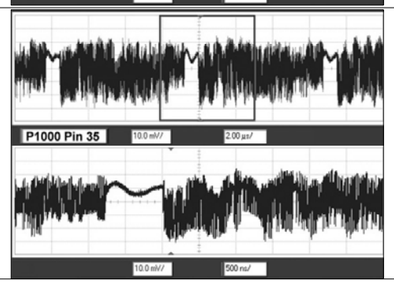


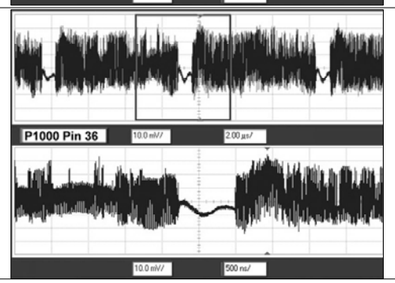


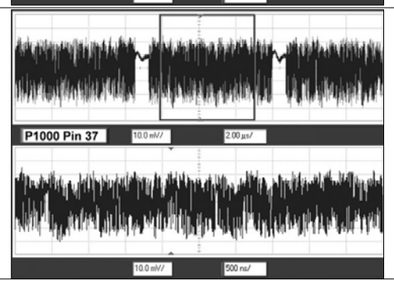


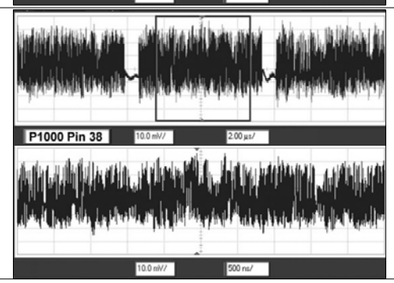






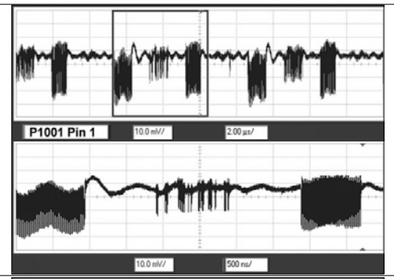


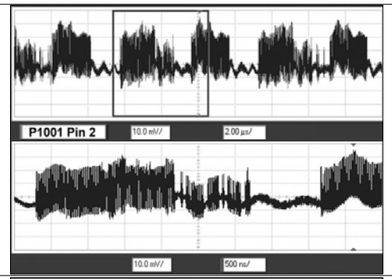


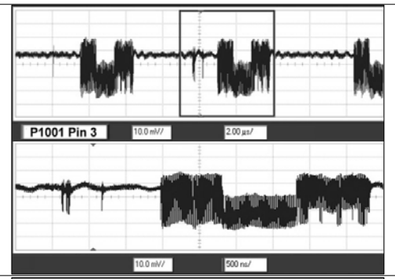


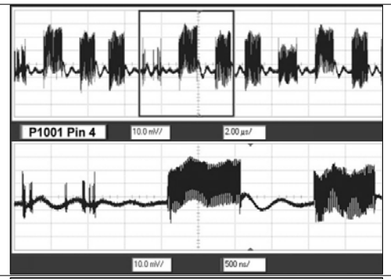
42LG70 P1000 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

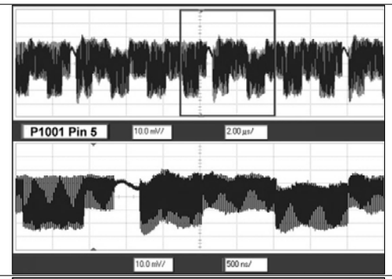
42LG70 LVDS P1001 WAVEFORMS

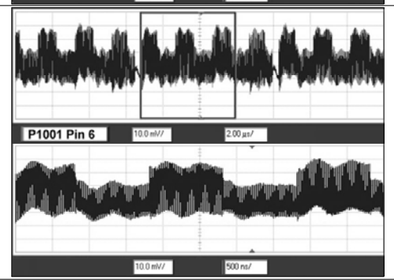


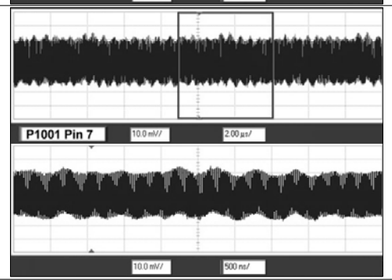


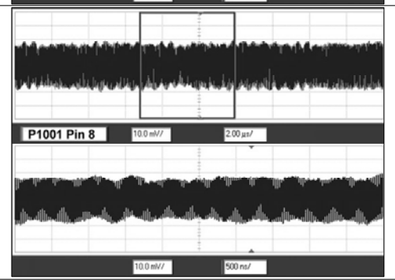


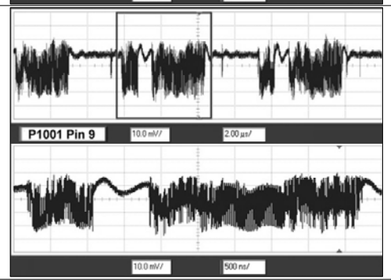


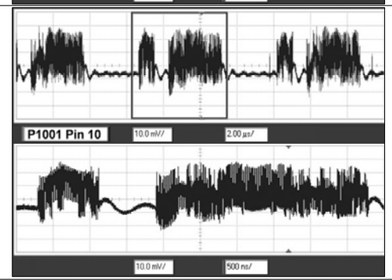


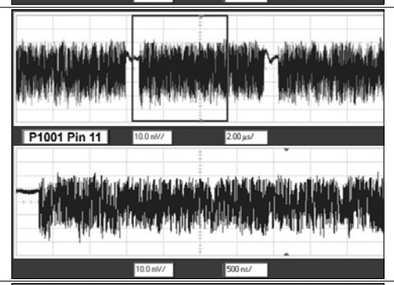


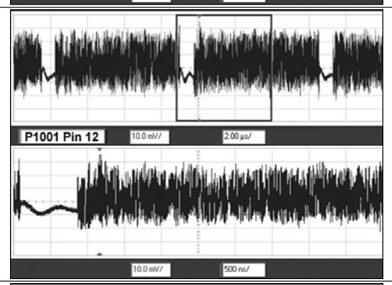


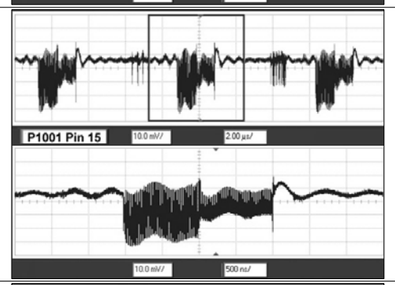


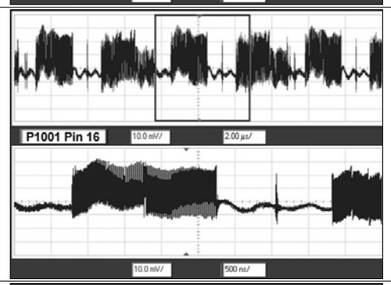


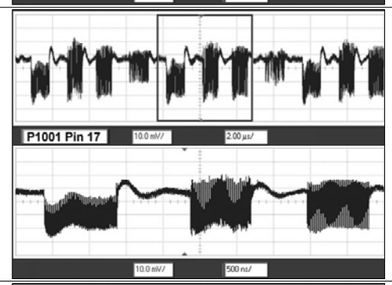


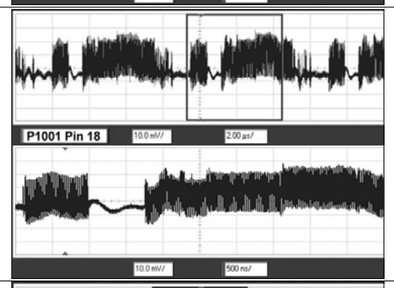


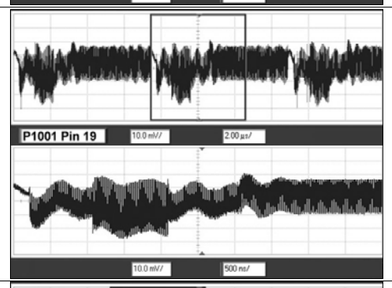


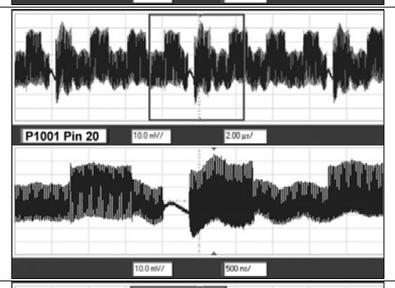


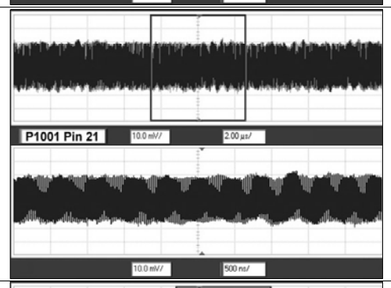


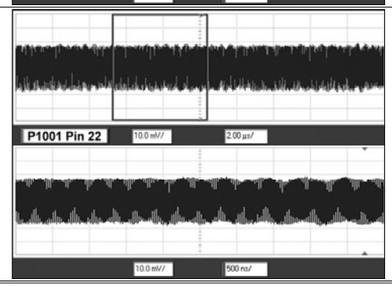


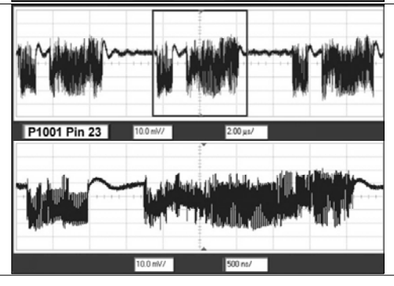


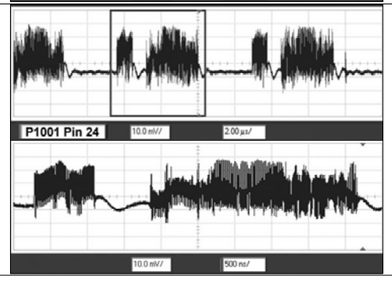


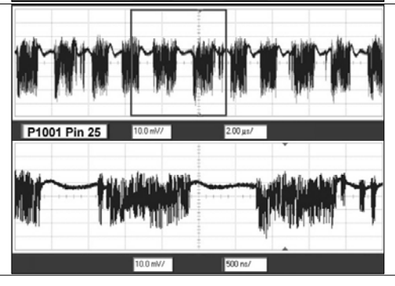


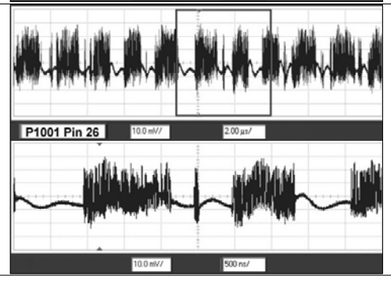












42LG70 P1001 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

47LH85 INTERCONNECT DIAGRAM

P201 "SMPS" to P601 "Main PWB"

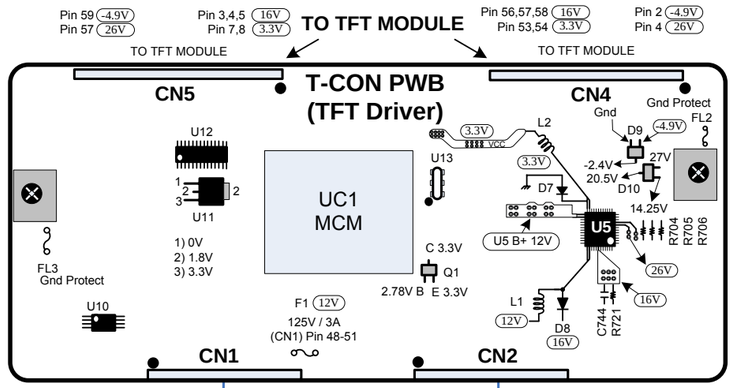
Pin	Label	STBY	Run	Diode Check
24	PDIM [2]	0V	2.43V	Open
23	nc	nc	nc	nc
22	Err Out	0V	0V	Open
21	A.DIM [1]	0V	1.66V	Open
20	INV.ON	0V	4.55V	2.25V
19	nc	nc	nc	nc
17,18	24V	0V	21.4V	0.81V
15,16	Gnd	Gnd	Gnd	Gnd
13,14	12V	0V	12.3V	1.2V
11,12	Gnd	Gnd	Gnd	Gnd
7,8,9,10	5.2V	5.14V	5.14V	2.85V
3,4,5,6	Gnd	Gnd	Gnd	Gnd
2	PWR-On	0V	4.95V	1.19V
1	nc	nc	nc	nc

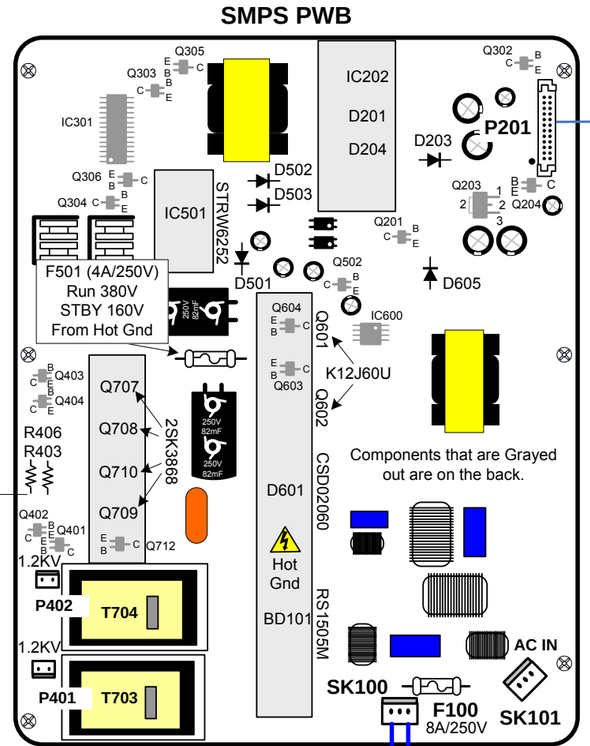
[1] ADIM Pin 21 Fixed and not used

[2] PDIM Pin 24 can vary according to type of signal being processed and the OSD Backlight setting. 0.6V 0% to 3.3V 100%. Output from the Mstar chip.

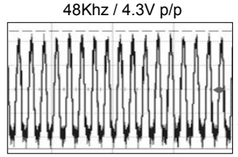
SMPS TEST 1: To Force Power Supply On. Disconnect P601 on Main PWB. Jump pin 7,8,9 or 10 (5V) to pin 2 using a 100Ω resistor. (Test Voltage Outputs 12V, and 24V).
Note:
Q709, Q710 center leg (Drain) will be approx. (0V)
Q707, Q708 center leg (Drain) will be (389V~390V)

SMPS TEST 2: Jump pin 2 to pin 20 (INV-ON). (Backlights and all voltages should turn on).
Note:
Q709, Q710 center leg (Drain) will be approx. (128V)
Q707, Q708 center leg (Drain) will be 387V~389V)





R406 / R403
Bottom leg
48Khz / 4.3V p/p



Q708~Q710
Toshiba
2SK3868

SET STAND-BY: Q707 and Q708 center leg (Drain) 170V. Q709 and Q710 center leg 0V.

SET IN RUN: Q709 and Q710 Center Leg runs at approximately 26V when the PDIM is low (0%) and between 86V to 136V when PDIM is high (100%). Varies with picture content.

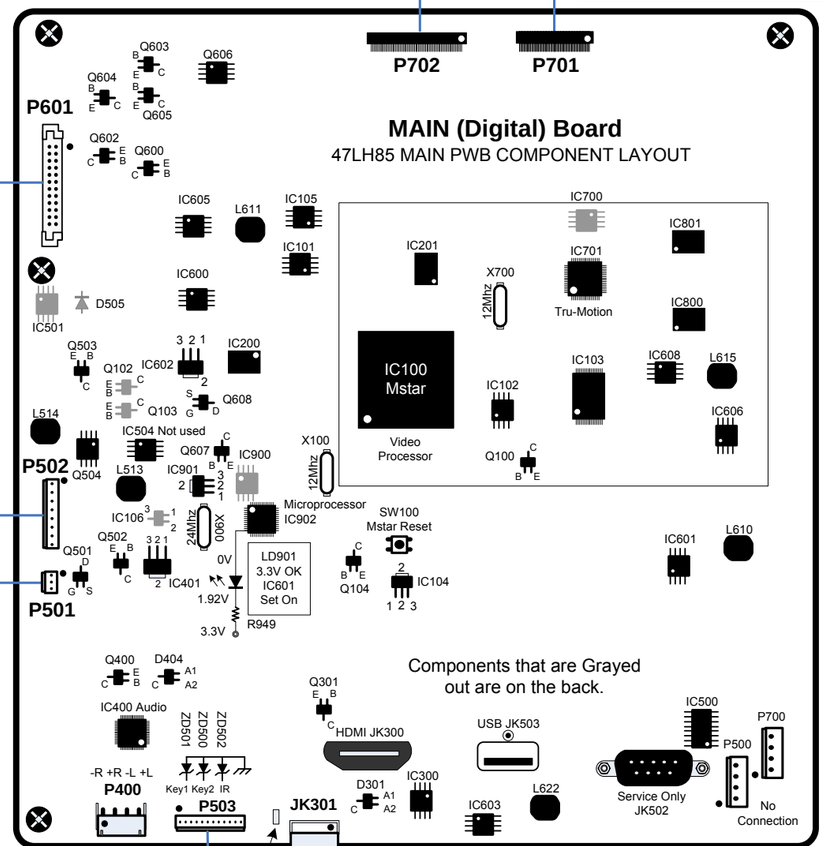
Q707 and Q708 Center Leg stays at 382V at 0% and 391V at 100% of PDIM.

P503 CONNECTOR "MAIN PWB" to P101 "Front IR / LED PWB

Pin	Label	STBY	Run	Diode Check
1	SCL	3.3V	3.3V	Open
2	SDA	3.3V	3.3V	1.67V
3	Gnd	Gnd	Gnd	Gnd
4	Key1	3.28V	3.28V	1.4V
5	Key2	3.28V	3.28V	1.1V
6	ST 5V	5.1V	5.1V	1.5V
7	Gnd	Gnd	Gnd	Gnd
8	Warm ST	Gnd	Gnd	Gnd
9	IR	4.9V	4.9V	Open
10	Gnd	Gnd	Gnd	Gnd
11	3.3V	0V	3.29V	0.76V
12	LED ON	0V	3.29V	Open

P600 "Main PWB" to P201 "SMPS" For Voltages, see the P201 Chart

Pin	Label	Diode Check
1	nc	nc
2	PWR-On	1.19V
3,4,5,6	Gnd	Gnd
7,8,9,10	5.2V	2.85V
11,12	Gnd	Gnd
13,14	12V	1.2V
15,16	Gnd	Gnd
17,18	24V	0.81V
19	nc	nc
20	INV.ON	2.25V
21	A.DIM [1]	Open
22	Err Out	Open
23	nc	nc
24	PDIM [2]	Open

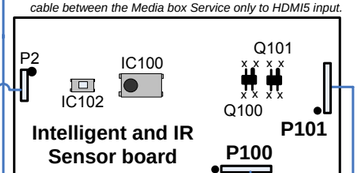


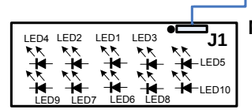
Wireless +5V (4.95V) Pins 1~4

Note: There are no Stand By voltages to the Transmitter.

Fan Power +5V (4.93V) Pin 1. Pin 3 Gnd.

Pin 2 Fan Error (Normal 0V)
If there is a Fan Error, TV won't communicate with Box. Wireless 5V and Fan 5V turns off
TV will still work if, you select HDMI5 and connect an HDMI cable between the Media box Service only to HDMI5 input.





HDMI Power VDD 5V Pin 18 ⟷ Propritary HDMI

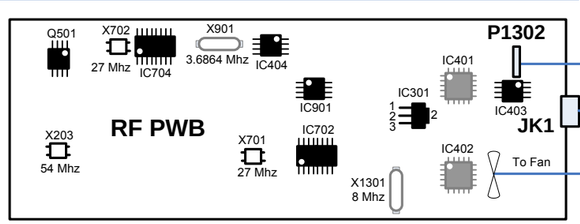
Main Power SW

P100

Side (Key) Controls

P2 "Front IR / LED PWB to P100 Keys

Pin	Label	STBY	Run	Diode Check
1	Key1	3.3V	3.3V	Open
2	Gnd	Gnd	Gnd	Gnd
3	Key2	3.3V	3.3V	Open
4	Gnd	Gnd	Gnd	Gnd



47LH85 MAIN (FRONT SIDE) ICs

IC101 EEPROM Mstar for Saturn IC100

Pin	
[1]	Gnd
[2]	Gnd
[3]	Gnd
[4]	Gnd
[5]	3.27V
[6]	3.27V
[7]	0V
[8]	3.27V

IC102 Flash Memory from Boot for Saturn IC100

Pin	
[1]	0.06V
[2]	2.95V
[3]	2.58V
[4]	Gnd
[5]	0V
[6]	0V
[7]	3.27V
[8]	3.27V

IC104 1.8V AMP Reg

Pin	
[1]	3.28V
[2]	0V
[3]	0V

IC105 HDCP EEPROM for Saturn IC100

Pin	
[1]	Gnd
[2]	Gnd
[3]	5V
[4]	Gnd
[5]	3.27V
[6]	3.27V
[7]	5V
[8]	5V

IC300 HDMI1 EDID

Pin	
[1]	Gnd
[2]	Gnd
[3]	Gnd
[4]	Gnd
[5]	4.72V
[6]	4.72V
[7]	4.72V
[8]	4.73V

IC401 1.8V AMP Reg

Pin	
[1]	Gnd
[2]	1.8V
[3]	3.27V

IC500 Receive/Transmit To Box

Pin	
[1]	3.31V
[2]	5.76V
[3]	0V
[4]	0V
[5]	(-5.64V)
[6]	(-5.64V)
[7]	n/c (5.76V)
[8]	n/c (0V)
[9]	n/c (3.29V)
[10]	n/c (0V)
[11]	0V
[12]	3.29V
[13]	0V
[14]	(-5.64V)
[15]	Gnd
[16]	3.29V

IC504 FAN 5V

Pin	
[1] through [8]	NOT USED

IC600 1.8V DDR Reg

Pin	
[1]	n/c (0V)
[2]	3.24V
[3]	3.24V
[4]	n/c (0V)
[5]	n/c (0V)
[6]	1.88V
[7]	0.8V
[8]	Gnd

IC601 3.3 MEMC Reg

Pin	
[1]	0.8V
[2]	Gnd
[3]	4.95V
[4]	n/c
[5]	4.9V
[6]	3.3V
[7]	3.3V
[8]	2.1V

IC602 3.3V-ST Reg

Pin	
[1]	Gnd
[2]	3.3V
[3]	5.1V

IC606 1.8V MEMC for URSA DDR Reg

Pin	
[1]	0.8V
[2]	Gnd
[3]	4.95V
[4]	n/c
[5]	4.9V
[6]	1.85V
[7]	1.85V
[8]	4.89V

IC603 5V EXT Reg

Pin	
[1]	0.8V
[2]	Gnd
[3]	12.1V
[4]	n/c (9.64V)
[5]	5V
[6]	4.96V
[7]	4.96V
[8]	2V

IC605 1.26 VDDC Reg for Core for Saturn

Pin	
[1]	0V
[2]	Gnd
[3]	5V
[4]	n/c (6V)
[5]	4.98V
[6]	1.3V
[7]	1.3V
[8]	3.23V

IC608 1.26 VDDC Reg for Core for URSA

Pin	
[1]	0V
[2]	Gnd
[3]	1.28V
[4]	1.28V
[5]	1.8V
[6]	5V
[7]	1.28V
[8]	5.04V

IC901 Reset Microprocessor IC902

Pin	
[1]	3.3V
[2]	Gnd
[3]	3.28V

47LH85 MAIN (FRONT SIDE) TRANSISTORS AND DIODES

Q100 WP Flash Memory for Boot IC102

Pin	
[B]	0V
[C]	2.59V
[E]	Gnd

Q104 Reset Switch S5 (Saturn) video processor

Pin	
[B]	0V
[C]	3.29V
[E]	0V

Q301 HDMI1 HP Det

Pin	
[B]	0.6V
[C]	0V
[E]	Gnd

Q400 Audio Mute to IC400 B from D404

Pin	
[B]	0.18V
[C]	3.28V
[E]	Gnd

Q501 Fan Driver FET (5V Ext Source)

Pin	
[G]	0.29V
[S]	4.95V
[D]	4.95V

Q502 Fan Enable turns on Q501

Pin	
[B]	0.64V
[C]	0V
[E]	Gnd

Q503 5V Wireless Switch Controls Q504

Pin	
[B]	0.62V
[C]	0V
[E]	Gnd

Q504 5V for Wireless Switch

Pin	
[1]	5V
[2]	1.21V
[3]	n/c
[4]	n/c
[5]	n/c
[6]	n/c
[7]	5V
[8]	5V

Q600 Relay On driver to P601 pin 2

Pin	
[B]	2.94V
[C]	4.95V
[E]	5V

Q602 INV On driver to P601 pin 20

Pin	
[B]	0.07V
[C]	4.6V
[E]	Gnd

Q603 5V General Sw Ctl. Turns on Q606

Pin	
[B]	0.64V
[C]	0V
[E]	Gnd

Q604 12V T-CON Sw Ctl. Turns on Q605

Pin	
[B]	0.6V
[C]	0V
[E]	Gnd

Q605 12V T-CON Sw Ctl. Turns on Q606

Pin	
[B]	0.67V
[C]	0V
[E]	Gnd

Q606 5V General Switch 12V LVDS Switch

Pin	
[1]	5V
[2]	0.3V
[3]	12V
[4]	6.1V
[5]	12V
[6]	12V
[7]	5.06V
[8]	5.06V

Q607 Turns on Q608 3.3V AVDD MPLL SW

Pin	
[B]	0.6V
[C]	0V
[E]	Gnd

Q608 3.3V AVDD MPLL SW

Pin	
[G]	0.2V
[S]	3.29V
[D]	3.29V

D301 HDMI1 5V power to IC300 EEPROM

Pin	
[A1]	0V
[A2]	5V
[C]	4.73V

D404 Audio Mute routing IC400 pic 25

0V	
0V	
0.19V	

47LH85 MAIN (BACK SIDE) SIMICONDUCTORS

IC106 Power Det +12V Reset

Pin	
[1]	Gnd
[2]	3.3V
[3]	3.49V

IC501 5V Reg for Wireless

Pin	
[1]	12.1V
[2]	0V
[3]	6.6V
[4]	4.35V
[5]	5.23V
[6]	1.21V
[7]	0.8V
[8]	Gnd

IC700 SPI Flash Memory for IC701

Pin	
[1]	0.1V
[2]	0.1V
[3]	3.3V
[4]	Gnd
[5]	0.1V
[6]	0.1V
[7]	3.3V
[8]	3.3V

IC900 EEPROM for Microprocessor IC902

Pin	
[1]	0V
[2]	0V
[3]	3.29V
[4]	Gnd
[5]	3.3V
[6]	3.3V
[7]	0V
[8]	3.3V

Q102 Power Det +12V (for Q103)

Pin	
[B]	0.64V
[C]	0V
[E]	0V

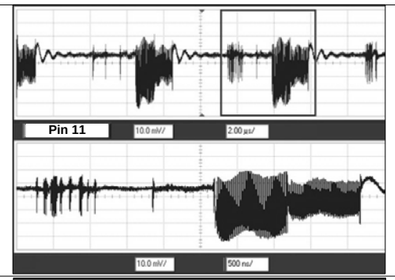
Q103 Power Det

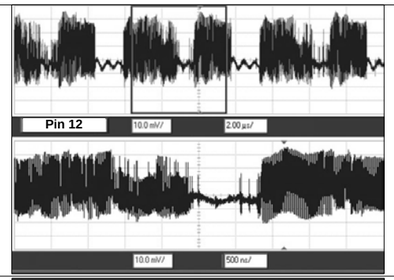
Pin	
[B]	0V
[C]	0.4V
[E]	0V

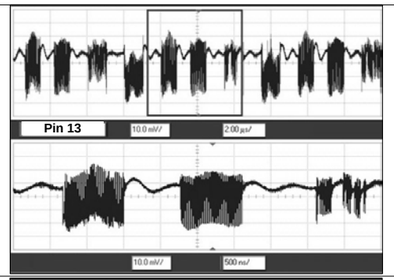
D505 5V Wireless Rectifier

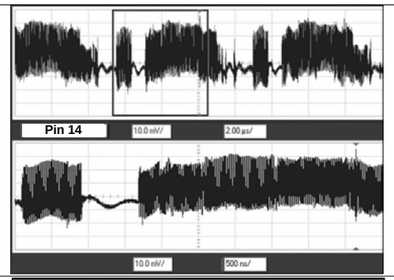
Pin	
[C]	5.23V
[A]	0V

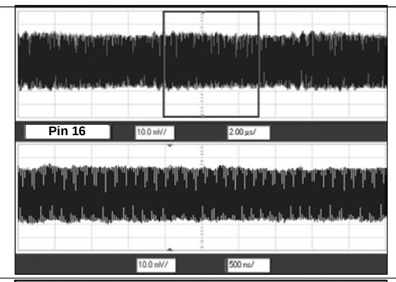
47LH85 LVDS P702 WAVEFORMS

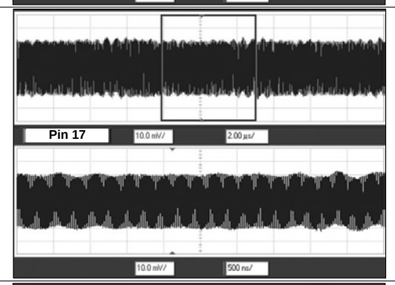


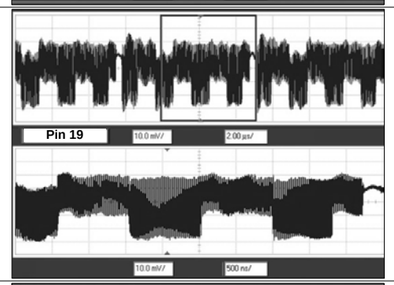


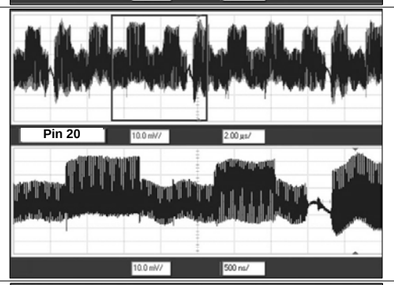


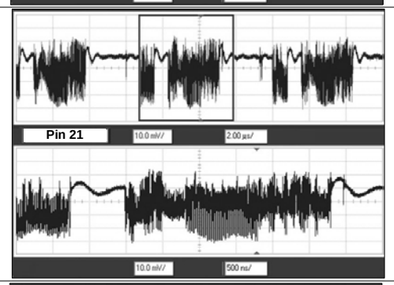


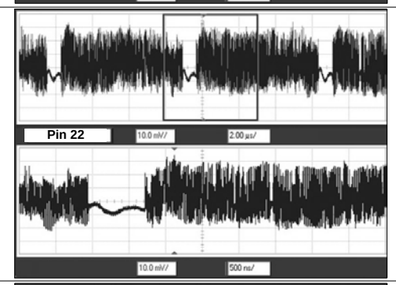


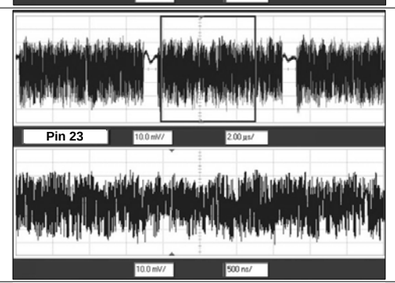


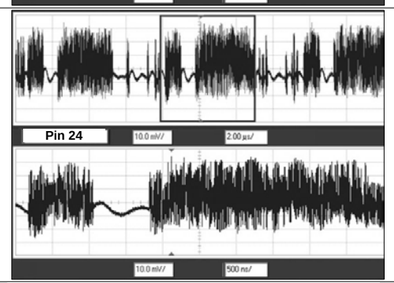


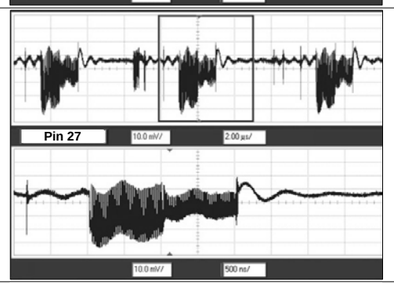


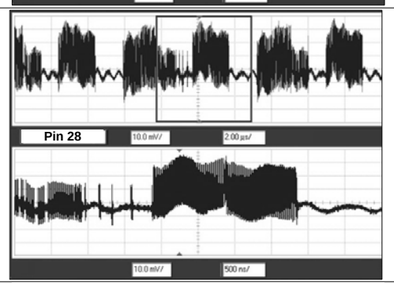


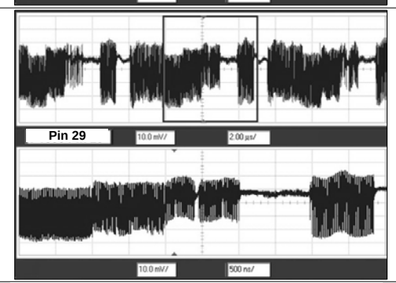


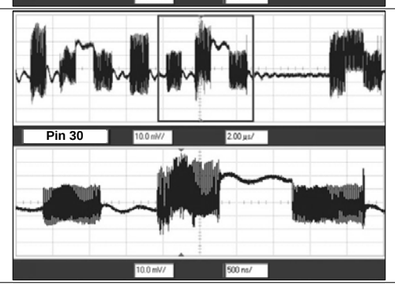


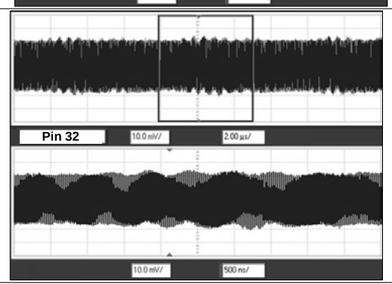


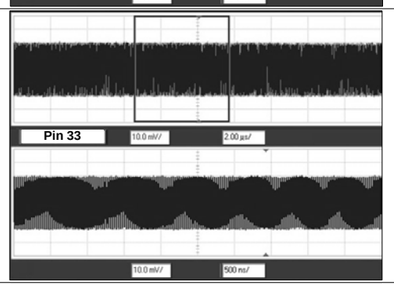


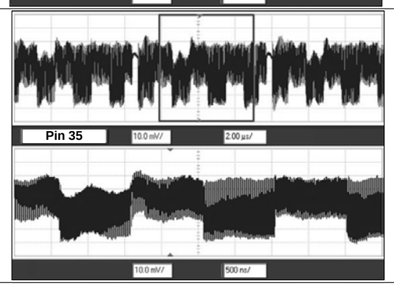


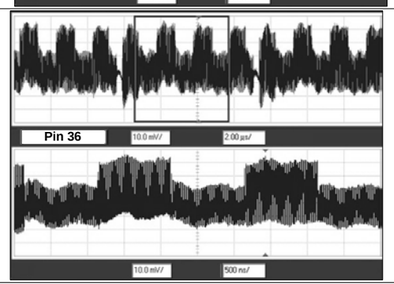


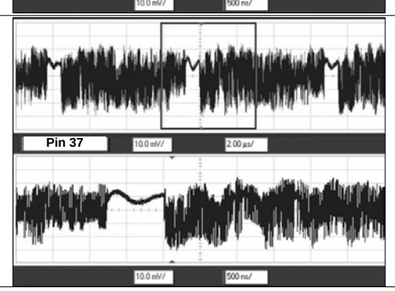


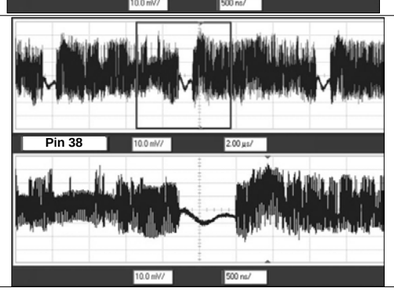


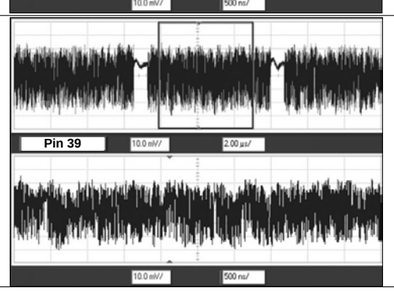


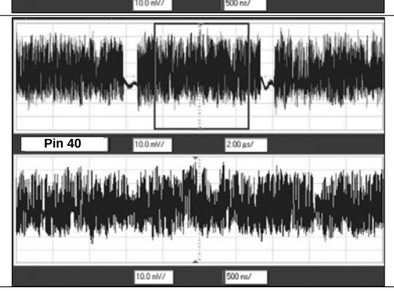






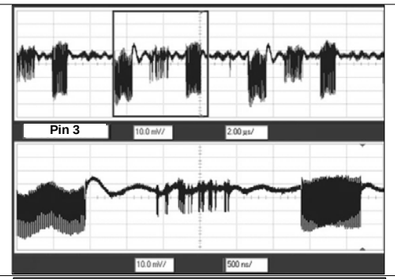


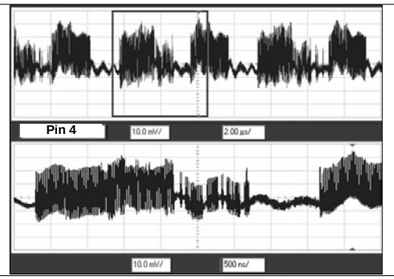


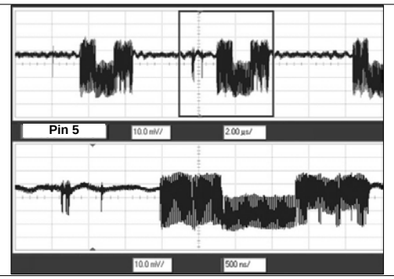


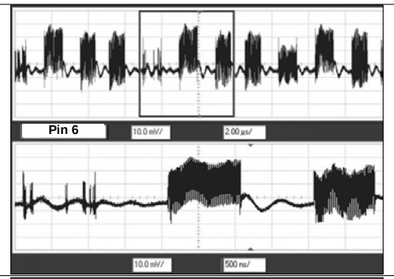
47LH85 P702 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

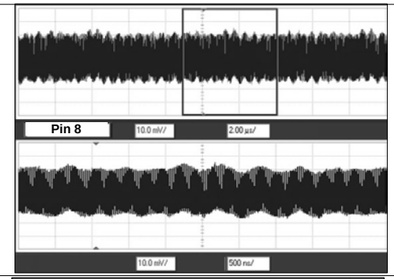
47LH85 LVDS P701 WAVEFORMS

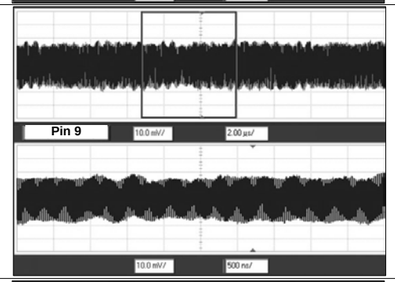


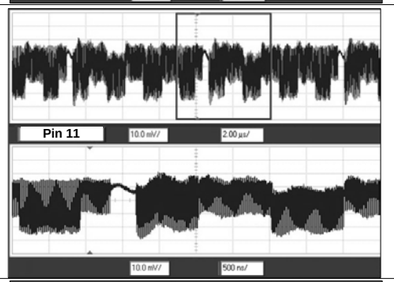


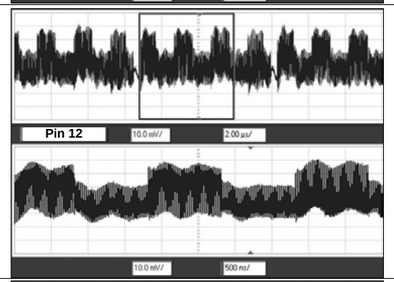


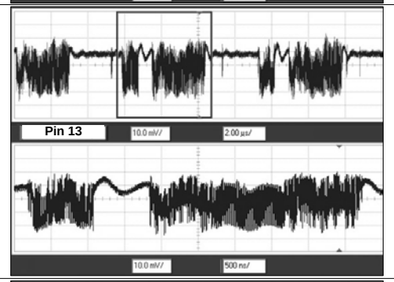


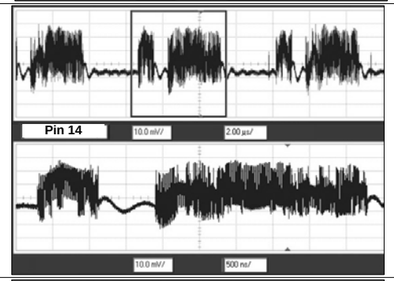


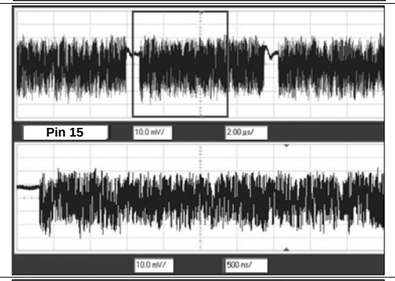


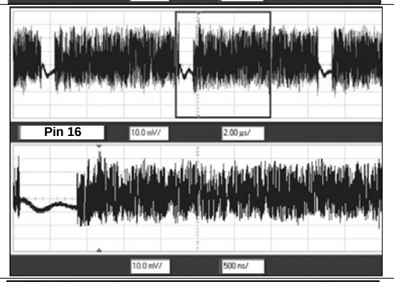


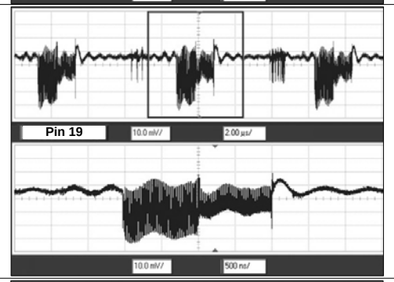


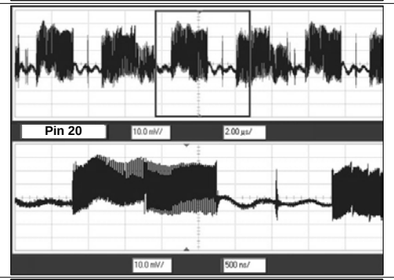


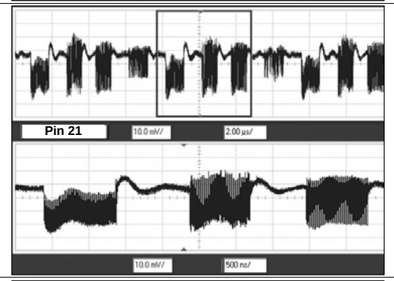


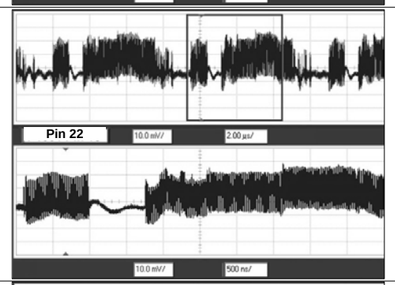


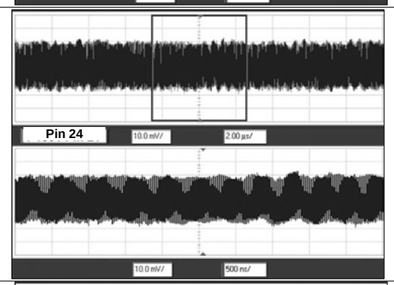


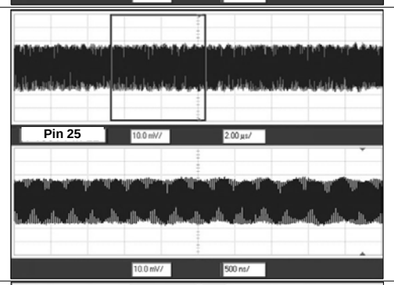


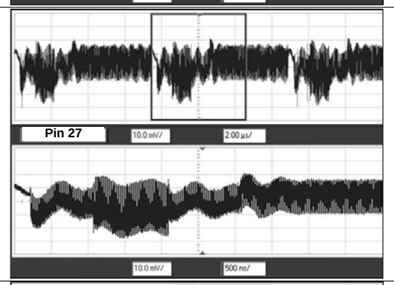


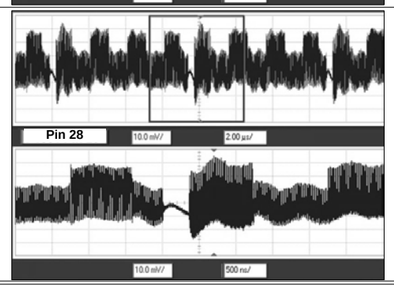


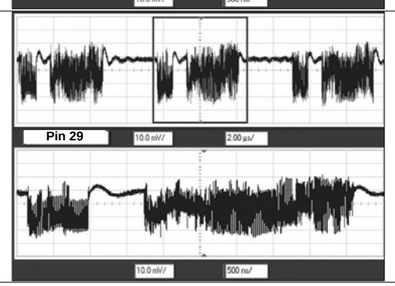


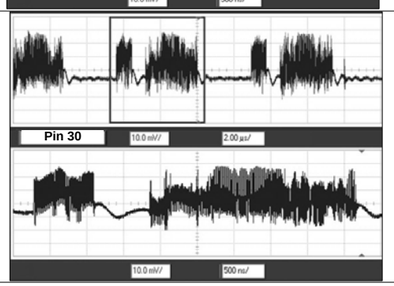


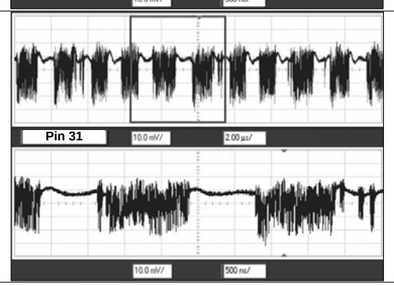


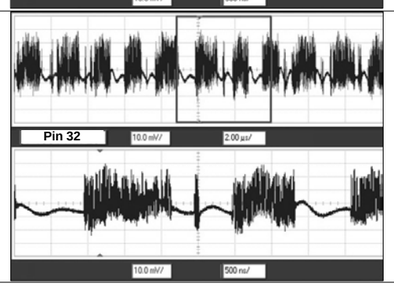












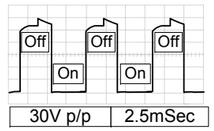
47LH85 P701 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

55GA6400 INTERCONNECT DIAGRAM

PANEL p/n: EAJ62271001

Note: If a particular area is exhibiting a dimmer backlight level than other areas or the overall brightness seems dim, be sure to first check the customer's Menu setting for Backlights. Raise the percentage and see if the overall brightness returns to normal. If not,
1st: Check the P-DIM level, it should rise with the percentage shown on screen.
100% = 3.25V. Follow the P-DIM signal from the Main to the T-CON, then to the Inverter board.
With power off, unplug CN2 on the Inverter, turn power on and check backlights. If OK, investigate P_DIM.

