

*1080P
Direct View LCD*



42LH50 Direct View LCD

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OUTLINE

Section 1

Contact Information, Preliminary Matters, Specifications,
LCD Overview, General Troubleshooting Steps,
Signal Distribution, Disassembly Instructions and Voltages

Section 2

Circuit Board Operation, Troubleshooting of :

- Switch mode Power Supply/Ballast Combination
- New • Main Board Internet Connection
- Ft Control Board
- Side Keys

42LH50 LCD Direct View Display

Section 1

This Section will cover Contact Information and remind the Technician of Important Safety Precautions for the Customers Safety as well as the Technician and the Equipment.

Basic Troubleshooting Techniques which can save time and money sometimes can be overlooked. These techniques will also be presented.

This Section will get the Technician familiar with the Disassembly, Identification and Layout of the LCD Display Panel.

At the end of this Section the Technician should be able to Identify the Circuit Boards and have the ability and knowledge necessary to safely remove and replace any Circuit Board or Assembly.

Preliminary Matters (The Fine Print)

IMPORTANT SAFETY NOTICE

The information in this training manual is intended for use by persons possessing an adequate background in electrical equipment, electronic devices, and mechanical systems. In any attempt to repair a major Product, personal injury and property damage can result. The manufacturer or seller maintains no liability for the interpretation of this information, nor can it assume any liability in conjunction with its use. When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Electronics. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury. If wires, screws, clips, straps, nuts, or washers used to complete a ground path are removed for service, they must be returned to their original positions and properly fastened.

CAUTION

To avoid personal injury, disconnect the power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks. Also be aware that many household products present a weight hazard. At least two people should be involved in the installation or servicing of such devices. Failure to consider the weight of an product could result in physical injury.

ESD Notice (Electrostatic Static Discharge)

Today's sophisticated electronics are electrostatic discharge (ESD) sensitive. ESD can weaken or damage the electronics in a manner that renders them inoperative or reduces the time until their next failure. Connect an ESD wrist strap to a ground connection point or unpainted metal in the product. Alternatively, you can touch your finger repeatedly to a ground connection point or unpainted metal in the product. Before removing a replacement part from its package, touch the anti-static bag to a ground connection point or unpainted metal in the product. Handle the electronic control assembly by its edges only. When repackaging a failed electronic control assembly in an anti-static bag, observe these same precautions.

Regulatory Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and the receiver; Connect the equipment to an outlet on a different circuit than that to which the receiver is connected; or consult the dealer or an experienced radio/TV technician for help.

CONTACT INFORMATION

Customer Service (and Part Sales) (800) 243-0000

Technical Support (and Part Sales) (800) 847-7597

USA Website (GCSC) aic.lgservice.com

Customer Service Website us.lgservice.com

LG Web Training lge.webex.com

LG CS Academy lgcsacademy.com <http://136.166.4.200>

LCD-DV:	32LG40, 32LH30, 42LG60, 42LG70, 42LH20, 42LH40, 42LH50, 47LG90
PLASMA:	42PG20, 42PQ20, 42PQ30, 50PG20, 50PS80, 50PS60

*Also available on the
Plasma page*

**Plasma Panel
Alignment Handbook**

*New Training Materials on
the Learning Academy site*

Published August 2009 by LG Technical Support and Training

**LG Electronics Alabama, Inc. 201
James Record Road, Huntsville,
AL, 35813.**

LCD DIRECT VIEW OVERVIEW

Safety and Handling Regulations

1. Approximately 20 minute pre-run time is required before any adjustments are performed.
2. Voltage levels on SMPS are factory adjusted and sealed. VR301 and VR302.
3. Be cautious of electric shock from the Backlight section, it uses high voltage AC. Check that the Power Supply and Drive Circuits are completely discharged because of residual current stored before Circuit Board removal.
4. C-MOS circuits are sensitive to static electricity, use caution when dealing with Circuit boards. Always handle the circuit boards on the outside edges, while wearing a static wrist strap.
5. Exercise care when making voltage and waveform checks to prevent damaging the unit and service equipment.
6. Be cautious of lost screws and other metal objects to prevent a possible short in the circuitry.

Checking Points to be Considered

1. Check the appearance of the Replacement Panel and Circuit Boards for both physical damage and part number accuracy.
2. Check the model label. Verify model names and board model matches.
3. Check details of defective condition and history. Example: Oscillator failure dead set, etc...