DIM OR DARK PICTURE AREA (LED SINGLE BLOCK TEST):
Turn the Brightness, Contrast and Backlights all the way up. Confirm 87V CN3 pin 1.
Confirm P-DIM is approx. 3V. Using a 220Ω resistor, jump any of the blocks grounding pin on LED 1~6 or CN3 (3~8) while observing the picture and each block should turn on maximum.



30V p/p	2.5mSec

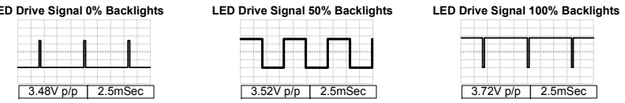
LED Drive Signal
50% Backlights
LED1 ~ LED6

Note: Backlight power is 24.59V with PWR_ON arrives, (no backlights) it goes to 87V when DRV_ON arrives, Backlights On).

P201 "SMPS Board" to P2400 "MAIN Board"

PIN	LABEL	STBY	RUN	Diode Check
17-18	Gnd	Gnd	Gnd	Gnd
16	N/C	n/c	n/c	n/c
13-15	12V	0V	12.08V	1.44V
11-12	Gnd	Gnd	Gnd	Gnd
9-10	24V	0V	24.96V	1.07V
7-8	Gnd	Gnd	Gnd	Gnd
6	*A-DIM	0V	1.12V	OL
5	3.5V_ST	3.56V	3.53V	OL
4	*P-DIM	0V	0.15V~3.25V	OL
3	3.5V_ST	3.56V	3.53V	OL
2	DRV_ON	0V	*3.50V	OL
1	PWR_ON	*0V or 3.4V	3.40V	1.21V

Scan 1-3 From the T-CON to the Inverter board (120Hz) For Dimming.



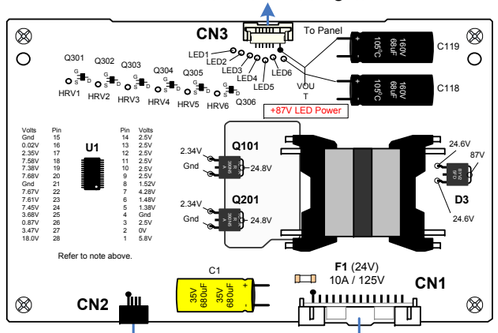
For Main Board DC voltages for Main board components, see Page 2, 3 and 4 of the Interconnect diagram.

For Main Board Back Side Components, see Page 5 of the Interconnect diagram.

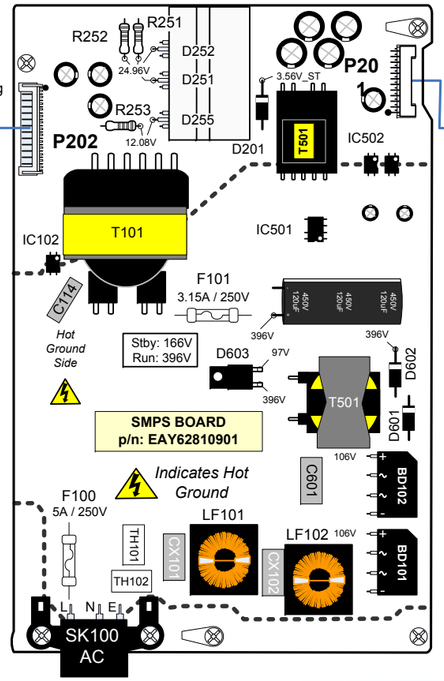
Comes on the Panel

Inverter Board

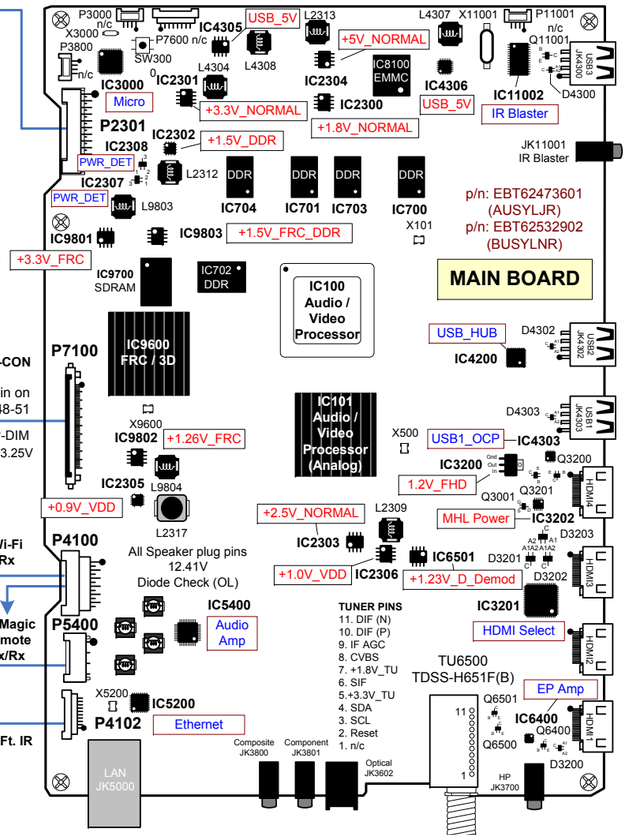
To the Panel Backlights



No Local Dimming In the Model.



Note: Pin 1 (RL_ON): Normally off in STBY, however, if "Quick Start" is turned on in the "Option" menu, it will be 3.4V for 2 hours, keeping all voltages to the Main alive. 24V to the Inverter is also available, but the backlights are not on.
Starts 12V, 24V
and 24.59V LED Power.
No Backlights.
Note: Pin 2 (DRV_ON): is INV_ON from Main.
Starts the Backlights. Baclight Power 87V.
Note: Pin 4 (PWM_DIM): Not Used.
Note: Pin 6 (A_DIM): Not Used.



P2300 "MAIN Board" To P201 "SMPS Board"

Pin	Diode Check
17-18	Gnd
16	n/c
13-15	OL
11-12	Gnd
9-10	OL
7-8	Gnd
6	0.78V
5	OL
4	0.78V
3	OL
2	1.63V
1	OL

For DC voltages See P201 Chart

To CN2 on T-CON

CN2 "INV Board" to "T-CON" CN2

PIN	LABEL	RUN	Diode Check
1	Gnd	Gnd	Gnd
2	Scan 3	0.14V~3.23V	OL
3	Scan 2	0.14V~3.23V	OL
4	Scan 1	0.14V~3.23V	OL

Note: Used for Dimming, See P-DIM. Pins are inverted on T-CON

P202 "SMPS Board" to "Backlight Driver"

PIN	LABEL	RUN	Diode Check
1-5	24V	24.7V	1.07V
6-10	Gnd	Gnd	Gnd
11	n/c	n/c	n/c
12	DRV_ON	3.5V	OL
13	A-DIM	1.13V	OL
14	P-DIM	0.15V~3.25V	OL

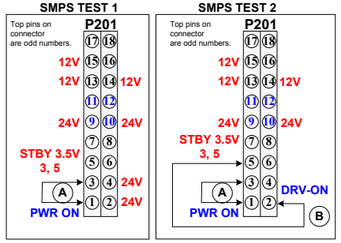
Note: A-DIM, (Fixed Voltage).

For LVDS Waveforms see Page 4 of the Interconnect diagram.

To T-CON
12V in on Pins 48-51
Pin 8 P-DIM 0.15V~3.25V

SMPS TEST 1: To Force Power Supply On without the Main Board.
Disconnect the P2300 on the Main board.
(A) Jump pin 3 (3.5V) to pin 1. Test Voltage Outputs 12V, 24V to Main and 24V to the Inverter. Remove AC power. Leave the jumper in place. No Backlights at this time. Backlight B+ will be 24.59V at this time.
Test 1 LED Ground Return Line (0.98V). (No Backlights).

SMPS TEST 2: (Turning on the Backlights) Leave Test 1 jumper in place. Disconnect CN2 on the Inverter Board. (If CN2 is not removed, no backlights).
(B) Jump pin 5 (3.5V) to pin 2 (DRV-ON). Apply AC power, the Backlights should turn on. Note, the LED B+ will now jump to 87.5V. During Test 2, the Test 2 LED Ground Return Line is (0.53V).



66 Total LEDs
1 Board (Strips)

6 Total Blocks
10 LEDs per/block

Key Board

To Main P4102

p/n: EBR76384104 or
p/n: EBR77104601

p/n: EBR76405702

To Logo

J3 J1

Front IR

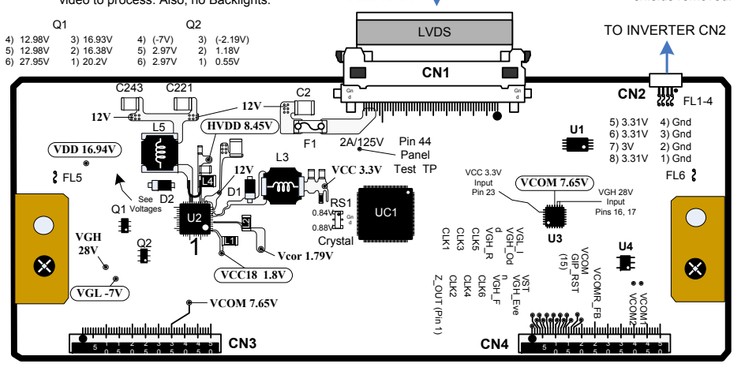
Note: Concerning Quick Start
If Quick Start is turned on in the Options Menu, T-CON 12V will be available during STBY, but there will be no video to process. Also, no Backlights.

12V in on Pins 48-51

Pin 8 P-DIM

Warning: Return the screws When servicing the T-CON with shields removed.

TO INVERTER CN2



CN2 Global Dimming

Pin	Label
1)	Scan1
2)	Scan2
3)	Scan3
4)	Gnd

Note: pins are inverted on Inverter

VDD 16.94V	Pin 31, 32	VCC18 1.8V	Pin 17
VGL -7V	Pin 38	VCOM 7.65V	Pin 35
HVDD 8.45V	Pin 30		

TO TFT MODULE (KEY VOLTAGES)

VDD 16.94V	Pin 19, 20	VCC18 1.8V	Pin 34
VGL -7V	Pin 13	VCOM 7.65V	Pin 11
HVDD 8.45V	Pin 21		

Additional Voltages from U3 to the Panel with no silk screen labels:

U10 pin 1 (7.76V) CN4 pin 48 CN5 pin 3
U10 pin 2 (7.74V) CN4 pin 47 CN5 pin 4
U10 pin 3 (7.75V) CN4 pin 46 CN5 pin 5
U10 pin 4 (7.74V) CN4 pin 45 CN5 pin 6
U10 pin 5 (7.76V) CN4 pin 44 CN5 pin 7
U10 pin 6 (7.74V) CN4 pin 43 CN5 pin 8
U10 pin 8 (27.9V) CN4 pin 42 CN5 pin 9
U10 pin 9 (-6.97V) CN4 pin 41 CN5 pin 10
U10 pin 10 (-6.95V to 27.9V) CN4 pin 40 CN5 pin 11
U10 pin 11 (-6.95V to 27.9V) CN4 pin 39 CN5 pin 12

T-CON BOARD
Comes the Panel

PANEL TEST
To run the T-CON "Panel Test", remove the LVDS cable CN1. Jump 12V to the 12V fuse. Jump VCC 3.3V to pin 44 on CN1. White, Red, Blue, Green and Black patterns show on screen.

Magic Remote Tx/Rx

J1

To Main P4100

p/n: EBR76363001

To Wi-Fi Tx/Rx

To Magic Remote Tx/Rx

To Spk
12.41V
Each Pin
SPK p/n: EAB62849101

All Speaker plug pins 12.41V
Diode Check (OL)

To Ft. IR

P4102 "MAIN" to "Front IR Board" J1

PIN	LABEL	STBY	RUN	Diode Check
8	Gnd	Gnd	Gnd	Gnd
7	IR	3.52V	3.47V	OL
6	Logo_Light	1.37V	1.32V	OL
5	Gnd	Gnd	Gnd	Gnd
4	3.5V_ST	3.56V	3.50V	OL
3	Key2	3.56V	3.50V	OL
2	Key1	3.56V	3.50V	OL
1	Gnd	Gnd	Gnd	Gnd

To Ft IR J3

Glued to Ft Frame

LOGO Board

p/n: EBR76382002

P4100 "MAIN Board" To "Wi-Fi and Motion Board"

PIN	LABEL	STBY	RUN	Diode Check
1	+3.5V_ST_Wake	0V	3.47V	1.97V
2	+3.5V_Normal	0V	3.34V	0.52V
3	WiFi_DM	0V	0.04V	1.36V
4	RTS	0V	3.37V	OL
5	WiFi_DP	0V	24.96V	1.35V
6	M_Remote_Rx	0V	3.34V	1.06V
7	Gnd	Gnd	Gnd	Gnd
8	M_Remote_Tx	0V	3.32V	0.78V
9	WiFi_PWR_On	0V	0.02V	2.08V
10	RF_Reset	0V	3.32V	0.78V
11	Gnd	Gnd	Gnd	Gnd
12	CTS	0V	3.40V	OL

Wi-Fi Tx/Rx

To Main P4100

p/n: EAT61813801

55GA6400 DC Voltages Main Board (Small ICs)

IC2300

Pin	+1.8V_NORMAL Regulator
[1]	0.3V n/c
[2]	0.3V n/c
[3]	0.3V n/c
[4]	0.3V n/c
[5]	3.33V
[6]	3.33V
[7]	0.8V
[8]	3.33V (Vcc In)

IC2301

Pin	+3.3V_NORMAL Regulator
[1]	Gnd
[2]	12V (Vcc In)
[3]	Gnd
[4]	0.8V
[5]	1.3V
[6]	3.5V On/Off
[7]	3.3V (Out)
[8]	3.3V (Out)

IC2302

Pin	+1.5V_DDR Regulator
[1]	3.5V_ST in
[2]	3.5V_ST in
[3]	Gnd
[4]	Gnd
[5]	Gnd
[6]	0.83V
[7]	0.68V
[8]	0.51V
[9]	1.85V
[10]	1.53V (Out)
[11]	1.53V (Out)
[12]	1.53V (Out)
[13]	5.06V
[14]	n/c
[15]	3.5V
[16]	3.5V_ST in

IC2303

Pin	+2.5V_NORMAL Regulator
[1]	3.3V_Normal in
[2]	n/c
[3]	5V_Normal in
[4]	3.5V On/Off
[5]	Gnd
[6]	4.7V
[7]	0.8V
[8]	2.5V (Out)

IC2304

Pin	+5V_NORMAL Regulator
[1]	3.4V On/Off
[2]	0.8V
[3]	3.4V
[4]	5.4V
[5]	Gnd
[6]	5V (Out)
[7]	10V
[8]	12V (Vcc In)

IC2305

Pin	+0.9V_VDD Regulator
[1]	0.5V
[2]	Gnd
[3]	Gnd
[4]	12V (Vcc In)
[5]	12V (Vcc In)
[6]	12V (Vcc In)
[7]	0.6V
[8]	0.4V
[9]	1.8V
[10]	3.5V (En)
[11]	0.95V (Out)
[12]	0.95V (Out)
[13]	7.76V
[14]	0.4V (n/c)

IC2306

Pin	+1.0V_VDD Regulator
[1]	Gnd
[2]	12V (Vcc In)
[3]	Gnd
[4]	0.8V
[5]	1.3V
[6]	3.5V On/Off
[7]	1.1V (Out)
[8]	1.1V (Out)

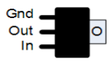
IC2307

Pin	Power_Det 12V side
[1]	Gnd
[2]	3.8V (Out)
[3]	3.7V (12V Sense)

IC2308

Pin	Power_Det 24V side
[1]	Gnd
[2]	3.7V (Out)
[3]	3.8V (24V Sense)

IC3200



Pin	1.2V_FHD Regulator
[Gnd]	Gnd
[Out]	1.2V
[In]	3.3V

IC3202

Pin	5V_HDMI_4 MHL Regulator
[1]	Gnd
[2]	5V (5V_Normal In)
[3]	5V (5V_Normal In)
[4]	Gnd
[5]	0V On/Off
[6]	0.25V
[7]	0V
[8]	0V (5V_HDMI4 Out)
[9]	0V (5V_HDMI4 Out)
[10]	0V On/Off

IC4303

Pin	+5V_USB1 OCP
[1]	Gnd
[2]	5.0V (Vcc In)
[3]	5.0V (Vcc In)
[4]	Gnd
[5]	3.3V On/Off
[6]	0.4V
[7]	0.4V
[8]	5.0V (Out USB1)
[9]	5.0V (Out USB1)
[10]	0V (OCP)

IC4305

Pin	+5V_USB1 Power
[1]	11V
[2]	24.7V In
[3]	3.5V On/Off
[4]	1.8V
[5]	0.8V
[6]	0.5V
[7]	Gnd
[8]	5.10V (Out USB1)

IC6400

Pin	Headphone Amp
[1]	0V (L HP In)
[2]	Gnd
[3]	Gnd
[4]	0V (R HP In)
[5]	0V (R HP Out)
[6]	3.3V
[7]	3.3V
[8]	0V
[9]	0V
[10]	Gnd
[11]	0V
[12]	0V
[13]	0V (HP Mute)
[14]	3.3V_Normal In
[15]	Gnd
[16]	0V (L HP Out)

IC6501

Pin	+1.23V_D_Demod Regulator
[1]	0.2 n/c
[2]	1.9V
[3]	3.0V (TU In)
[4]	5V (5V_Normal In)
[5]	0.2 n/c
[6]	1.2V (Out)
[7]	0.6V
[8]	Gnd

IC9801

Pin	+3.3V_FRC Regulator
[1]	3.4V (On/Off)
[2]	0.7V
[3]	5.5V
[4]	5.5V
[5]	Gnd
[6]	3.3V Out
[7]	8.7V
[8]	12V (Vcc In)

IC9802

Pin	+1.26V_FRC Regulator
[1]	3.2V (On/Off)
[2]	0.8V
[3]	5.5V
[4]	5.5V
[5]	Gnd
[6]	1.2V Out
[7]	6.8V
[8]	12V (Vcc In)

IC9803

Pin	+1.5V_FRC_DDR Regulator
[1]	3.3V_FRC In
[2]	0.5V n/c
[3]	3.3V_FRC In
[4]	3.3V On/Off
[5]	Gnd
[6]	3.2V
[7]	0.8V
[8]	1.5V Out

55GA6400 DC Voltages Main Board (Large ICs & Transistors)

Q11001 IR Blaster Data Buffer

Pin	
B	0V
C	0V
E	Gnd

Q3001 CEC (Consummer Electronic Control)

Pin	
[G]	3.5V
[S]	3.4V
[D]	3.4V

Q3200 MHL Detection Switch Ctl

Pin	
[B]	0V
[C]	3.5V
[E]	Gnd

Q3201 MHL Detection Switch

Pin	
[B]	3.5V
[C]	0V
[E]	3.5V

Q6400 HP Amp Mute

Pin	
[B]	0.7V
[C]	0V
[E]	Gnd

Q6500 TUNER_SIF Buffer

Pin	
[B]	0.1V
[C]	Gnd
[E]	0.8V

Q6501 Tuner (Analog) Video Buffer

Pin	
[B]	1.5V
[C]	Gnd
[E]	2.2V

D3200 DDC_SCL_1 Pull_Up

Pin	
[A1]	5V
[A2]	0V
[C]	5V

D3201
D3202
D3203 DDC_SCL_2, 3, 4 Pull_Up

Pin	
[A1]	5V
[A2]	0V
[C]	4.9V

D4300
D4301
D4302 USB1, 2, 3 5V Clamp

Pin	
[A1]	0V
[A2]	0V
[C]	Gnd

IC4306 USB Power USB 2 and 3

Pin	
[1]	3.5V On/Off
[2]	0.6V
[3]	2.2V n/c
[4]	6.2V n/c
[5]	3.3V
[6]	3.3V
[7]	3.3V
[8]	3.3V
[9]	5.0V (Out USB3)
[10]	Gnd
[11]	Gnd
[12]	5.0V (Out USB2)
[13]	5.0V (5V USB In)
[14]	5.0V (5V USB In)
[15]	5.0V (5V USB In)
[16]	5.0V (5V USB In)
[17]	5.0V (5V USB In)
[18]	11V
[19]	Gnd
[20]	Gnd
[21]	12V (Vcc In)
[22]	12V (Vcc In)
[23]	Gnd
[24]	6.2V (On/Off)

IC3000 Micro Processor

Pin		Pin	
[1]	3.3V	[25]	0V
[2]	3.3V	[26]	0V
[3]	0.3V	[27]	2.5V
[4]	1.9V	[28]	0V
[5]	0V	[29]	0V
[6]	3.5V	[30]	0V
[7]	3.5V	[31]	3.5V
[8]	3.5V	[32]	3.5V
[9]	3.5V	[33]	3.5V
[10]	3.5V	[34]	3.5V
[11]	3.5V	[35]	0V
[12]	3.5V	[36]	0V
[13]	0V	[37]	0.3V n/c
[14]	3.8V	[38]	0V
[15]	3.5V	[39]	3.5V
[16]	0V	[40]	3.5V
[17]	3.5V	[41]	0.7V
[18]	3.5V	[42]	0.2V
[19]	3.5V	[43]	0V n/c
[20]	3.3V	[44]	0.3V n/c
[21]	3.3V	[45]	0.3V n/c
[22]	0V	[46]	2.1V
[23]	0.16V n/c	[47]	Gnd
[24]	0.16V n/c	[48]	3.5V

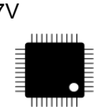
IC4200 USB HUB

Pin		Pin	
[1]	0V	[19]	0V n/c
[2]	0V	[20]	0V n/c
[3]	0V	[21]	0V n/c
[4]	0V	[22]	0V
[5]	3.3V_Normal	[23]	3.3V_Normal
[6]	0V n/c	[24]	0V
[7]	0V n/c	[25]	3.3V
[8]	0V n/c	[26]	3.3V
[9]	0V n/c	[27]	3.3V
[10]	3.3V_Normal	[28]	3.3V
[11]	Gnd	[29]	3.3V_Normal
[12]	3.3V	[30]	0V
[13]	3.3V	[31]	0V
[14]	1.3V	[32]	0.3V
[15]	3.3V	[33]	0.64V
[16]	3.3V	[34]	1.2V
[17]	2.4V	[35]	1.2V
[18]	0V n/c	[36]	3.3V_Normal

IC5200 Ethernet Realtek

Pin		Pin	
[1]	0.64V	[17]	0V
[2]	1.1V	[18]	0V n/c
[3]	1.1V	[19]	0V n/c
[4]	1.1V	[20]	0V
[5]	1.1V	[21]	3.3V
[6]	1.1V	[22]	1.7V
[7]	3.5V_WOL	[23]	3.5V
[8]	0V	[24]	0V
[9]	0V	[25]	3.4V
[10]	0V	[26]	0V
[11]	0V	[27]	0V
[12]	0V	[28]	0V
[13]	0V n/c	[29]	1.0V
[14]	3.5V_WOL	[30]	3.5V_WOL
[15]	1.2V	[31]	0.7V
[16]	0V	[32]	0.7V

IC5400 Audio Amp

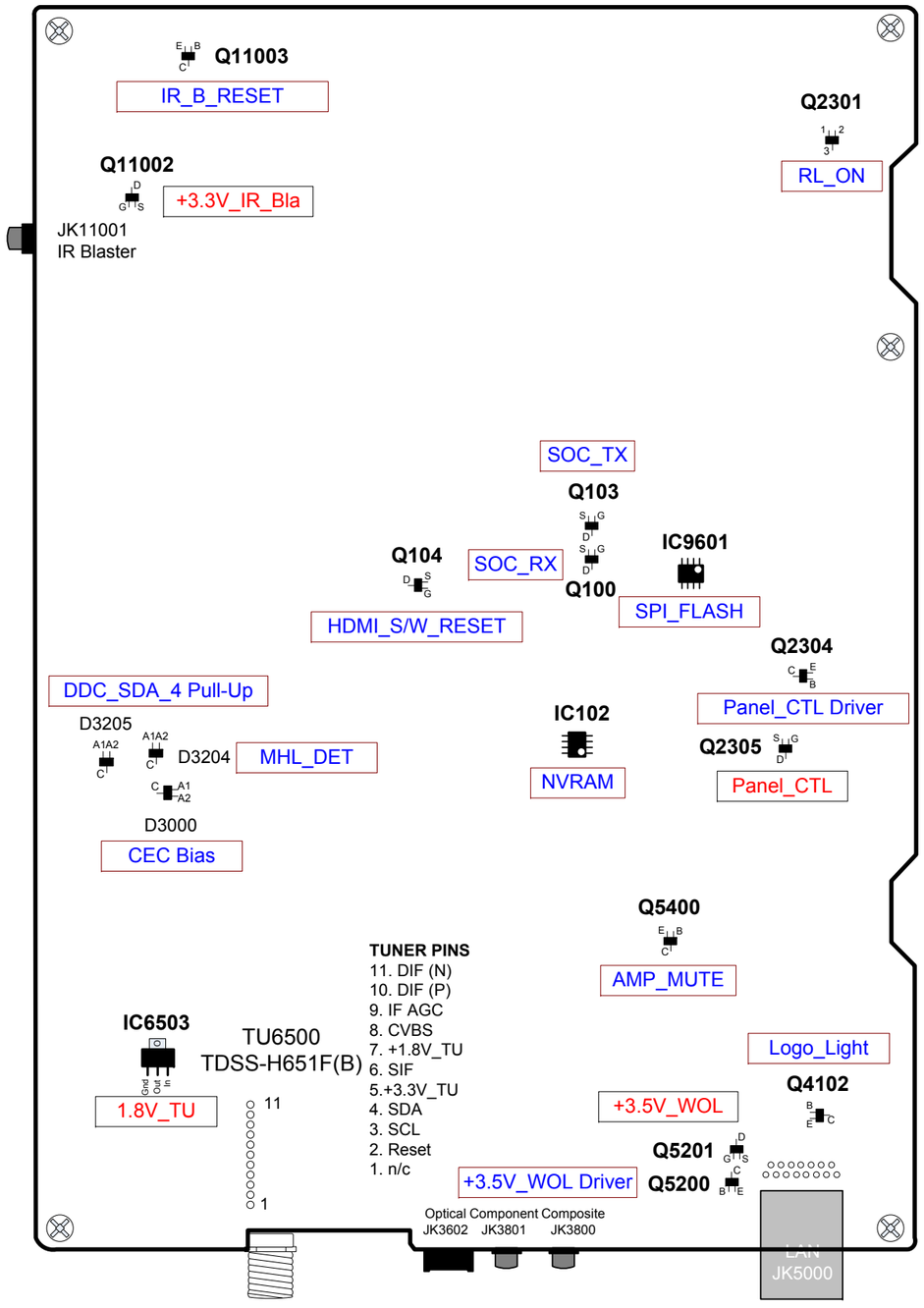


Pin		Pin	
[1]	Gnd	[25]	12.4V
[2]	1.2V	[26]	12.4V
[3]	1.2V	[27]	Gnd
[4]	0.8V	[28]	17.8V
[5]	Gnd	[29]	6.2V
[6]	Gnd	[30]	Gnd
[7]	Gnd	[31]	5.4V
[8]	1.3V	[32]	6.2V
[9]	1.2V	[33]	17.8V
[10]	1.66V	[34]	Gnd
[11]	1.66V	[35]	0V
[12]	3.3V	[36]	12.4V
[13]	3.3V	[37]	12.4V
[14]	3.3V	[38]	24.7V
[15]	3.3V n/c	[39]	24.7V
[16]	3.3V n/c	[40]	24.7V
[17]	3.3V n/c	[41]	12.4V
[18]	18V	[42]	12.4V
[19]	Gnd	[43]	17.8V
[20]	12.4V	[44]	3.3V
[21]	12.4V	[45]	Gnd
[22]	24.7V	[46]	Gnd
[23]	24.7V	[47]	1.7V
[24]	24.7V	[48]	3.3V

IC11002 USB HUB

Pin		Pin	
[1]	Gnd	[15]	3.3V n/c
[2]	1.5V	[16]	3.3V n/c
[3]	1.6V	[17]	3.3V n/c
[4]	3.3V	[18]	3.3V n/c
[5]	3.3V	[19]	3.3V n/c
[6]	3.3V	[20]	3.3V n/c
[7]	3.3V n/c	[21]	3.3V n/c
[8]	3.3V n/c	[22]	3.3V n/c
[9]	3.3V n/c	[23]	3.3V n/c
[10]	3.3V n/c	[24]	3.3V n/c
[11]	3.3V	[25]	3.3V
[12]	3.3V	[26]	3.3V
[13]	3.3V	[27]	0V
[14]	0V	[28]	3.3V

55GA6400 Main Board (Rear) Component Layout



55GA6400 DC Voltages Main Board (Back Side)

IC102

Pin	NVRAM Memory
[1]	Gnd
[2]	Gnd
[3]	Gnd
[4]	Gnd
[5]	3.33V
[6]	3.33V
[7]	0V
[8]	3.33V (Vcc In)

IC6503

Pin	1.8V_TU Regulator
[Gnd]	0V (Gnd)
[Out]	1.8V (Out)
[In]	3.33V (In)

IC9601

Pin	NVRAM Memory
[1]	0V n/c
[2]	3.3V
[3]	3.3V
[4]	Gnd
[5]	0V
[6]	0V
[7]	3.3V
[8]	3.33V (Vcc In)

Q100

Pin	SOC_RX Buffer
[S]	3.3V
[G]	5.0V (5V_Normal)
[D]	3.3V

Q103

Pin	SOC_TX Buffer
[S]	3.3V
[G]	5.0V (5V_Normal)
[D]	3.3V

Q104

Pin	HDMI_S/W_RESET Buffer
[S]	3.3V
[G]	5.0V (5V_Normal)
[D]	3.3V

Q2301

Pin	RL_On Switch
[1]	3.5V
[2]	2.8V
[3]	3.4V

Q2304

Pin	Panel VCC Switch (Q2407) Control
[B]	0.6V
[C]	0.0V
[E]	Gnd

Q2305

Pin	Panel_VCC Switch
[G]	1.8V
[S]	12V
[D]	12V

Q4102

Pin	Logo Light Driver
B	0V
C	1.3V
E	Gnd

Q5200

Pin	+3.5V_WOL Driver Controls Q5201
[B]	0.7V
[C]	0V
[E]	Gnd

Q5201

Pin	+3.5V_WOL Switch
[S]	3.5V_ST
[G]	0.4V
[D]	3.55V (Out)

Q5400

Pin	AMP Mute
[B]	0V
[C]	3.30V
[E]	Gnd

Q11002

Pin	+3.3V_IR_Bla Switch
[S]	3.3V_Normal
[G]	5V
[D]	3.3V (Out)

Q11003

Pin	IR_B_RESET (Q2407) Control
[B]	0.0V
[C]	3.3V
[E]	Gnd

D3000

Pin	CEC Bias for (Q3001)
[A1]	0V
[A2]	3.5V
[C]	3.4V

D3204

Pin	MHL_Det To (IC3202)
[A1]	0V (n/c)
[A2]	0V (Det)
[C]	Out

D3205

Pin	DDC_SDA_4 Pull-Up
[A1]	0.76V (n/c)
[A2]	3.5V (3.5V_ST)
[C]	5V Out

55GA6400 T-CON Board Component Voltages

U3 DC-to-DC

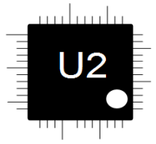
Panel Power
Level Shifter

Pin		Pin	
[1]	7.76V (GCLK1)	[15]	(-6.97) (VGL)
[2]	7.74V (GCLK2)	[16]	27.96V (VGH)
[3]	7.75V (GCLK3)	[17]	27.96V (VGH)
[4]	7.74V (GCLK4)	[18]	7.65V (V_COM)
[5]	7.76V (GCLK5)	[19]	7.65V
[6]	7.74V (GCLK6)	[20]	7.62V
[7]	2.5V	[21]	16.9V
[8]	27.9V (VGH_R)	[22]	Gnd
[9]	(-6.97) (VGH_F)	[23]	3.3V (VCC)
[10]	*(-6.95V to 27.9V) (VGH_ODD)	[24]	0V
[11]	*(-6.95V to 27.9V) (VGH_EVEN)	[25]	0V
[12]	(-6.91) (VST)	[26]	0.7V
[13]	(-6.88) (GIP_RST)	[27]	1.27V
[14]	(-6.97)	[28]	3.24V

* EVERY Second

U2 DC-to-DC

T-CON and Panel Power
DC-to-DC Conv



Pin		Pin	
[1]	1.81V	[25]	4.95V
[2]	1.86V	[26]	0.53V
[3]	Gnd	[27]	3.3V
[4]	3.3V	[28]	3.3V
[5]	1.79V	[29]	4.99V
[6]	1.81V	[30]	1.3V
[7]	Gnd	[31]	16.4V
[8]	3.31V (VCC)	[32]	27.94V
[9]	3.31V (VCC)	[33]	5.69V
[10]	0V	[34]	8.21V
[11]	11.7V (Panel_VCC)	[35]	(-6.98V) (VGL_FB)
[12]	11.7V (Panel_VCC)	[36]	1.19V
[13]	11.7V (Panel_VCC)	[37]	13.86V
[14]	11.7V (Panel_VCC)	[38]	12.85V
[15]	8.45V (H_VDD)	[39]	10.91V
[16]	8.44V (H_VDD_FB)	[40]	6.55V
[17]	Gnd	[41]	4.6V
[18]	Gnd	[42]	3.5V
[19]	Gnd	[43]	7.65V
[20]	11.7V (Panel_VCC)	[44]	7.64V
[21]	11.7V (Panel_VCC)	[45]	7.63V
[22]	16.97V	[46]	7.61V (VCOM_RFB)
[23]	16.97V (VDD)	[47]	1.61V
[24]	Gnd	[48]	Gnd

U1 Buffer

Pin	
[1]	Gnd
[2]	Gnd
[3]	Gnd
[4]	Gnd
[5]	3.31V
[6]	3.31V
[7]	3.31V
[8]	3.31V

Q1 VDD Rectifier

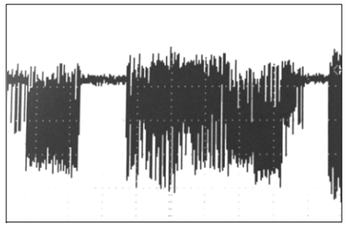
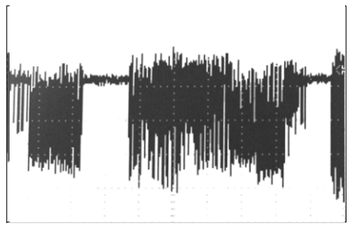
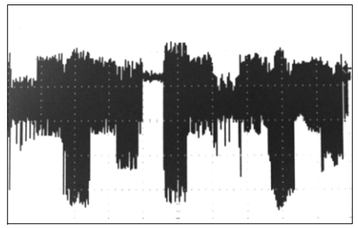
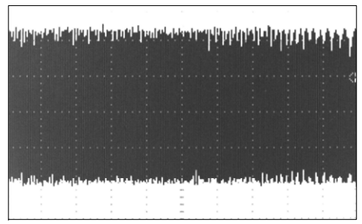
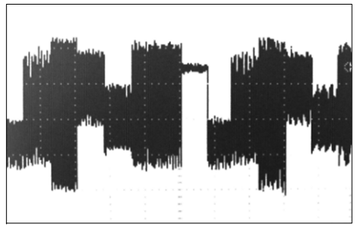
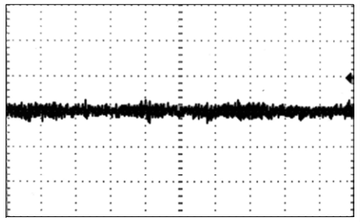
Pin	
[1]	20.2V
[2]	16.38V
[3]	16.93V Output
[4]	12.98V
[5]	12.98V
[6]	12.95V

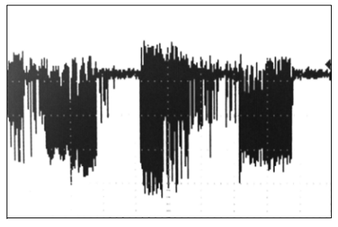
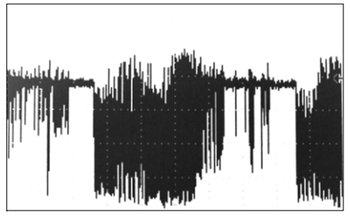
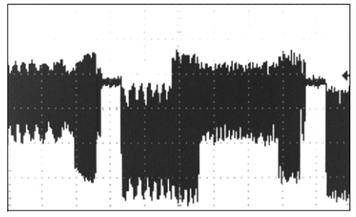
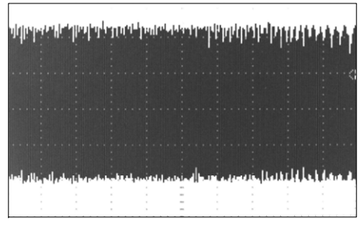
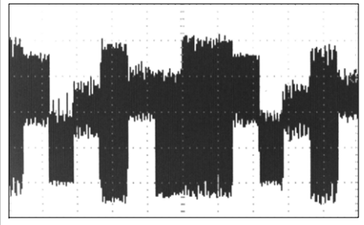
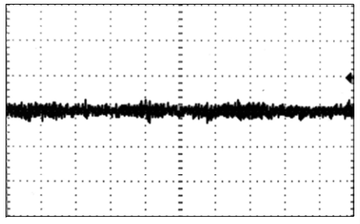
Q2 VGL Rectifier

Pin	
[1]	0.56V
[2]	1.18V
[3]	(-2.9V)
[4]	(-7V) Output
[5]	2.97V
[6]	2.97V

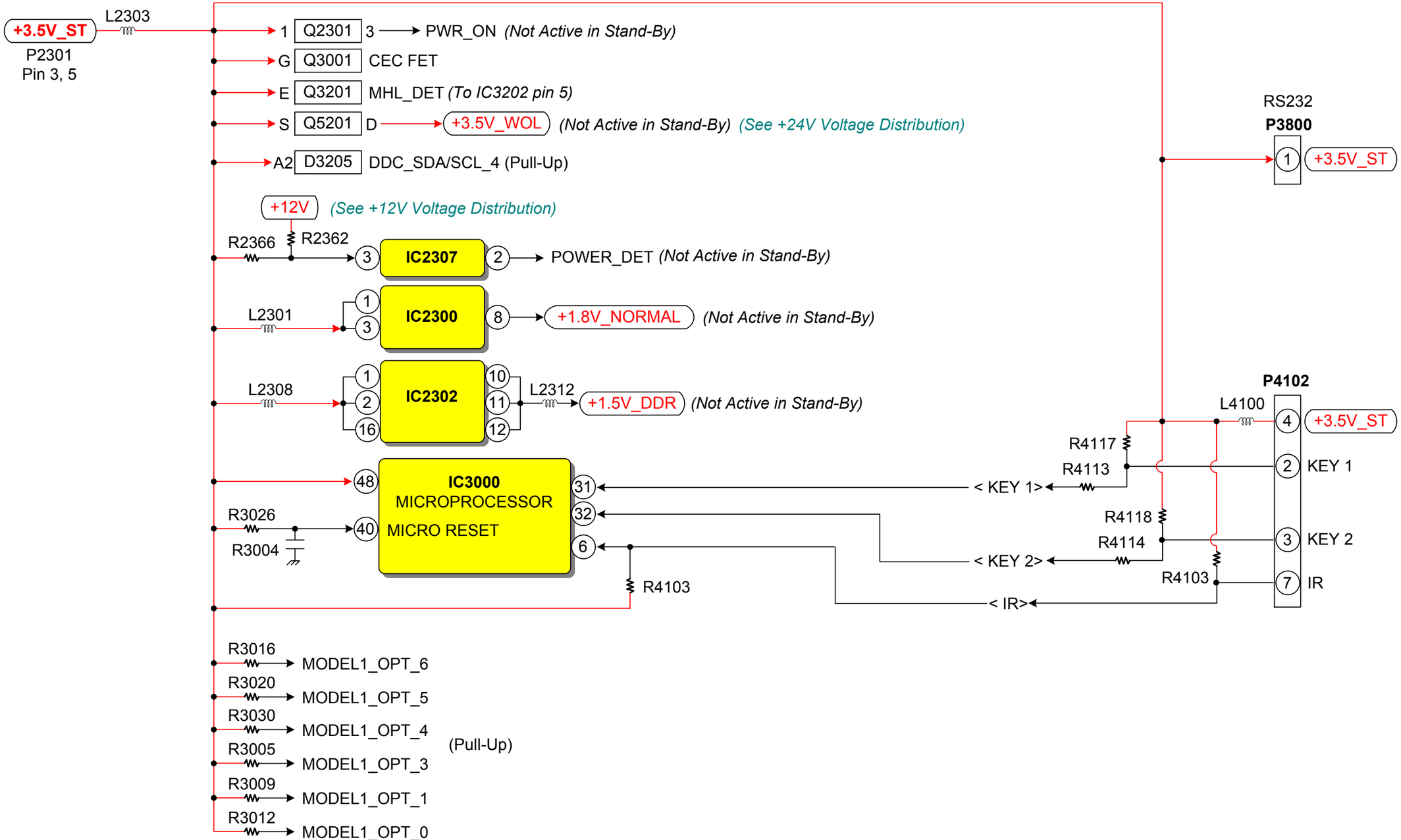
55GA6400 P7100 LVDS Connector Video Waveforms

All LVDS signals are taken with SMPTE Color Bar signal input (1080P) Component Input.
All LVDS signals are "Differential Pairs". The ones shown are the "Positive" signal of the pair. The Negative signal looks exactly the same but flipped 180^0.
Scope Settings are 100mV per/division, 2.5uSec per/division.

Pin 12	Pin 14	Pin 16	Pin 19	Pin 22	Pin 24
					
456mV p/p	476mV p/p	484mV p/p	464mV p/p	444mV p/p	56mV p/p
Pin 13 looks the same but inverted.	Pin 15 looks the same but inverted.	Pin 16 looks the same but inverted.	Pin 20 looks the same but inverted.	Pin 23 looks the same but inverted.	Pin 25 looks the same but inverted.

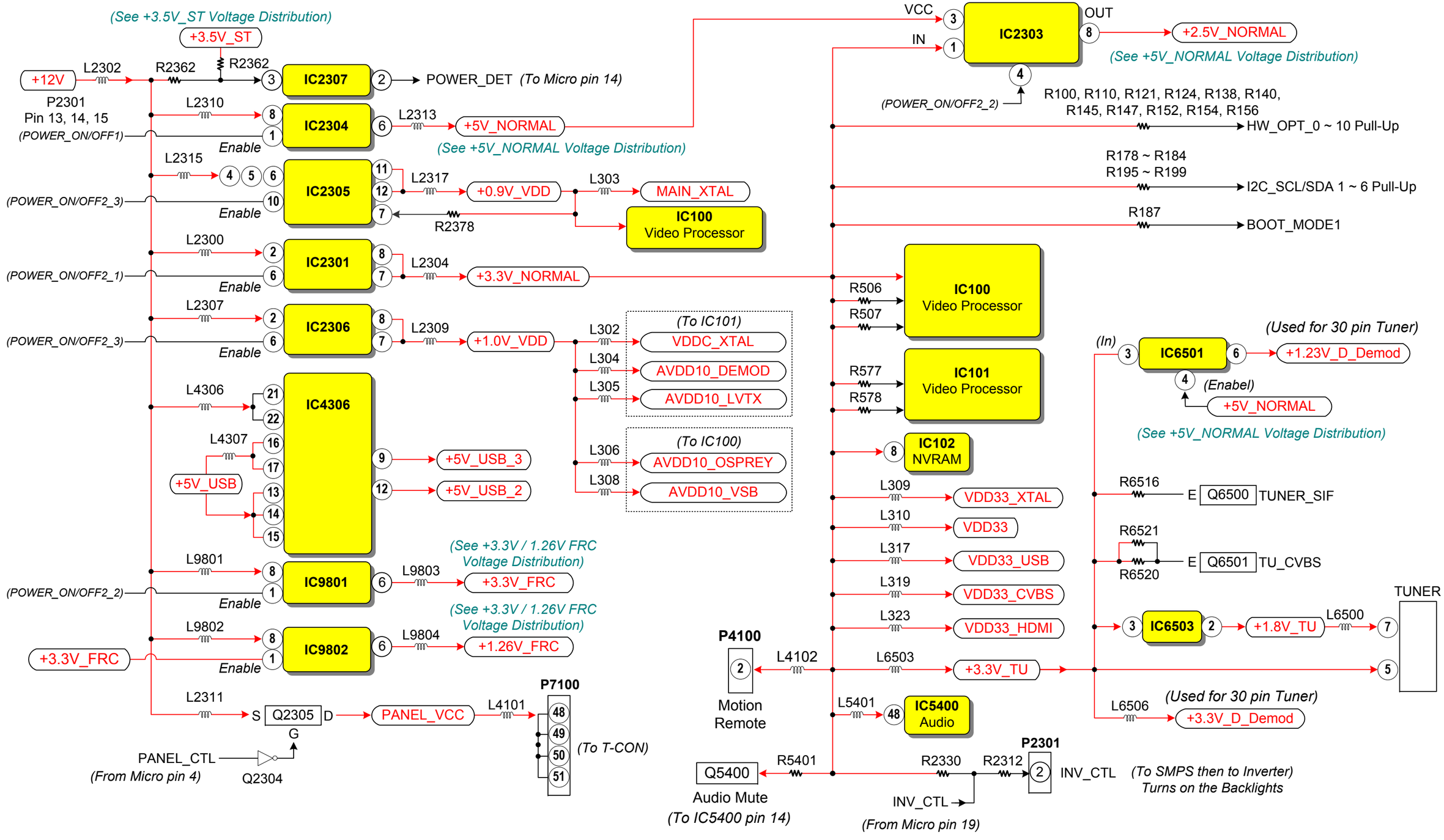
Pin 28	Pin 30	Pin 32	Pin 35	Pin 38	Pin 40
					
456mV p/p	468mV p/p	448mV p/p	456mV p/p	476mV p/p	64mV p/p
Pin 29 looks the same but inverted.	Pin 31 looks the same but inverted.	Pin 33 looks the same but inverted.	Pin 36 looks the same but inverted.	Pin 39 looks the same but inverted.	Pin 41 looks the same but inverted.

55GA6400 Main Voltage (+3.5V_ST) Distribution Block Diagram

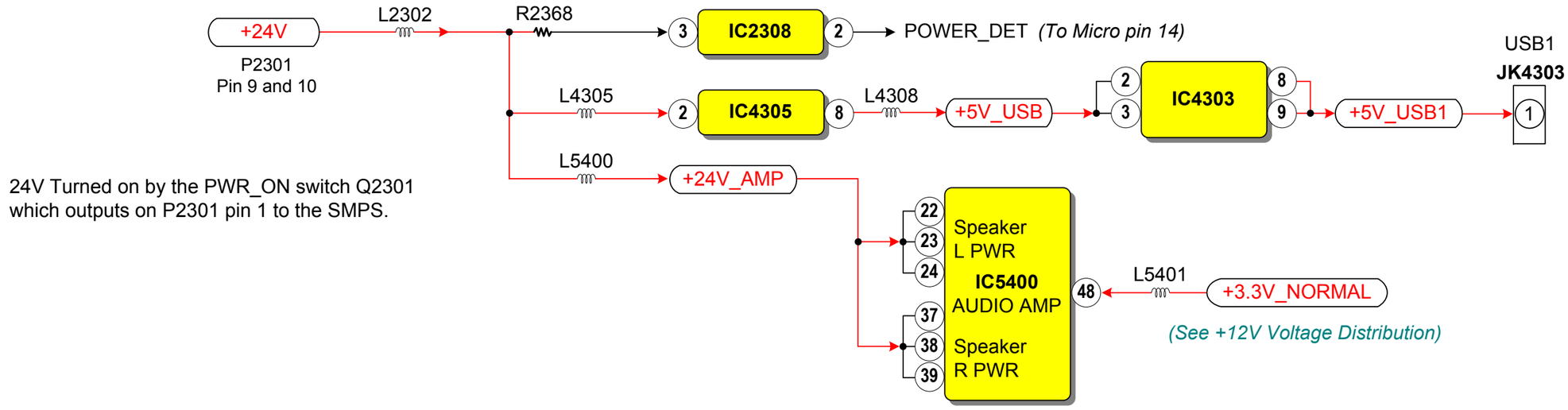


55GA6400 Main Voltage (+12V) Distribution Block Diagram

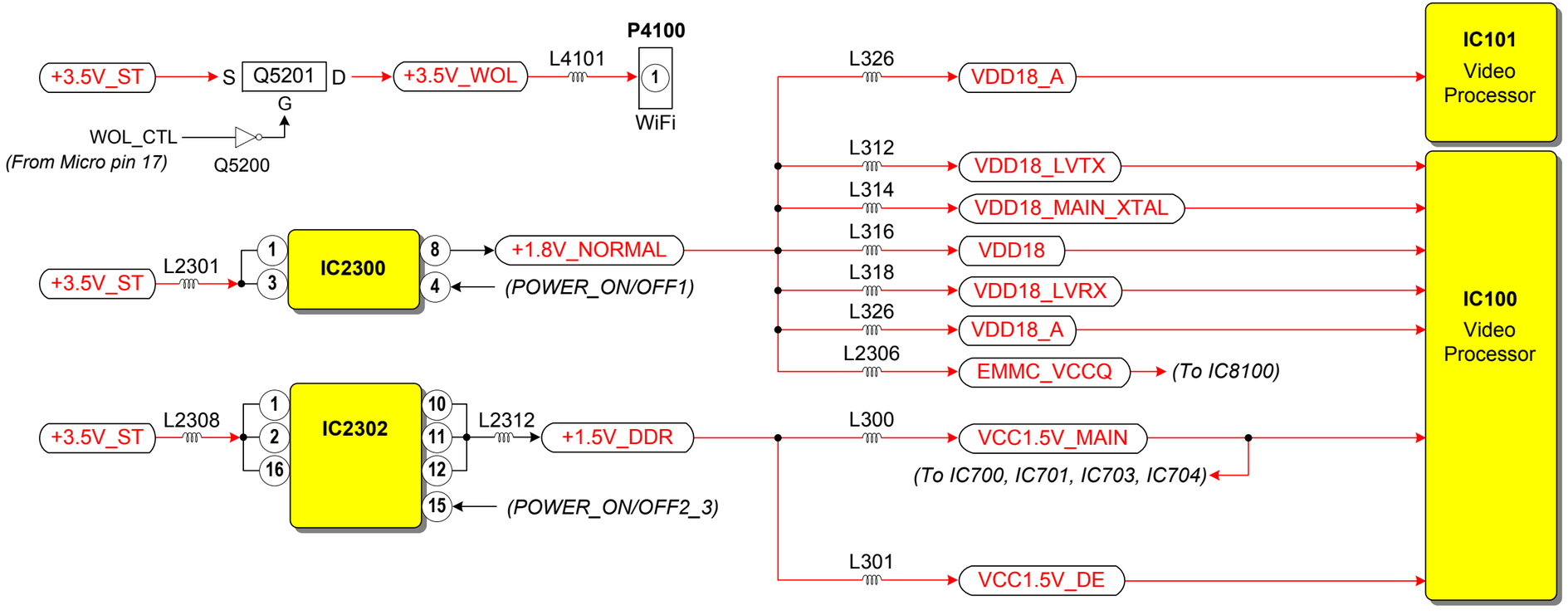
12V Turned on by the PWR_ON switch Q2301 which outputs on P2301 pin 1 to the SMPS.



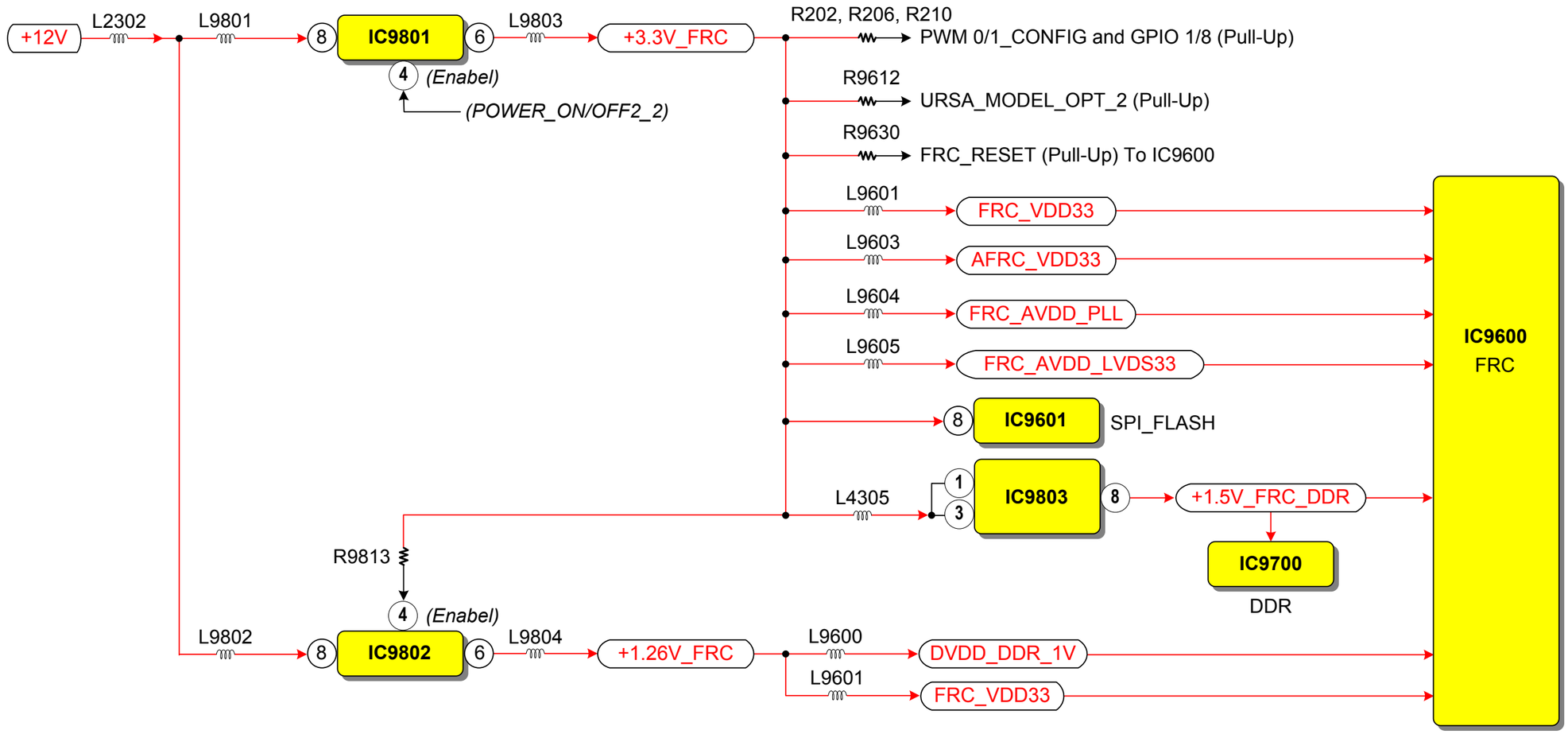
55GA6400 Main Voltage (+24V) Distribution Block Diagram



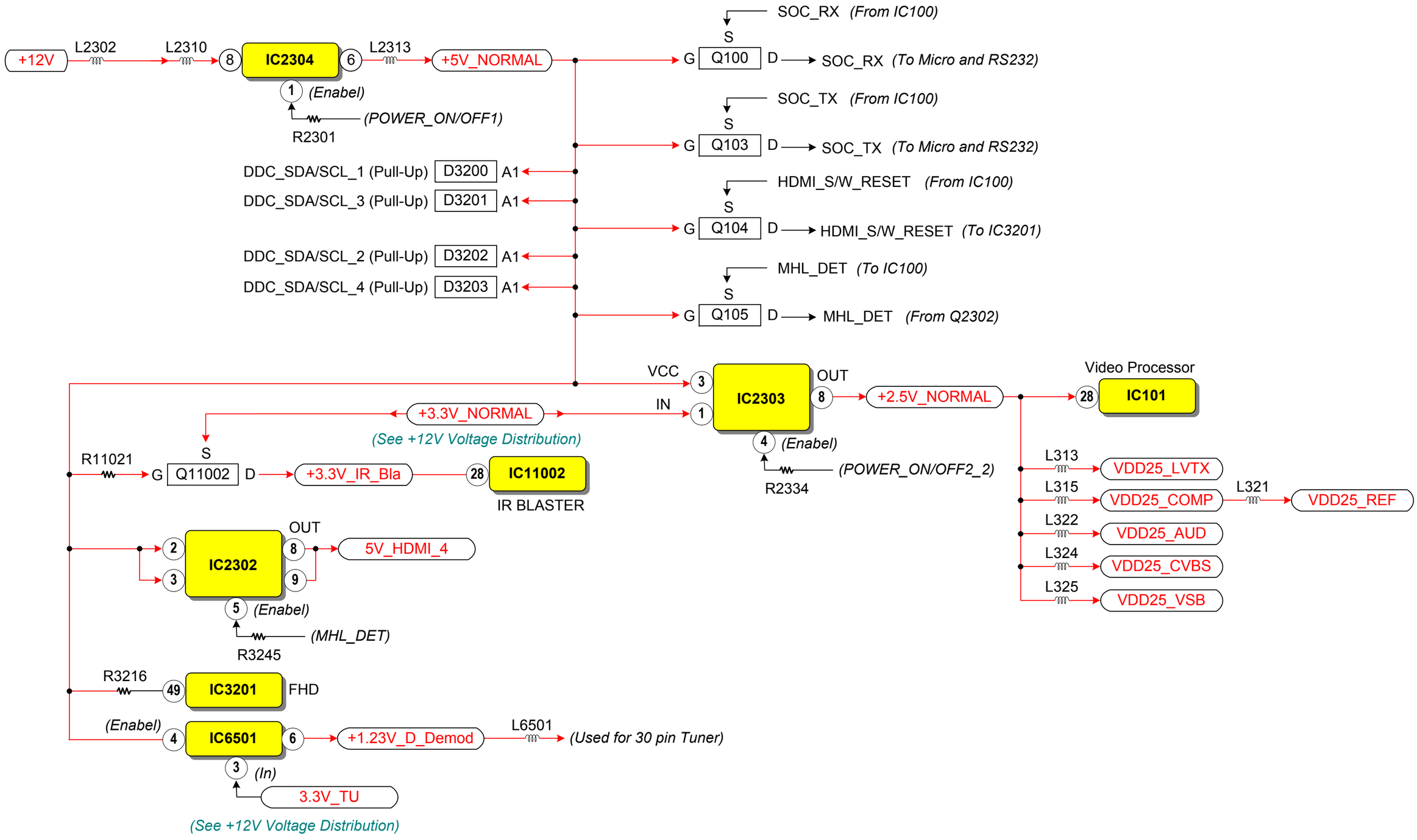
47GA6400 Main Voltage (+1.8V_Normal, +1.5V_DDR) Distribution Block Diagram



55GA6400 Main Voltage (3.3V / 1.26V FRC) Distribution Block Diagram



55GA6400 Main Voltage (5V_NORMAL) Distribution Block Diagram



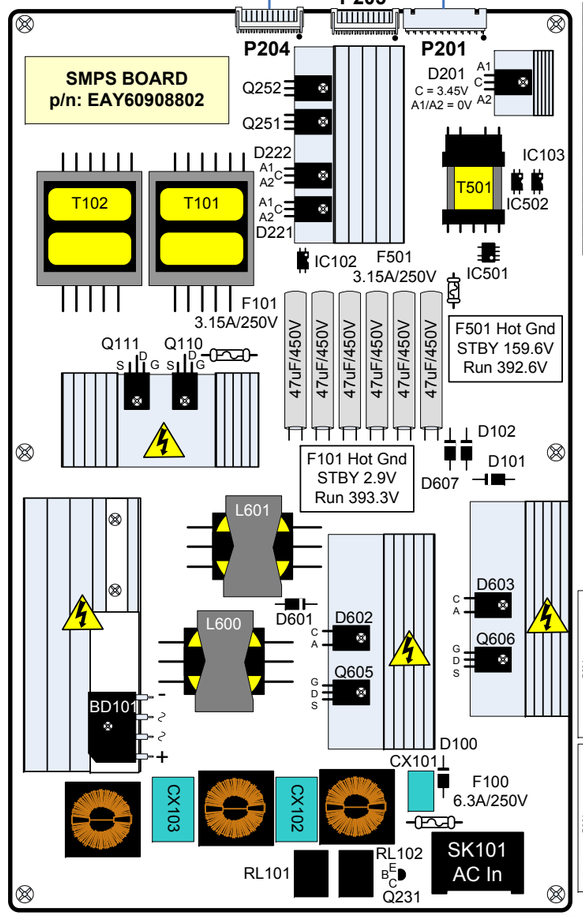
55LX6500 INTERCONNECT DIAGRAM

P204 "SMPS" To CN1 "Inverter"

Pin	Label	STBY	Run	Diode Check
1-5	24V	0V	24.49V	0.43V
6-10	Gnd	Gnd	Gnd	Gnd
11	n/c	n/c	n/c	Open
12	*I-C	0V	2.92V	Open
13	*P-DIM (VBR-B)	0V	0.37V~2.8V	Open
14	ERROR	0V	0V	Open

***Note:* If a particular area (Block) is exhibiting a dimmer level that the other or the overall brightness seems dim, be sure to first check the customer's Menu setting for Backlights. Raise the percentage and see if the overall brightness returns to normal. If not,**
1st: Check the P-DIM level, it should rise with the percentage shown on screen. (100% = 3.3V). Follow the P-DIM signal all the way to the Inverter.
2nd: Turn off the set and unplug the connector CN2 to the Inverter coming from the Main board. If the brightness returns to normal, the Main board is defective.

I-C is Inverter On (INV)_ON)



P201 "SMPS" To P8000 "MAIN"

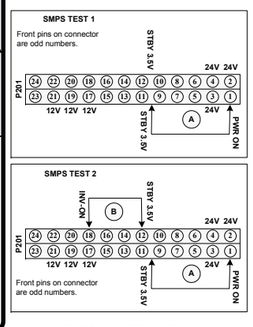
Pin	Label	STBY	Run	Diode Check
1	PWR-ON	0V	3.28V	1.7V
2-4	24V	0V	24.57V	0.43V
5-8	Gnd	Gnd	Gnd	Gnd
9-12	3.5V	3.44V	3.37V	Open
13-15	Gnd	Gnd	Gnd	Gnd
16	n/c	n/c	n/c	Open
17	12V	0V	11.81V	1.4V
18	INV-ON	0V	3.17V	Open
19	12V	0V	11.81V	1.4V
20	n/c	n/c	n/c	Open
21	12V	0V	11.81V	1.4V
22	P-DIM	0V	0.37V~3.3V	Open
23	n/c	n/c	n/c	Open
24	ERROR	0V	0V	Open

SMPS TEST 1: To Force Power Supply On. Disconnect P8000 on Main board.
(A) Jump pins 9, 10, 11 or 12 (3.5V) to pin 1. Test Voltage Outputs 12V, 24V to Main.
And 24V to the Inverter.
Remove AC power. Leave the jumper in place.

SMPS TEST 2: (B) Jump pins 9, 10, 11 or 12 (3.5V) to pin 18 (INV-ON). Apply AC power, the Backlights should turn on.

Note: If the Inverter is loading down 24V and causing the SMPS to shut down,
Remove AC Power and disconnect P204
Check all of the SMPS voltage outputs:

Measure the connectors P102 and P103 in the Diode Mode to make sure the panel isn't loading down the LED block B+ outputs.



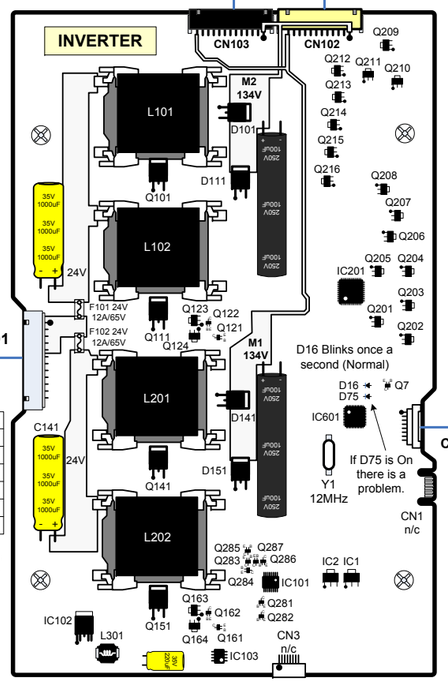
CN101 to SMPS P204

Pin	Diode
1-5	1.33V
6-10	Gnd
11	Open
12	Open
13	Open
14	Open

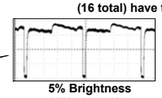
For voltages See the SMPS table for P204

If either connector (P102 or P103) is disconnected D75 will illuminate. The backlights will still light, but appear dimmer.

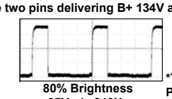
To the Panel's LED Backlights



Each connector (CN102 and CN103) to the LED Blocks (16 total) have two pins delivering B+ 134V and 8 Drive Signals



5% Brightness
35V p/p 240Hz



80% Brightness
35V p/p 240Hz

V1~V16 Drive Signals to LED Blocks

*To force a Block to turn on, simply ground the pin labeled V1~V16. Providing the 134V source is present.

CN102 "Inverter" To "Panel LEDs" White Plug

Pin	Label	STBY	Run	Diode Check
1	Out_M1	0V	134V	Open
2	n/c	n/c	n/c	Open
3	V1	0V	*1V~30V	Open
4	V2	0V	*1V~30V	Open
5	V3	0V	*1V~30V	Open
6	V4	0V	*1V~30V	Open
7	n/c	0V	Gnd	Open
8	V9	0V	*1V~30V	Open
9	V10	0V	*1V~30V	Open
10	V11	0V	*1V~30V	Open
11	V12	0V	*1V~30V	Open
12	n/c	n/c	n/c	Open
13	Out_M2	0V	134V	Open

*Black to White

CN103 "Inverter" To "Panel LEDs" Black Plug

Pin	Label	STBY	Run	Diode Check
1	Out_M1	0V	134V	Open
2	n/c	0V	Gnd	Open
3	V5	0V	*1V~30V	Open
4	V6	0V	*1V~30V	Open
5	V7	0V	*1V~30V	Open
6	V8	0V	*1V~30V	Open
7	V13	0V	*1V~30V	Open
8	V14	0V	*1V~30V	Open
9	V15	0V	*1V~30V	Open
10	V16	0V	*1V~30V	Open
12	n/c	n/c	n/c	Open
12	Out_M2	0V	134V	Open

*Black to White

P7800 "MAIN Board" To "T-CON" P802

Pin	Label	Run	Diode	Pin	Label	Run	Diode
1	PANEL_VCC	11.59V	Open	26	Gnd	Gnd	Gnd
2	PANEL_VCC	11.59V	Open	27	RRXA4+	1.08V	0.97V
3	PANEL_VCC	11.59V	Open	28	RRXA4-	1.26V	1.15V
4	PANEL_VCC	11.59V	Open	29	RRXA3+	1.14V	0.97V
5	n/c	n/c	n/c	30	RRXA3-	1.2V	1.15V
6	Gnd	Gnd	Gnd	31	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd	32	RRXACK+	1.2V	0.97V
8	Gnd	Gnd	Gnd	33	RRXACK-	1.16V	1.15V
9	Gnd	Gnd	Gnd	34	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd	35	RRXA2+	1.14V	0.97V
11	RRXB4+	1.09V	0.97V	36	RRXA2-	1.22V	1.15V
12	RRXB4-	1.26V	1.15V	37	RRXA1+	1.17V	0.97V
13	RRXB3+	1.14V	0.97V	38	RRXA1-	1.19V	1.15V
14	RRXB3-	1.22V	1.15V	39	RRXA0+	1.19V	0.97V
15	Gnd	Gnd	Gnd	40	RRXA0-	1.17V	1.15V
16	RRXBCK+	1.2V	0.97V	41	n/c	n/c	n/c
17	RRXBCK-	1.16V	1.15V	42	3D_DIM_2	0.05V	1.03V
18	Gnd	Gnd	Gnd	43	3D_DIM	0V	1.03V
19	RRXB2+	1.14V	0.97V	44	3DTV	0V	Open
20	RRXB2-	1.2V	1.15V	45	n/c	n/c	n/c
21	RRXB1+	1.16V	0.97V	46	FRC_RESET	3.32V	Open
22	RRXB1-	1.19V	1.15V	47	SCL3_3.3V	3.34V	1.04V
23	RRXB0+	1.19V	0.97V	48	SDA3_3.3V	3.34V	1.04V
24	RRXB0-	1.19V	1.15V	49	V_SYNC	3.33V	0.998V
25	n/c	n/c	n/c	*50	3D_Sync_Out	0.03V	Open
				51	Gnd	Gnd	Gnd

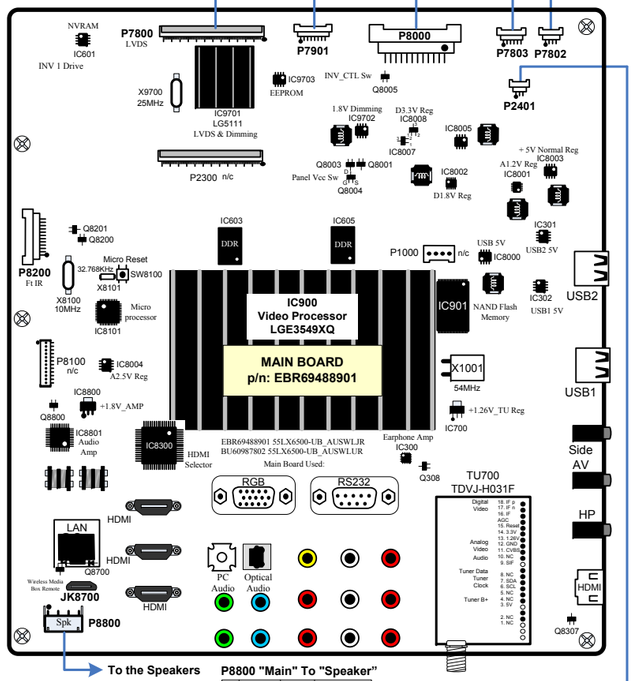
*Pin 2 (1.6V) with 3D source 5.5V p/p 60 Hz 3D-Sync

Inverter CN2 pins inverted from Main P7901.
For Waveforms
See page 3 of Interconnect Diagram

CN2 "Inverter" To P7901 "Main Board"

Pin	Label	STBY	Run	Diode
1	n/c	0V	0.02V	Open
2	n/c	Gnd	Gnd	Gnd
3	n/c	Gnd	Gnd	Gnd
4	M2_MOSI	0V	3.27V	Open
5	Gnd	Gnd	Gnd	Gnd
6	M2_SCLK	0V	0.05V	Open
7	Gnd	Gnd	Gnd	*Open
8	R_VS	0V	3.31V	Open

*Gnd on Main



P7901 to Inverter CN2

Pin	Diode
1	Open
2	Gnd
3	1.06V
4	Gnd
5	1.06V
6	Gnd
7	Gnd
8	1.06V

For voltages See the Inverter table for CN2

P8000 to SMPS P201

Pin	Diode
1	Open
2-4	Open
5-8	Gnd
9-12	1.11V
13-15	Gnd
16	Open
17	Open
18	1.61V
19	Open
20	Open
21	Open
22	Open
23	Open
24	Open

For voltages See the SMPS table for P201

P803 "T-CON" to P7802 "Main"

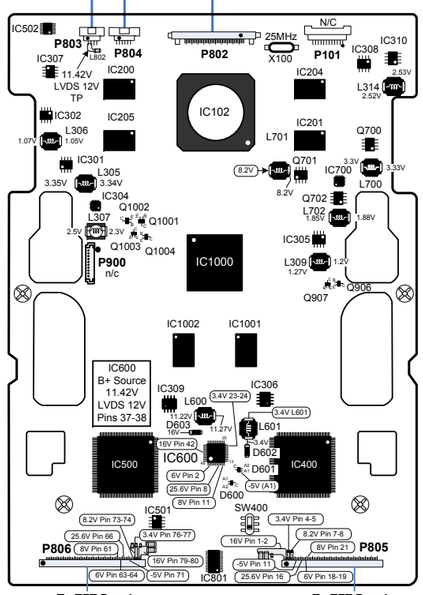
Pin	LABEL	Run	Diode
1	PANEL_VCC	11.55V	Open
2	PANEL_VCC	11.55V	Open
3	Gnd	Gnd	Gnd
4	Gnd	Gnd	Gnd

P804 "TCON" to P7803 "Main Board"

Pin	LABEL	Run	Diode
1	Gnd	Gnd	Gnd
2	E_TCK	0V	Open
3	E_TDO	3.33V	Open
4	E_TMS	0.35V	Open
5	E_TDI	3.32V	Open
6	Gnd	Gnd	Gnd

P7802 "Main" To "T-CON" P803

Pin	LABEL	Run	Diode Check
1	PANEL_VCC	11.55V	Open
2	PANEL_VCC	11.55V	Open
3	Gnd	Gnd	Gnd
4	Gnd	Gnd	Gnd



P806 LVDS to Panel

PIN	LABEL	RUN	PIN	LABEL	RUN	PIN	LABEL	RUN
1	Gnd	Gnd	28	Gnd	Gnd	54	V14	3.75V
2	LLMV0P	1.19V	29	LRMV4P	1.15V	55	V15	2.68V
3	LLMV0N	1.24V	30	LRMV4N	1.25V	56	V16	0.27V
4	LLMV1P	1.18V	31	LRMV5P	1.18V	57	V17	0.26V
5	LLMV1N	1.3V	32	LRMV5N	1.26V	58	V18	0.26V
6	LLMV2P	1.15V	33	LRMV6P	1.17V	59	Gnd	Gnd
7	LLMV2N	1.29V	34	LRMV6N	1.25V	60	Gnd	Gnd
8	Gnd	Gnd	35	Gnd	Gnd	61	Z_OUT	8V
9	LLMVCLKP	1.22V	36	OPT_N	3.33V	62	Gnd	Gnd
10	LLMVCLKN	1.23V	37	H_CONV	Gnd	63	**VCOMLOUT**	6V
11	Gnd	Gnd	38	GSP	0V	64	**VCOMLFB**	6V
12	LLMV4P	1.18V	39	POL	1.66V	65	Gnd	Gnd
13	LLMV4N	1.26V	40	GAD	Gnd	66	**VGH (28V)**	25.6V
14	LLMV5P	1.26V	41	SOE_L	0.24V	67	Gnd	Gnd
15	LLMV5N	1.27V	42	Gnd	Gnd	68	GSC	2.3V
16	LLMV6P	1.16V	43	V1	15.75V	69	GOE	0.83V
17	LLMV6N	1.26V	44	V2	15.75V	70	Gnd	Gnd
18	Gnd	Gnd	45	V3	14V	71	**VGL (6V)**	(-5V)
19	LRMV0P	1.17V	46	V4	12.26V	72	Gnd	Gnd
20	LRMV0N	1.28V	47	V5	11.07V	73	**HVDD (8V)**	8.2V
21	LRMV1P	1.15V	48	V6	11.07V	74	**HVDD (8V)**	8.2V
22	LRMV1N	1.26V	49	V7	10.27V	75	Gnd	Gnd
23	LRMV2P	1.17V	50	V9	8.31V	76	**VCC (3.3V)**	3.4V
24	LRMV2N	1.27V	51	V10	5.74V	77	**VCC (3.3V)**	3.4V
25	Gnd	Gnd	52	V12	Gnd	78	Gnd	Gnd
26	LRMVCLKN	1.21V	53	V13	4.94V	79	**VDD (16V)**	16V
27	LRMVCLKP	1.23V				80	**VDD (16V)**	16V

P805 LVDS to Panel

PIN	LABEL	RUN	PIN	LABEL	RUN	PIN	LABEL	RUN
1	**VDD (16V)**	16V	28	V8	11.08V	54	RLMVCLKP	1.19V
2	**VDD (16V)**	16V	29	V7	10.28V	55	RLMVCLKN	1.18V
3	Gnd	Gnd	30	V9	8.31V	56	Gnd	Gnd
4	**VCC (3.3V)**	3.4V	31	V10	7.71V	57	RLMV4P	1.15V
5	**VCC (3.3V)**	3.4V	32	V12	3.37V	58	RLMV4N	1.24V
6	Gnd	Gnd	33	V13	4.94V	59	RLMV5P	1.34V
7	**HVDD (8V)**	8.2V	34	V14	3.75V	60	RLMV5N	1.22V
8	**HVDD (8V)**	8.2V	35	V15	2.68V	61	RLMV6P	1.12V
9	Gnd	Gnd	36	V16	1.97V	62	RLMV6N	1.23V
10	OPT_P	n/c	37	V17	0.27V	63	Gnd	Gnd
11	**VGL-(5V)**	(-6V)	38	V18	0.26V	64	RRMV0P	1.13V
12	Gnd	Gnd	39	Gnd	Gnd	65	RRMV0N	1.23V
13	GOE	**0.83V**	40	GSP	0V	66	RRMV1P	1.15V
14	GSC	2.3V	41	POL	1.66V	67	RRMV1N	1.23V
15	Gnd	Gnd	42	Gnd	Gnd	68	RRMV2P	1.15V
16	**VGH (26V)**	25.6V	43	SOE_R	0.25V	69	RRMV2N	1.23V
17	**Gnd**	Gnd	44	H_CONV	0.44V	70	Gnd	Gnd
18	**VCOMRFB**	6V	45	OPT_N	3.33V	71	RRMVCLKP	1.19V
19	**VCOM ROUT**	6V	46	Gnd	Gnd	72	RRMVCLKN	1.18V
20	Gnd	Gnd	47	RLMV0P	0.15V	73	Gnd	Gnd
21	Z_OUT	8V	48	RLMV0N	0.17V	74	RRMV4P	1.13V
22	Gnd	Gnd	49	RLMV1P	0.14V	75	RRMV4N	1.24V
23	V1	15.75V	50	RLMV1N	1.24V	76	RRMV5P	1.11V
24	V2	15.75V	51	RLMV2P	1.13V	77	RRMV5N	1.12V
25	V3	14V	52	RLMV2N	1.22V	78	RRMV6P	1.12V
26	V4	13.35V	53	Gnd	Gnd	79	RRMV6N	1.22V
27	V5	12.27V				80	Gnd	Gnd

P802 "T-CON" to P7800 "MAIN Board"

Pin	Label	Run	Diode Check	Pin	Label	Run	Diode Check
1	Gnd	Gnd	Gnd	24	RRXA4	1.26V	1.67V
*2	3D_Sync_Out	0.03V	2.34V	25	RRXA4+	1.08V	1.67V
3	V_SYNC	3.33V	1V	26	Gnd	Gnd	Gnd
4	SDA3_3.3V	3.34V	1.73V	27	n/c	n/c	n/c
5	SCL3_3.3V	3.34V	1.73V	28	RRXB0-	1.19V	1.67V
6	FRC_RESET	3.32V	Open	29	RRXB0+	1.19V	1.67V
7	n/c	n/c	n/c	30	RRXB1-	1.19V	1.67V
8	3DTV	0V	Open	31	RRXB1+	1.16V	1.67V
9	3D_DIM	0V	Open	32	RRXB2-	1.2V	1.67V
10	3D_DIM_2	0.05V	Open	33	RRXB2+	1.14V	1.67V
11	n/c	n/c	n/c	34	Gnd	Gnd	Gnd
12	RRXA0-	1.17V	1.67V	35	RRXBCK-	1.16V	1.67V
13	RRXA0+	1.19V	1.67V	36	RRXBCK+	1.2V	1.67V
14	RRXA1-	1.19V	1.67V	37	Gnd	Gnd	Gnd
15	RRXA1+	1.17V	1.67V	38	RRXB3-	1.22V	1.67V
16	RRXA2-	1.22V	1.67V	39	RRXB3+	1.14V	1.67V
17	RRXA2+	1.14V	1.67V	40	RRXB4-	1.26V	1.67V
18	Gnd	Gnd	Gnd	41	RRXB4+	1.09V	1.67V
19	RRXACK-	1.16V	1.67V	42-46	Gnd	Gnd	Gnd
20	RRXACK+	1.20V	1.67V	47	n/c	n/c	n/c
21	Gnd	Gnd	Gnd	48-51	PANEL_VCC	11.59V	Open
22	RRXA3-	1.20V	1.67V				
23	RRXA3+	1.14V	1.67V				

*Pin 2 (1.6V) with 3D source 5.5V p/p 60 Hz 3D-Sync

P8200 "Main Board" To J1 "IR Board"

Pin	Label	STBY	Run	Diode Check
1	SCL	3.45V	3.37V	Open
2	SDA	3.45V	3.37V	Open
3	Gnd	Gnd	Gnd	Gnd
4	KEY 1	3.45V	3.37V	1.86V
5	KEY 2	2.76V	2.7V	1.86V
6	3.5V_ST	3.46V	3.37V	1.11V
7	Gnd	Gnd	Gnd	Gnd
8	LED_LOGO	0V	0.82V	Open
9	IR	1.57V	1.52V	Open
10	Gnd	Gnd	Gnd	Gnd
11	+3.3V_Normal	0V	3.33V	0.50V
12	LED_R/BUZZ	0V	0V	Open

P8800 "Main" To "Speaker"

Pin	LABEL	Run	Diode Check
1	Spk_R+	12.28V	Open
2	Spk_R-	12.28V	Open
3	Spk_L+	12.28V	Open
4	Spk_L-	12.28V	Open

JK8700 Jack "MAIN Board" To "Wireless Dungle"

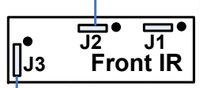
Pin	Label	STBY	Run	Diode
1-6	*24V	0V	24.65V	Open
7	Detect	0V	0.3V	2.38V
8	Interrupt	0V	3.3V	Open
9	Gnd	0V	Gnd	Gnd
10	n/c	0V	3.3V	Open
11	Gnd	0V	Gnd	Gnd
12	I2C_SCL	0V	3.3V	1.04V
13	I2C_SDA	0V	3.3V	1.04V
14	Gnd	0V	Gnd	Gnd
15	Wireless_RX	0V	3.3V	1.8V
16	Wireless_TX	0V	3.3V	1.8V
17	Gnd	0V	Gnd	Gnd
18	IR	0.67V	3.3V	Open
19-20	Gnd	0V	Gnd	Gnd

P2401 "Main" To "3D Emitter"

Pin	LABEL	Run	Diode Check
1	+5V_EMITTER	5.1V	Open
2	Gnd	Gnd	Gnd
3	3D_SYNC	0.03V	Open

Original: p/n: EBR69838801
Sub: p/n: EBR72073501
Use Sub p/n for interference on certain remotes.

Soft Touch Keys



p/n EBR64966201

LG LOGO

J3 "IR" To "LG LOGO"

Pin	LABEL	SBY	Run	Diode
1	3.5V_ST	3.46V	3.37V	Open
2	Gnd	Gnd	Gnd	Gnd
3	Logo Drive	2.19V	0.69V	Open
4	Gnd	Gnd	Gnd	Gnd

J2 "IR Board" To "Key Board"

Pin	Label	STBY	Run	Diode
1	Key 1	3.45V	3.37V	Open
2	Gnd	Gnd	Gnd	Gnd
3	Key 2	2.76V	2.7V	Open
4	Gnd	Gnd	Gnd	Gnd

Voltages with Dongle plugged in.
(Use Dongle side to read voltages. Remove cover).
*24V Switched from Q8701 Drain
Q8701 turned on by Q8700

55LX6500 MAIN (FRONT SIDE) SIMICONDUCTORS

IC300 Earphone Amp

Pin	
[1]	0V
[2]	0V
[3]	0V
[4]	0V
[5]	0V (HP R Out)
[6]	3.3V
[7]	3.3V
[8]	(-1.8V)
[9]	(-0.88V)
[10]	Gnd
[11]	0.94V
[12]	1.83V
[13]	3.32V (Mute)
[14]	3.32V (B+)
[15]	Gnd
[16]	0V (HP L Out)

IC301 USB 2 5V

Pin	
[1]	Gnd
[2]	5.1V (In)
[3]	5.1V
[4]	3.33V
[5]	3.33V
[6]	5.1V (Out)
[7]	5.1V (Out)
[8]	n/c

IC302 USB 1 5V

Pin	
[1]	Gnd
[2]	5.1V (In)
[3]	5.1V
[4]	3.33V
[5]	3.33V
[6]	5.1V (Out)
[7]	5.1V (Out)
[8]	n/c

IC601 NVRAM

Pin	
[1]	n/c
[2]	0V
[3]	3.34V
[4]	Gnd
[5]	3.34V
[6]	0V
[7]	Gnd
[8]	3.34V (B+)

IC700 (+1.26V_TU) Regulator

Pin	
[1]	0V (Gnd)
[2]	1.27V (Out)
[3]	3.32V (B+)

IC8000 5V Regulator for USB

Pin	
[1]	11.75V (B+)
[2]	5.1V (Out)
[3]	5.1V (Out)
[4]	10.5V
[5]	3.3V
[6]	0.81V
[7]	5.06V
[8]	0V (Gnd)

IC8001 D1.2V and A1.2V Regulator

Pin	
[1]	0V (Gnd)
[2]	3.3V
[3]	0V (Gnd)
[4]	1.27V
[5]	3.32V
[6]	n/c
[7]	4.48V
[8]	3.32V
[9]	3.32V
[10]	3.34V
[11]	1.28V
[12]	Gnd
[13]	3.3V
[14]	0.82V

IC8002 D1.8V Regulator

Pin	
[1]	5V
[2]	3.35V (B+)
[3]	1.83V (Out)
[4]	Gnd
[5]	Gnd
[6]	2.36V
[7]	0.91V
[8]	1.05V
[9]	2.4V
[10]	3.37V (PWR On/Off1 Ctl)

IC8003 (+5V_NORMAL) Regulator

Pin	
[1]	Gnd
[2]	11.74V (B+)
[3]	Gnd
[4]	0.81V
[5]	0.86V
[6]	3.34V (PWR On/Off2 Ctl)
[7]	5.17V (In)
[8]	5.17V (In)

IC8004 A2.5V Regulator for USB

Pin	
[1]	n/c
[2]	3.26V (B+)
[3]	3.26V (B+)
[4]	n/c
[5]	n/c
[6]	2.57V (Out)
[7]	0.83V
[8]	Gnd

IC8005 (+3.3V_NORMAL) And D3.3V Regulator

Pin	
[1]	Gnd
[2]	11.74V (B+)
[3]	Gnd
[4]	0.81V
[5]	0.89V
[6]	3.34V (PWR On/Off2 Ctl)
[7]	3.36V (Out)
[8]	3.36V (Out)

IC8007 Power Det Gen (+12V and +3.5V)

Pin	
[1]	Gnd
[2]	3.6V (B+
[3]	3.5V (Out)

IC8008 Power Det Gen (+24V)

Pin	
[1]	Gnd
[2]	3.64V (B+)
[3]	3.76V (Out)

IC8800 (+1.8V_AMP) Regulator

Pin	
[1]	Gnd
[2]	1.8V (Out)
[3]	3.3V (B+)

IC9702 (+1.8V_L/Dimming) Regulator

Pin	
[1]	Gnd
[2]	11.74V (B+)
[3]	Gnd
[4]	0.81V (FB)
[5]	0.77V
[6]	3.34V
[7]	3.32V (Out)
[8]	3.34V (Out)

IC9703 EEPROM for LG5111

Pin	
[1]	Gnd
[2]	3.34V
[3]	Gnd
[4]	Gnd
[5]	3.34V
[6]	3.34V
[7]	3.32V
[8]	3.34V (B+)

Q308 Headphone Mute

Pin	
B	0V
C	3.32V
E	Gnd

Q8001 PANEL_VCC Control 1st Driver

Pin	
B	0V
C	0.68V
E	Gnd

Q8700 Wireless PWR Turns on Q8701

Dongle Out

B	0V (0.0V w/Dongle Out)
C	24.6V (24V w/Dongle Out)
E	Gnd

Dongle In

B	0.66V (0.0V w/Dongle In)
C	0.14V (24V w/Dongle In)
E	Gnd

Q8003 PANEL_VCC Control 2nd Driver

Pin	
B	0.66V
C	0V
E	Gnd

Q8004 PANEL_VCC Switch

S	11.62V (In)
G	1.8V (Enable)
D	11.8V (Out)

Q8200 IR Buffer 2nd

Pin	
B	0.56V
C	0V
E	Gnd

Q8201 IR Buffer 1st

Pin	
B	0V
C	3.36V
E	Gnd

Q8307 Side HDMI Hot Swap

Pin	
B	0V
C	4.32V
E	Gnd

Q8800 AMP Mute to AMP_MUTE1 IC8801

B	0V
C	3.34V
E	Gnd

55LX6500 MAIN (BACK SIDE) SIMICONDUCTORS

IC602 D1.8V Regulator

Pin	
[1]	0V (Gnd)
[2]	3.29V (PWR On/Off1 Ctl)
[3]	0.9V (DDR_VTT)
[4]	0.93V
[5]	1.83V
[6]	3.38V (In)
[7]	1.8V (Out)
[8]	0.91V (DDR_VTT)

IC8100 EEPROM Micro

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	3.37V
[6]	3.37V
[7]	0V (Gnd)
[8]	3.37V

IC8200 RS232 Routing

Pin	
[1]	0V
[2]	0V
[3]	0V
[4]	0V
[5]	0V
[6]	(-5.47V)
[7]	n/c (5.59V)
[8]	n/c (0V)
[9]	n/c (3.3V)
[10]	n/c (0.2V)
[11]	n/c (3.3V)
[12]	3.35V
[13]	0V
[14]	(-5.47V)
[15]	0V (Gnd)
[16]	3.37V

IC8400 RGB H/V Sync

Pin	
[1]	1.9V
[2]	1.9V
[3]	4.4V
[4]	0V
[5]	0.9V
[6]	n/c (4.5V)
[7]	0V (Gnd)
[8]	n/c (4.5V)
[9]	n/c (1.9V)
[10]	n/c (1.9V)
[11]	n/c (4.5V)
[12]	0.9V
[13]	0.9V
[14]	5V

IC8401 EDID Data PC

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	0.7V
[6]	4.1V
[7]	4.5V
[8]	4.5V (In)

IC8700 Wireless Buffer

Pin	
[1]	0V (3.3V Dongle In)
[2]	3.3V (0.3V Dongle In)
[3]	n/c
[4]	n/c
[5]	n/c
[6]	Gnd
[7]	Gnd
[8]	Gnd
[9]	n/c
[10]	0.02V
[11]	0V
[12]	3.3V
[13]	0V (3.3V Dongle In)
[14]	3.3V
[15]	3.3V
[16]	3.3V

IC9000 Serial Flash T-CON

Pin	
[1]	0.06V
[2]	0.67V
[3]	3.3V (In)
[4]	0V (Gnd)
[5]	0V
[6]	0.34V
[7]	3.31V (In)
[8]	3.34V (In)

IC9303 EEPROM for LG5111

Pin	
[1]	0V (Gnd)
[2]	0V (Gnd)
[3]	0V (Gnd)
[4]	0V (Gnd)
[5]	3.37V
[6]	3.37V
[7]	3.34V
[8]	3.37V (In)

Q200 (1.8V_HDMI) Switch

Pin	
S	1.83V (Out)
G	3.35V (PWR On/Off2 Ctl)
D	1.83V (In)

Q701 Tuner SIF (Sound) Buffer

Pin	
B	0.16V
C	Gnd
E	0.83V

Q702

Q901

Q8000

Q8002

Q8203

Q8205

Tuner Video (Analog) Buffer

Pin	
B	2.05V
C	2.75V
E	Gnd

FLASH_WP for IC901

Pin	
B	0V (Flash_WP)
C	3.36V
E	Gnd

RL_ON (PWR_On) 1st Driver

Pin	
B	0.66V
C	0V
E	Gnd

PWR_ON Switch

Pin	
[1]	3.36V (In)
[2]	0V
[3]	3.3V (Out)

IR Wireless Pass 2nd Driver

Pin	
B	0V
C	3.3V
E	Gnd

IR Wireless Pass 1st Driver

Pin	
B	0.6V
C	0V
E	Gnd

Q8300,1,2,6 HDMI 2 Det

Pin	
B	4.2V
C	0V
E	Gnd

Q8303,4,5,7 HDMI 3 Det

Pin	
B	0V
C	4.2V
E	Gnd

Q8308 CEC Remote HDMI CEC

Pin	
[B]	2.72V
[G]	2.73V
[S]	3.27V
[D]	3.37V

D8312 3.5V Pull Up HDMI CEC

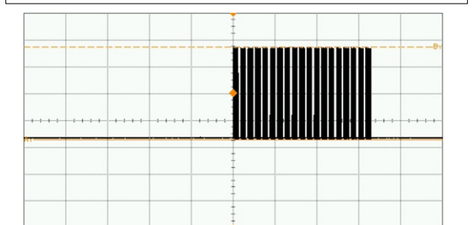
Pin	
A1	0V
C	3.26V
A2	3.2V

D8306,7,9,10 5V Pull Up Routing HDMI SCL/SDA

Pin	
A1	5.04V
C	4.58V
A2	0V

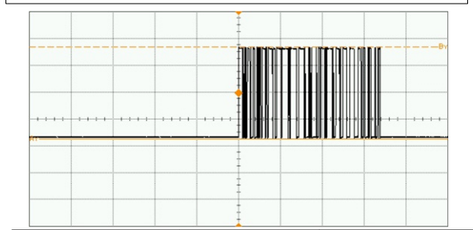
55LX6500 P7901 Main to Inverter CN2 Local Dimming Control Signals Waveforms