Basic Troubleshooting Steps

Define, Localize, Isolate and Correct

•**Define** Look at the symptom carefully and determine what circuits could be causing the failure. Use your senses Sight, Smell, Touch and Hearing. Look for burned parts and check for possible overheated components. Capacitors will sometimes leak dielectric material and give off a distinct odor. Frequency of power supplies will change with the load, or listen for relay closing etc. Observation of the front Power LED may give some clues.

•**Localize** After carefully checking the symptom and determining the circuits to be checked and after giving a thorough examination using your senses the first check should always be the DC Supply Voltages to those circuits under test. Always confirm the supplies are not only the proper level but be sure they are noise free. If the supplies are missing check the resistance for possible short circuits.

•**Isolate** To further isolate the failure, check for the proper waveforms with the Oscilloscope to make a final determination of the failure. Look for correct Amplitude Phasing and Timing of the signals also check for the proper Duty Cycle of the signals. Sometimes “glitches” or “road bumps” will be an indication of an imminent failure.

•**Correct** The final step is to correct the problem. Be careful of ESD and make sure to check the DC Supplies for proper levels. Make all necessary adjustments and lastly always perform a Safety AC Leakage Test before returning the product back to the Customer.

42LH50 Product Information



This section of the manual will discuss the specifications of the 42LH50 LCD Direct View Display Panel.

Basic Specifications

Key Features

- **LG NetCast™ Entertainment Access***
- **(Netflix®, YouTube™, Yahoo!® Widgets,**
- **My Media Access CIFS)**
- **TruMotion 120Hz**
- **Full HD 1080p HD Resolution**
- **70,000:1 Dynamic Contrast Ratio**
- **2.7ms Response Time (GTG)**
- **500 cd/m2 Brightness**
- **Wide Color Gamut**
- **Super IPS Panel**
- **Wide Viewing Angle**
- **XD Engine®**
- **24p Real Cinema**
- **ISFccc® Ready**
- **Picture Wizard**
- **AV Mode II (Cinema, Sports, Game)**
- **60,000 Hour Panel Life (typical)**
- **NTSC/ATSC Tuners with Clear QAM**

Pixel Count to Resolution Comparisons



720P Logo

720P Panel

768

HD RESOLUTION 720p HD Resolution Pixels: 1365 (H) × 768 (V)
High definition television is the highest performance segment of the DTV system used in the US. It's a wide screen, high-resolution video image, coupled with multi-channel, compact-disc quality sound.

FORMATS

NTSC 480I
SD 480P
HD 1080I
HD 720P
HD 1080P

Interlaced 240 Lines
Progressive 480 Lines
Interlaced 540 Lines
Progressive 720 Lines
Progressive 1080 Lines

Possible Frame Rates:
24FPS
30FPS
60FPS

Interlaced
2 Fields to make a Frame

Progressive
Each Field is a Frame

BASIC PIXEL COUNTS



720P Panel
1365 (H) × 768 (V)



1080P Panel
1920 (H) × 1080 (V)

Think of sync as the Panels “Refresh Rate”



LG TRAINING CENTER

Basic Specifications (LOGO Familiarization)



Full HD 1080p Resolution

Displays HDTV programs in full 1920 x 1080p resolution for a more detailed picture.



Remote Control Familiarization

TOP PORTION



BOTTOM PORTION



Accessing the Service Menu

SIDE KEYS

REMOTE BOTTOM PORTION



To access the Service Menu.

- 1) Turn the Set On
- 2) Simultaneously, Press and “Hold” the Menu Key on the Side Key pad and Press and “Hold” the Menu Key on the Remote approximately 5 seconds.
- 3) If Customer’s Menu appears, continue to hold until it disappears.
- 4) The Service Menu appears

**Note: If a Password is required to enter the Service Menu. Enter;
0000**



Rear and Side Input Jacks

Rear In/Out Jacks

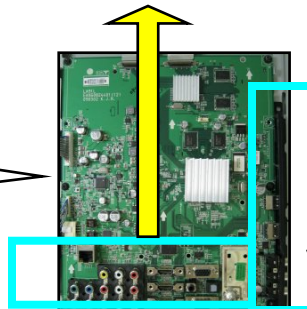
USB Port
Software Upgrades
Music, Photos