Main P9701 pin 03
Inverter CN2 pin 06
Black or White



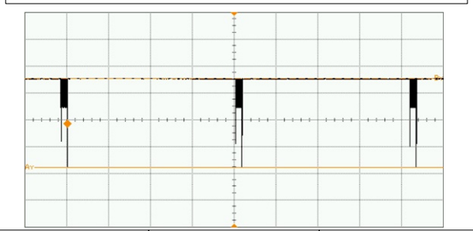
1V per/div	50uSec	3.43V p/p

Main P9701 pin 05
Inverter CN2 pin 04
Tuner Video



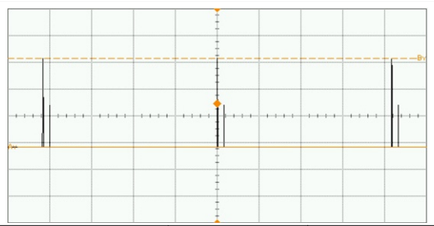
1V per/div	50uSec	3.43V p/p

Main P9701 pin 05
Inverter CN2 pin 04
100 IRE (Full White)



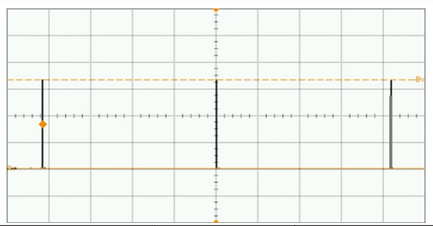
1V per/div	100mSec	3.31V p/p

Main P9701 pin 05
Inverter CN2 pin 04
0 IRE (Black)



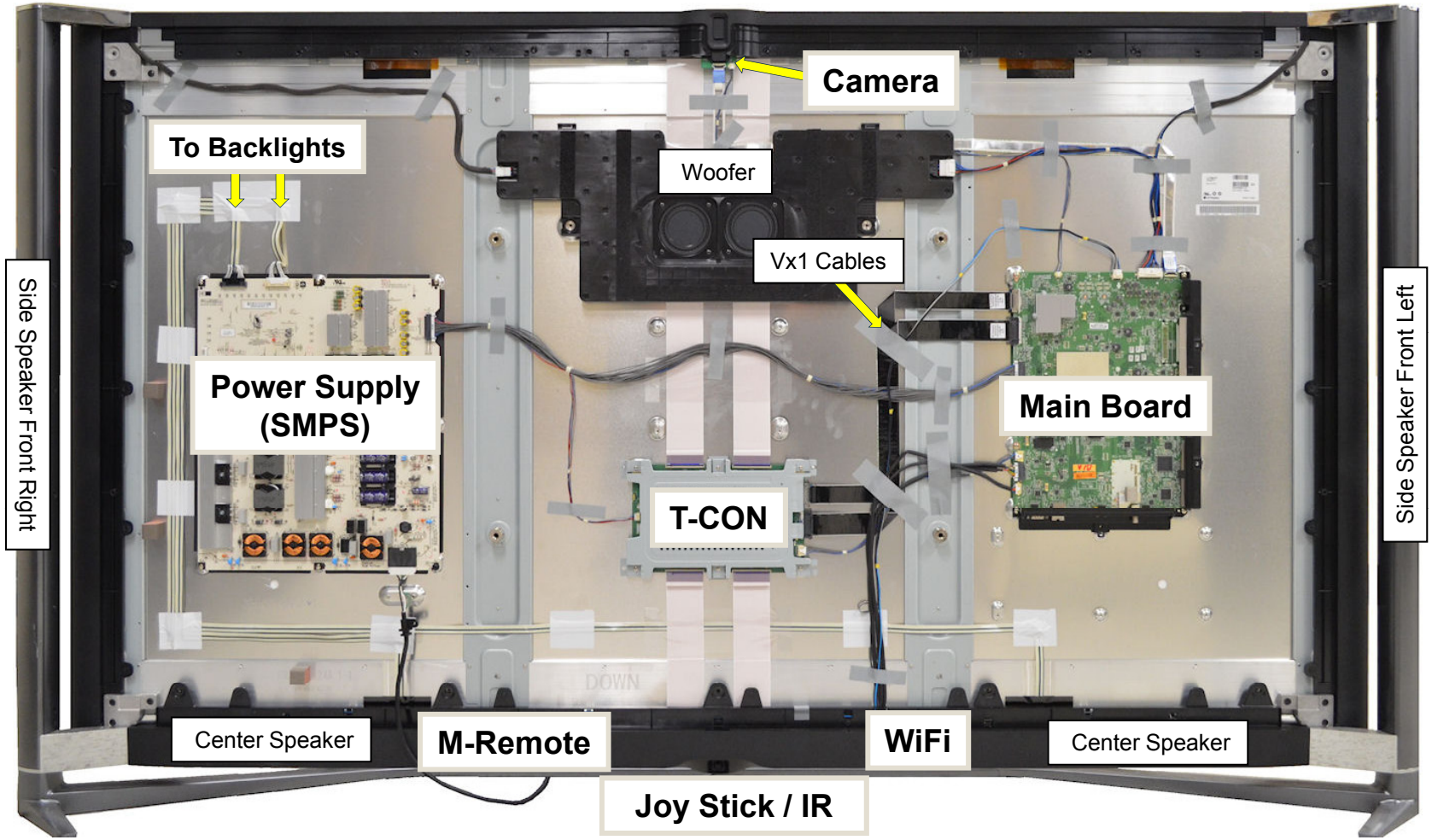
1V per/div	1mSec	3.32V p/p

Main P9701 pin 08
Inverter CN2 pin 01
Black or White



1V per/div	1mSec	3.33V p/p

To gain access to the Front IR/Joy Stick, Magic Remote, WiFi Board and the Center Speakers, The outside Frame and Bottom Cover must be removed. (See Next Page)



Joy Stick, M-Remote and WiFi Boards are under Outer Bottom Cover

79UB9800 INTERCONNECT DIAGRAM

P802 Black Plug "SMPS" To "Panel LEDs"

Pin	Label	TP	Run	Diode
1	VC-11	EL90	*1.16V ~ 14.35V	OL
2	VC-12	EL88	*1.20V ~ 14.4V	OL
3	VC-13	EL93	*1.35V ~ 16.54V	OL
4	VC-14	EL86	*1.43V ~ 14.60V	OL
5	VC-15	EL89	*1.42V ~ 14.37V	OL
6	n/c	n/c	n/c	n/c
7	LED+	P810	*59.6V ~ 60.81V	OL
8	n/c	n/c	n/c	n/c
9	LED+	P810	*59.6V ~ 60.81V	OL
10	n/c	n/c	n/c	n/c
11	VC-16	EL92	*1.34V ~ 14.52V	OL
12	VC-17	EL91	*1.31V ~ 14.15V	OL
13	VC-18	EL87	*1.06V ~ 14.38V	OL
14	VC-19	EL95	*1.00V ~ 14.18V	OL
15	VC-20	EL103	*1.18V ~ 14.18V	OL

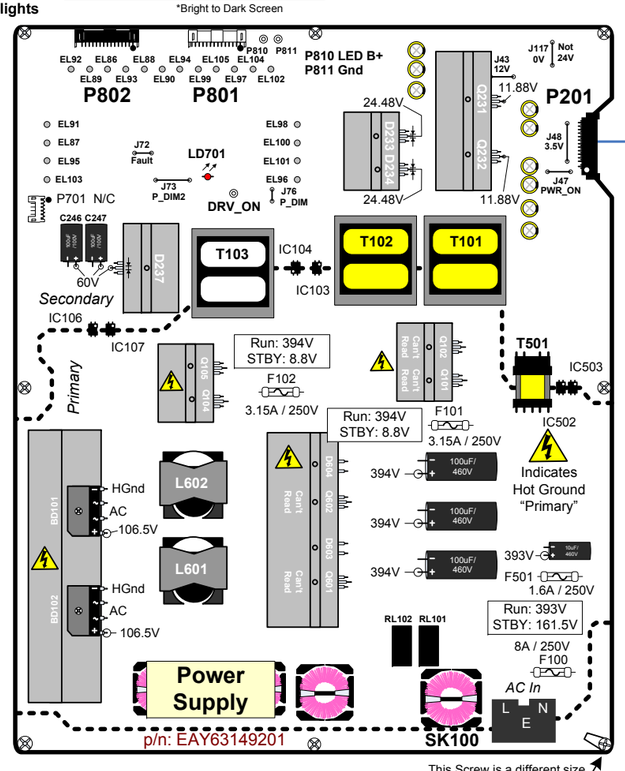
*Bright to Dark Screen

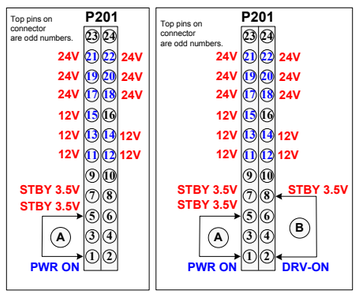
P801 White Plug "SMPS" To "Panel LEDs"

Pin	Label	TP	Run	Diode
1	VC-1	EL96	*1.17V ~ 13.93V	OL
2	VC-2	EL101	*1.17V ~ 14.09V	OL
3	VC-3	EL100	*1.30V ~ 14.18V	OL
4	VC-4	EL98	*1.40V ~ 14.18V	OL
5	VC-5	EL102	*1.53V ~ 14.18V	OL
6	n/c	n/c	n/c	n/c
7	LED+	P810	*59.6V ~ 60.81V	OL
8	LED+	P810	*59.6V ~ 60.81V	OL
9	n/c	n/c	n/c	n/c
10	VC-6	EL104	*1.44V ~ 13.99V	OL
11	VC-7	EL97	*1.43V ~ 14.20V	OL
12	VC-8	EL105	*1.24V ~ 14.08V	OL
13	VC-9	EL99	*1.22V ~ 14.01V	OL
14	VC-10	EL94	*1.22V ~ 14.32V	OL

*Bright to Dark Screen

P801, P802 To Backlights





Note: If P801 or P802 is disconnected, the backlights power will come on, start at 37.7V climb to 48V, the fallback to 47.87V. ½ of the Backlights will be on

200 Total LEDs, 2 boards per/strip.
100 LEDs per/Strip. (10 Blocks/Zones per/strip)
Total 20 columns (Blocks or Zones). 10 LEDs per/Block
10 on the left are controlled by P801, 10 on the right are controlled by P802

P201 "SMPS Board" to P13002 "MAIN Board"

PIN	LABEL	STBY	RUN	Diode Check
28	*V_SYNC	0V	0.02V	OL
27	*SIN	0V	0.07V	OL
26	*Gnd	Gnd	Gnd	Gnd
25	*SCLK	0V	0.04V	OL
23-24	Gnd	Gnd	Gnd	Gnd
18-22	24V	0V	24.38V	1.12V
16-17	Gnd	Gnd	Gnd	Gnd
11-15	12V	0V	11.74V	0.44V
9-10	Gnd	Gnd	Gnd	Gnd
7-8	3.5V	3.57V	3.46V	OL
6	Gnd	Gnd	Gnd	Gnd
5	3.5V	3.57V	3.46V	OL
4	(4) P-DIM2	0V	0.94V	OL
3	(3) P-DIM	0V	0.16V~3.25V	OL
2	DRV_ON	0V	3.07V	1.66V
1	PWR_ON	0V	3.34V	1.15V

* The last 4 pins go to the T-CON board CN14.
Pin 25 to pin 4, 26 to pin 3, 27 to pin 2, 28 to pin 1

PANEL TEST:
To run the Panel Test (Testing the T-CON without the Main board), simply unplug CN7_1 or CN7_2. Apply 12V to the Fuse F1 on the T-CON. Apply power to the set. (Backlights and Power Supply should already be working). T-CON outputs color patterns on the screen. This test confirms the T-CON, Power Supply, Panel and Backlights are working normally.

WARNING: Be sure to install the screws in the T-CON board before applying power. Damage to the board will occur.

Note: P201 is actually a 28 pin connector, but only the 24 pins going to the Main board are shown here.

WARNING: Do not add or remove jumpers with Power Applied.

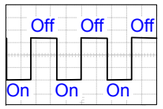
NOTE: The pin numbers on P2600 on the Main board are different than P201 on the SMPS. The pins denoted on the left are for P201, but use the Main board side to insert Jumpers.

SMPS TEST 1: To Force Power Supply On without the Main Board.
Disconnect the P13002 on the Main board.
(A) Jump pin 5 (3.5V) to pin 1. Test Voltage Outputs 12V, 24V to Main. (0V Backlight power and the Backlights are not on at this time).
LED Ground Return Line is (0V).
Remove AC power. Leave the jumper in place.

SMPS TEST 2: (Turning on the Backlights)
(B) Jump pin 8 (3.5V) to pin 2 (DRV-ON). Apply AC power, the Backlights should turn on. Note, the LED B+ will now read to 59V.
LED Ground Return Line is (0.98V-1.37V). P-DIM and P_DIM2 P201 (pins 3 and 4) will read 3.50V.

PANEL p/n: EAJ62573301

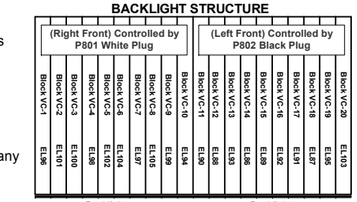
DARK AREA ON SCREEN: If a part of the picture is exhibiting a dimmer backlight level than the other or the overall brightness seems dim, be sure to first check the customer's Menu setting for Backlights. Raise the percentage and see if the overall brightness returns to normal. If not, Check the P-DIM level, it should rise with the percentage shown on screen.
Unplug CN14 (T-CON to SMPS) Local Dimming signals. If problem is fixed, assume T-CON, if not perform Block test below.



4.64V p/p | 2.5mSec
120Hz

LED ONE BLOCK TEST (DIM OR DARK PICTURE AREA):
Turn the Brightness, Contrast and Backlights all the way up. Confirm 60V on P210.
Confirm P-DIM is approx. 3V. You can turn on a Block of LEDs by using a 1K ohm resistor from any test point EL86 – EL105 to Ground.
The Power Supply must be producing the 60V for the Backlight B+.
Failure to use a resistor will damage the panels backlight and may also damage the power supply.

BACKLIGHT STRUCTURE



(1) PWR_ON: turns on the 12V and 24V lines. Backlight power is 0V.
(2) DRV_ON: (INV_ON from Main) turns on the Backlights. Backlight power goes to 60V.
(3) P-DIM: controls the backlight brightness. Controlled via the Customer's Menu: Home -> Settings -> Picture -> Backlights. Range 0% to 100% directly proportional to DC voltage to Backlight brightness. (0.16V~3.25V)
P-DIM is actually a PWM signal.
(4) P_DIM2: Fixed Voltage

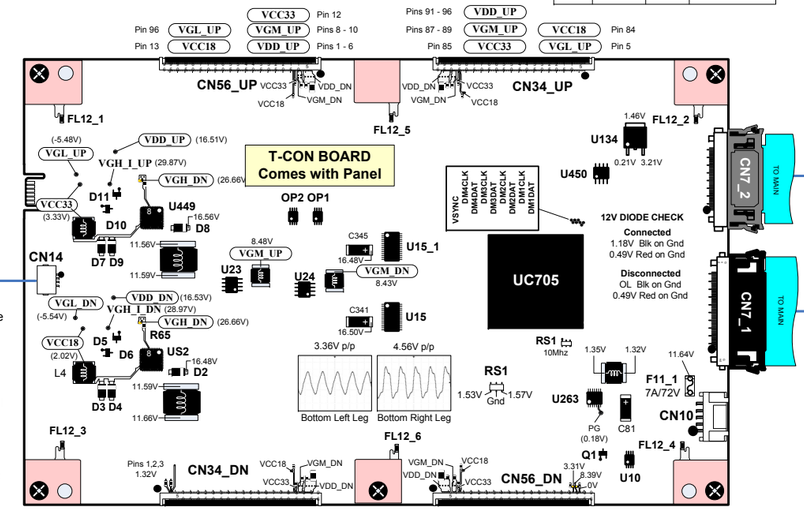
DIODE CHECK CONNECTED

	Blk on Gnd	Red on Gnd
3.5V_ST	1.09V	0.20V
12V	0.58V	0.41V
24V	0.98V	0.17V

For T-CON component Voltages see 13th page of the Interconnect diagram.

CN10 "T-CON" to P13401 "Main"

PIN	LABEL	RUN	Diode Check
3-5	12V	11.66	OL
1-2	Gnd	Gnd	Gnd



CN14 Local Dimming To SMPS Top 4 pins

Pin 5	VGL_DN	VCC33	Pin 85	Pins 1-6	VDD_DN	VCC18	Pin 13
Pin 7	VGH_DN	VGM_DN	Pins 87 - 89	Pins 8-10	VGM_DN	VGH_DN	Pin 94
Pin 84	VCC18	VDD_DN	Pins 91 - 96	Pin 12	VCC33	VGL_DN	Pin 96

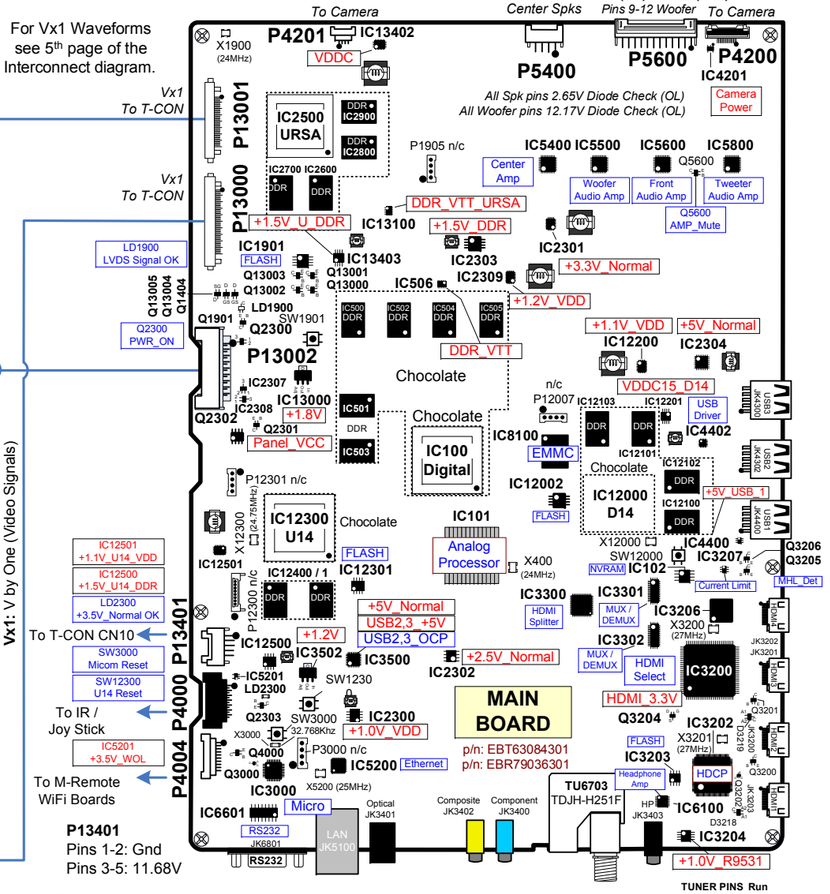
Key Voltages

M-Remote
To P4004 Main Board
p/n: EBR76363003

Front IR/ Joy Stick
To P4000 Main Board
p/n: EBR78101301

WiFi
To P4004 Main Board
p/n: ETA62093401

For Vx1 Waveforms see 5th page of the Interconnect diagram.



Vx1: V by One (Video Signals)

LD1900: Indicates VX1 Signal to T-CON is good if LD1900 is illuminated. If Off, possible causes: Improper seated LVDS cable, or problem with signal processing.
LD2300: Indicates +3.3V_NORMAL voltage is good. If Off, suspect a load on the line or a failue of IC2301.

KEY VOLAGES
P4000 "MAIN" to "M-Remote/WiFi"

PIN	LABEL	STBY	RUN	Diode ✓
2	+3.5V_WOL	0V	3.44V	1.17V
4	+3.5V_Normal	0V	3.45V	0.43V

Pin 2: Is for WiFi. Pin 4: Is for Magic Remote

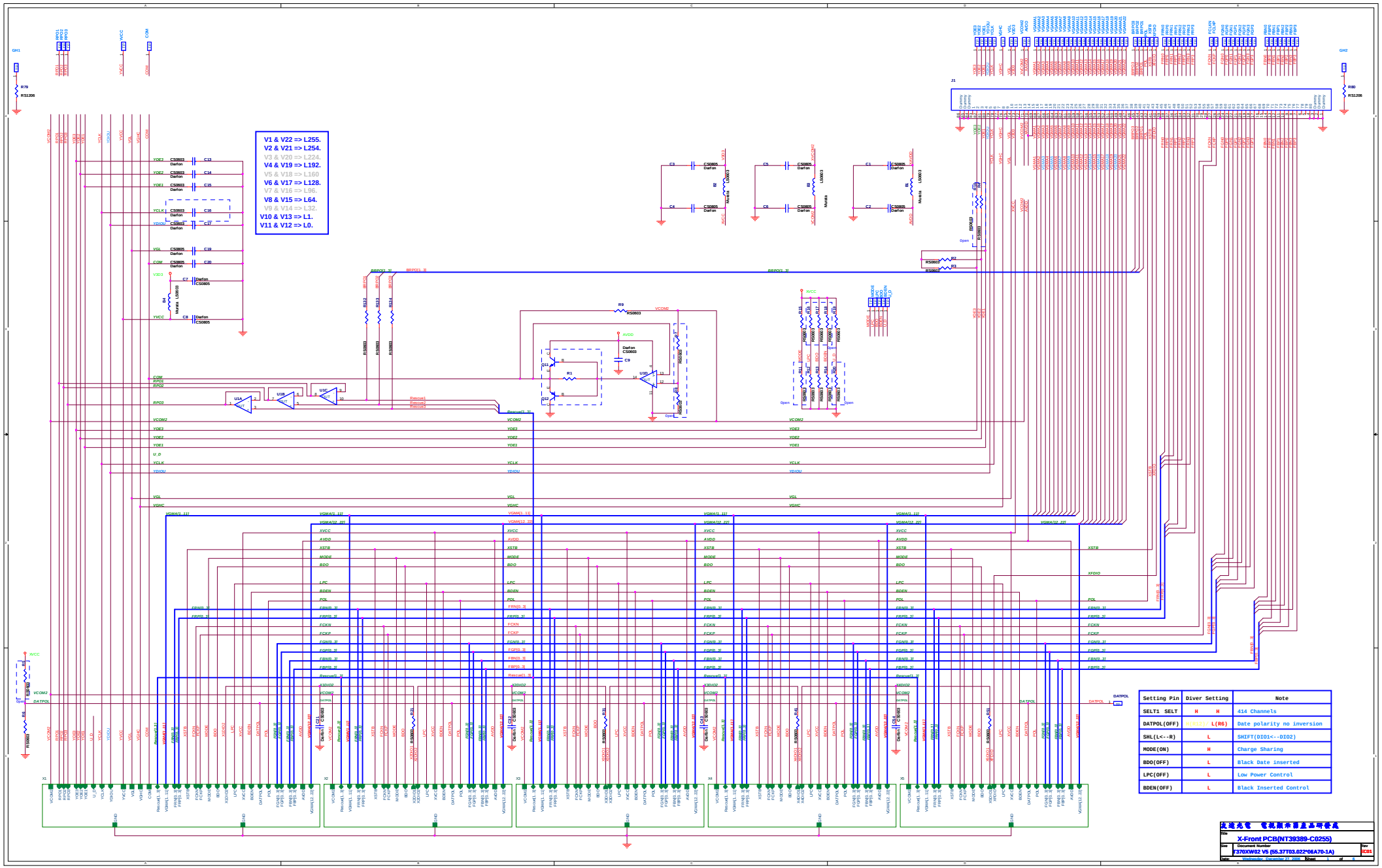
P4004 "Main" To "Joy Stick"

Pin	Label	STBY	Run	Diode ✓
10	Eye_SDA	3.55V	3.46V	2.01V
9	Eye_SCL	3.55V	3.46V	2.01V
8	Gnd	Gnd	Gnd	Gnd
7	IR	3.50V	3.42V	2.01V
6	LOGO	1.32V	1.23V	OL
5	Gnd	Gnd	Gnd	Gnd
4	3.5V_ST	3.56V	3.46V	1.20V
3	Key 2	3.54V	3.46V	2.01V
2	Key 1	3.54V	3.46V	2.01V
1	Gnd	Gnd	Gnd	Gnd

IR 3.80V p/p

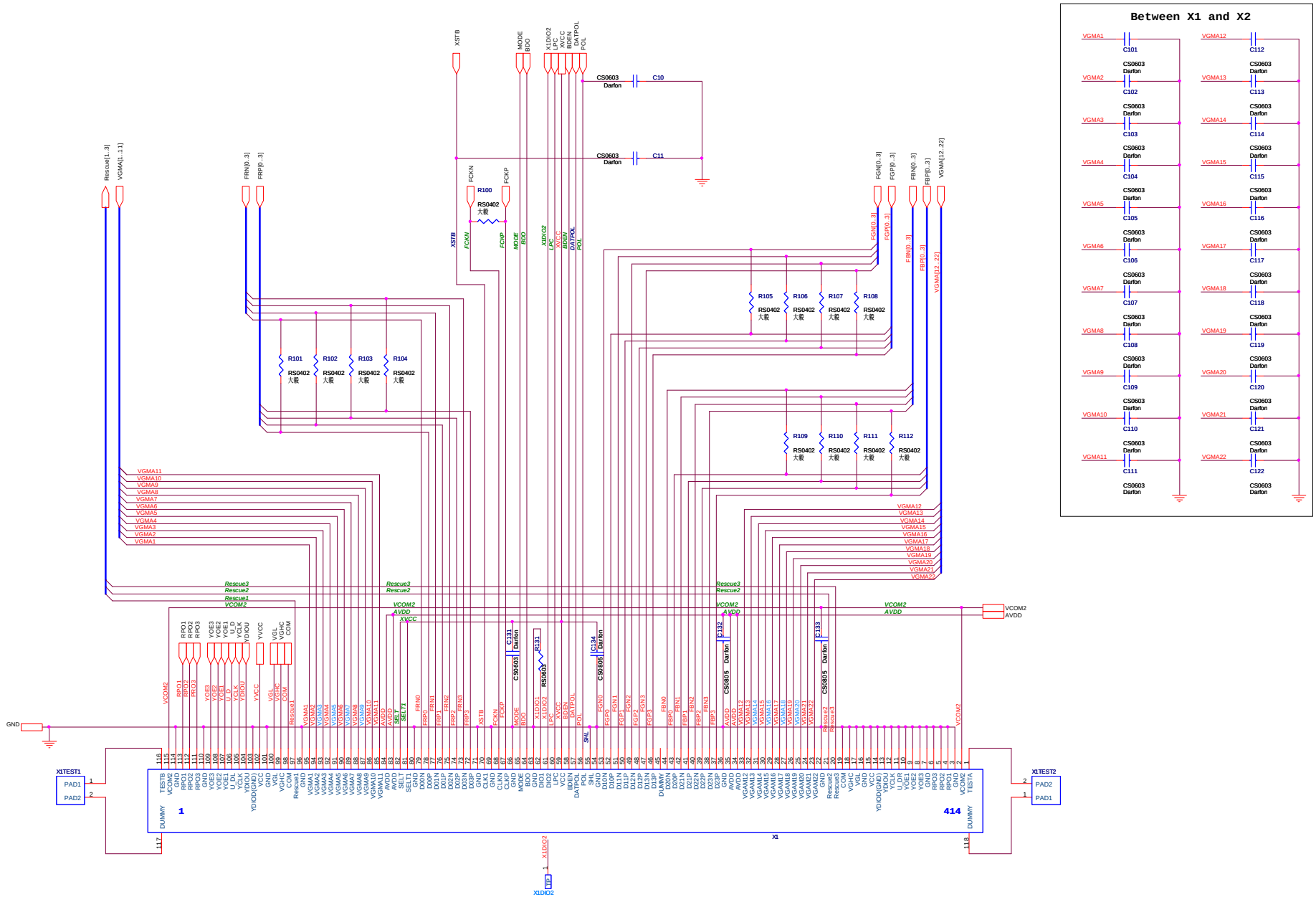
TUNER PINS Run
9. CVBS 1.51V
8. SIF 0.42V
7. DIF (N) 0V
6. DIF (P) 0V
5. SDA 3.32V
4. SCL 3.32V
3. DIF_AGC 1.30V
2. NC 0V
1. 3.3V 3.32V

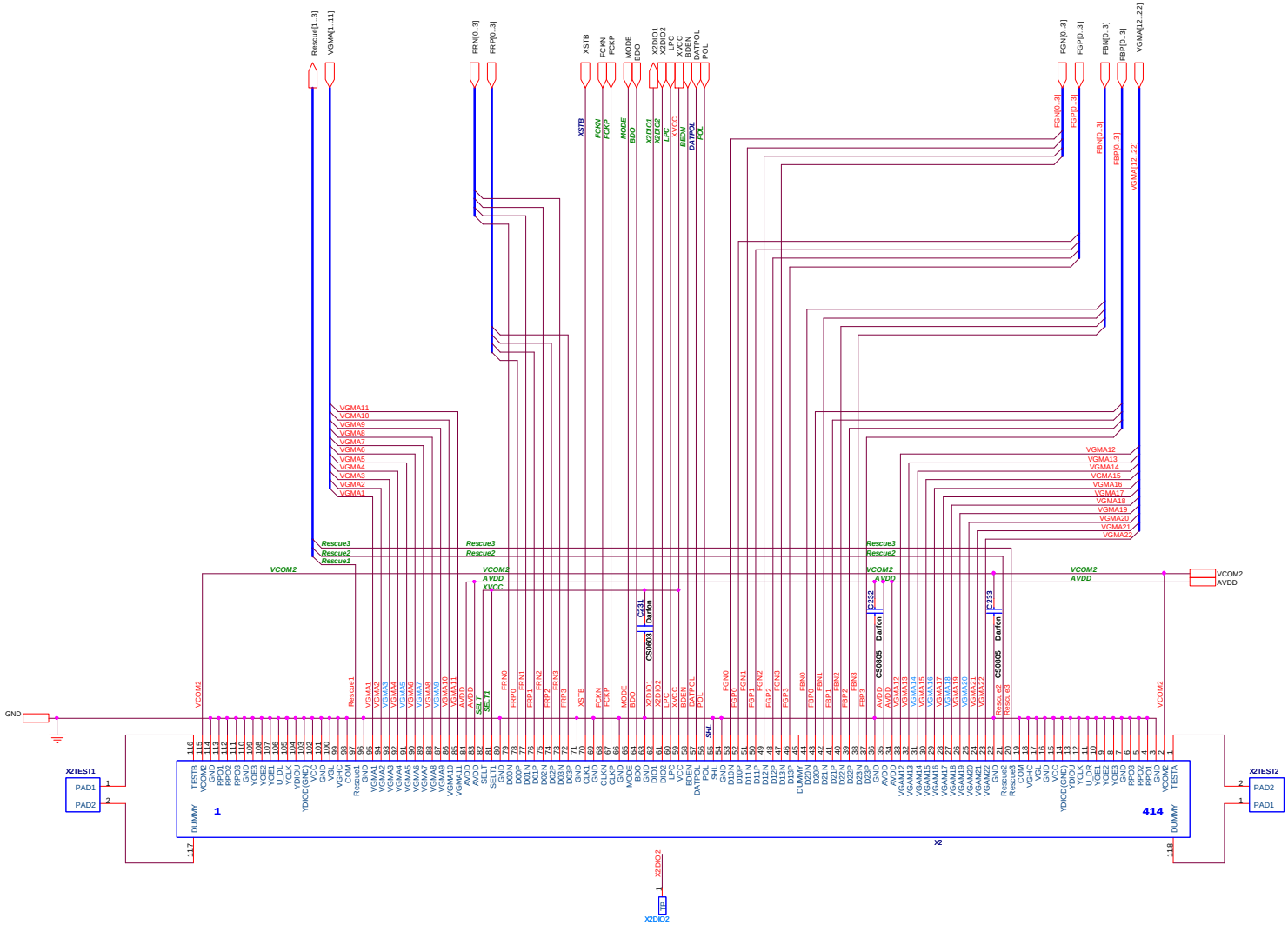
P4200 PINS Run
1. Cam Slide 3.31V
2. Cam Trigger 0.80V
3. Gnd Gnd
4. DM 0V
5. DP 0V
6. Gnd Gnd
7. I2C 0.64V
8. AUD_CLK 1.60V
9. AUD_LRCK 1.61V
10. I2C_AMP 1.28V
11. Gnd Gnd
12. 3.5V_CAM 3.41V
13. 3.5V_CAM 3.41V
14. CAM ON 0.01V
15. CAM_Reset 3.41V
16. CAM_Sleep 0.01V



Setting Pin	Diver Setting		Note
SELT1 SELT	H	H	414 Channels
DATPOL(OFF)	L(R6)		Date polarity no inversion
SHL(L<--R)	L		SHIFT(DIO1<--DIO2)
MODE(ON)	H		Charge Sharing
BDO(OFF)	L		Black Date inserted
LPC(OFF)	L		Low Power Control
BDEN(OFF)	L		Black Inserted Control

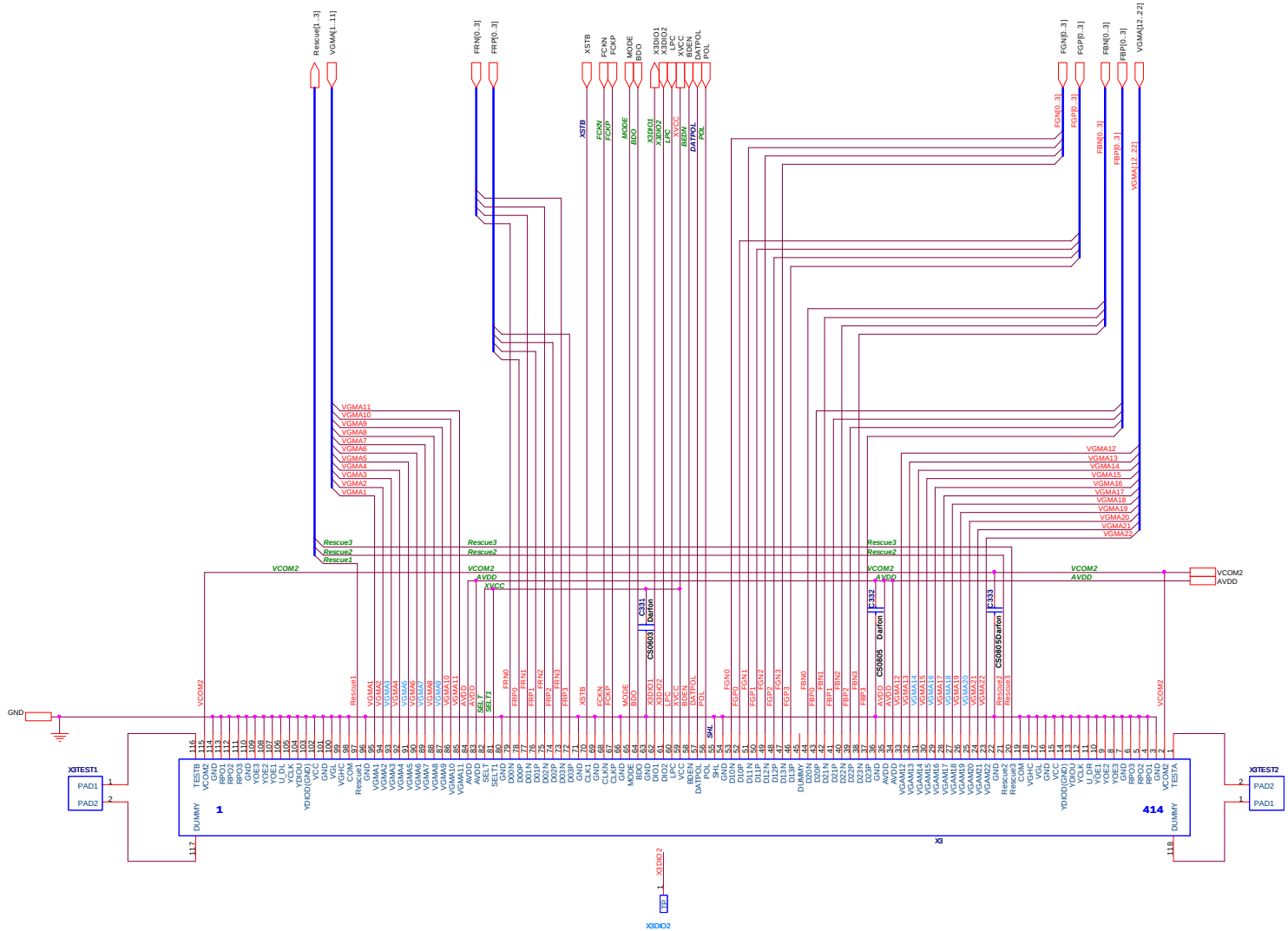
友通光電 電視顯示器產品研發處		
Title	X-Front PCB(NT39389-C0255)	
Size	Document Number	Rev
	7370XW02 V5 (55.37T03.022*06A70-1A)	C01
Date: Wednesday, December 27, 2006	Sheet 1 of 8	





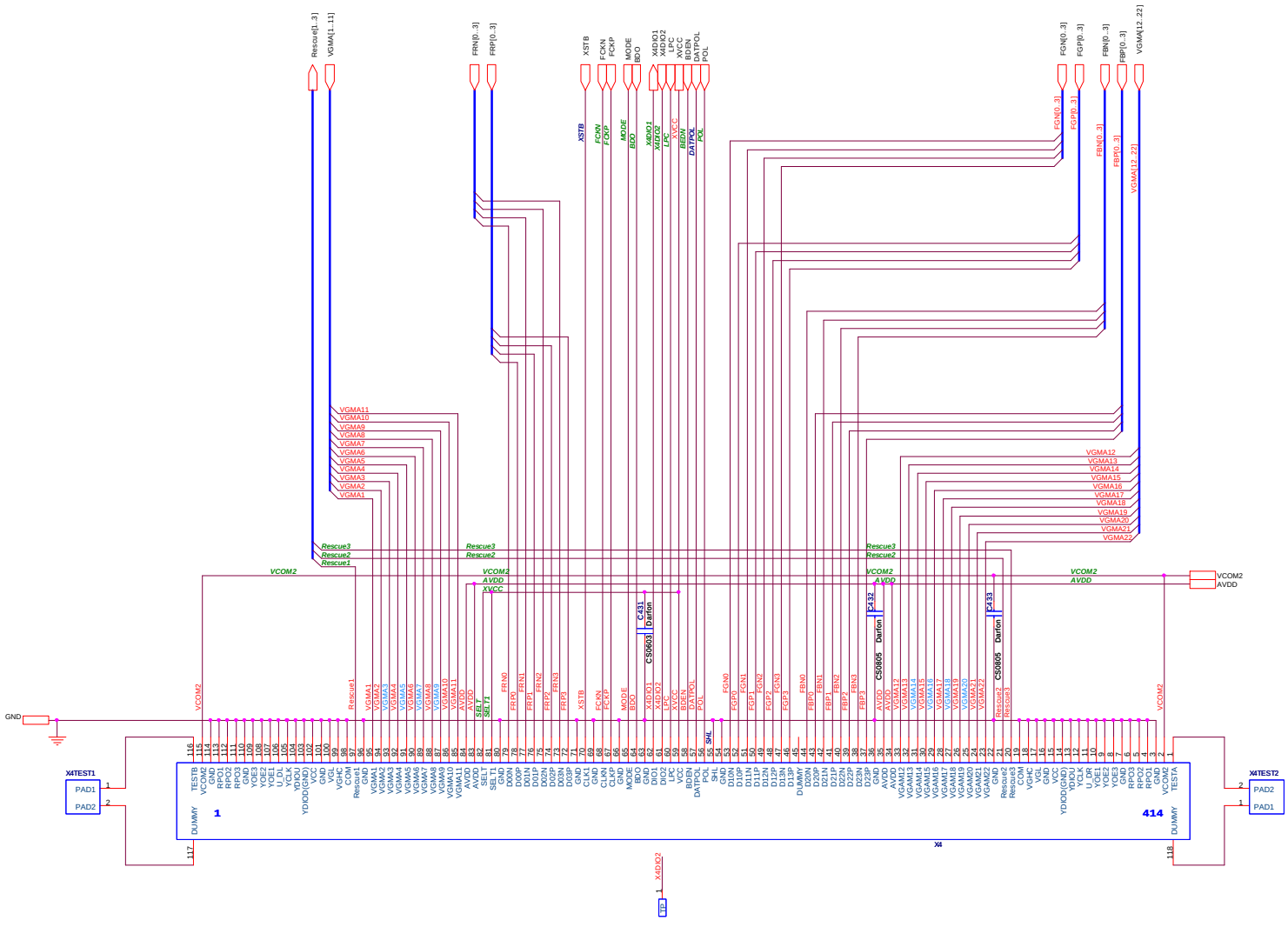
友達光電　電視顯示器產品研發處

Title	X2 Block(NT39389-C0255)	
Size C	Document Number T370XW02 V5 (55.37T03.022*06A70-1A)	Rev EC01
Date: Wednesday, December 27, 2006	Sheet 3 of 6	



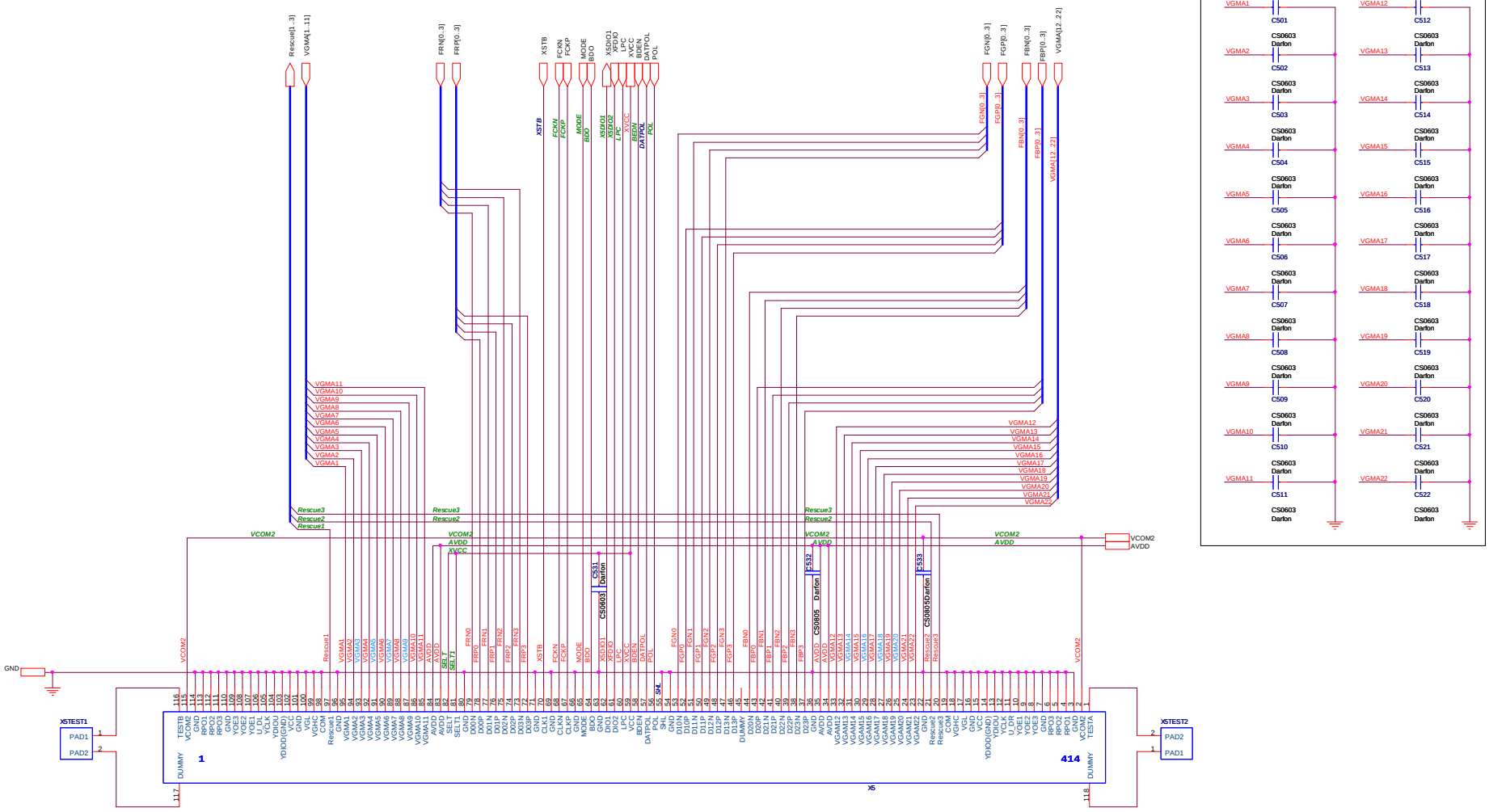
友達光電　電視顯示器產品研發處

Title	X3 Block(NT39389-C0255)	
Size C	Document Number T370XW02 V5 (55.37T03.022*06A70-1A)	Rev EC01
Date: Wednesday, December 27, 2006	Sheet 4 of 6	



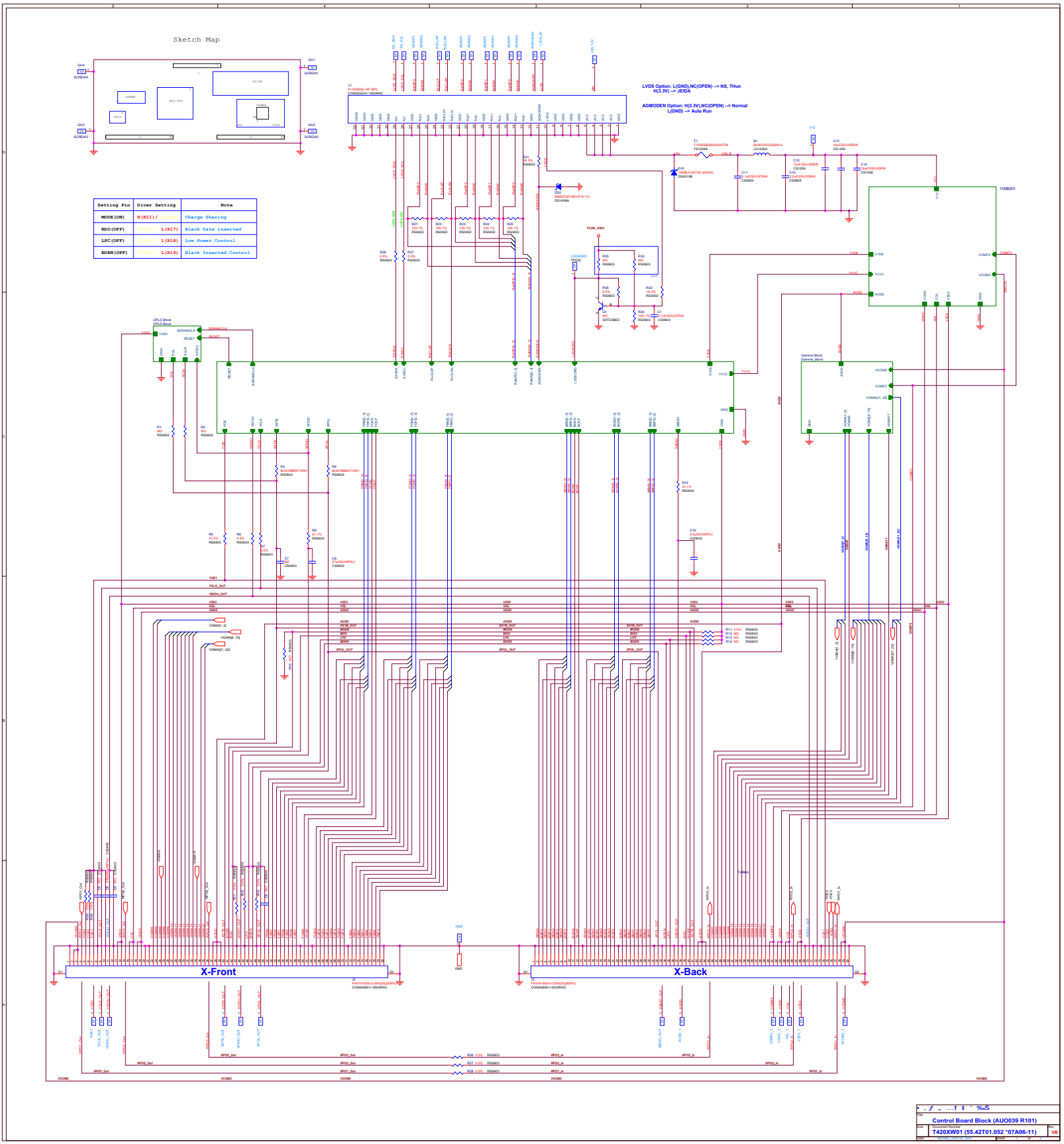
友達光電　電視顯示器產品研發處

Title	X4 Block(NT39389-C0255)	
Size: C	Document Number: T370XW02 V5 (55.37T03.022*06A70-1A)	Rev: EC01
Date: Wednesday, December 27, 2006	Sheet 5 of 6	

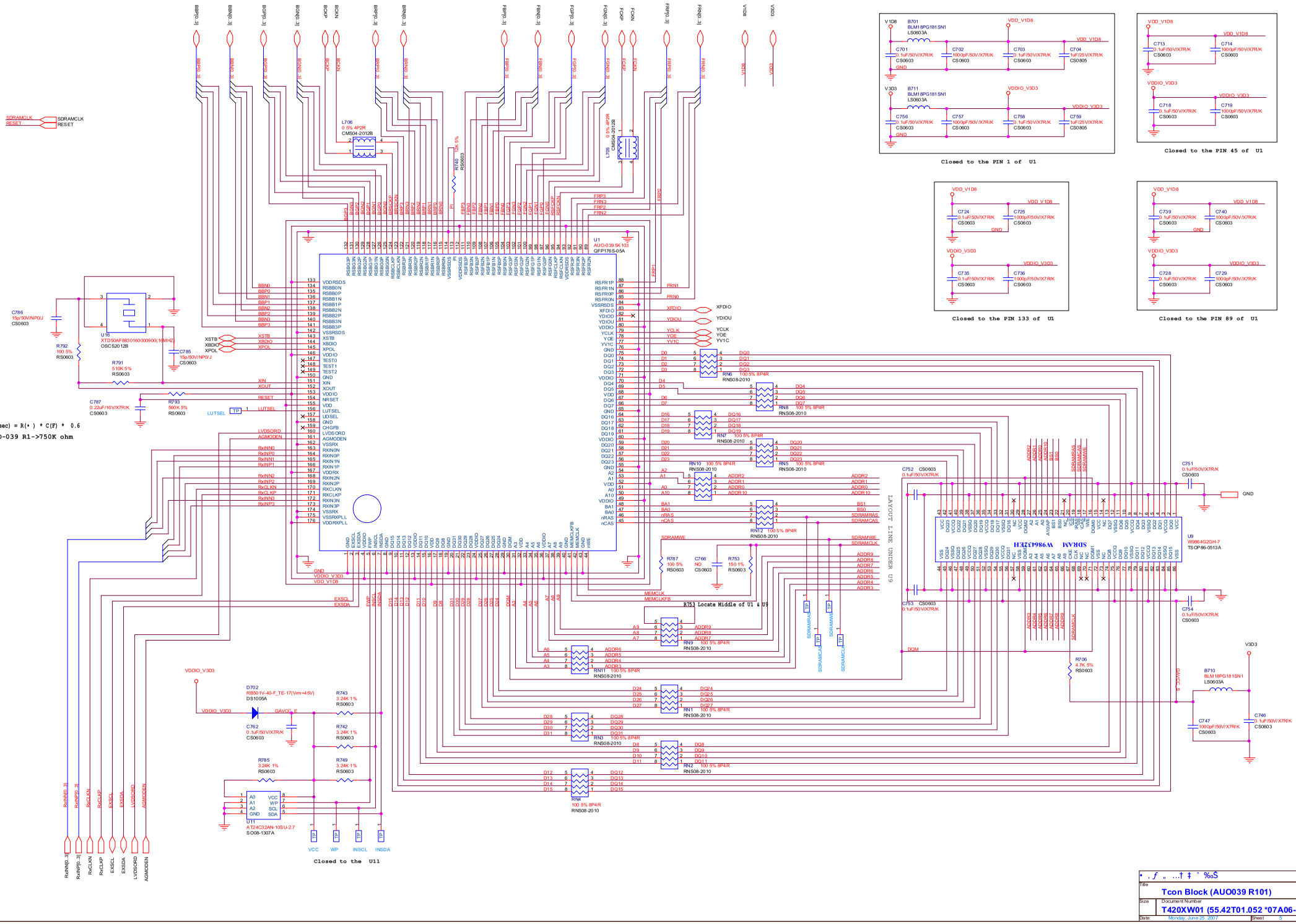


Between X4 and X5

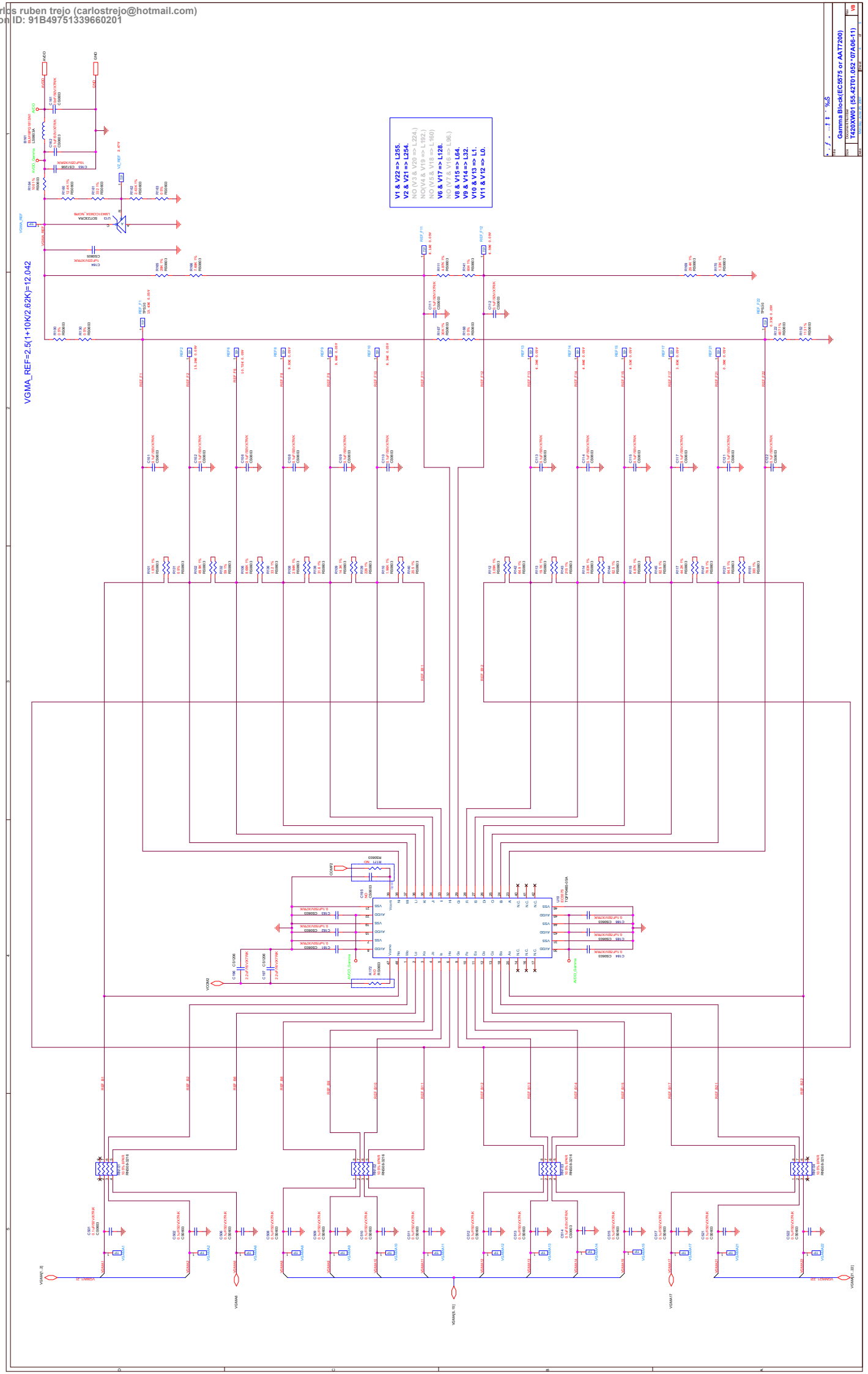
友達光電 電視顯示器產品研發處		
Title: X5 Block(NT39389-C0255)		
Size: C	Document Number: T370XW02 V5 (55.37T03.022*06A70-1A)	Rev: EC01
Date: Wednesday, December 27, 2006	Sheet 6 of 6	

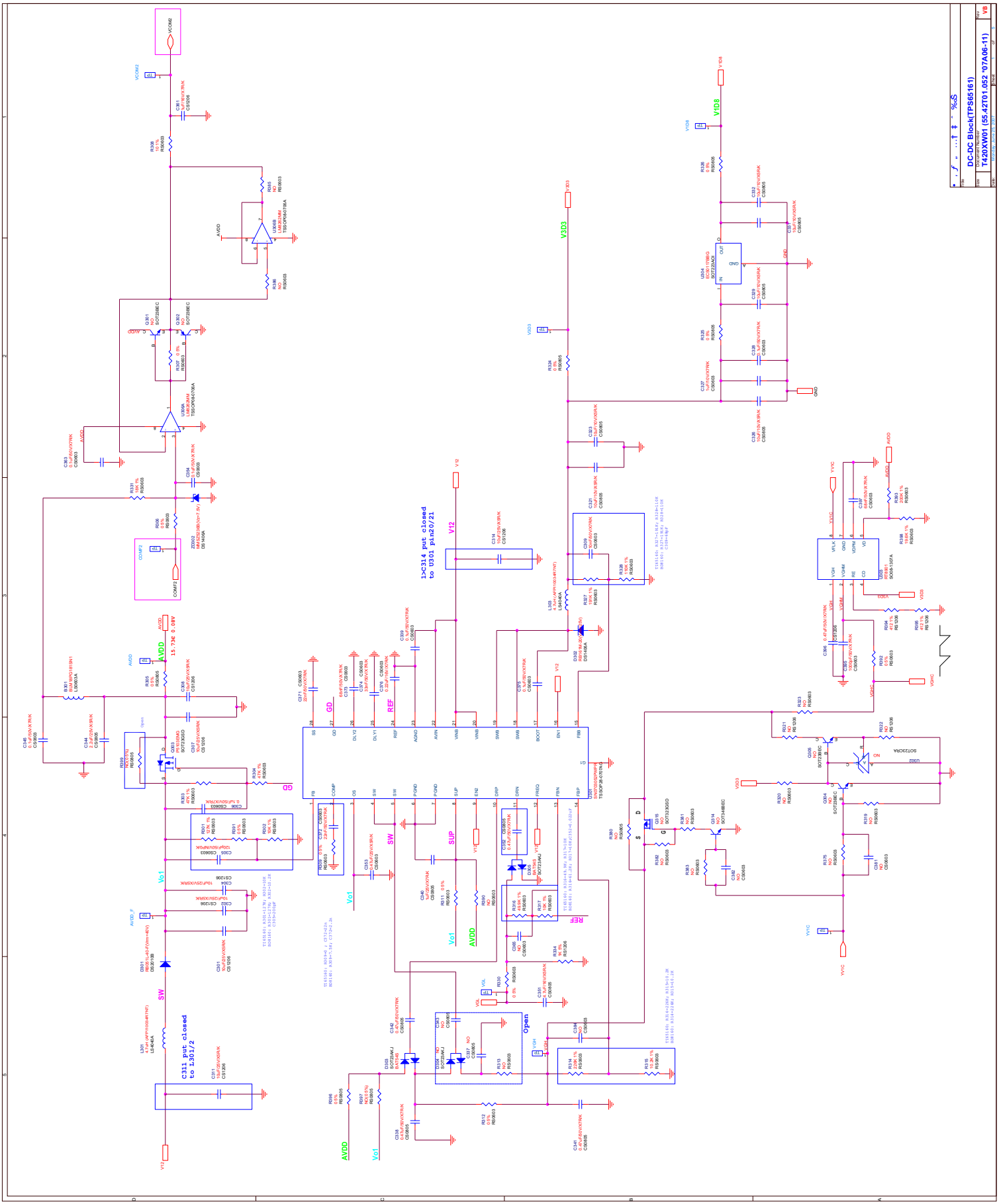


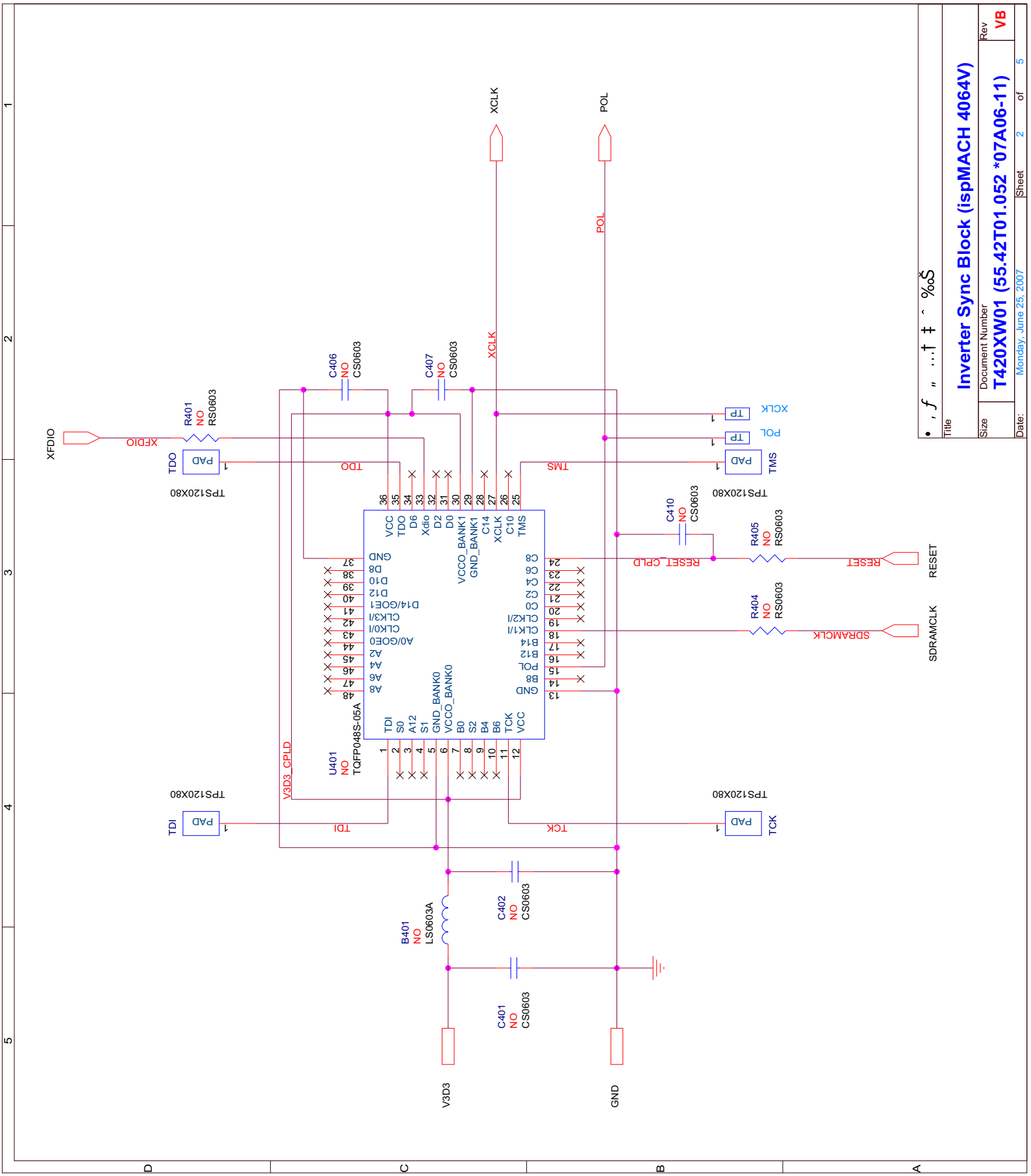
Setting Pin	Diver Setting	Note
MODE (ON)	H(R11)/ L(R16)	Charge Sharing
BDO (OFF)	H(R13)/ L(R17)	Black Date inserted
LPC (OFF)	H(R14)/ L(R18)	Low Power Control
BDEN (OFF)	H(R15)/ L(R19)	Black Inserted Control



Title	Tcon Block (AUO039 R101)	
Size	Document Number: T420XW01 (55.42T01.052 *07A06-11)	Rev: VB
Date: Monday, June 25, 2007	Sheet 5 of 8	







Close to U101

Close to U101

Close to U101

Close to U101

Close to U101

Close to U101 terminal resistor(100 ohm)

60Hz & 120Hz S-IC Setting

Close to J1

Close to J1

RESET

Path balance between U101 &U201

FPC connector

LVDS connector

Model Name	T520HW01 V0
Size	A1
Document Number	00.C-PCB Block
Rev	EC04
Date:	Wednesday, October 01, 2008
Sheet	1 of 7

AUO12401 K1

U101

Close to U101

BA102 CMS04-2012C

BA101 CMS04-2012C

RV2P[0..7] RV2N[0..7] RV2PCLK RV2NCLK

LV2P[0..7] LV2N[0..7] LV2PCLK LV2NCLK

For B1 & K1 Compatible

R120 NC 5% 0603

R119 5% 0603

C127 1210 X7R 16V

C128 0603 X7R 16V

Close to U101-Pin64

VDD_V3D3

C124 X7R 50V 0402

C125 X7R 16V 0603

C126 X7R 16V 0603

VDD_V1D2

C121 X7R 50V 0402

C122 X7R 16V 0603

C123 X7R 16V 0603

R123 NC 5% 0402

Close to U101-Pin118

V1D2_M L101 LS0603A10

C101 X7R 16V 0603

C102 X7R 50V 0402

C103 X7R 16V 0603

C104 X7R 16V 0603

V3D3_M L102 LS0603A10

C105 X7R 16V 0603

C106 X7R 50V 0402

C107 X7R 16V 0603

C108 X7R 16V 0603

GND

VDD_V1D2

VDD_V3D3

XIN_M PAD

XOUT_M PAD

PWM_M OSCSEL

R121 0603 1%

R122 0603 1%

Close to U101-Pin127

Y101 NPO 50V 0603

C109 NPO 50V 0603

R113 1% 0603

R114 1% 0603

C110 NPO 50V 0603

Close to U101

RXOBN0 R101 1% 0402 RXOBP0

RXOBN1 R102 1% 0402 RXOBP1

RXOBN2 R103 1% 0402 RXOBP2

RXOBNCLK R104 1% 0402 RXOBPCLK

RXOBN3 R105 1% 0402 RXOBP3

RXOBN4 R106 1% 0402 RXOBP4

RXODN0 R107 1% 0402 RXODP0

RXODN1 R108 1% 0402 RXODP1

RXODN2 R109 1% 0402 RXODP2

RXODNCLK R110 1% 0402 RXODPCLK

RXODN3 R111 1% 0402 RXODP3

RXODN4 R112 1% 0402 RXODP4

RXOBN[0..4] RXOBP[0..4] RXOBNCLK RXOBPCLK

RXODN[0..4] RXODP[0..4] RXODNCLK RXODPCLK

Close to U101-Pin33

VDD_V1D2

C111 X7R 50V 0402

C112 X7R 16V 0603

C113 X7R 16V 0603

VDD_V3D3

C114 X7R 50V 0402

C115 X7R 16V 0603

C116 X7R 16V 0603

Close to U101-Pin56

L103 LS0603A10

V3D3_M

C120 X7R 16V 0603

C119 X7R 50V 0402

C118 X7R 16V 0603

Close to U102

NSDA_M NSCL_M EPWP_M VCCE_M GNDE_M PAD

U102 SDA SCL WP VCC GND A2 A1 A0

R115 1% 0402

R116 1% 0402

R117 1% 0402

R118 0603 1%

D101 DS1005A

C117 X7R 16V 0603

VDD_V3D3

GND

VDD_V1D2

VDD_V3D3

SWAPL_M GOAEN SPDEN DCREN ODEN AGBSEN LVDSORD

VSEL XSTB_M XBDO_M XPOL_M YDIO_M YCLK_M YOE1_M GSEL_M

YOE3_M YOE4_M YV1C_M

RSTN

INSDA_M INSCL_M EPWP_M

EXSDA_M EXSCL_M

AUO			
Model Name	T520HW01 V0		
Size A3	Document Number 01.TCON		Rev EC04
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V12 GND

C301, C302 put closed to L301

L301 LS4040A 25%

SW

D301 DS2010B

C303 X7R 25V 1210

C304 X7R 25V 1210

Vo1

Layout closely to IC, far from D301 and L301
TI65161: R301=127K; R303=10K; C306=120pF

R301 1% 0603

R302 1% 0402

R303 1% 0402

C306 NPO 50V 0603

TI65161: R313=0 ; C307=22n

R313 0402 5%

C307 25V X7R 0603

C308 25V X7R 0805

U301

1 FB
2 COMP
3 OS
4 SW
5 SW
6 PGND
7 PGND
8 SUP
9 EN2
10 DRP
11 DRN
12 FREQ
13 FBN
14 FBP

28 SS
27 GD
26 DLY2
25 DLY1
24 REF
23 GND
22 AVIN
21 VINB
20 VINB
19 NC
18 SWB
17 BOOT
16 EN1
15 FBB

G1

C309: AVDD soft-start time control

C309 16V X7R 0402

R312 0603

GD

C310 X7R 16V 0402

C311 X7R 25V 0402

REF

C312 X7R 16V 0603

C310: AVDD and VGH delay time control

C311: VGL delay time control

C330 put closed to Pin 22 C331 put closed to Pin 20

C330 X7R 25V 0603

C331 X7R 25V 1210

V12

R321 NC 5% 0603

S D G

R320 0603

Q301 SOT23GSD

C313 X7R 50V 0603

AVDD_L

15.73±0.08V

R326 5% 0805

AVDD_L

C314 X7R 25V 1210

C315 X7R 25V 1210

C316 X7R 25V 1210

C317 X7R 25V 1210

C318 X7R 25V 1210

1/2 AVDD soft-start

C344 X7R 25V 0603

U305

1 SS
2 BST
3 VIN
4 SW
8 EN
7 COMP
6 FB
5 GND

G1

V12

C345 X7R 25V 0603

C343 X7R 25V 1210

VFB=0.9V

R376 0402 1%

R375 0402 1%

close pin6

close pin7

R374 0402 1%

NC C346 X7R 10V 0603

C342 X7R 50V 0402

X7R 060310V

C347 NC

R378 0402 1%

R377 AVDD_L 0402 1%

L304 LS4040A 25%

D309 DS2010A

C341 X7R 10V 1206

NC C340 X7R 10V 1206

C339 X7R 10V 1206

R372 5% 0603

R373 5% 0603

VTOP

VTOP

VBOT

VBOT

Current limit R to reduce inrush current during YV1C switch

R330 1206 5% NC

R331 5% 1206 NC

C358 NC X7R 50V 1210

C357 NC X7R 50V 1206

R324 NC 5% 0603

D307 NC DS1406A

D306 NC DS1406A

C355 NC X7R 50V 1206

D305 NC DS1406A

D304 NC DS1406A

C356 NC X7R 50V 0805

C351 put closed to Pin 8

C351 X7R 25V 0805

V12

C352 X7R 50V 0805 NC

C353 X7R 50V 0805 NC

Layout close to IC

VGL_L

R322 0603 5%

R307 0402 1%

R308 0402 1%

C354 X7R 1206 16V

R311 0805 1%

D303

SOT23AKJ

REF

R309 NC 1% 0402

R310 NC 1% 0402

R328 5% 0603

V3D3_M

Layout closely to Pin13 and far from D203, D204, D205,D206 and D207
TI65161: R207=49.9K; R208=10K

Layout close to Pin14 and far from D203, D204, D205,D206 and D207
TI65161: R209=226K; R210=10.2K

L302 LS4040A 25%

C332 50V X7R 0603

D302 DS2010A

C333 X7R 10V 1206

C334 X7R 10V 1206

R304 1% 0402

R305 1% 0402

C335 X7R 16V 0603

Layout closely to pin15 and far from L302 and D302
TI65161: R304=191K; R305=110K; C335=10pF

V3D3_M

R322 5% 0805

V1D2_M

R327 5% 0603

V1D2_M

U302

Vin GND Vout

C336 X7R 10V 1206

C337 X7R 10V 1206

C338 X7R 10V 1206

VGH

When YV1C initial value is "L" => the Q2, Q3, R8, R9, C10 are NC
When YV1C initial value is "H" => add the Q2, Q3, R8, R9, C10 , and the R10 is NC

R355 5% 0805

Q316 NC SOT23GSD

C383 X7R 50V 1206

L303 LS4040A 25%

D308 DS2010A

C373 X7R 25V 1210

C374 X7R 50V 1206

R351 1% 0603

C375 NPO 50V 0402

R352 1% 0603

R353 1% 0603

C380 X7R 50V 1206

C381 X7R 50V 1206

C382 X7R 25V 0603

R354 1% 0603

NC NC

R356 NC 1% 0603

Q317 NC SOT23GSD

Close to U303

U303 BD93306AFVM

1 RT
2 CT
3 ENB
4 GD
8 FB
7 COMP
6 GND
5 VCC

FB

R350 0603 1%

GND V12

C376 NPO 50V 0402

C378 X7R 25V 0603

C379 X7R 50V 0402

R347 1% 0603

Q315 RSS070N05 SO08-1307A

S1 D8
S2 D7
S3 D6
G4 D5

AVDD_L

R348 1% 0603

R349 1% 0603

C377 X7R 25V 0603

Power on sequence :12V
=>3.3V =>VGL =>AVDD =>VGH

VGHC

VGHC

R371 5% 0805

NC R357 5% 0805

NC C384 X7R 50V 0805

C385 NPO 50V 0603

R358 5% 1206
R359 5% 1206
R360 5% 1206
R361 5% 1206
R362 5% 1206
R363 5% 1206
R364 5% 1206
R365 5% 1206
R366 5% 1206
R367 5% 1206

R368 5% 0805

U304

G1 GND GND
1 VGH
2 VGHM
3 SVGHM
4 RE
12 11
10 VFLK
9 CD
8 VDPM
7 VD
5 GND
6 GND

YV1C_M

C386 X7R 50V 0603

R369 1% 0603

R370 1% 0402

AVDD_L

AUO		
Model Name	T520HW01 V0	
Size A2	Document Number 02.DC_DC_1	Rev EC04
Date: Tuesday, September 30, 2008	Sheet 3 of 7	

Layout closely to IC, far from D401 and L401
TI65161: R401=127K; R403=10K; C406=120pF

C401, C402 put closed to L401

TI65161: R413=0 ; C407=22n

C409: AVDD soft-start time control

C410: AVDD and VGH delay time control

C411: VGL delay time control

C430 put closed to Pin 22

C431 put closed to Pin 20

Layout close to IC

Layout closely to Pin13 and far from D403, D404, D405,D406 and D407
TI65161: R407=49.9K; R408=10K

Layout closely to pin15 and far from L402 and D402
TI65161: R404=191K; R405=110K; C435=10pF

Model Name	T520HW01 V0		
Size A3	Document Number 03.DC_DC_2		Rev EC04
Date: Tuesday, September 30, 2008	Sheet 4 of 7		

VG_A[1..18]

VG_A[1..18]

VG_A1 VG_A2 VG_A3 VG_A4 VG_A5 VG_A6 VG_A7 VG_A8 VG_A9 VG_A10 VG_A11 VG_A12 VG_A13 VG_A14 VG_A15 VG_A16 VG_A17 VG_A18

C501–C518: X7R 25V 0603

RN51: VGM_A1 VGM_A2 VGM_A3 VGM_A4 — 5% RNS08-3216

RN52: VGM_A5 VGM_A6 VGM_A7 VGM_A8 — 5% RNS08-3216

RN53: VGM_A9 VGM_A10 VGM_A11 VGM_A12 — 5% RNS08-3216

RN54: VGM_A13 VGM_A14 VGM_A15 VGM_A16 — 5% RNS08-3216

AVDD_MGA

R501 5% 0603 AVDD_L

C521 X7R 25V 0603

C522 X7R 25V 0603

C519 X7R 25V 0603

VCOM_REF

R507 5% 0603

R508 NC 5% 0603 VCOM_REF VCOM_REF

R509 NC 5% 0603

R502 5% 0603 V3D3_MGA V3D3_M

R503 1% 0402

C523 X7R 25V 0603

C524 X7R 25V 1210

GND

R504 NC 1% 0402

R506 1% 0402

R505 1% 0402 V3D3_MGA

SDA_MGA

SCL_MGA

U501

				14	13	12	11	10	9	8												
				GMA2	GMA1	GMA0	AGND	AVDD	VDD_AMP	VCOM_FB												
VGM_A4	15	GMA3									VCOM	7										
VGM_A5	16	GMA4									GND_AMP	6										
VGM_A6	17	GMA5									DVDD	5										
VGM_A7	18	GMA6									A0	4										
VGM_A8	19	GMA7									SDA	3										
AVDD_MGA	20	AVDD									SCL	2										
	21	AGND									GMA15	1										
			22	23	24	25	26	27	28	G1												
			GMA8	GMA9	GMA10	GMA11	GMA12	GMA13	GMA14	G1												

GA_SDA

SDA_MGA R523 5% 0603 GA_SDA

SDA_IGA R524 5% 0603

GA_SCL

SCL_MGA R525 5% 0603 GA_SCL

SCL_IGA R526 5% 0603

AVDD_IGA R527 AVDD_L 5% 0603

R517 1% 0402

R516 1% 0402

C530 X7R 0603 25V

R514 1% 0402

C528 X7R 25V 0603

V3D3_IGA

VCOM_REF

R515 NC 5% 0603

C529 X7R 25V 0603

AVDD_IGA R512 1% 0402

R513 1% 0402

C527 X7R 25V 0603

U502

				32	31	30	29	28	27	26												
				REFIN	V_THERM	SET_COMP	VSD	SET	INPCOM/DVROUT	OUTCOM												
VGI_A1	1	OUT1									OUT18	25	VGI_A18									
VGI_A2	2	OUT2									OUT17	24	VGI_A17									
VGI_A3	3	OUT3									OUT16	23	VGI_A16									
VGI_A4	4	OUT4									OUT15	22	VGI_A15									
C525 060325V X7R	5	AVDD									AVDD	21	AVDD_IGA C526 X7R 25V 0603									
	6	GND									GND	20										
VGI_A5	7	OUT5									OUT14	19	VGI_A14									
VGI_A6	8	OUT6									OUT13	18	VGI_A13									
VGI_A7	9	OUT7									OUT12	17	VGI_A12									
		G1									G1											
			10	11	12	13	14	15	16													
			OUT8	OUT9	SDA	SCL	BANK_SEL	OUT10	OUT11													

VGI_A8 VGI_A9 SDA_IGA SCL_IGA VGI_A10 VGI_A11 V3D3_IGA

V3D3_M R529 V3D3_IGA 5% 0603

R520 1% 0402

R521 1% 0402

R510 NC 1% 0402

R511 1% 0402

R518 NC 1% 0402 VG_A1 VGI_A1

RN55: VG_A2 VG_A3 VG_A4 VG_A5 VGI_A2 VGI_A3 VGI_A4 VGI_A5 — 5% RNS08-3216

RN56: VG_A6 VG_A7 VG_A8 VG_A9 VGI_A6 VGI_A7 VGI_A8 VGI_A9 — 5% RNS08-3216

RN57: VG_A10 VG_A11 VG_A12 VG_A13 VGI_A10 VGI_A11 VGI_A12 VGI_A13 — 5% RNS08-3216

RN58: VG_A14 VG_A15 VG_A16 VG_A17 VGI_A14 VGI_A15 VGI_A16 VGI_A17 — 5% RNS08-3216

R519 NC 1% 0402 VG_A18 VGI_A18

R530 VG_A8 1% 0402 U504A VGM_A8

R531 1% 0603 AVDD_MGA

R532 1% 0603

R533 1% 0603

R534 1% 0603 VGM_A9

R535 VG_A11 1% 0402 U504B VGM_A11

R536 1% 0603 AVDD_MGA VGM_A10

R537 1% 0603

R538 1% 0603

R539 1% 0603 VGM_A12

R540 VG_B_2 VG_B2 1% 0402 U504C VGM_B2

R541 1% 0603 VG_B_1 VGM_B1 AVDD_MGA

R542 1% 0603

R543 1% 0603

R544 1% 0603 VG_B_3 VGM_B3

R545 VG_B17 1% 0402 U504D VGM_B17

R546 1% 0603 VG_B_16 VGM_B16 AVDD_MGA

R547 1% 0603

R548 1% 0603

R549 1% 0603 VG_B_18 VGM_B18

Maxim

V1 & V18 => L255.
V2 & V17 => L224.
V3 & V16 => L192.
V4 & V15 => L160.
V5 & V14 => L128
V6 & V13 => L96.
V7 & V12 => L64.
V9 & V10 => L0.

Intersil

V1 & V18 => L255.
V2 & V17 => L224.
V3 & V16 => L192.
V4 & V15 => L160.
V5 & V14 => L128
V6 & V13 => L96.
V7 & V12 => L64.
V8 & V11 => L32.
V9 & V10 => L0.

AUO

Model Name: T520HW01 V0

Size: A2 | Document Number: 04.Gamma_A | Rev: EC04

Date: Wednesday, October 01, 2008 | Sheet 5 of 7

VG_B[1..18]

VG_B1 VG_B2 VG_B3 VG_B4 VG_B5 VG_B6 VG_B7 VG_B8 VG_B9 VG_B10 VG_B11 VG_B12 VG_B13 VG_B14 VG_B15 VG_B16 VG_B17 VG_B18

C601–C618: X7R 25V 0603

VG_B2 → VGB2

VG_B17 → VGB17

RN61: VGM_B1 VGM_B2 VGM_B3 — 5% RNS08-3216

RN62: VGM_B4 VGM_B5 VGM_B6 VGM_B7 VGM_B8 — 5% RNS08-3216

RN63: VGM_B9 VGM_B10 VGM_B11 VGM_B12 — 5% RNS08-3216

RN64: VGM_B13 VGM_B14 VGM_B15 VGM_B16 — 5% RNS08-3216

AVDD_MGB R601 5% 0603 → AVDD_L

C621 X7R 25V 0603

C622 X7R 25V 0603

C619 X7R 25V 0603

U601

GMA3	15	VCOM	7
GMA4	16	GND_AMP	6
GMA5	17	DVDD	5
GMA6	18	A0	4
GMA7	19	SDA	3
AVDD	20	SCL	2
AGND	21	GMA15	1
GMA8	22	G1	
GMA9	23		
GMA10	24		
GMA11	25		
GMA12	26		
GMA13	27		
GMA14	28		
G1			
GMA2	14		
GMA1	13		
GMA0	12		
AGND	11		
AVDD	10		
VDD_AMP	9		
VCOM_FB	8		

R607 5% 0603

R609 NC 5% 0603

R603 NC 1% 0402

R604 1% 0402

R606 1% 0402

R605 1% 0402

SDA_MGB SCL_MGB

V3D3_MGB R602 5% 0603 → V3D3_M

C623 X7R 25V 0603

C624 X7R 25V 1210

GND

SDA_MGB R623 5% 0603 → GB_SDA

SDA_IGB R624 5% 0603

SCL_MGB R625 5% 0603 → GB_SCL

SCL_IGB R626 5% 0603

AVDD_IGB R627 5% 0603 → AVDD_L

R614 1% 0402

C628 X7R 25V 0603 V3D3_IGB

R612 1% 0402

R613 1% 0402

C627 X7R 25V 0603

U602

OUT1	1	OUT18	25
OUT2	2	OUT17	24
OUT3	3	OUT16	23
OUT4	4	OUT15	22
AVDD	5	AVDD	21
GND	6	GND	20
OUT5	7	OUT14	19
OUT6	8	OUT13	18
OUT7	9	OUT12	17
G1			
REFIN	32		
V_THERM	31		
SET_COMP	30		
VSD	29		
SET	28		
INPCOM/DVROUT	27		
OUTCOM	26		
OUT8	10		
OUT9	11		
SDA	12		
SCL	13		
BANK SEL	14		
OUT10	15		
OUT11	16		

VGI_B1 VGI_B2 VGI_B3 VGI_B4 VGI_B5 VGI_B6 VGI_B7 VGI_B8 VGI_B9 VGI_B10 VGI_B11 VGI_B12 VGI_B13 VGI_B14 VGI_B15 VGI_B16 VGI_B17 VGI_B18

C625 0603 25V X7R AVDD_IGB

C626 X7R 25V 0603 AVDD_IGB

V3D3_M R629 5% 0603 V3D3_IGB

R620 1% 0402

R621 1% 0402

R610 NC 1% 0402

R611 1% 0402

V3D3_IGB

VGI_B8 VGI_B9 SDA_IGB SCL_IGB VGI_B10 VGI_B11

R618 VG_B1 NC VGI_B1 1% 0402

RN65: VG_B2 VG_B3 VG_B4 VG_B5 NC VGI_B2 VGI_B3 VGI_B4 VGI_B5 — 5% RNS08-3216

RN66: VG_B6 VG_B7 VG_B8 VG_B9 NC VGI_B6 VGI_B7 VGI_B8 VGI_B9 — 5% RNS08-3216

RN67: VG_B10 VG_B11 VG_B12 VG_B13 NC VGI_B10 VGI_B11 VGI_B12 VGI_B13 — 5% RNS08-3216

RN68: VG_B14 VG_B15 VG_B16 VG_B17 NC VGI_B14 VGI_B15 VGI_B16 VGI_B17 — 5% RNS08-3216

R619 VG_B18 NC VGI_B18 1% 0402

VGB1 → VG_B1
VGB3 → VG_B3
VGB16 → VG_B16
VGB18 → VG_B18

Maxim

V1 & V18 => L255.
V3 & V16 => L192.
V4 & V15 => L160.
V5 & V14 => L128
V6 & V13 => L96.
V7 & V12 => L64.
V8 & V11 => L32.
V9 & V10 => L0.

Intersil

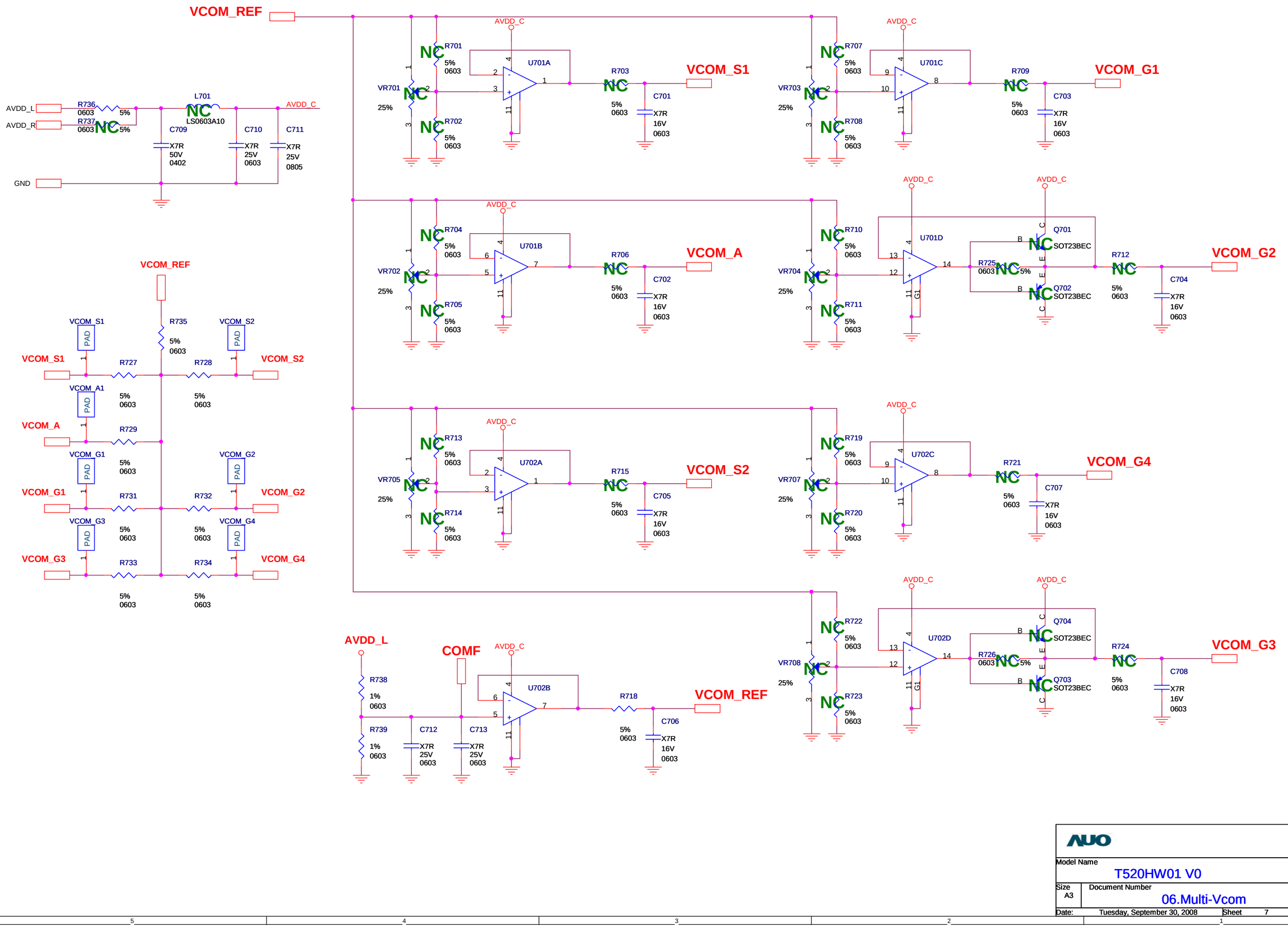
V1 & V18 => L255.
V2 & V17 => L224.
V3 & V16 => L192.
V4 & V15 => L160.
V5 & V14 => L128
V6 & V13 => L96.
V7 & V12 => L64.
V8 & V11 => L32.
V9 & V10 => L0.

AUO

Model Name: T520HW01 V0

Size: A2 | Document Number: 05.Gamma_B | Rev: EC04

Date: Tuesday, September 30, 2008 | Sheet 6 of 7



AUO		
Model Name	T520HW01 V0	
Size A3	Document Number 06.Multi-Vcom	Rev EC04
Date: Tuesday, September 30, 2008	Sheet 7 of 7	

CIRCUITO DE CONTROLE DO DISPLAY
TV LG 26LG7R
(PLACA T-CON V260-B1-C03)

U4 AT08A — A0, A1, A2, GND, VDD, DCK, SCL, SDA

CNF1 — V+12V, GND, LVDS SEL, NC, RX0-N/P, RX1-N/P, RX2-N/P, RXCK-N/P, RX3-N/P, DE 1, FDOT

U3 CM1671A — GND, RX0-N/P, RX1-N/P, LVDS VDD, RX2-N/P, RXCK-N/P, RX3-N/P, PLL VDD, LVDS DE, SEL LVDS

CPU

TIMING BASE + CONVERTER 8BIT P/ 6BIT

LVDS RX

RSDS TX

LINE/COLUNA CONTROL

U1 HX8904

CN1 / CN2

UP3 — RP10 0R, RP36 0R, CP42, CP41, CP43, C46, V25V

AO PINO 9 DO IC UP1 — R86 22R

AO PINO 2 DO IC QP2 — R85 22R, R88 1K

R76 22R, R79 22R, R70 0R, R82 22R, R83 22R

R66 0R

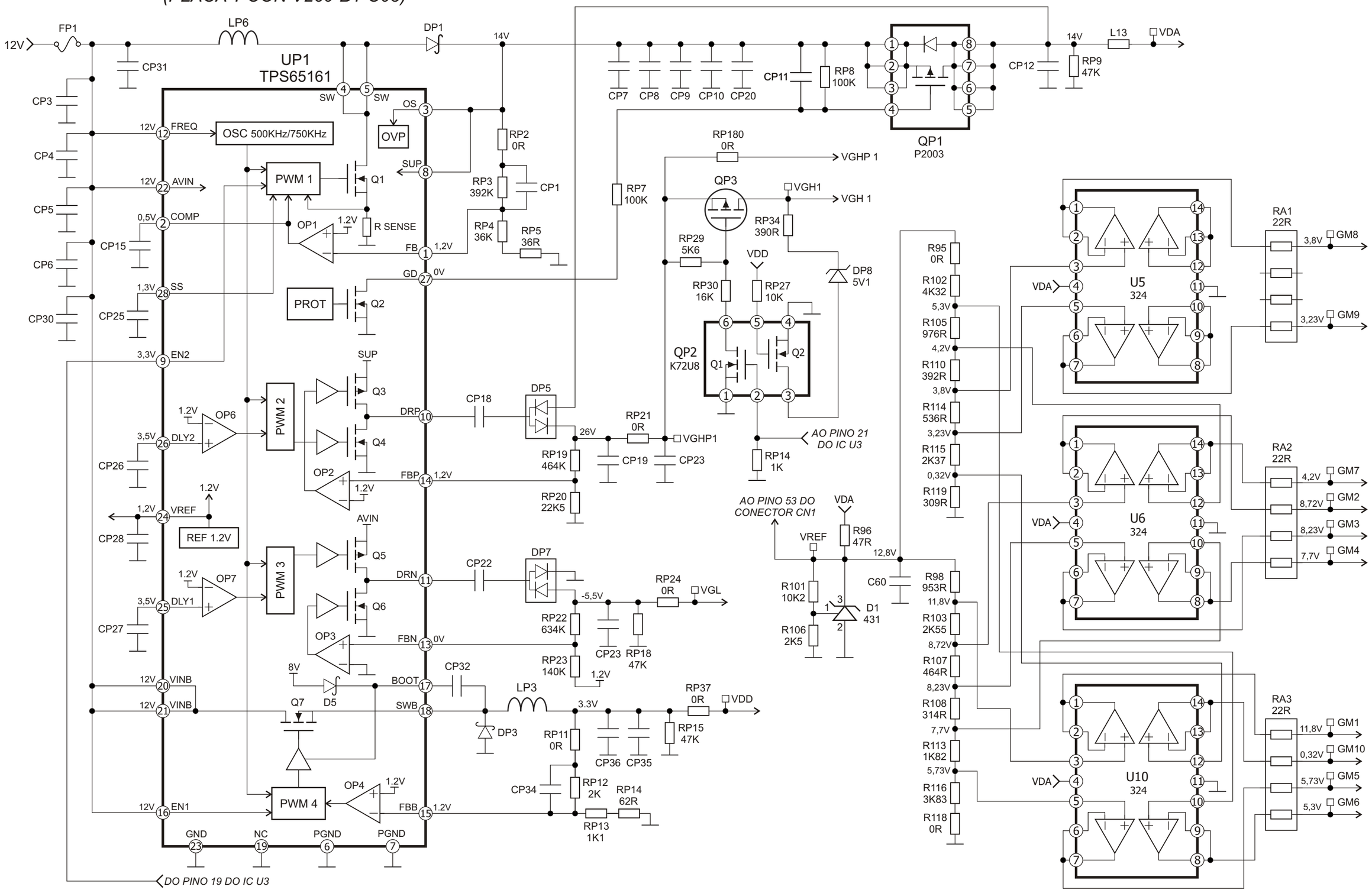
R64 100K, R69 0R

R0-P, R0-N, R1-P, R1-N, R2-P, R2-N, CK-P, CK-N, G0-P/N, G1-P/N, G2-P/N, B0-P/N, B1-P/N, B2-P/N

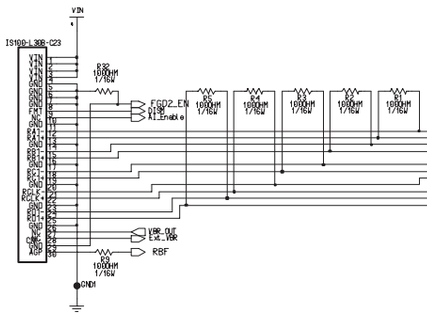
GM1 … GM10

CIRCUITO BIAS E CIRCUITO GAMA TV LG 26LG7R

(PLACA T-CON V260-B1-C03)



[USER CONNECTOR]



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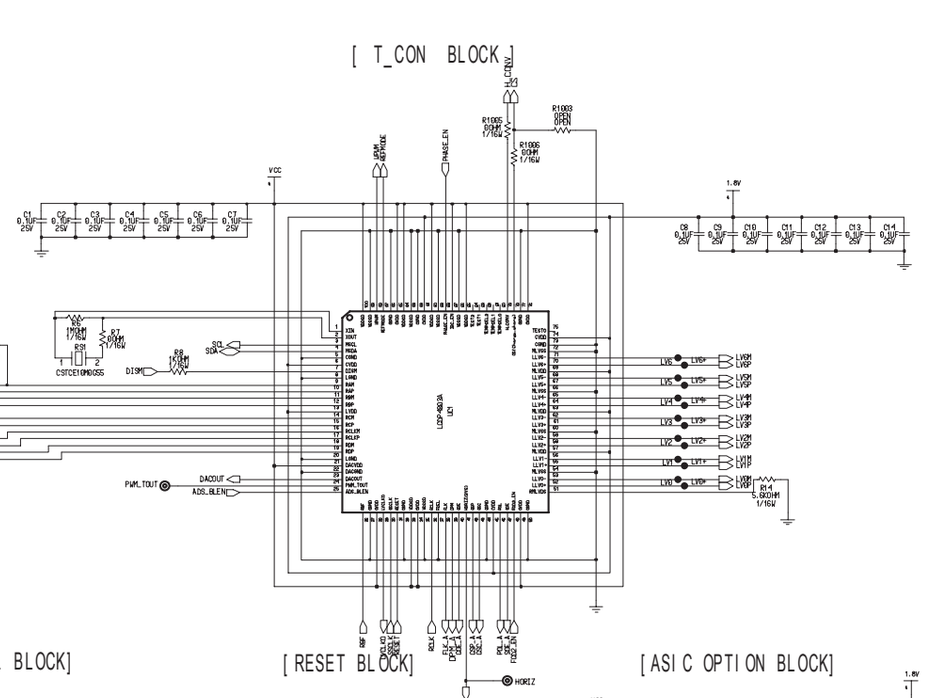
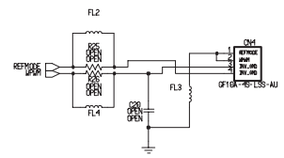
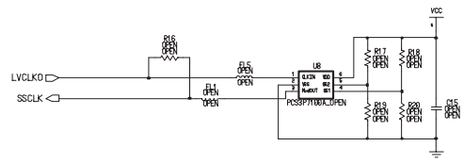


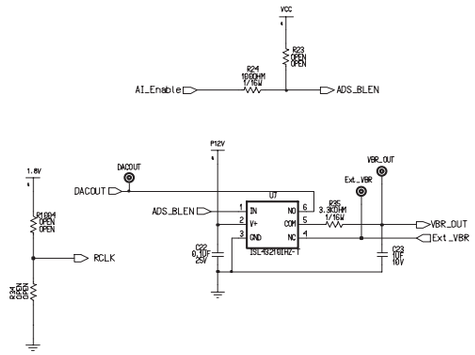
[WAVY I/F BLOCK-4PIN]



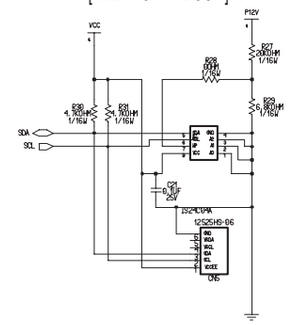
[SPREAD SPECTRUM]



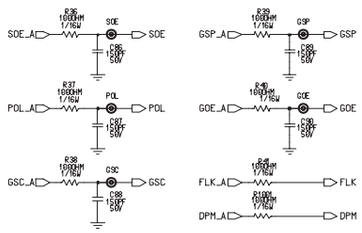
[AI I/F BLOCK]



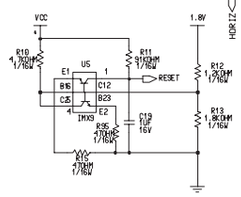
[EEPROM BLOCK]



[CONTROL SIGNAL BLOCK]



[RESET BLOCK]



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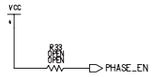
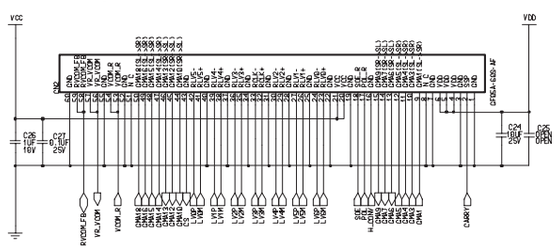


[CONTROL-SOURCE RIGHT CONNECTOR]



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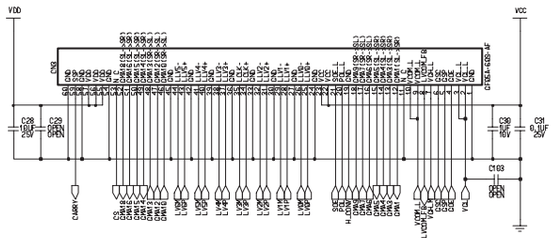
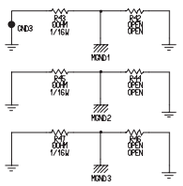




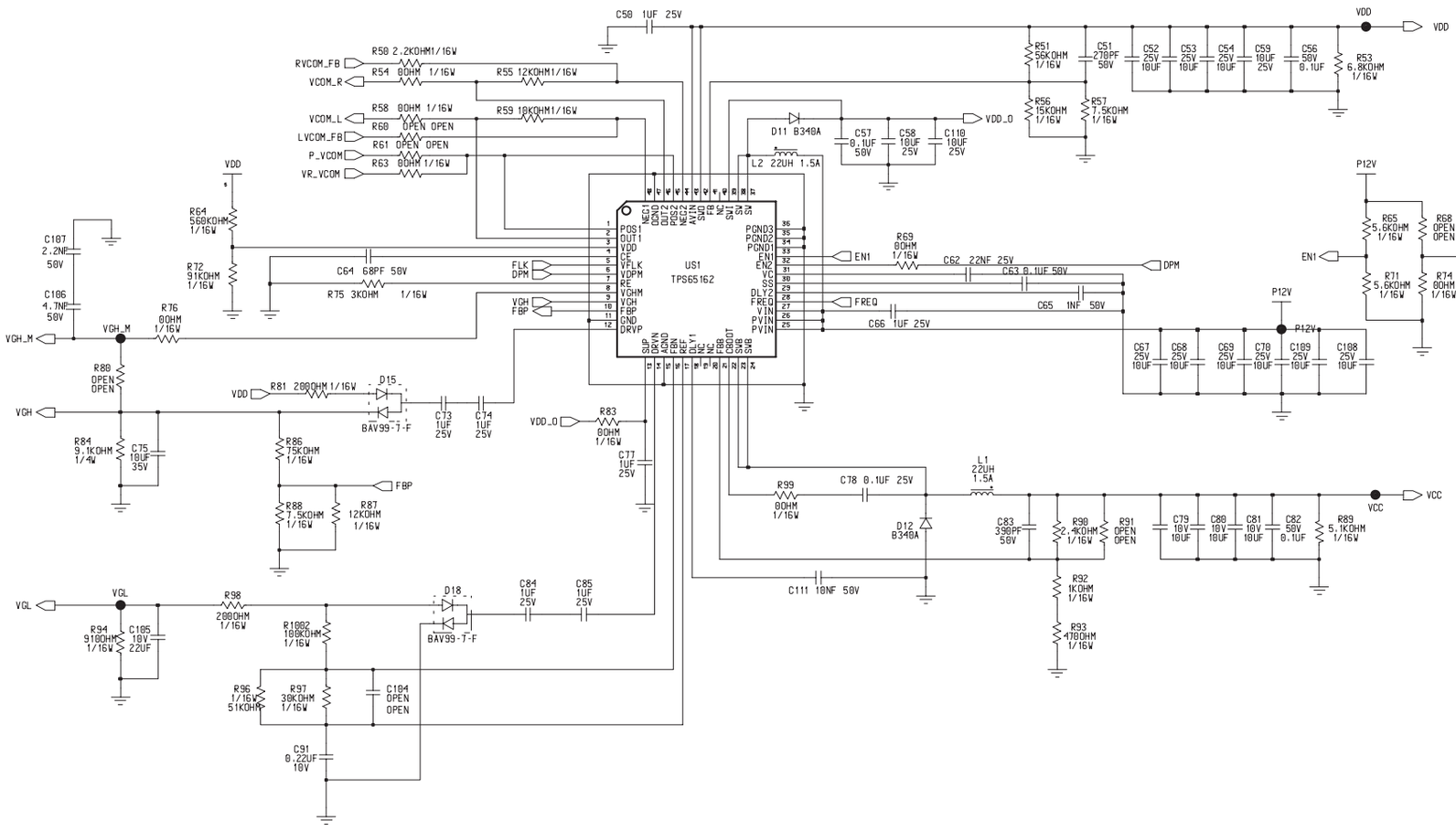
** REFERENCE :
R : ~R103
C : ~C102

CONTROL SCHEMATIC(1/2)

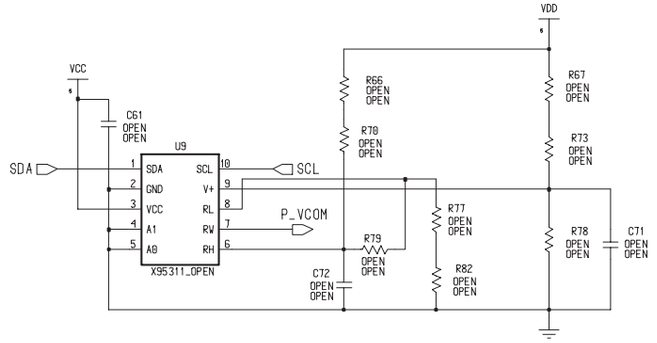
LC320WXN-SAC1-731

6871L-1478A
(6870C-0195A)

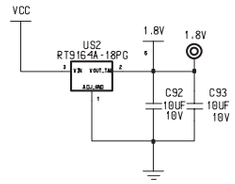
[POWER BLOCK]



[P-VCOM BLOCK]



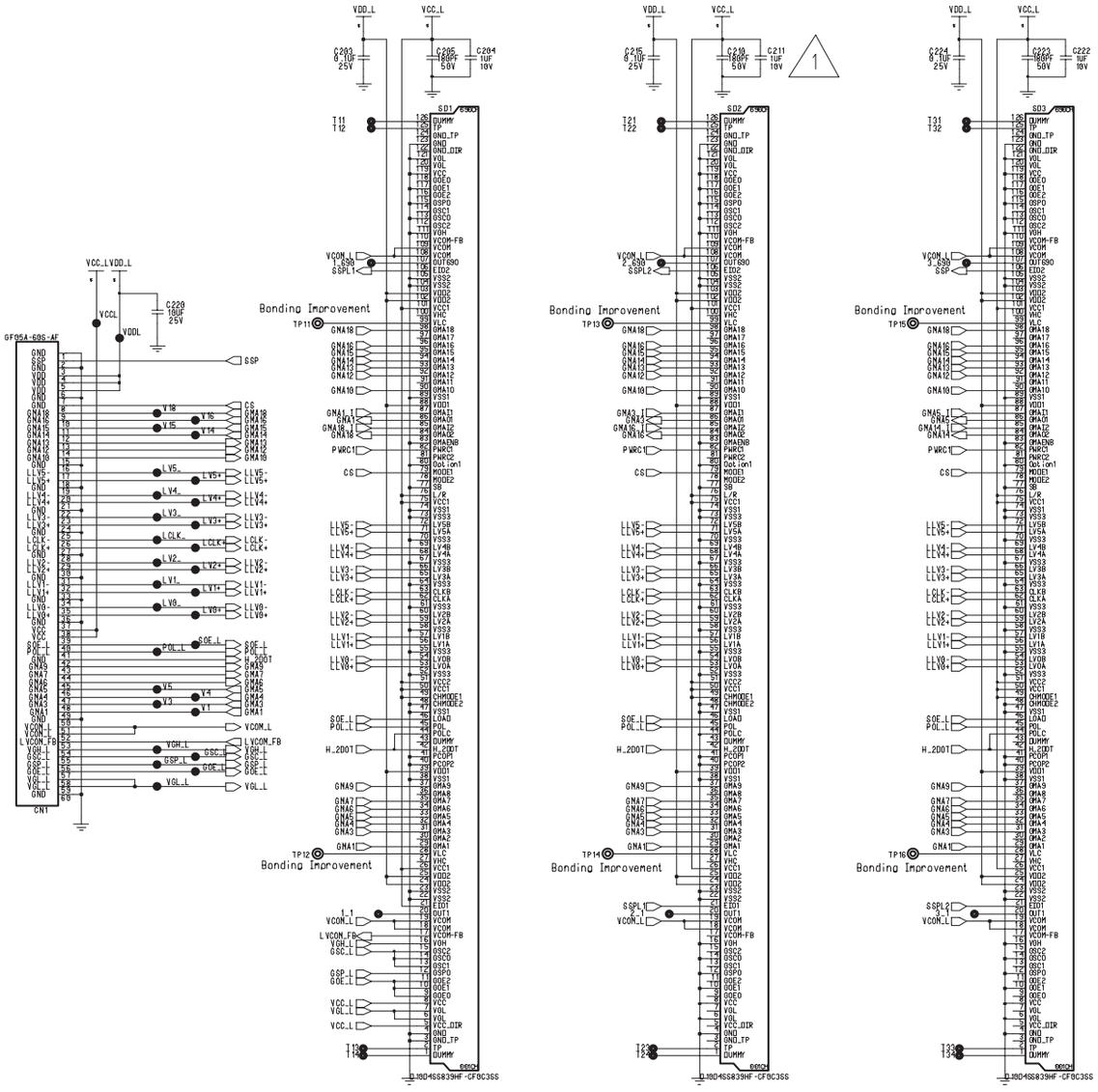
[3.3V --> 1.8V BLOCK]



CONTROL SCHEMATIC (2/2)

LC320WXN-SAC1-731

6871L-1478A
(6870C- 0195A)



[H_2DOT] : Inversion Select Pin
H : Horizontal 2-Dot inversion Enable
L : Horizontal 2-Dot inversion Disable

[PWRC1/PWRC2] : Power Select Pin
H/H : Maximun
H/L : Medium Large
L/H : Medium Small
L/L : Minimum

[MODE1/MODE2] : Output operation control
H/H : Hi-Z Mode
H/L : Charge Sharing
L/H : Charge Sharing (Default)
L/L : Pre-charge Mode

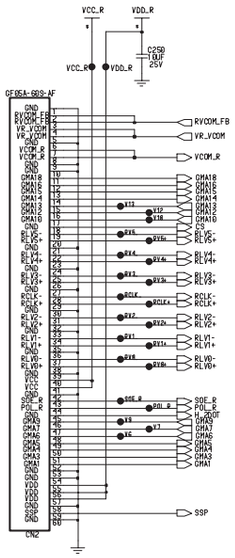
[PCOP1/PCOP2] : Pre-charge width select (690ch)
H/H : 168CLK
H/L : 128CLK
L/H : 88CLK
L/L : 0CLK (Default)

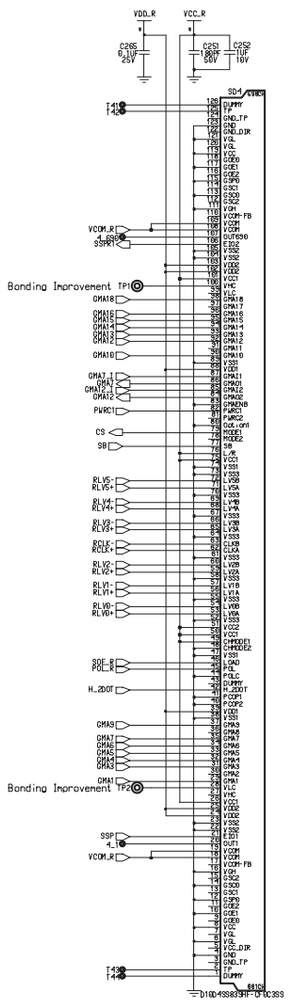
[Default Option]
L/R : H (right shift , S1->S690)
POLC : Connected in H_2DOT (H:Normal operation, L:POL signal is inverted)
SB : L (mini LVDS Input D0A(D0+)->D5B(D5-))
RxBIAS : H (bias current High power)
CHMODE1/CHMODE2 : Output channel number select (H/L : 690)
Option1 : L (Normal Mode)
Option2 : H (Normal Mode)
GMAENB1 : L (Enable)
PWRC1 : L

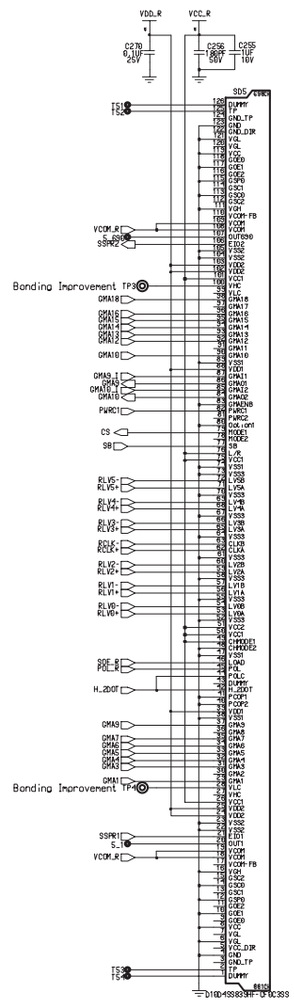
SOURCE LEFT PWB

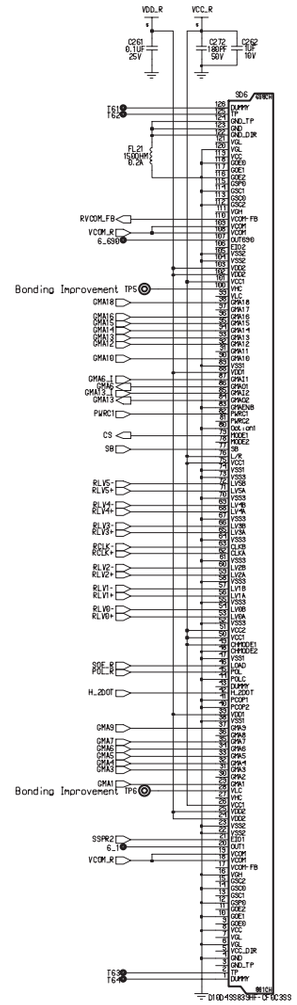
LC320WXN-SAC2-731

6871L- 1475A
(6870S- 0544A)









[H_2DOT] : Inversion Select Pin
H : Horizontal 2-Dot inversion Enable
L : Horizontal 2-Dot inversion Disable

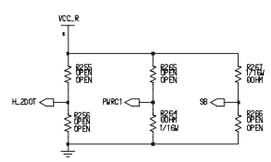
[PWRC1/PWRC2] : Power Select Pin
H/H : Maximun
H/L : Medium Large
L/H : Medium Small
L/L : Minimum

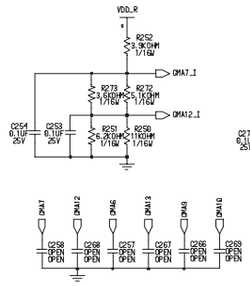
[MODE1/MODE2] : Output operation control
H/H : Hi-z Mode
H/L : Charge Sharing
L/H : Charge Sharing (Default)
L/L : Pre-charge Mode

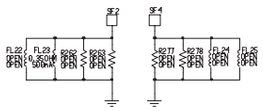
[PCOP1/PCOP2] : Pre-charge width select (G90ch)
H/H : 160CLK
H/L : 120CLK
L/H : 80CLK
L/L : 0CLK (Default)

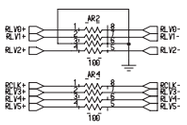
[SB] : Mini-LVDS Input
H : D5- --> D0+
L : D0+ --> D5-

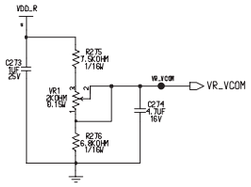
[Default Option]
L/R : H (right shift , S1->S690)
POLC : Connected in H_2DOT (H:Normal operation, L:POL signal is inverted)
RxBIAS : H (bias current High power)
CHMODE1/CHMODE2 : Output channel number select (H/L : 690)
Option1 : L (Normal Mode)
Option2 : H (Normal Mode)
GMAENB1 : L (Enable)
PWRC1 : L









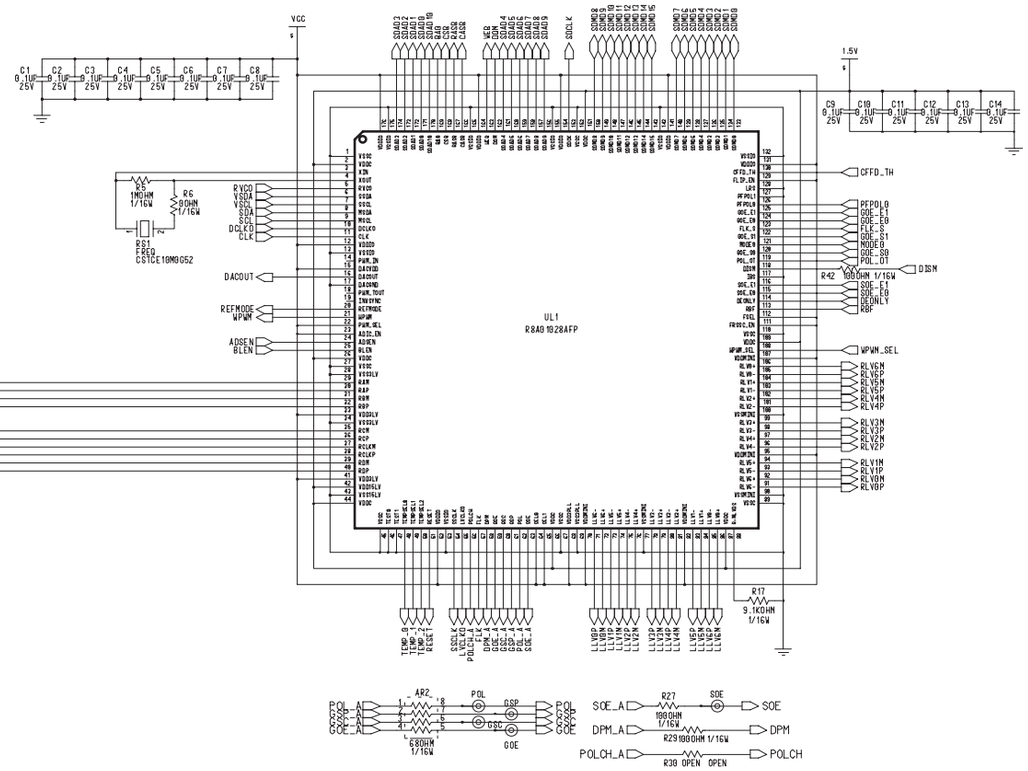


SOURCE RIGHT PWB

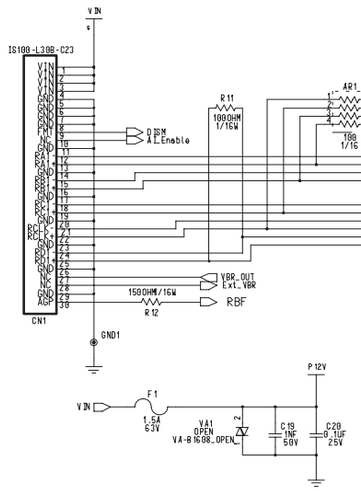
LC320WXN-SAC2-731

6871L-1476A
(6870S-0545A)

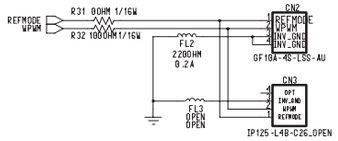
[T_CON BLOCK]



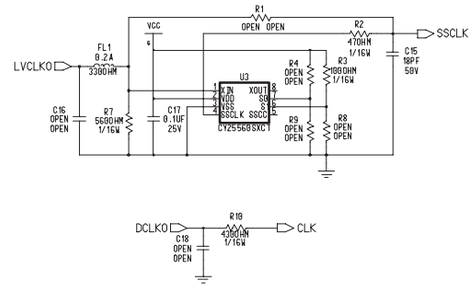
[USER CONNECTOR]



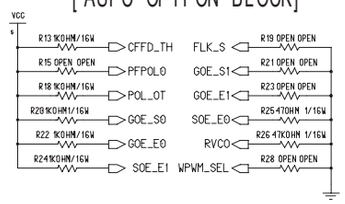
[WAVY I/F BLOCK-4PIN]



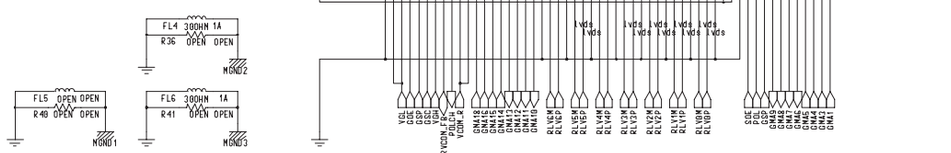
[SPREAD SPECTRUM]



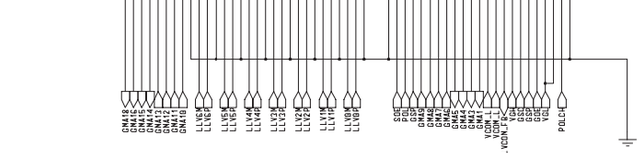
[ASIC OPTION BLOCK]



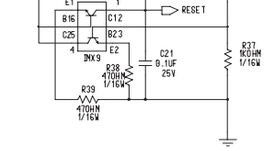
[CONTROL-SOURCE RIGHT CONNECTOR]



[CONTROL-SOURCE LEFT CONNECTOR]



[RESET BLOCK]

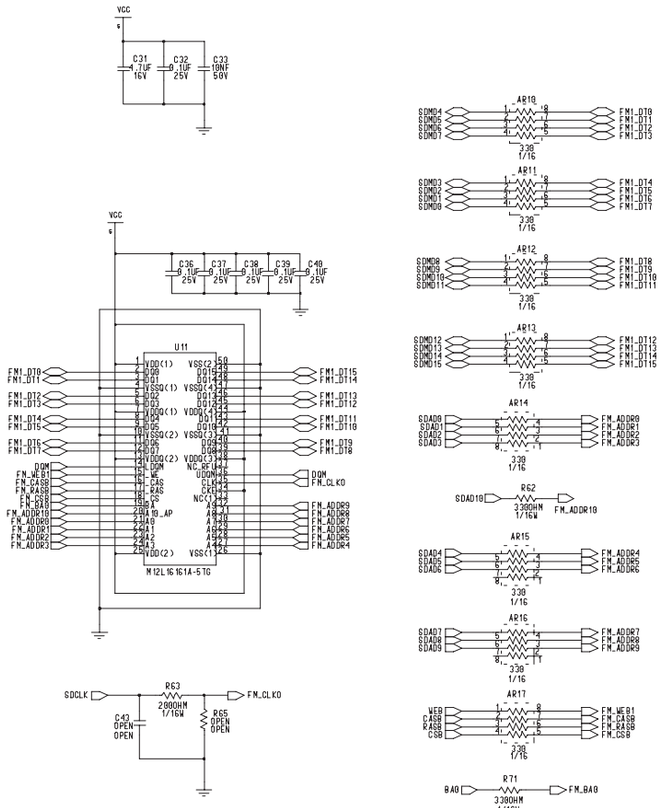


CONTROL SCHEMATIC (1/3)

LC370WX4-SLA1-F11

6871L-1219A-1_1_3

[SDRAM I / F BLOCK]



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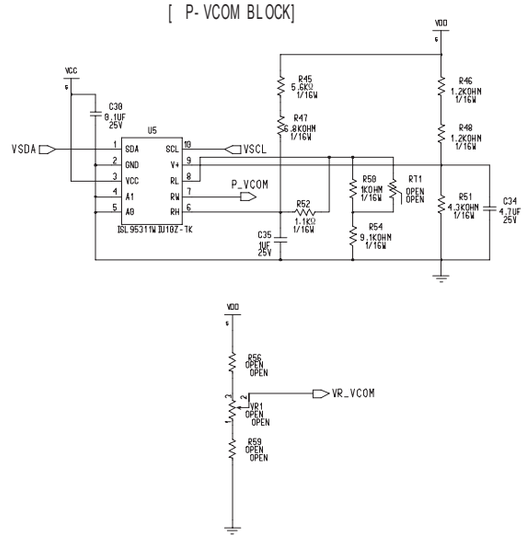
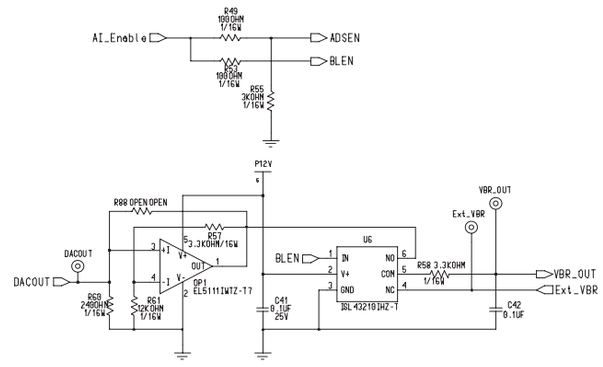


[AI I / F BLOCK]



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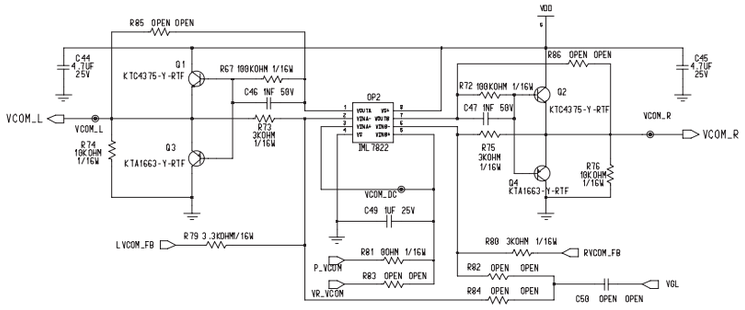
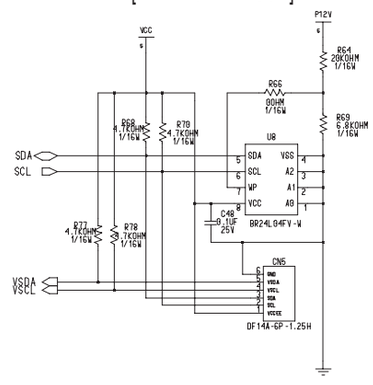


[EEPROM BLOCK]

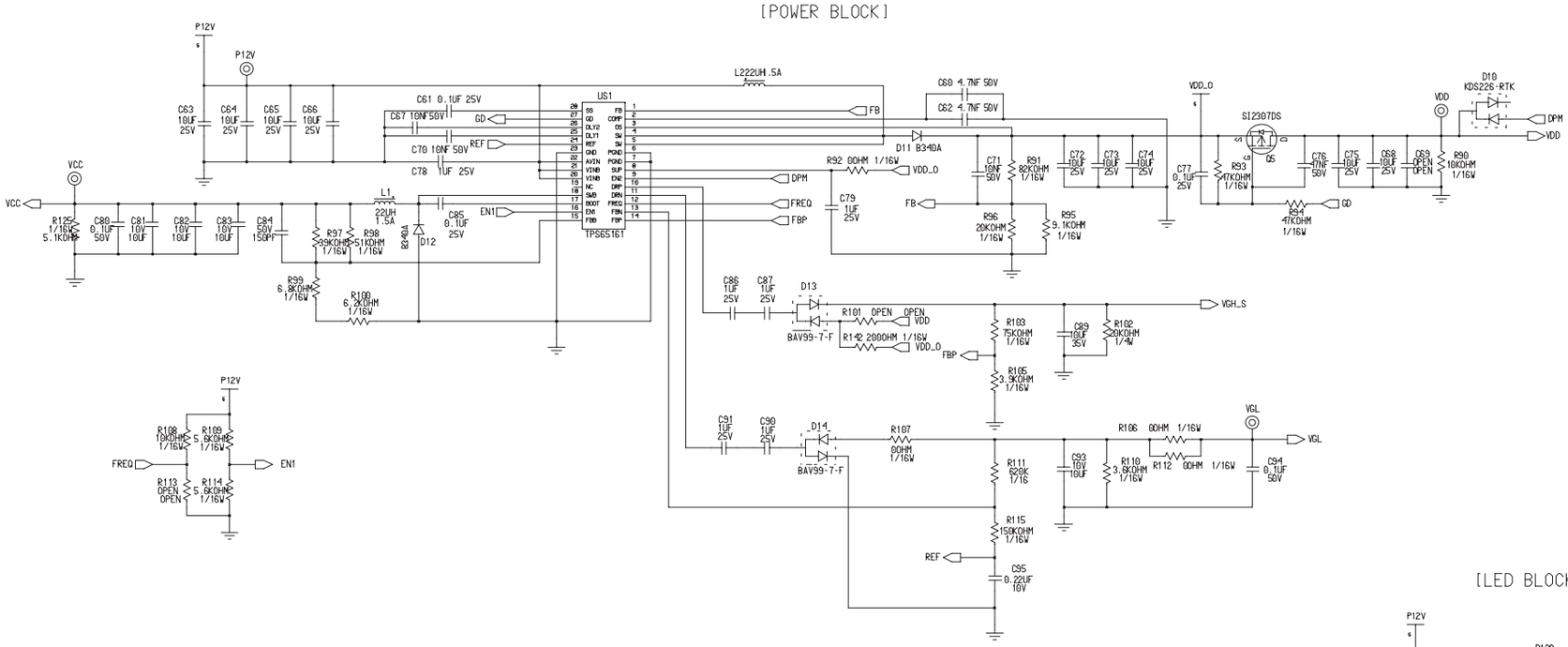


CONTROL SCHEMATIC (2/3)

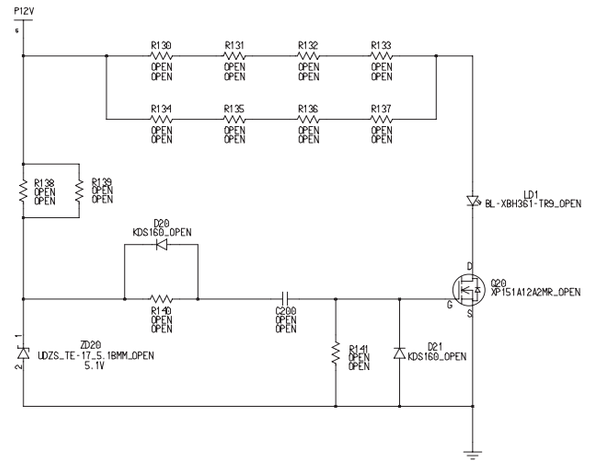
LC370WX4-SLA1-F11

6871L-1219A-1_2_3

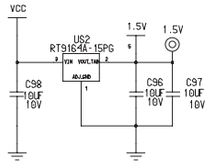
[POWER BLOCK]



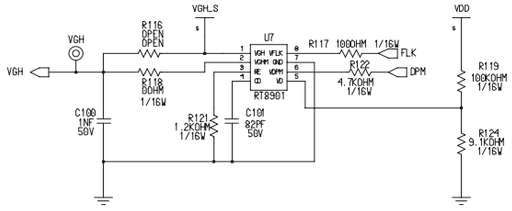
[LED BLOCK]



[3.3V --> 1.5V BLOCK]



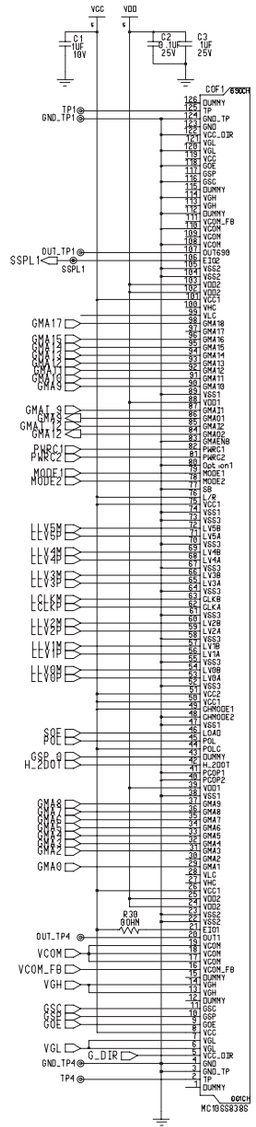
[GATE MODULATION]

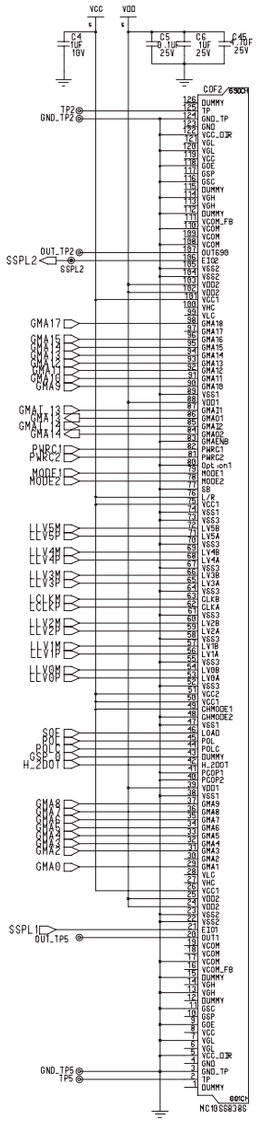


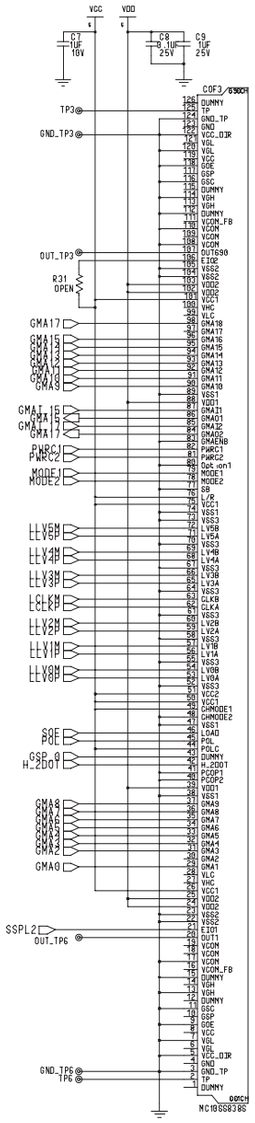
CONTROL SCHEMATIC (3/3)

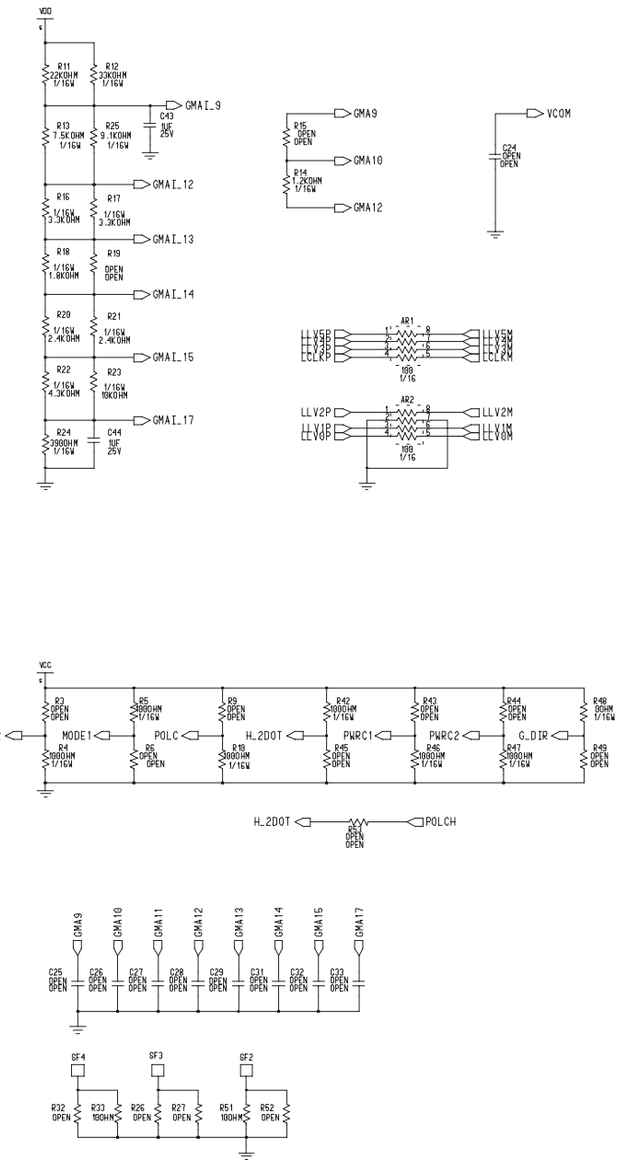
LC370WX4-SLA1-F11

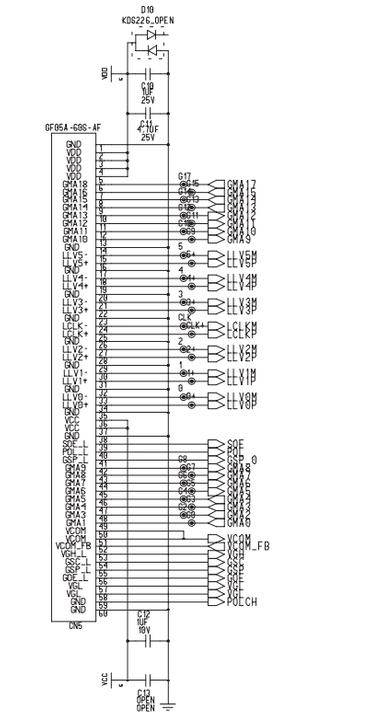
6871L-1219A-1_3_3











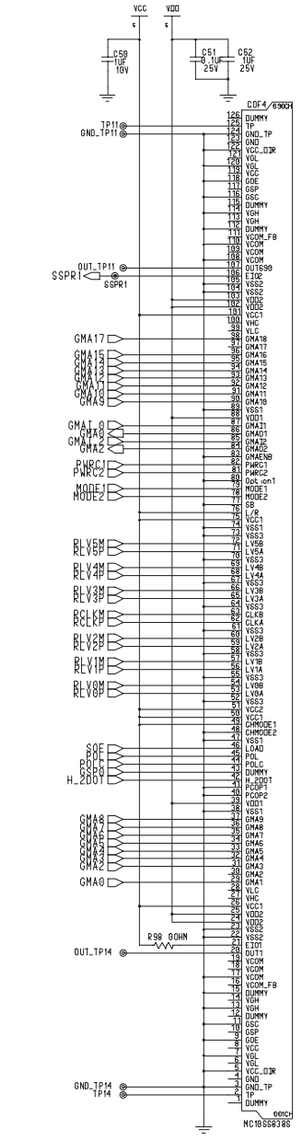
[H_2DOT] : Inversion Select Pin
H : Horizontal 2-Dot Inversion Enable
L : Horizontal 2-Dot Inversion Disable

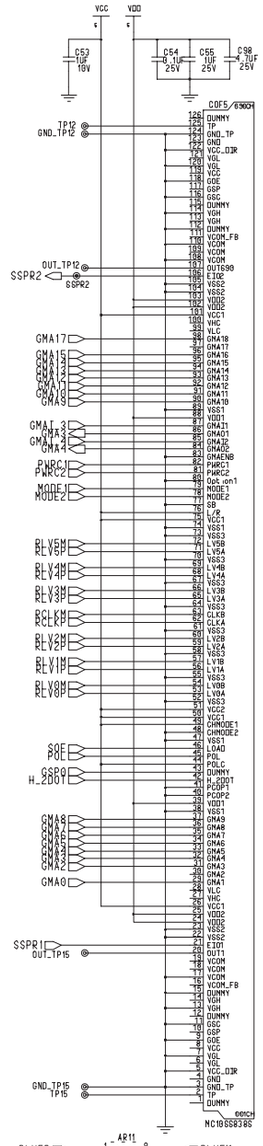
[PWRC1/PWRC2] : Output Power Control Pin
H/H : High Power Mode
H/L : Normal Mode
L/H : Low Power Mode
L/L : UltraLow Power Mode

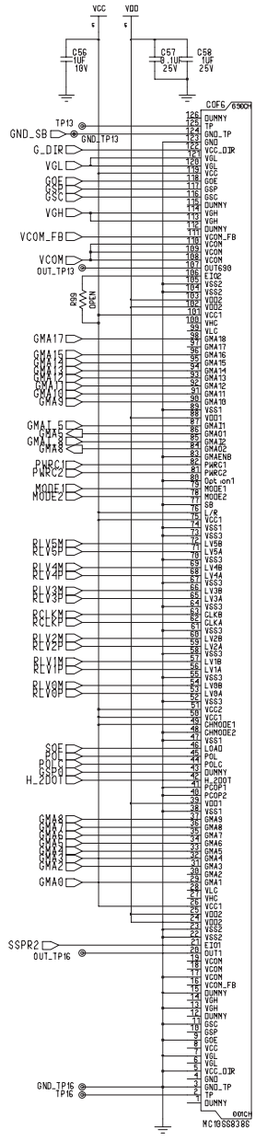
LC370WX4-SLA1(S2-T)

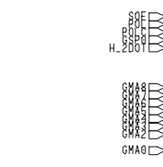
SOURCE_LEFT SCHEMETIC

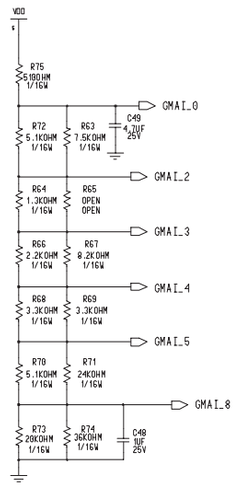
6871L-xxxxA-1_1_1











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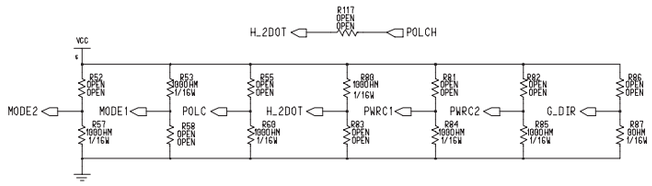
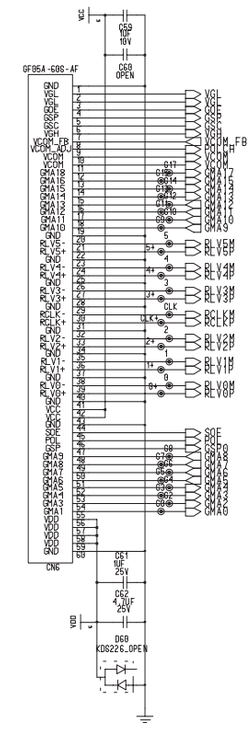
L/H : Low Power Mode
L/L : UltraLow Power Mode





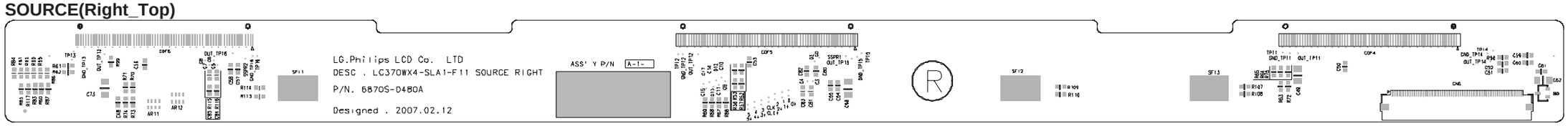
LC370WX4-SLA1

SOURCE_RIGHT SCHEMETIC(S2-T)

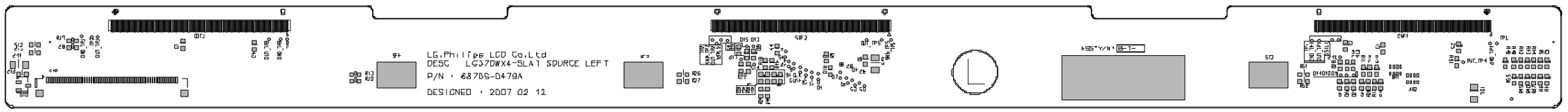
6871L-xxxx-1_1_1

Printed Circuit Board / 회로기판

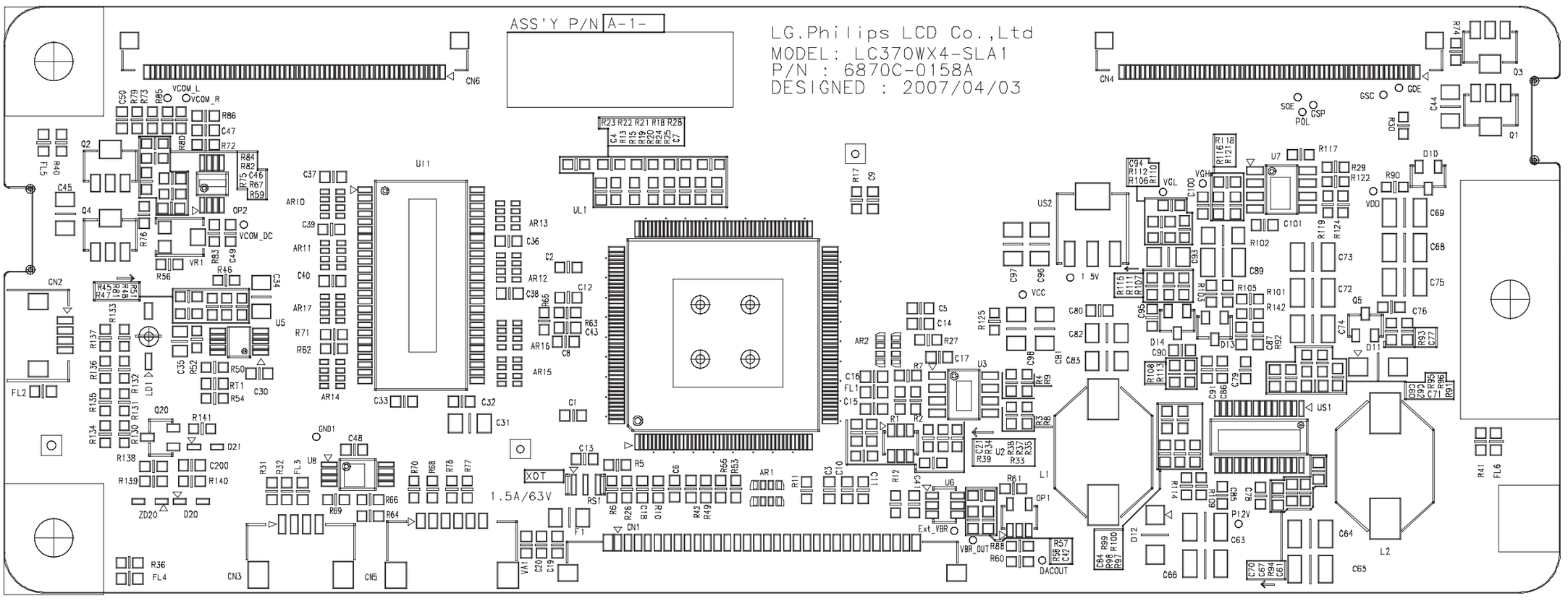
SOURCE(Right_Top)

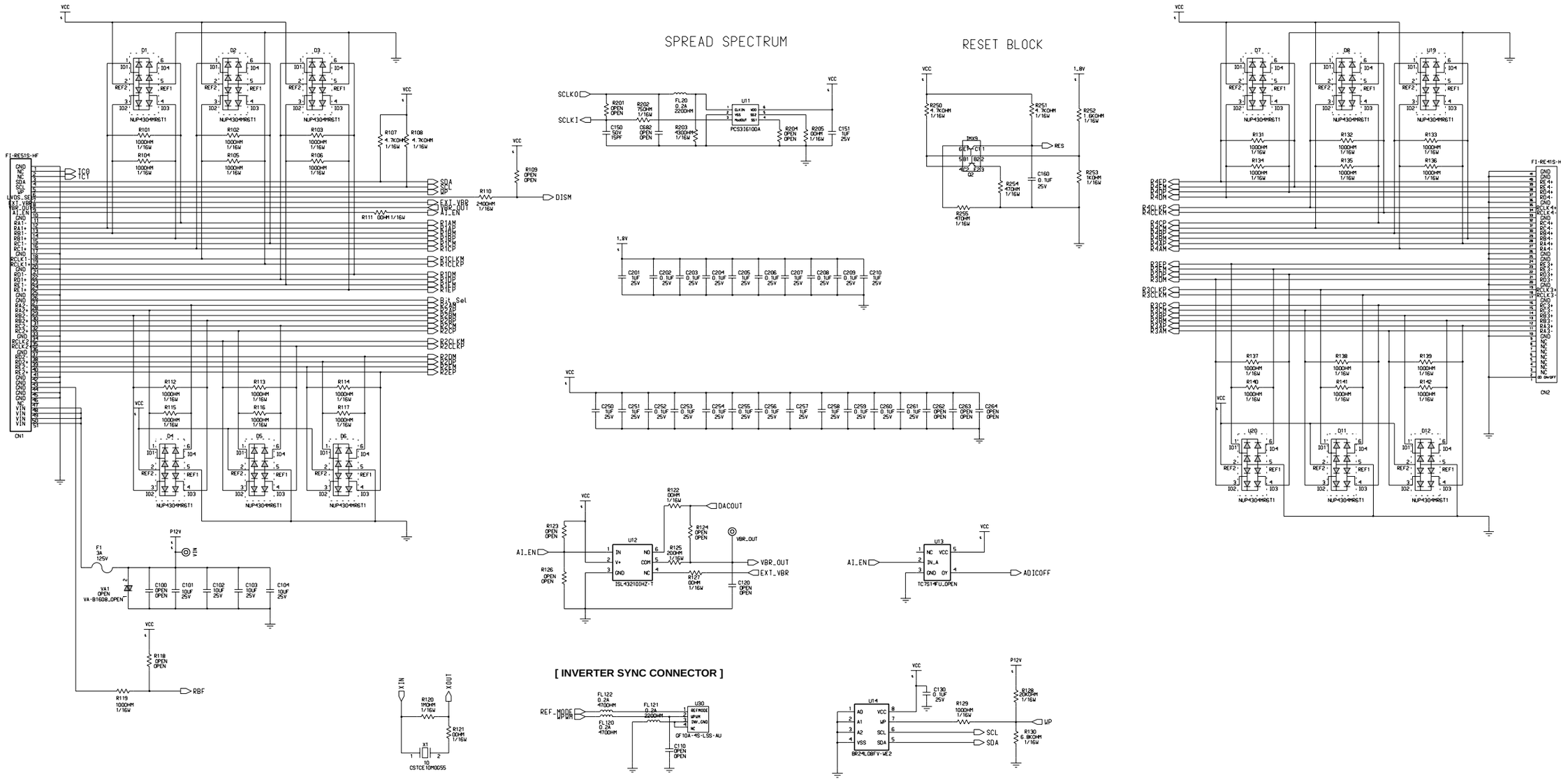


SOURCE(Left_Top)



Control(Top)

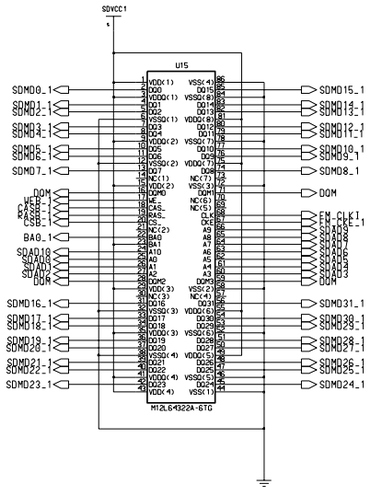


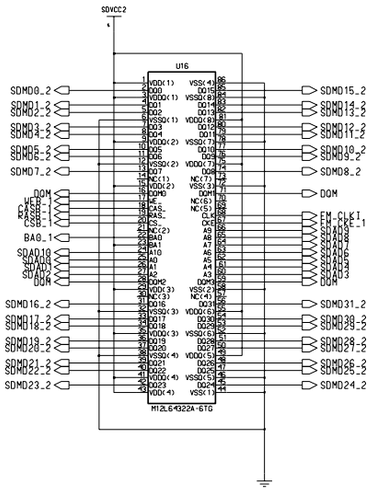


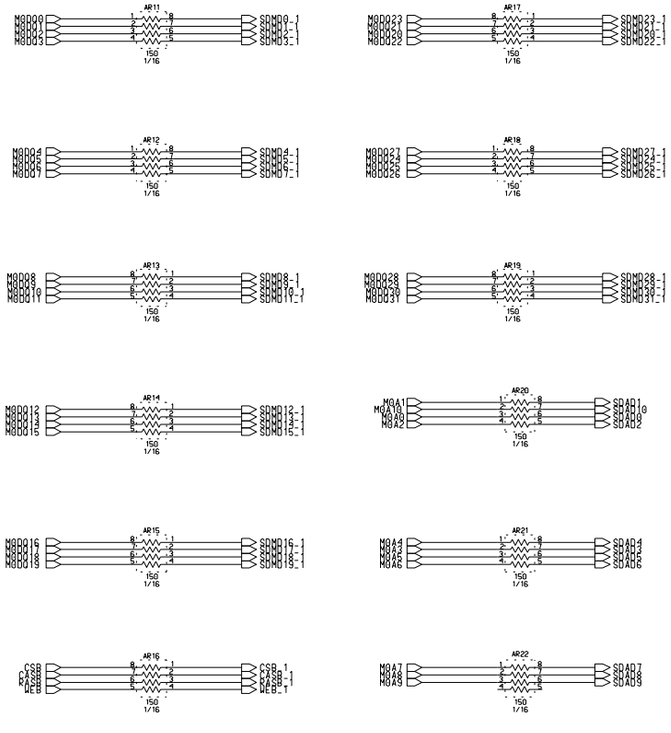
LC470WUD_CONTROL

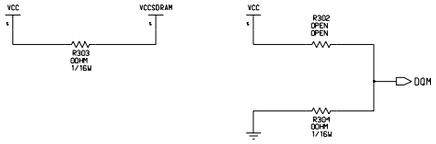
CONTROL SCHEMETIC

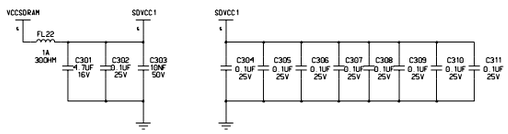
6871L-CONTROL

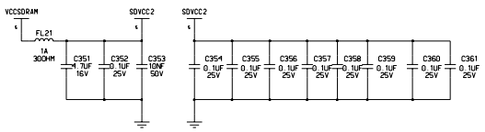










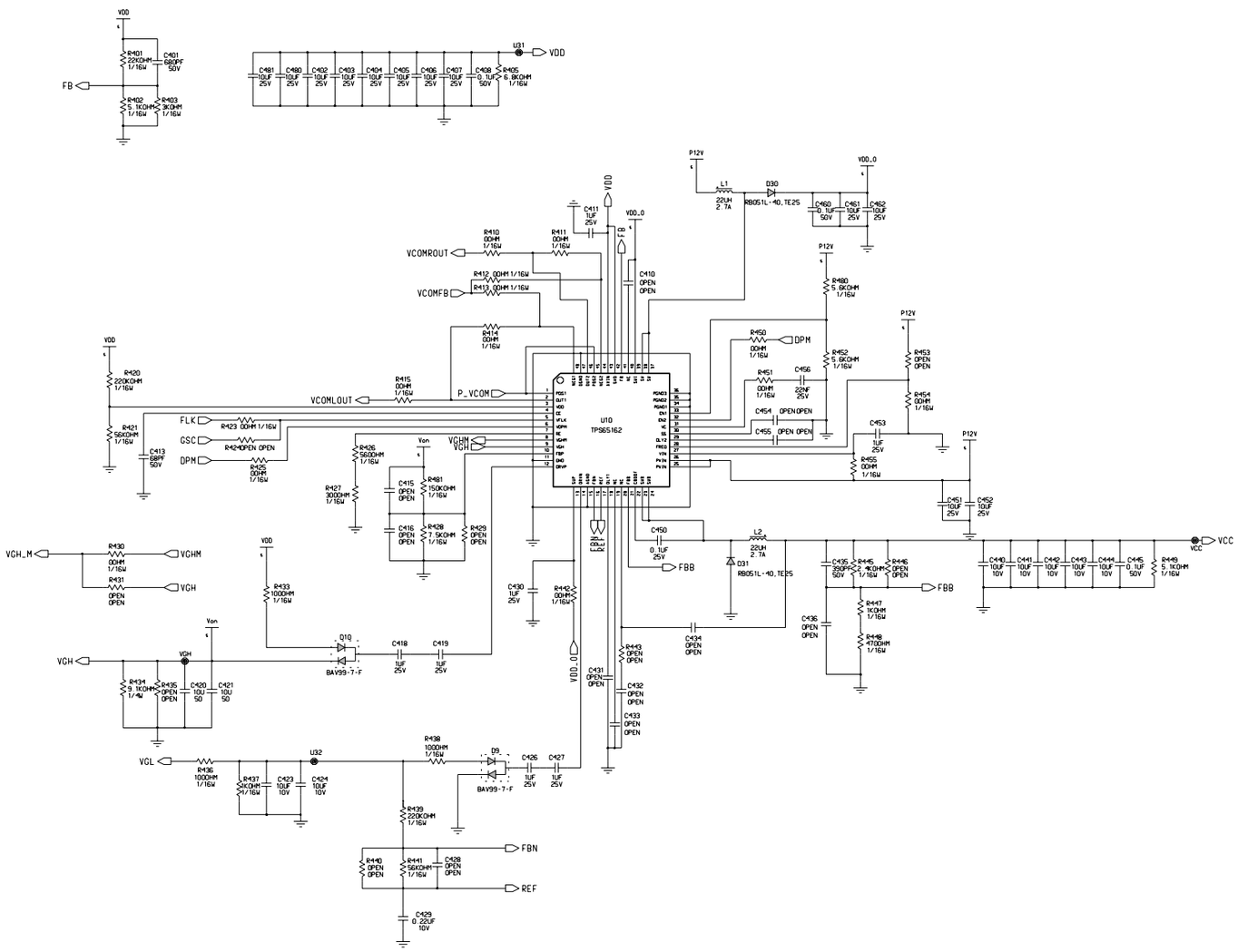


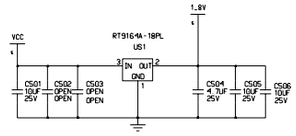
LC470WUD_CONTROL

CONTROL SCHEMETIC

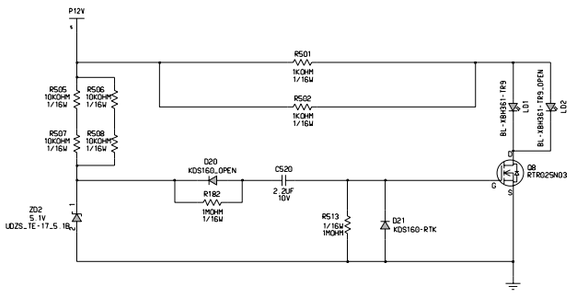
6871L-CONTROL

[DC/DC POWER BLOCK]





[LED BLOCK]

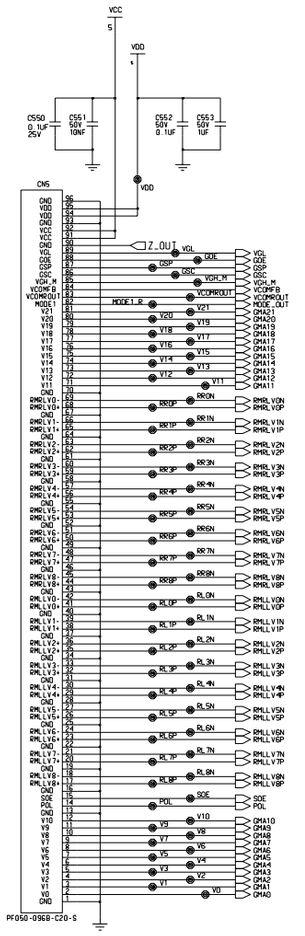


LC470WUD_CONTROL

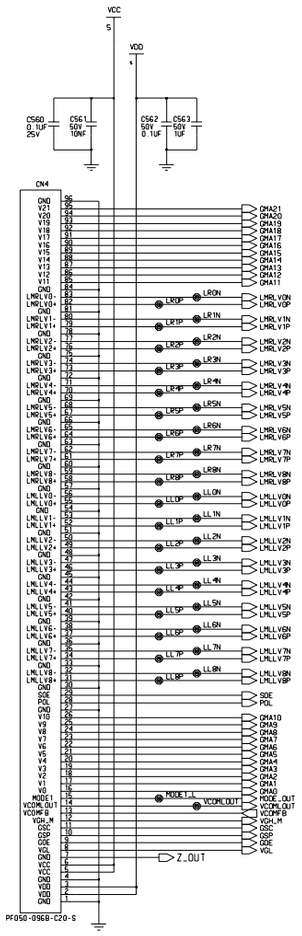
CONTROL SCHEMETIC

6871L-CONTROL

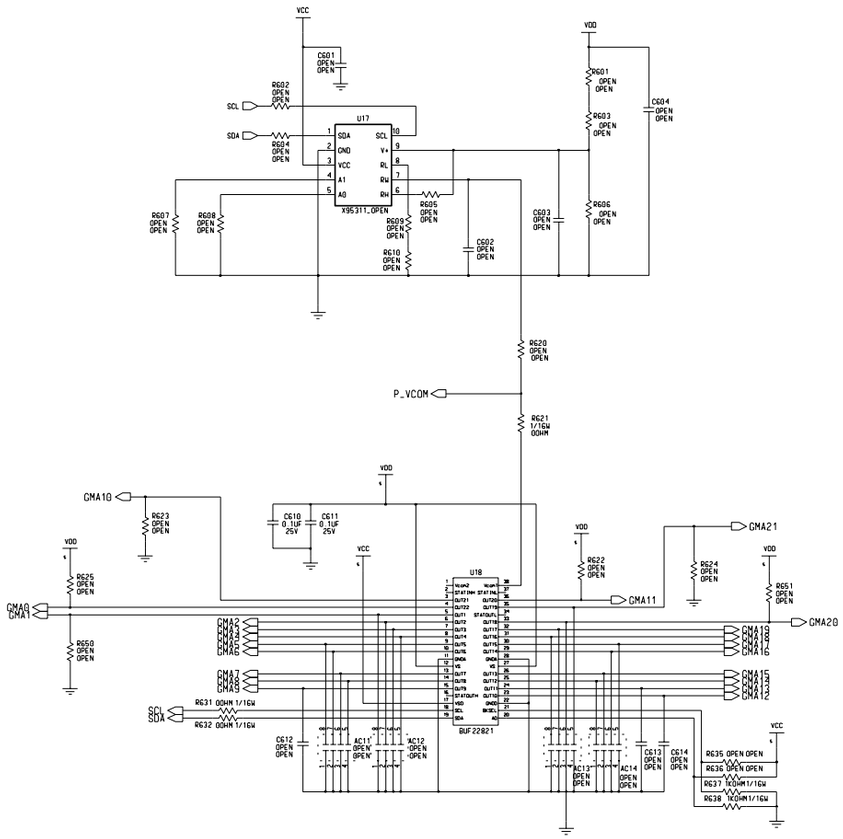
UP_RIGHT



UP_LEFT



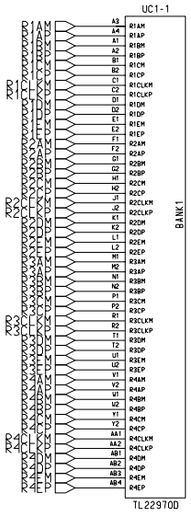
[GAMMA BUFFER & P-VCOM]

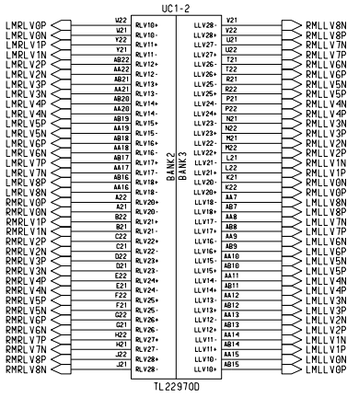


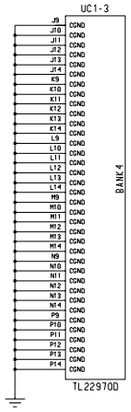
LC470WUD_CONTROL

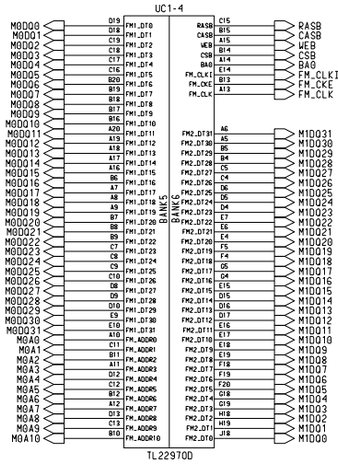
CONTROL SCHEMETIC

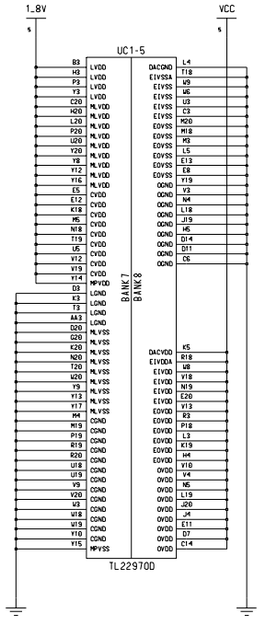
6871L-CONTROL

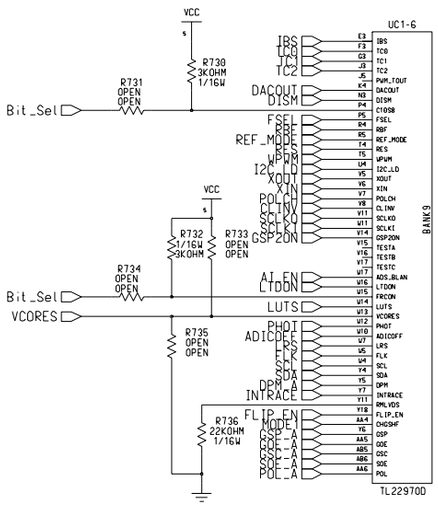


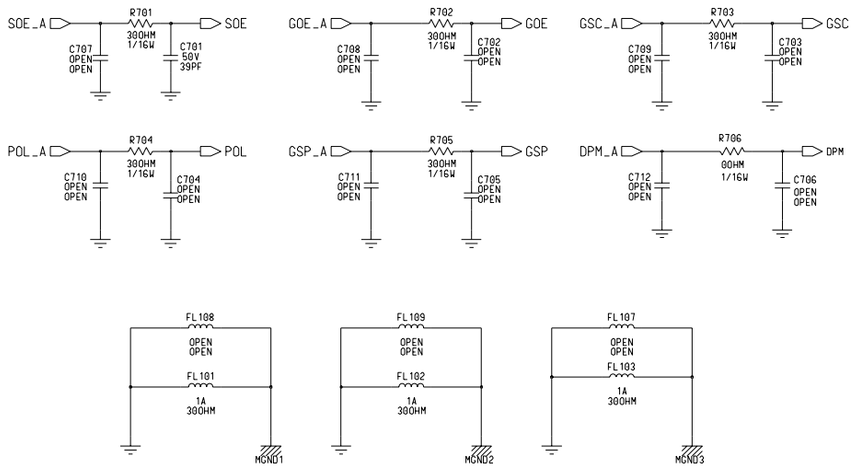


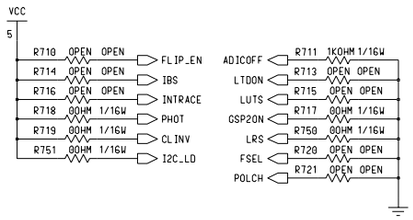








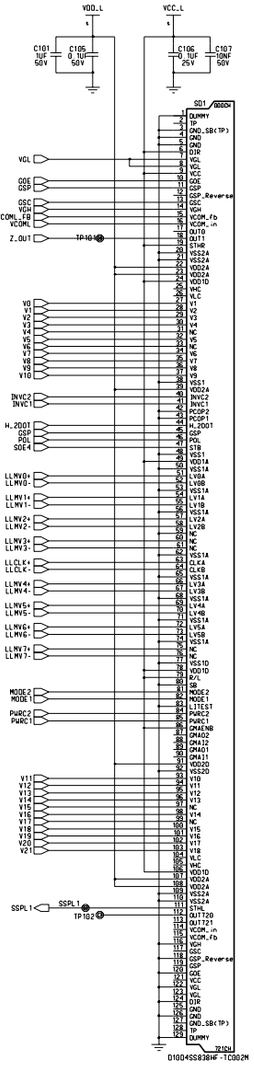


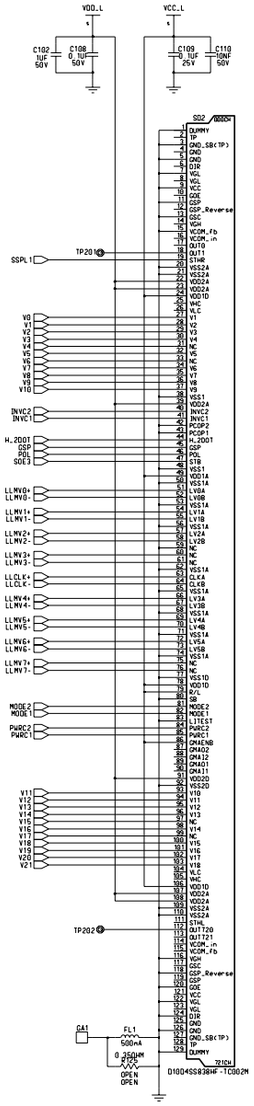


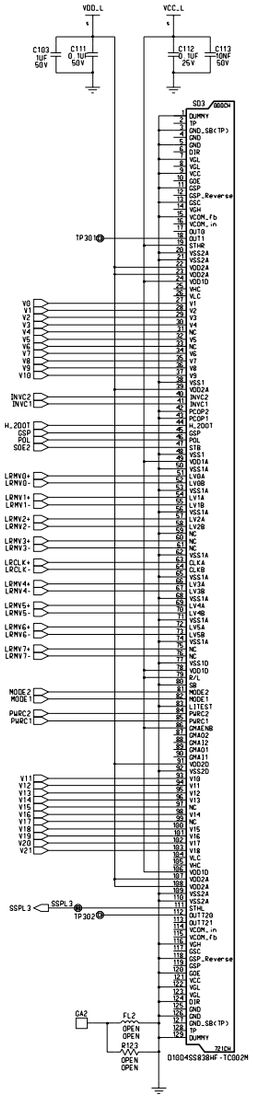
LC470WUD_CONTROL

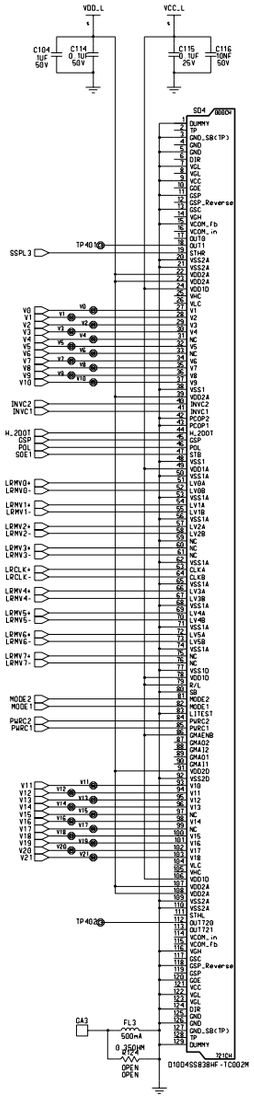
CONTROL SCHEMETIC

6871L-CONTROL









[H_2DOT] : INVERSION SELECT CONTROL

L : Horizontal 2 Dot inversion Disable

H : Horizontal 2 Dot inversion Enable

[SB] : Bus-Line Set-Back Selection

L : D0(+) ==>D7(-) H : D7(-) ==>D0(+)

[RL] : Data Latch direction Control

L : 720,719 ==> 2,1 H : 1,2 ==> 719, 720

[DIR] : Data Shift direction Control

L : DI02 ==>X270 ==>X1==> DI01

H : DI01 ==>X1 ==>X270==> DI02

[PWRC] : Output buffer power Control

HH : Maximum, HL : Medium Large , LH : Medium Small, LL : Minimum

[PCOP] : Pre-charge width select

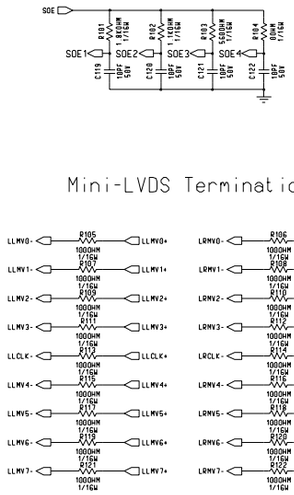
HH : 320clk, HL : 240clk , LH : 160clk, LL : 0clk

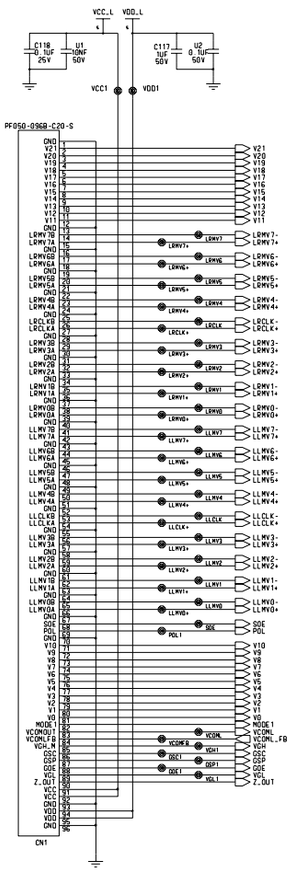
[MODE] : Output operation Control

HH : Hi-Z, HL LH : Charge Sharing, LL : Pre-charge

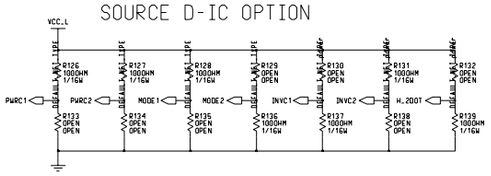
[GMAENB] : Gamma buffer enable Selection

H : Disable , L : Enable





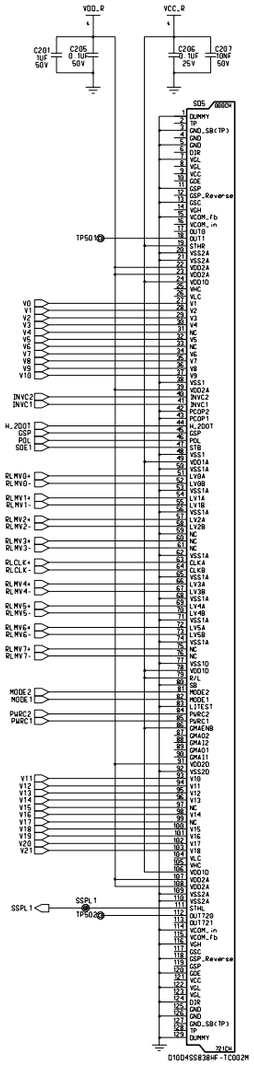
SOURCE D-IC OPTION



LC420WUD-SAA1-G31

SOURCE LEFT SCHEMETIC

6871L-



[H_2DOT] : INVERSION SELECT CONTROL

L : Horizontal 2 Dot inversion Disable

H : Horizontal 2 Dot inversion Enable

[SB] : Bus-Line Set-Back Selection

L : D0(+) ==>D7(-) H : D7(-) ==>D0(+)

[RL] : Data Latch direction Control

L : 720,719 ==> 2,1 H : 1,2 ==> 719, 720

[DIR] : Data Shift direction Control

L : DIO2 ==>X270 ==>X1==> DIO1

H : DIO1 ==>X1 ==>X270==> DIO2

[PWRC] : Output buffer power Control

HH : Maximum, HL : Medium Large , LH : Medium Small, LL : Minimum

[PCOP] : Pre-charge width select

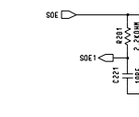
HH : 320clk, HL : 240clk , LH : 160clk, LL : 0clk

[MODE] : Output operation Control

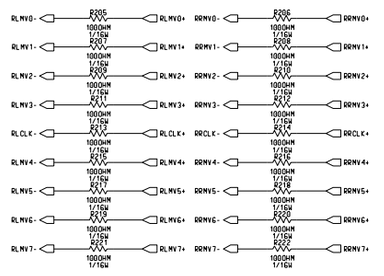
HH : Hi-Z, HL LH : Charge Sharing, LL : Pre-charge

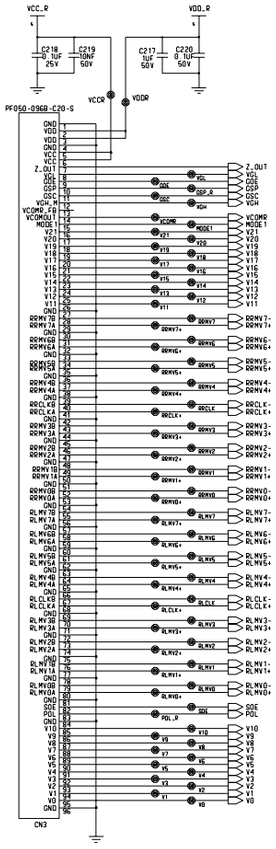
[GMAENB] : Gamma buffer enable Selection

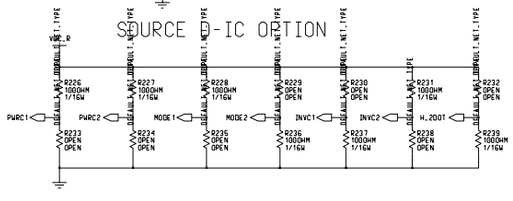
H : Disable , L : Enable



Mini-LVDS Termination







LC420WUD-SAA1-G31

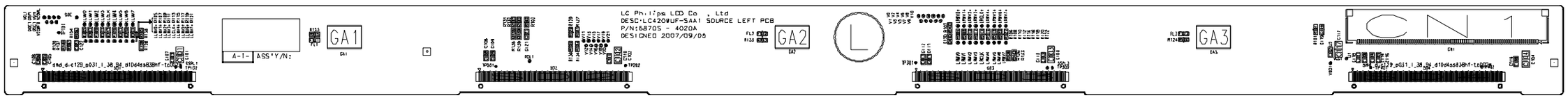
SOURCE RIGHT SCHEMETIC

6871L-

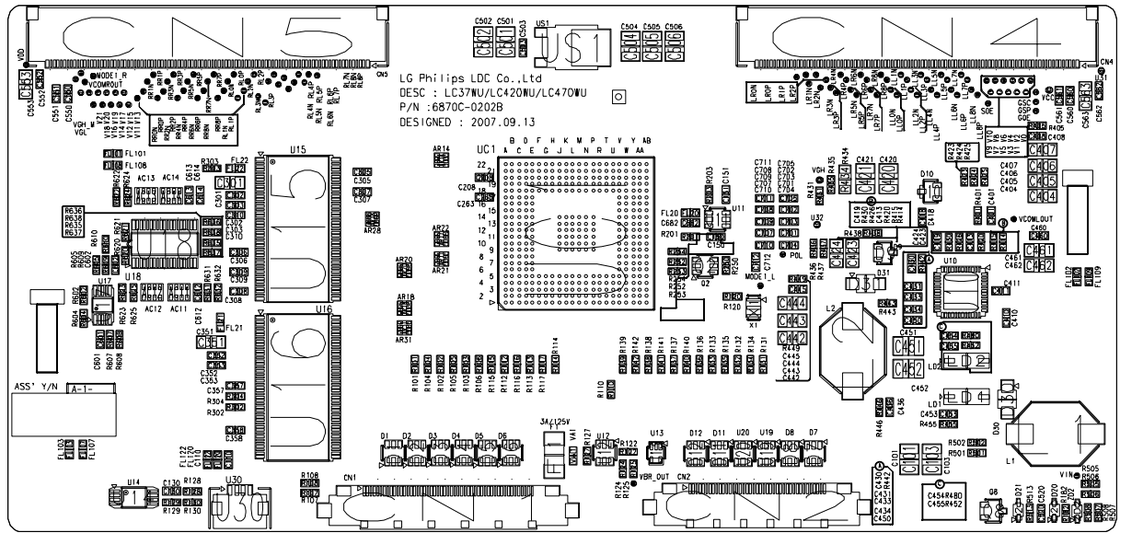
Printed Circuit Board / 회로기판

SOURCE(Right_Top)

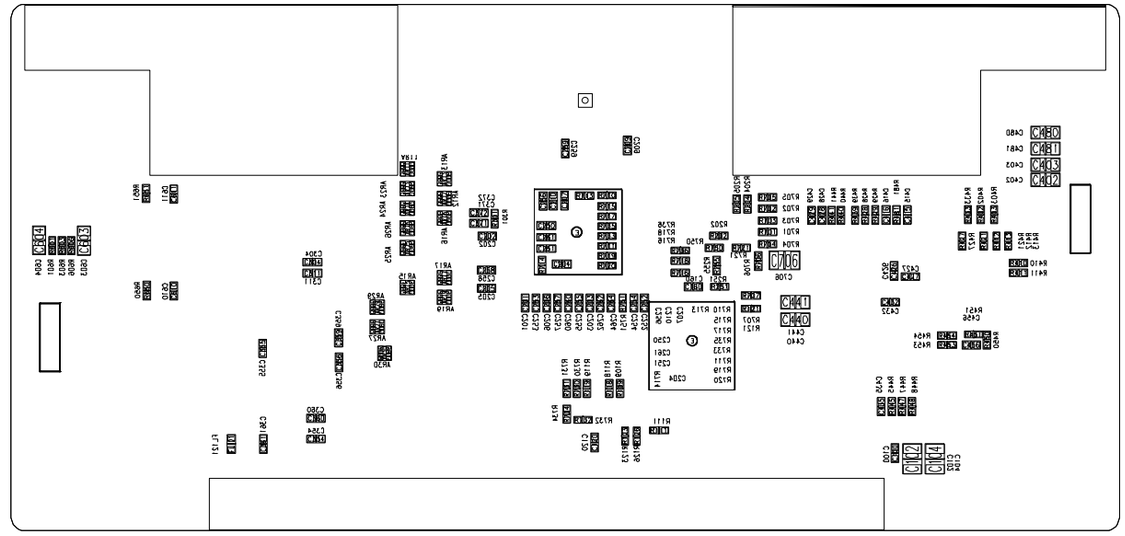
SOURCE(Left_Top)



Control(Top)



Control(Bottom)



11. Parts List

(Specified parts list is subject to change.)

PART No.	DESCRIPTION	SPECIFICATION	LOCA. No.
6871L-4020B	PCB Assembly	Source, Left, LC420WUD-SAC1-G31	
6871L-4021B	PCB Assembly	Source, Right, LC420WUD-SAC1-G31	
6871L-2040C	PCB Assembly	Control, Single, LC420WUD-SAC1-G31	
		CIRCUIT_CAPACITOR	
0CH2103K562	CAPACITOR,CHIP[CERAMIC	10NF 50V K X 1608 R/TP	C107,C110,C113,C116,U1
0CH2103K562	CAPACITOR,CHIP[CERAMIC	10NF 50V K X 1608 R/TP	C207,C210,C213,C216,C219
0CH2103K562	CAPACITOR,CHIP[CERAMIC	10NF 50V K X 1608 R/TP	C551,C561
0CH2223H562	CAPACITOR,CHIP[CERAMIC	22NF 25V K X 1608 R/TP	C456
0CH2105K944	MLCC	1uF, Z, 50V, Y5V, 1.0mm, 3216, R/TP	C101,C102,C103,C104,C117
0CH2A-0003A	MLCC	10uF, K, 25V, X5R, 2.2mm, 3225, R/TP	C101,C102,C103,C104,C451, C452,C501,C505,C506
0CH2104K562	MLCC	0.1uF, K, 50V, X7R, 0.85mm, 1608, R/TP	C105,C108,C111,C114,U2
0CH2104H942	MLCC	0.1uF, Z, 25V, Y5V, 0.85mm, 1608, R/TP	C106,C109,C112,C115,C118
0CH5100K412	MLCC	10pF, J, 50V, C0G, 0.85mm, 1608, R/TP	C119,C120,C121,C122
0CH5150K412	MLCC	15pF, J, 50V, C0G, 0.85mm, 1608, R/TP	C150,C372
0CH2105K944	MLCC	1uF, Z, 50V, Y5V, 1.0mm, 3216, R/TP	C201,C202,C203,C204,C217
0CH2104K562	MLCC	0.1uF, K, 50V, X7R, 0.85mm, 1608, R/TP	C205,C208,C211,C214,C220
0CH2104H942	MLCC	0.1uF, Z, 25V, Y5V, 0.85mm, 1608, R/TP	C212,C215,C218,C206,C209
0CH5100K412	MLCC	10pF, J, 50V, C0G, 0.85mm, 1608, R/TP	C221,C222,C223,C224
0CH2A-0015A	MLCC	1uF, K, 25V, X5R, 0.9mm, 1608, R/TP	C258,C411,C418,C419,C426,C427, C430,C453,C151,C201,C205, C207,C210,C250,C251,C257
0CH2475F944	MLCC	4.7uF, Z, 16V, Y5V, 1.0mm, 3216, R/TP	C301,C351
0CH2103K942	MLCC	10nF, Z, 50V, Y5V, 0.85mm, 1608, R/TP	C303,C353
0CH2104H942	MLCC	0.1uF, Z, 25V, Y5V, 0.85mm, 1608, R/TP	C310,C311,C352,C354,C355,C356,C357, C358,C359,C360,C361,C450,C550,C560, C610,C611,C130,C160,C202,C203,C204, C206,C208,C209,C252,C253,C254,C255, C256,C259,C260,C261,C302,C304, C305,C306,C307,C308,C309
0CH5681K412	MLCC	680pF, J, 50V, C0G, 0.85mm, 1608, R/TP	C401
0CH2A-0013A	MLCC	10uF, K, 25V, X5R, 1.8mm, 3216, R/TP	C402,C403,C404,C405,C406, C407,C461,C462,C480,C481
0CH2104K562	MLCC	0.1uF, K, 50V, X7R, 0.85mm, 1608, R/TP	C408,C445,C460,C552,C562
0CH5680K412	MLCC	68pF, J, 50V, C0G, 0.85mm, 1608, R/TP	C413
0CH2A-0037A	MLCC	10uF, K, 50V, X7R, 2.7mm, 3225, R/TP	C420,C421
0CH2A-0004A	MLCC	10uF, K, 10V, X5R, 1.8mm, 3216, R/TP	C423,C424,C440,C441,C442,C443,C444
0CH2A-0016A	MLCC	0.22uF, K, 10V, X7R, 0.9mm, 1608, R/TP	C429
0CH5391K412	MLCC	390pF, J, 50V, C0G, 0.85mm, 1608, R/TP	C435
0CH2475H579	MLCC	4.7uF, K, 25V, X5R, 1.6mm, 3225, R/TP	C504
0CH2A-0017A	MLCC	2.2uF, K, 10V, X5R, 0.9mm, 1608, R/TP	C520
0CH2105K944	MLCC	1uF, Z, 50V, Y5V, 1.0mm, 3216, R/TP	C553,C563
0CH5390K412	MLCC	39pF, J, 50V, C0G, 0.85mm, 1608, R/TP	C701

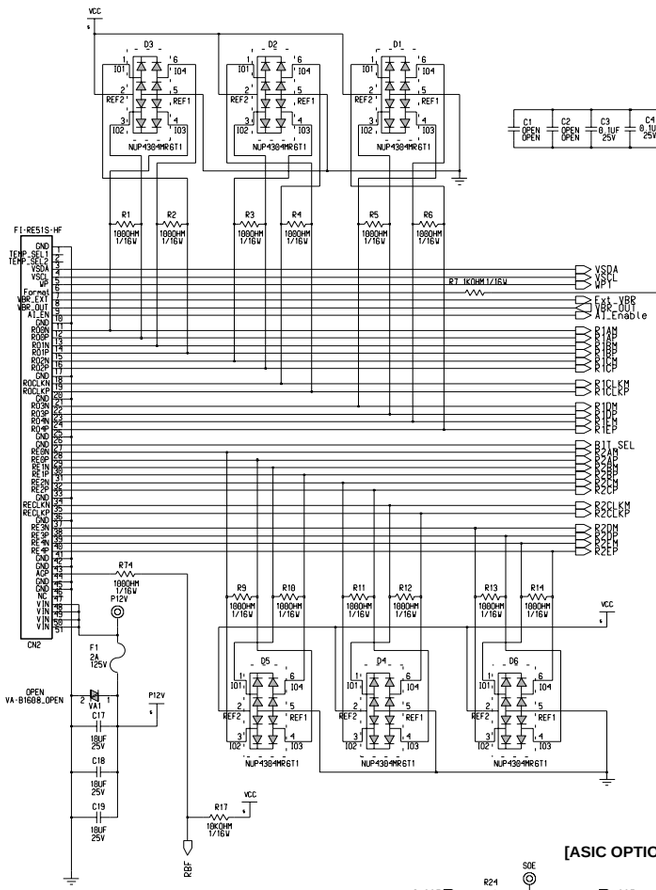
PART No.	DESCRIPTION	SPECIFICATION	LOCA. No.
CIRCUIT_IC			
0ITIL-0063A	Power	TPS65162RGZR, TEXAS INSTRUMENT, TV_IPS	U10
0IPLC-0005B	EMI	PCS3I6100A, Pulsecore, 30~130MHz, 3.3, TSOT-26	U11
0IETL-0011A	Analog	ISL43210IHZ-T, Intersil, 2.7 to 12, 28nsec, 20nsec, 5uW	U12
0IROL-0006A	EEPROM	BR24L08FV-WE2, Rohm, 8K, 5msec, SSOP-B8, R/TP, 8	U14
0IESL-0002B	SDRAM	M12L64322A-6TG, ESMT, 64Mbit, 166MHz, TSOP, TR, 86	U15,U16
0ITIL-0065A	P-Gamma	BUF22821, TEXAS INSTRUMENT, 0V to 22V, 22, 8bit, 16	U18
0ITLL-0021A	Timing	TL2297OD, TLI, LVDS, 8/10, 4, Mini, 8/10, 4, COD,DRC	UC1
0IRTL-0002C	LDO	RT9164A-18PL, RICHTEK, Fix_1.8V, 1A, TO-252, R/TP	US1
CIRCUIT_CONNECTOR			
6630L-0193A	CONNECTOR	GF10A-4S-LSS-AU, LS CABLE, 4 Pin, 1.0 mm, Angle, Sn	U30
6630L-0209A	CONNECTOR	PF050-O96B-C20-S, UJU, 96 Pin, 0.5 mm, Angle, Au, FPC	CN1
6630L-0209A	CONNECTOR	PF050-O96B-C20-S, UJU, 96 Pin, 0.5 mm, Angle, Au, FPC	CN3
6630L-0209A	CONNECTOR	PF050-O96B-C20-S, UJU, 96 Pin, 0.5 mm, Angle, Au, FPC	CN4,CN5
6630L-0182A	Wire-Board	FI-RE51S-HF, JAE, 51PIN, 0.5MM, Angle, Female, R/TP	CN1
6630L-0214A	Wire-Board	FI-RE41S-HF, JAE, 41PIN, 0.5MM, Angle, Female, R/TP	CN2
CIRCUIT_DIODE			
0DHZL-0017A	ESD	NUP4304MR6T1, ON-SEMI, TSOP-6, R/TP	D1,D11,D12,D2,D3,D4,D5,D6,D7,D8,U19,U20
0DHZL-0008A	Schottky	BAV99-7-F, DIODES, SOT-23, R/TP	D10,D9
0DD160009AA	Schottky	KDS 160-RTK, KEC, USC, R/TP	D21
0DR051409AA	Schottky	RB051L-40 TE25, ROHM, SOD-106, R/TP	D30,D31
0DZ510009FE	Zener	UDZS TE-17 5.1B, ROHM, SOD-323, R/TP	ZD2
DRIVE_IC			
0INEL-0107A	Source Drive IC	UPD160236N-051-A, NEC, 720, 8, MINI-LVDS, T_B, R/TP	
0IOKL-0136A	Gate Drive IC	MT3804VK01L, OKI, 256/263/267/270, N/A,N/A,C_B,R/TP	
CIRCUIT_FILTER			
6200C-0014A	Bead	BLM18EG601SN1D, MURATA, 0.35 Ohm, 1.6X0.8, R/TP	FL1,FL3
6200L-J015A	Bead	BLM18PG300SN1D, MURATA, 30 ohm, 1.6X0.8X0.8 MM	FL102,FL103,FL21,FL22,FL101
6200C-0010A	Bead	BLM18BD471SN1D, MURATA, 470 Ohm, 1.6X0.8, R/TP	FL120,FL122
6200L-0056A	Bead	BLM18BD221SN1D, MURATA, 220 ohm, 1.6X0.8X0.8 MM	FL121,FL20
6200C-0014A	Bead	BLM18EG601SN1D, MURATA, 0.35 Ohm, 1.6X0.8, R/TP	FL4,FL6
CIRCUIT_RESISTOR			
0RH0000C622	chip	0 ohm, 1/16W, 1608, 5%, R/TP	R104
0RH0000C622	chip	0 ohm, 1/16W, 1608, 5%, R/TP	R111,R122,R127,R621,R455,R631,R632, R706,R717,R718,R719,R750,R751,R121, R205,R303,R304,R410,R411,R412,R413, R414,R415,R423,R425,R430, R442,R450,R451,R454
0RH0000C622	chip	0 ohm, 1/16W, 1608, 5%, R/TP	R111,R122,R127,R621,R455,R631,R632, R706,R717,R718,R719,R750,R751,R121, R205,R303,R304,R410,R411,R412, R413,R414,R415,R423,R425,R430, R442,R450,R451,R454
0RH0202C422	chip	20 ohm, 1/16W, 1608, 1%, R/TP	R125
0RH0302C422	chip	30 ohm, 1/16W, 1608, 1%, R/TP	R701,R702,R703,R704,R705
0RH0472C422	chip	47 ohm, 1/16W, 1608, 1%, R/TP	R254,R255

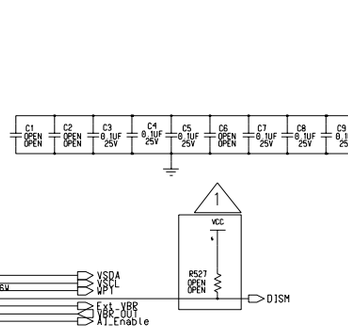
PART No.	DESCRIPTION	SPECIFICATION	LOCA. No.
0RH0682C422	chip	68 ohm, 1/16W, 1608, 1%, R/TP	R301
0RH0752C422	chip	75 ohm, 1/16W, 1608, 1%, R/TP	R202
0RH1000C422	chip	100 ohm, 1/16W, 1608, 1%, R/TP	R105,R106,R107,R108,R109,R110,R111, R112,R113,R114,R115,R116,R117,R118, R119,R120,R121,R122,R126,R127, R128,R131,R136,R137,R139
0RH1000C422	chip	100 ohm, 1/16W, 1608, 1%, R/TP	R205,R206,R207,R208,R209,R210,R211, R212,R213,R214,R215,R216,R217,R218, R219,R220,R221,R222,R226,R227, R228,R231,R236,R237,R239
0RH1000C422	chip	100 ohm, 1/16W, 1608, 1%, R/TP	R101,R102,R103,R104,R105,R106,R112, R113,R114,R115,R116,R117,R119, R129,R131,R132,R133,R134,R135, R136,R137,R138,R139,R140, R141,R142,R433,R436,R438
0RH1001C422	chip	1K ohm, 1/16W, 1608, 1%, R/TP	R711,R253,R437,R447,R501,R502,R637,R638
0RH1001C422	chip	1K ohm, 1/16W, 1608, 1%, R/TP	R711,R253,R437,R447,R501,R502,R637,R638
0RH1002C422	chip	10K ohm, 1/16W, 1608, 1%, R/TP	R505,R506,R507,R508
0RH1004C422	chip	1M ohm, 1/16W, 1608, 1%, R/TP	R120,R182,R513
0RH1101C422	chip	1.1K ohm, 1/16W, 1608, 1%, R/TP	R102
0RH1501C422	chip	1.5K ohm, 1/16W, 1608, 1%, R/TP	R202
0RH1503C422	chip	150K ohm, 1/16W, 1608, 1%, R/TP	R481
0RH1601C422	chip	1.6K ohm, 1/16W, 1608, 1%, R/TP	R252
0RH1801C422	chip	1.8K ohm, 1/16W, 1608, 1%, R/TP	R101
0RH2002C422	chip	20K ohm, 1/16W, 1608, 1%, R/TP	R128
0RH2201C422	chip	2.2K ohm, 1/16W, 1608, 1%, R/TP	R201
0RH2202C422	chip	22K ohm, 1/16W, 1608, 1%, R/TP	R401,R736
0RH2203C422	chip	220K ohm, 1/16W, 1608, 1%, R/TP	R420,R439
0RH2400C422	chip	240 OHM, 1/16W, 1608, 1%, R/TP	R110
0RH2401C422	chip	2.4K ohm, 1/16W, 1608, 1%, R/TP	R445
0RH2700C422	chip	270 ohm, 1/16W, 1608, 1%, R/TP	R204
0RH3000C422	chip	300 ohm, 1/16W, 1608, 1%, R/TP	R427
0RH3001C422	chip	3K ohm, 1/16W, 1608, 1%, R/TP	R403,R730,R732
0RH4300C422	chip	430 ohm, 1/16W, 1608, 1%, R/TP	R203
0RH4700C422	chip	470 ohm, 1/16W, 1608, 1%, R/TP	R448
0RH4701C422	chip	4.7K ohm, 1/16W, 1608, 1%, R/TP	R107,R108,R250,R251
0RH5101C422	chip	5.1K ohm, 1/16W, 1608, 1%, R/TP	R402,R449
0RH5600C422	chip	560 ohm, 1/16W, 1608, 1%, R/TP	R103
0RH5600C422	chip	560 ohm, 1/16W, 1608, 1%, R/TP	R426
0RH5601C422	chip	5.6K ohm, 1/16W, 1608, 1%, R/TP	R452,R480
0RH5602C422	chip	56K ohm, 1/16W, 1608, 1%, R/TP	R421,R441
0RH6801C422	chip	6.8K ohm, 1/16W, 1608, 1%, R/TP	R130,R405
0RH7501C422	chip	7.5K ohm, 1/16W, 1608, 1%, R/TP	R428
0RH8200C422	chip	820 ohm, 1/16W, 1608, 1%, R/TP	R203
0RHAA-0002A	chip	9.1K ohm, 1/4W, 3216, 5%, R/TP	R434
		CIRCUIT_POLARIZER	
6308L-1422A	Polarizer	LGC, S, A, X, S, P, B, S, X, X, 1, 42, TOP	
6308L-1423A	Polarizer	LGC, S, X, X, S, P, B, A, X, I, 1, 42, BOTTOM	
		INVERTER	
6632L-0482B	Inverter	PNEL-T711B, LGIT, LC420WUN, ONE BOARD, VITIAZ3, INTERNAL	

PART No.	DESCRIPTION	SPECIFICATION	LOCA. No.
		MECHANICAL PART	
6884L-0032A	Anisotropic Conductive Film	L15-1141RT18, LGC, L=1.5MMX300M, T=18	
*6884L-0034A	Anisotropic Conductive Film	CP5420ISL, SONY, L=1.5MMX300M, T=20	
6884L-0034A	Anisotropic Conductive Film	CP5420ISL, SONY, L=1.5MMX300M, T=20	
*6884L-0044B	Anisotropic Conductive Film	DP2252KSL(2.0MMX300M), SONY	
6884L-0044C	Anisotropic Conductive Film	AC-9825R-45(2.0MMX300M), HITACHI	
*6884L-0050A	Anisotropic Conductive Film	L20-1051RP45(2.0MMX300M), LSC	
0RHZL-0006A	Array	150 ohm, 1/16W, 2010, 5%, R/TP	AR11,AR12,AR13,AR14,AR15,AR16, AR17,AR18,AR19,AR20,AR21,AR22, AR23,AR24,AR25,AR26,AR27, AR28,AR29,AR30,AR31
0TR900009BA	Bipolar	IMX9, ROHM, NP DUAL, TP, SMT6, N/A	Q2
0LCAA-0010A	Coil	DLOB8037-2R7220, DACOWELL, 22UH, M=20%, 2.7A, 0.09	L1,L2
0TFFL-0006A	FET	RTR025N03, ROHM, MOSFET, N-CHANNEL, R/TP, TSMT3	Q8
6851L-0130S	FFC	6851L-0130S, STANDARD, 96pin, 65X49.8 mm, LC420, LC470	
6851L-0121A	FFC	6851L-0121A, SUMITOMO, 4pin, 496 mm, LC420WUN	
*6851L-0122A	FFC	6851L-0122A, DONGBANG, 4pin, 496 mm, LC420WUN	
6640L-0007A	FINGER	SM-RUBBER, JSM-5-4.5-8,GASKET SMT TYPE, JOINSET	GA1,GA3
6640L-0007A	FINGER	SM-RUBBER, JSM-5-4.5-8,GASKET SMT TYPE, JOINSET	GA4,GA6
6915L-0007A	LED	BZ-XBH361-TR9,BLUE,FOR EEFL	LD1
6212L-0002A	Resonator	10MHz, +-30 PPM, 33pF, 3.2X1.3X0.7 mm, R/TP, Resonator	X1
0FSLO-0001A	Slow	452003.MRL, LITTELFUSE, Nickel, 125V, 3A, UL/CSA	F1

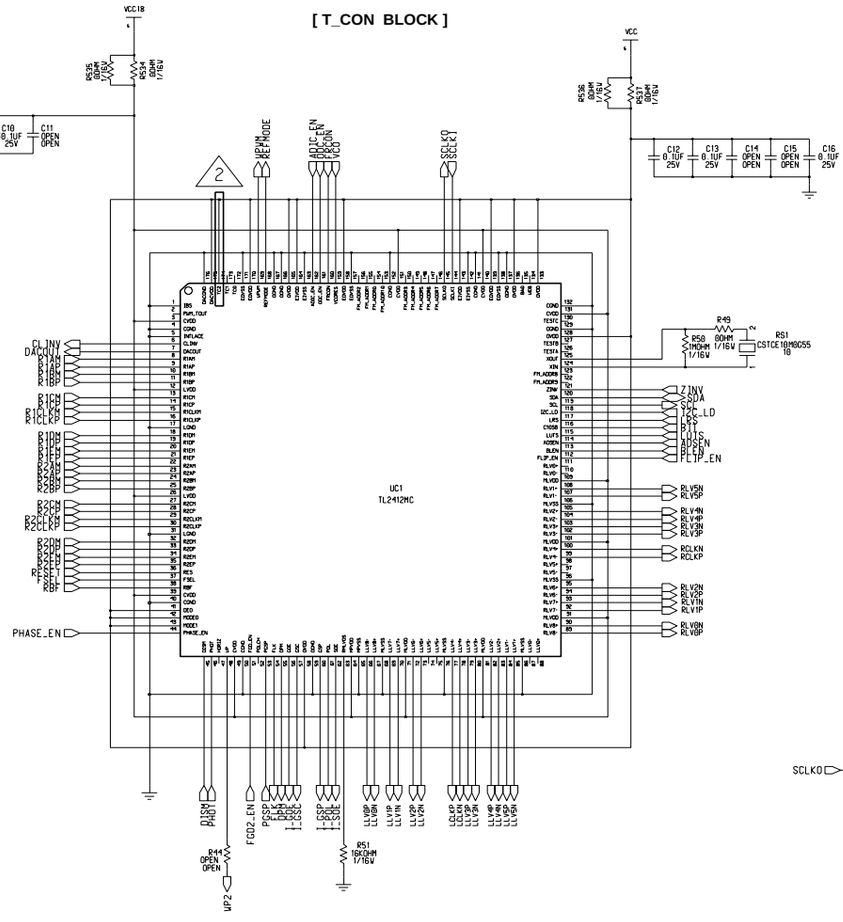
PART No.	ITEM	DESCRIPTION
		PACKING & BOX
3930L-0024A	Pallet	PAPER, 1140X990X130
3920L-0724A	Packing	TOP_R, EPS, LC420WX7
3920L-0880A	Packing	BOTTOM, EPS, LC420WUN
3000L-0032A	Angle Packing	PAPER, DW, 1095X835X505
3000L-0033A	Angle Packing	PAPER, SW, D20X665XT5
7250L-0041A	TAPE(RAW)	OPP 70MMX300M(LG,PHLIPS LCD)
		LABEL
3850L-0112A	Label	PALLET, ART, 100X100
3850L-0088A	Label	ID, YUPO, 78X37
		BACKLIGHT
6900L-0223D	Backlight System	LC420WUD, SAC1-G31
6912L-0442A	Lamp EEFL	WOOREE ETI, 0.253/0.218, N/A, D3.4, L960, I Type
		MECHANICAL PART
3880L-0016P	Bag	AL, 1070X750(42NARROW)
3111L-0243A	Case Top Assembly	Up, LC420WUN-SAA1-G31
3111L-0244A	Case Top Assembly	SIDE, LC420WUN-SAA1-G31
3111L-0245A	Case Top Assembly	Down, LC420WUN-SAA1-G31
3550S-0558A	Metal Cover Shield	CONTROL, EGI, T0.5, LC420WUN-SAA1-G31
3550S-0559A	Metal Cover Shield	INV, EGI, T0.5, LC420WUN-SAA1-G31
5135L-0046B	PROTECT FILM	LDPE+HDPE, 970X554X0.075, 42W
4000L-0034A	Screw	SWCH18A, MACHINE, BIND HEAD, M3.0, L=6.0, NI
4000L-0034B	Screw	SWCH18A, MACHINE, BIND HEAD, M3.0, L=16.0, NI
7250L-0123M	Single Side Tape	E-SONG, T3181, GRAY, 40X60X0.12
7250L-0023A	TAPE(RAW)	MASKING 20MMX50M
7250L-0082C	TAPE(RAW)	OPP FILM TAPE

[USER CONNECTOR]

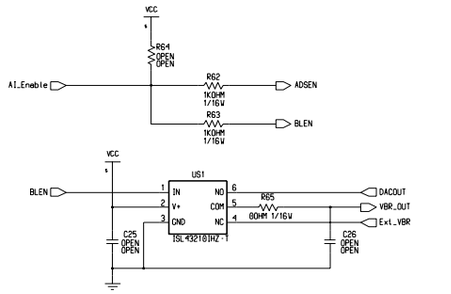




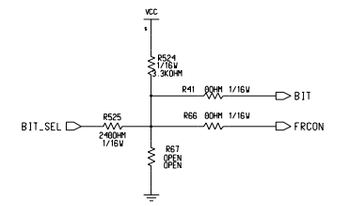
[T_CON BLOCK]



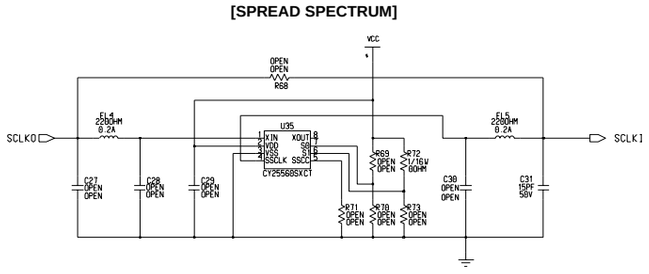
[AI I/F BLOCK]



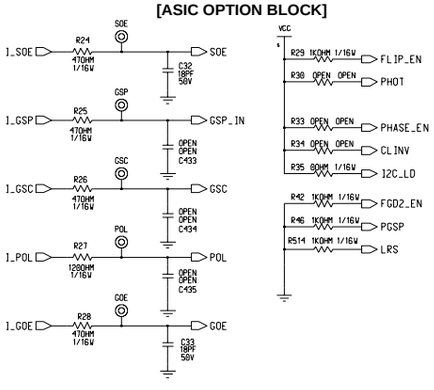
[BIT & FRC selection]



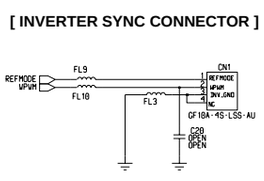
[SPREAD SPECTRUM]

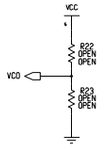


[ASIC OPTION BLOCK]

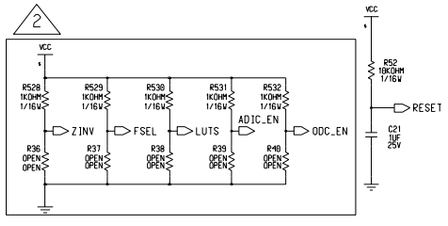


[INVERTER SYNC CONNECTOR]





[T_CON RESET BLOCK]



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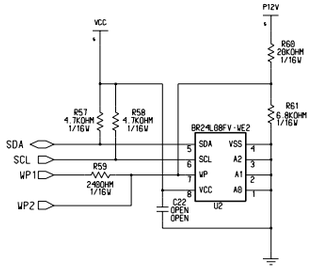


LC470WUN-SAA1-732

Control Schematic 1/3

[MECH_CIRCUIT GND BLOCK]

[POWER BLOCK]

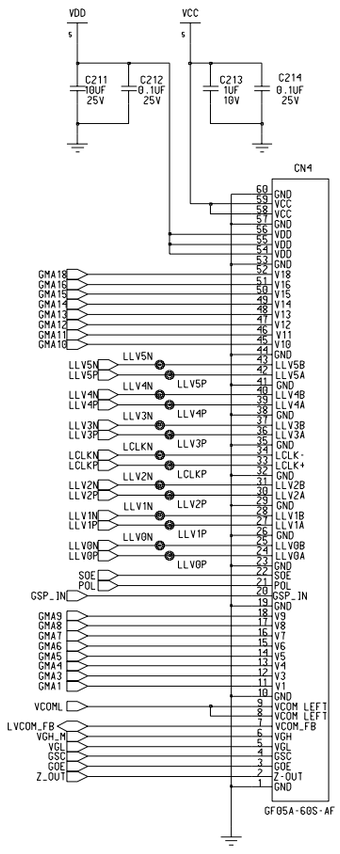
[POWER BLOCK(3.3V -> 1.8V)]

[P-VCOM BLOCK]

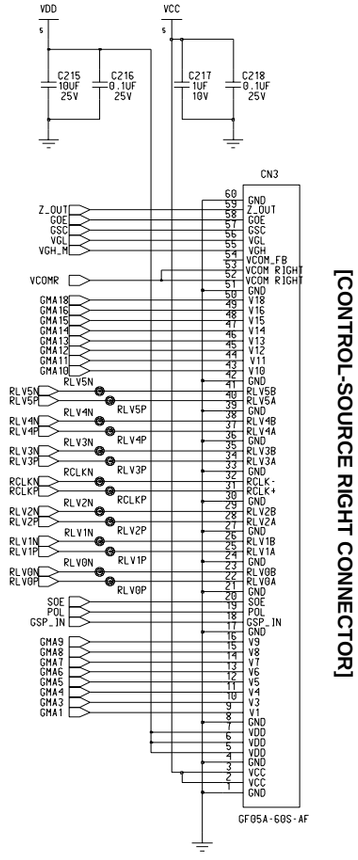
[LED Block]

LC470WUN-SAA1-732

Control Schematic 2/3



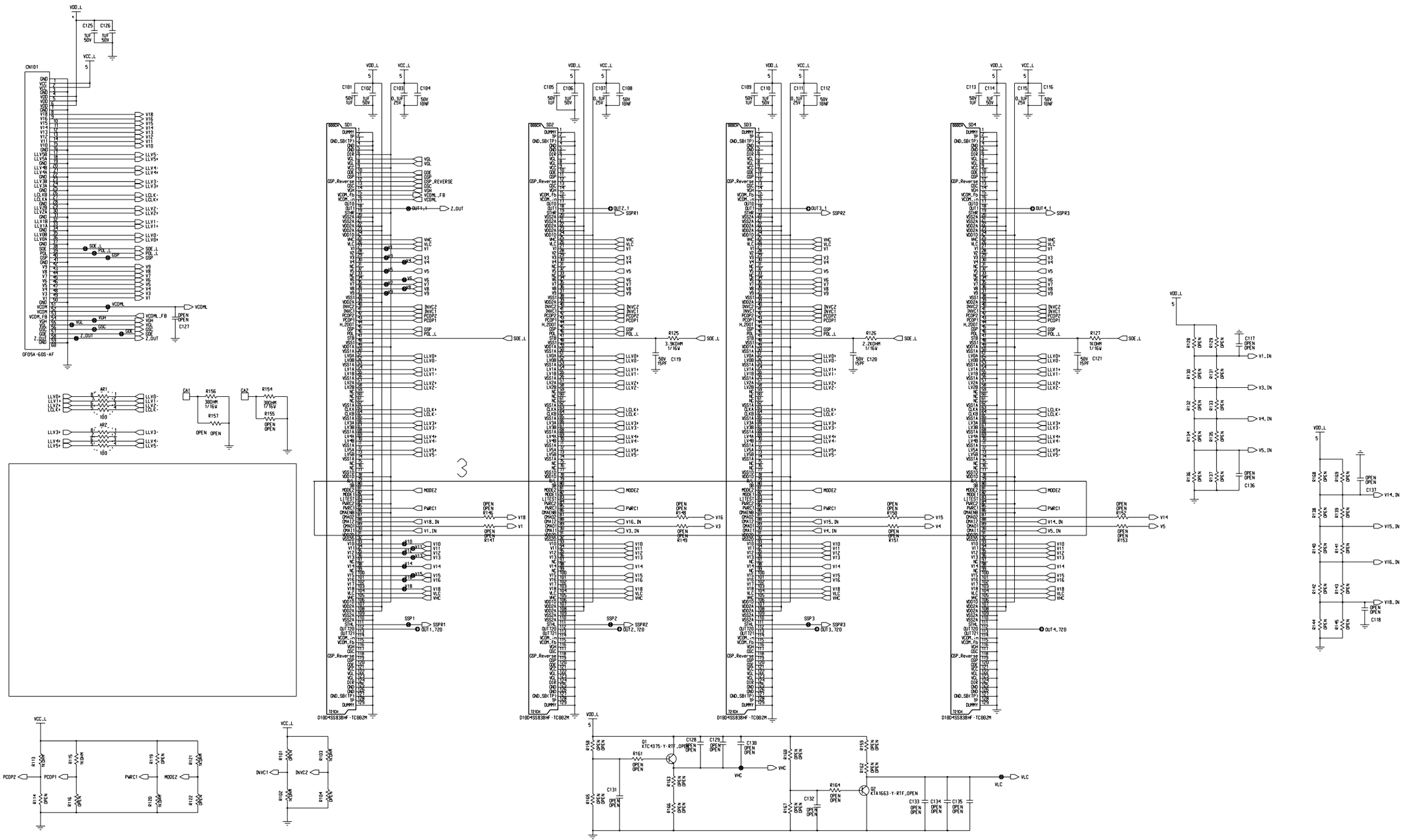
[CONTROL-SOURCE LEFT CONNECTOR]

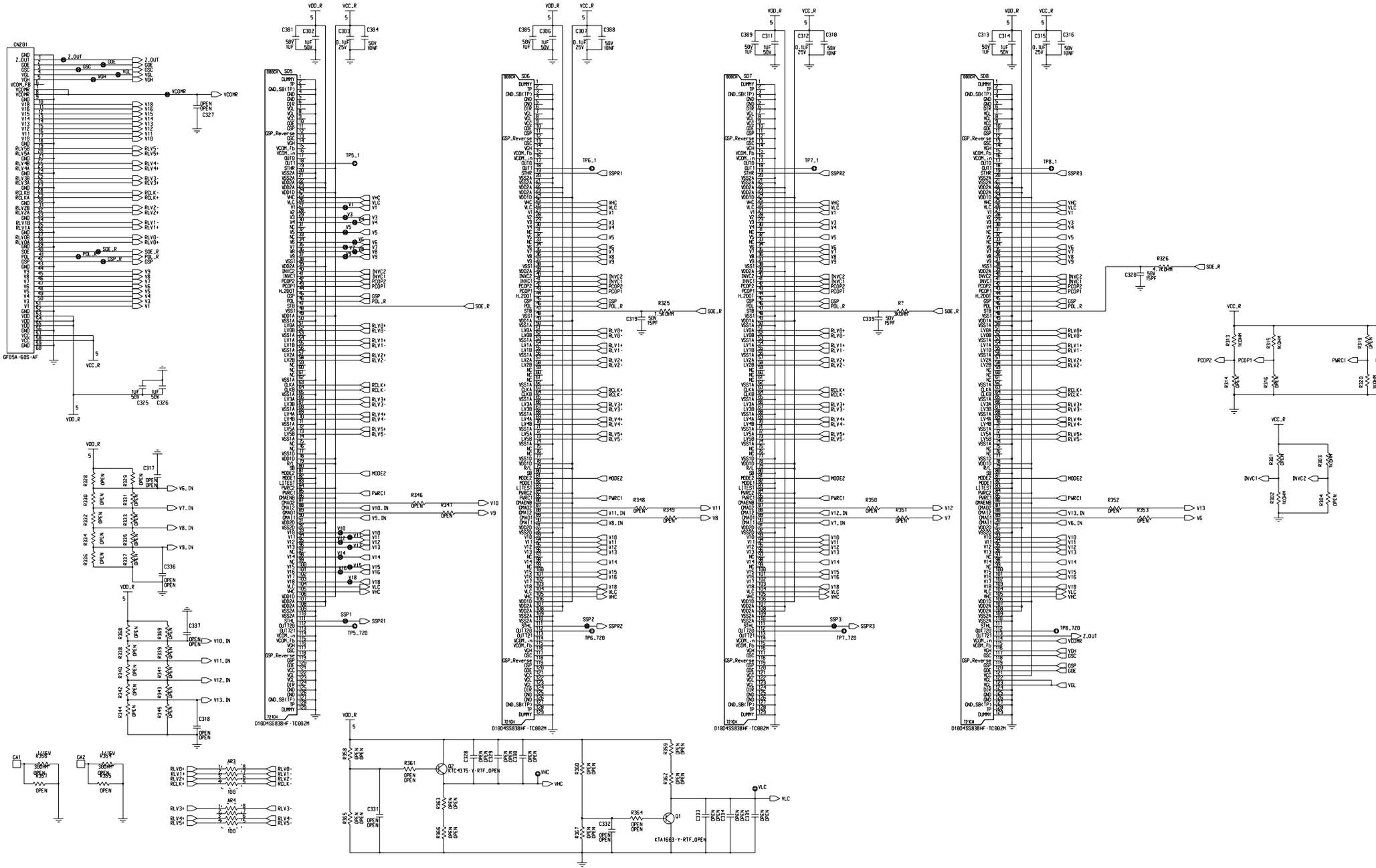


[CONTROL-SOURCE RIGHT CONNECTOR]

LC470WUN-SAA1-732

Control Schematic 3/3





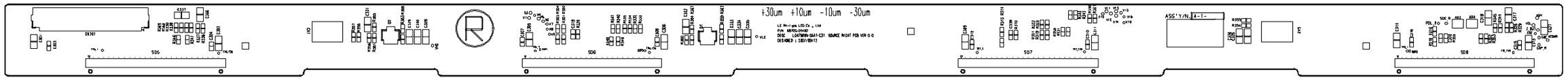
SOURCE RIGHT PWB (1/1)

LC470WUN-SAA1-732

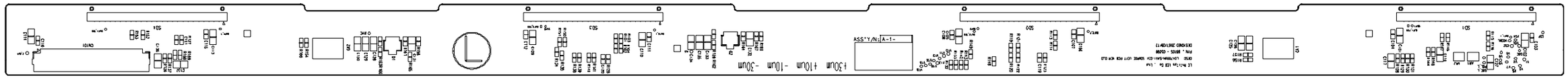
6871L-1340A

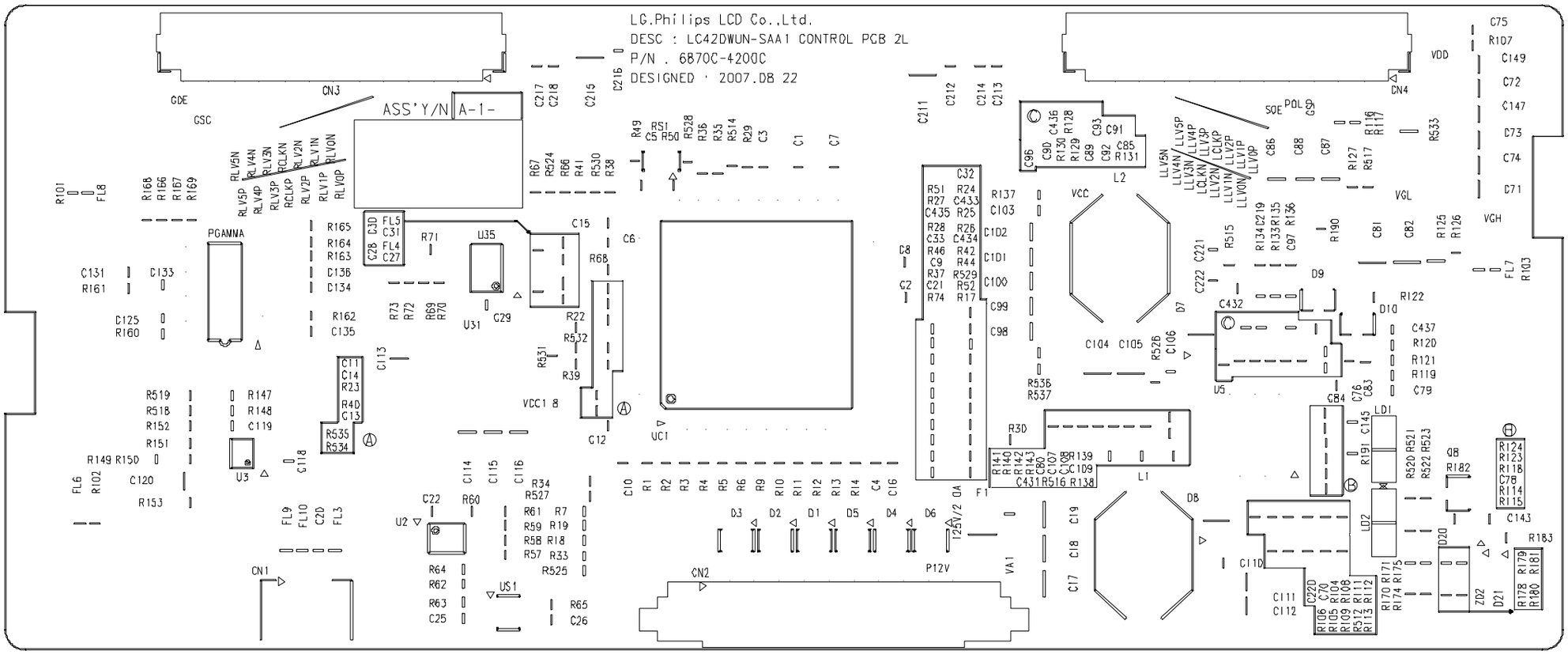
Printed Circuit Board / 회로기판

SOURCE(Right_Top)

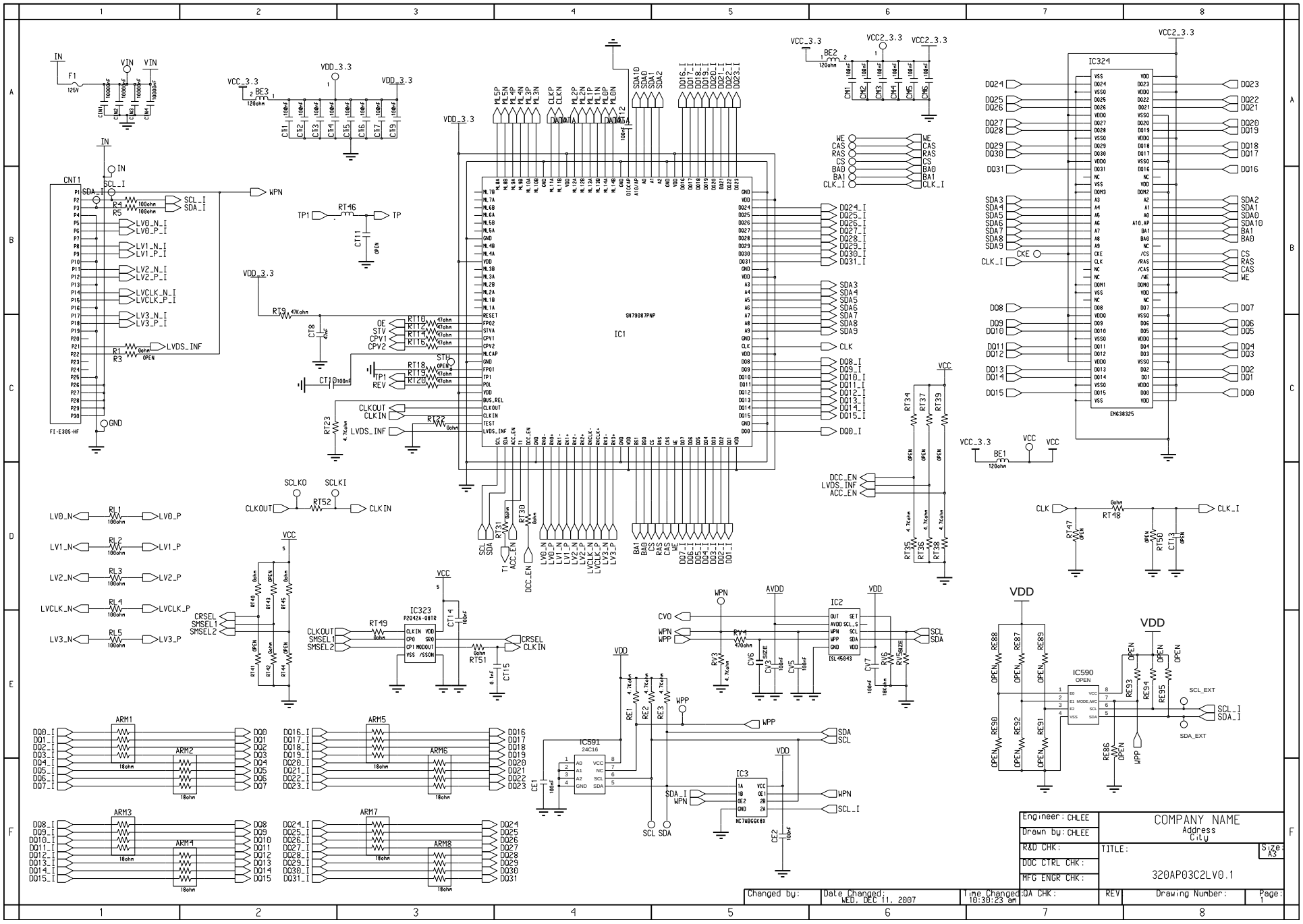


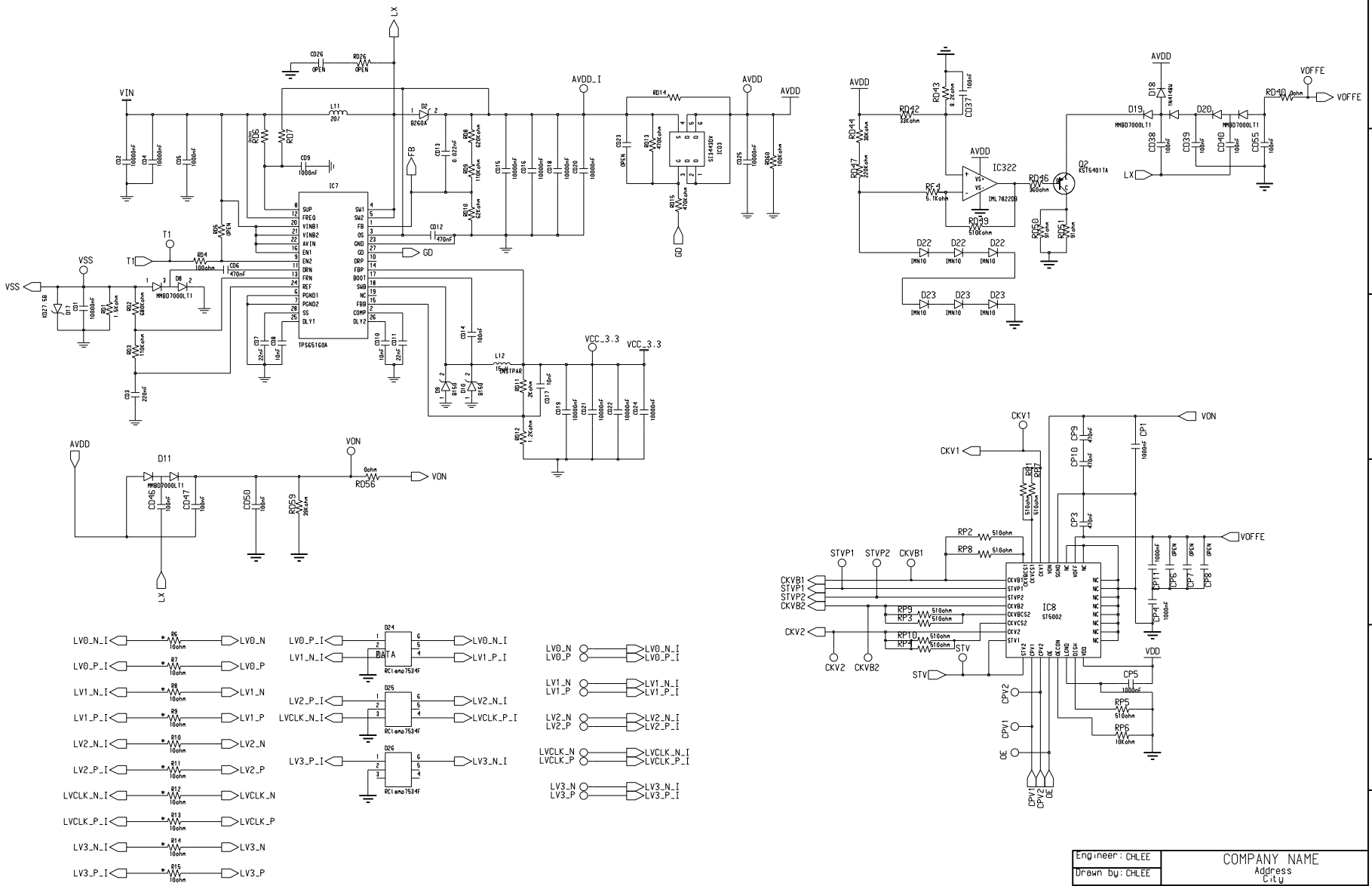
SOURCE(Left_Top)





Control(Top)





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MFG ENGR CHK:							
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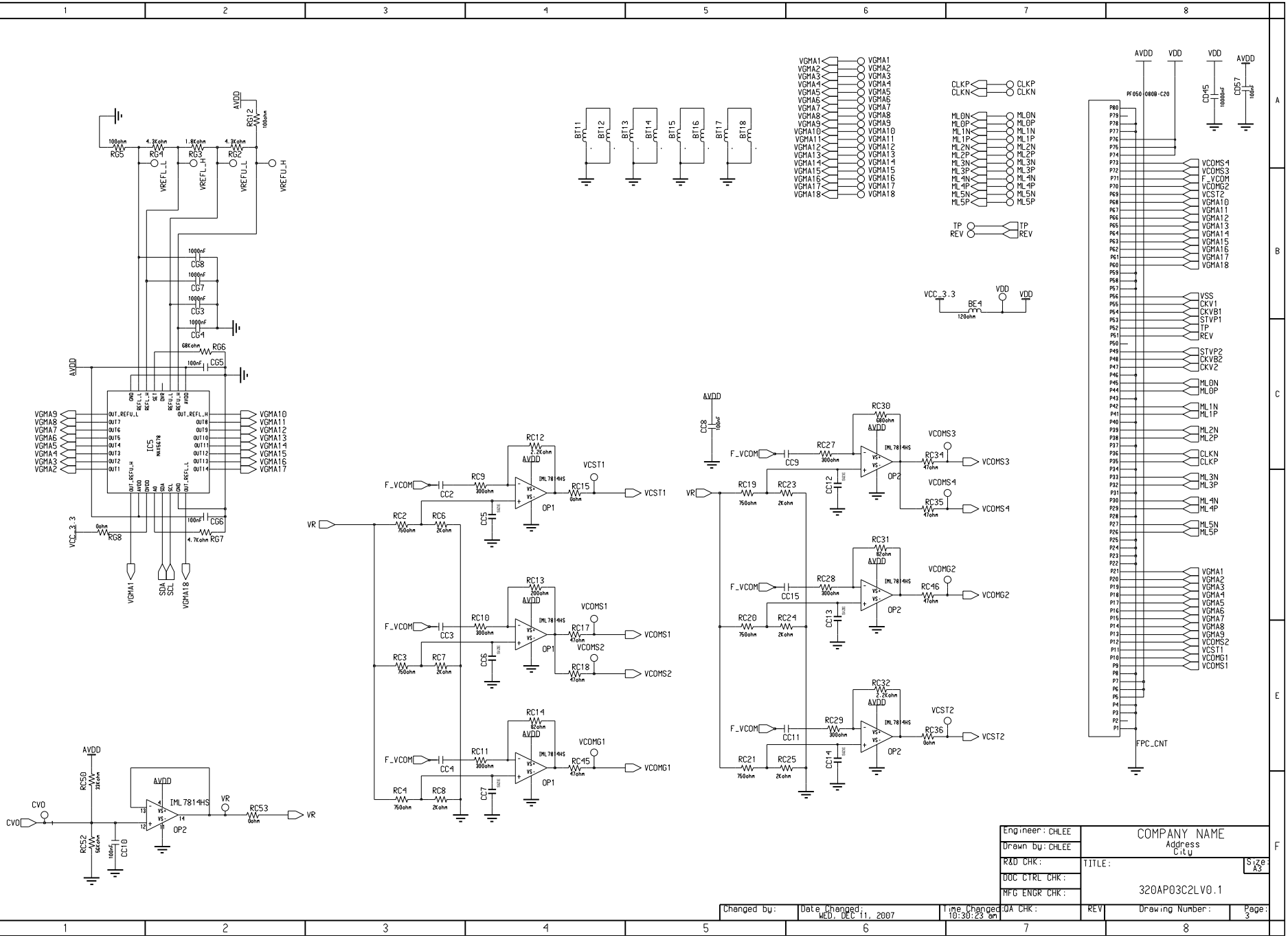

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Engineer: CHLEE	COMPANY NAME
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