Side In/Out

Internet Port

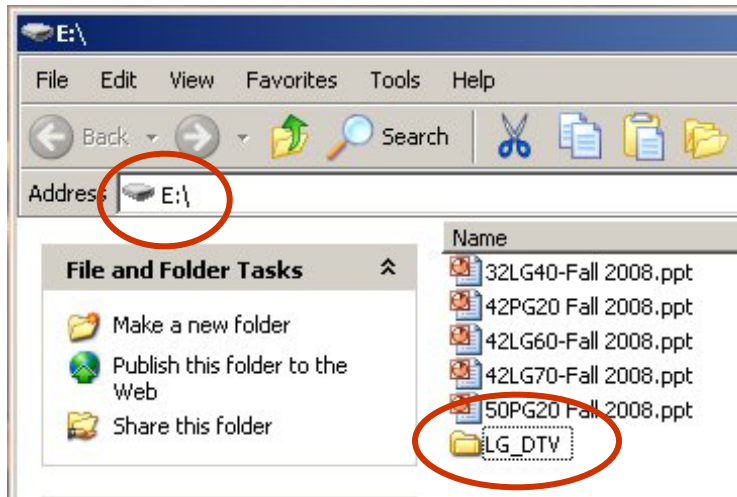


MAIN PWB
Rear and Side
Input/Output locations

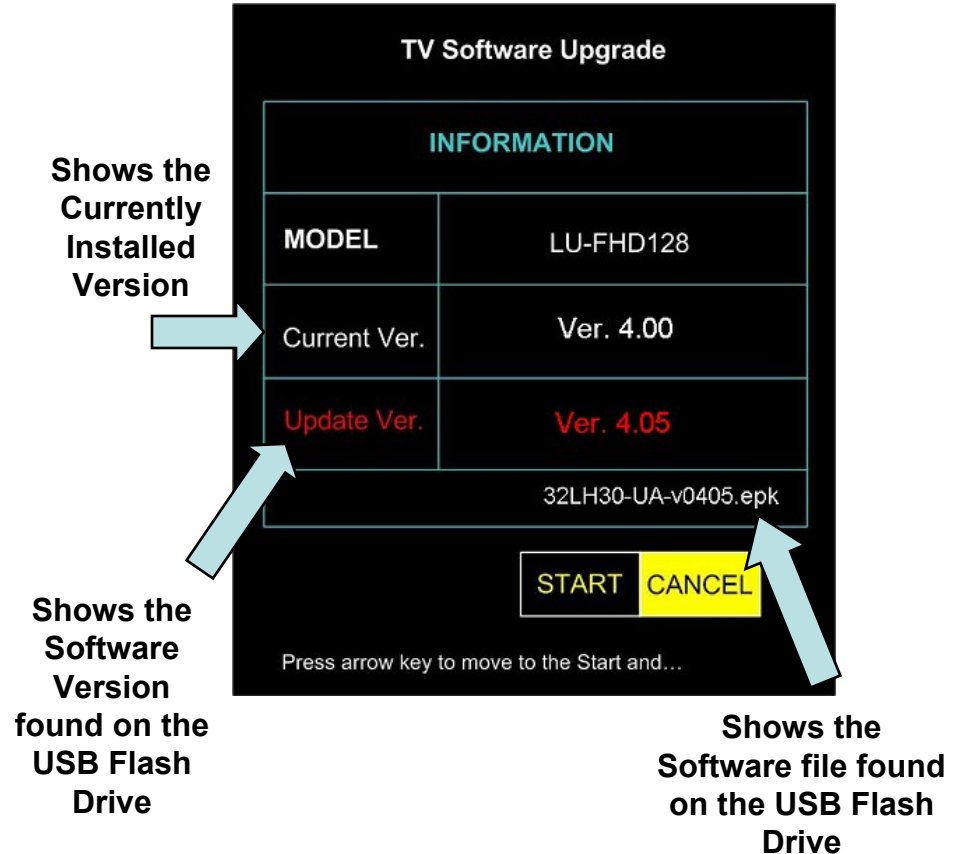


USB DOWNLOAD

1) Create an LG_DTV folder on the USB Flash Drive

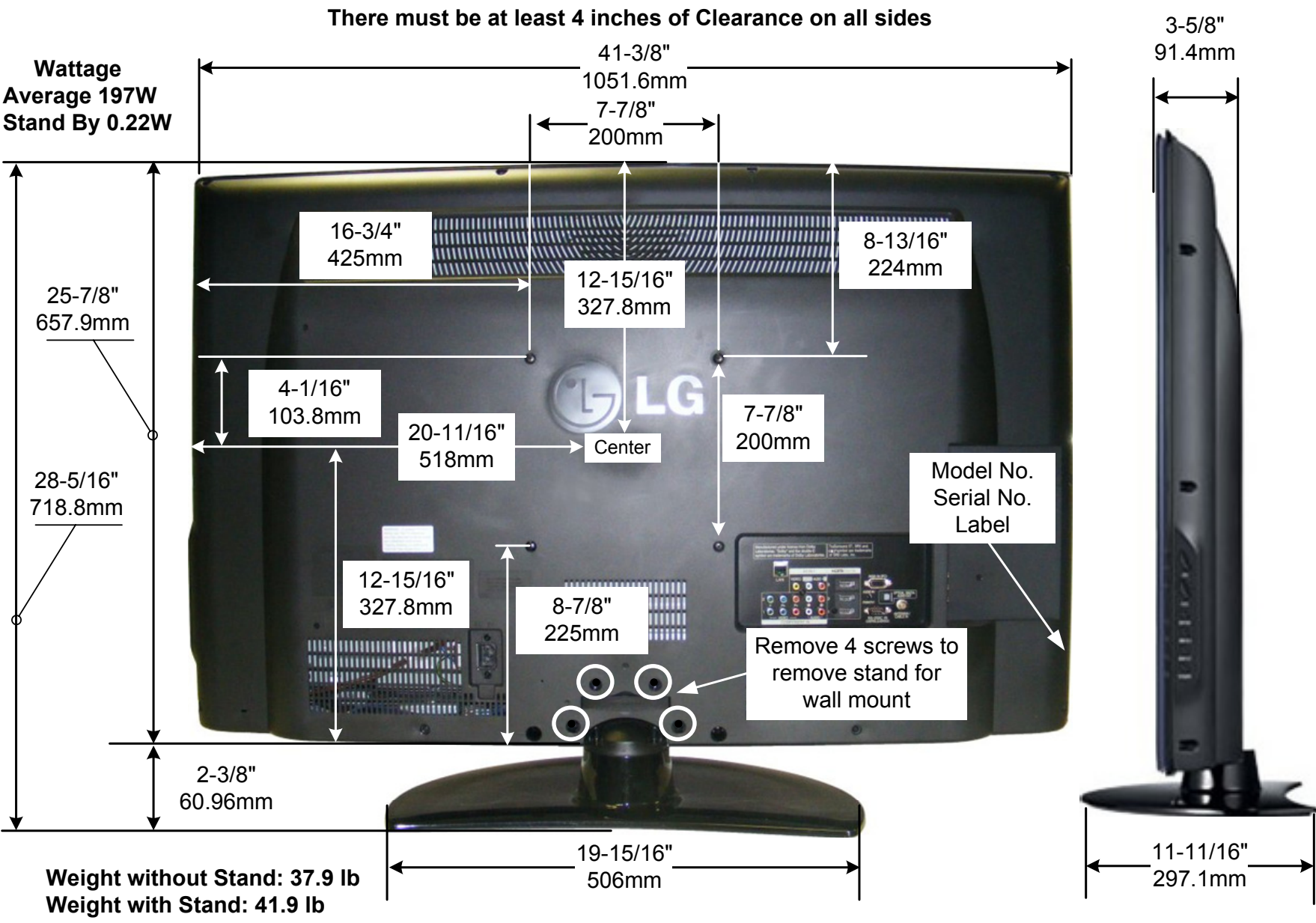


- 2) Copy new software (xxx.epk) to "LG_DTV" folder. Make sure to have correct software file.
- 3) With TV turned on, insert USB flash drive.
- 4) You can see the message "TV Software Upgrade" (See figure to right)
- 5) Cursor left and highlight "START" Button and push "Enter" button using the remote control.
- 6) You can see the download progress Bar.
- 7) Do not unplug until unit has automatically restarted.
- 8) When download is completed, you will see "COMPLETE".
- 9) Your TV will be restarted automatically.



*** CAUTION:**
Do not remove AC power or the USB Flash Drive.
Do not turn off Power, during the upgrade process.

42LH50 PRODUCT DIMENSIONS



DISASSEMBLY AND TROUBLESHOOTING SECTION

Disassembly:

This section of the manual will discuss Disassembly, Layout and Circuit Board Identification, of the 42LH50 LCD Direct View Television.

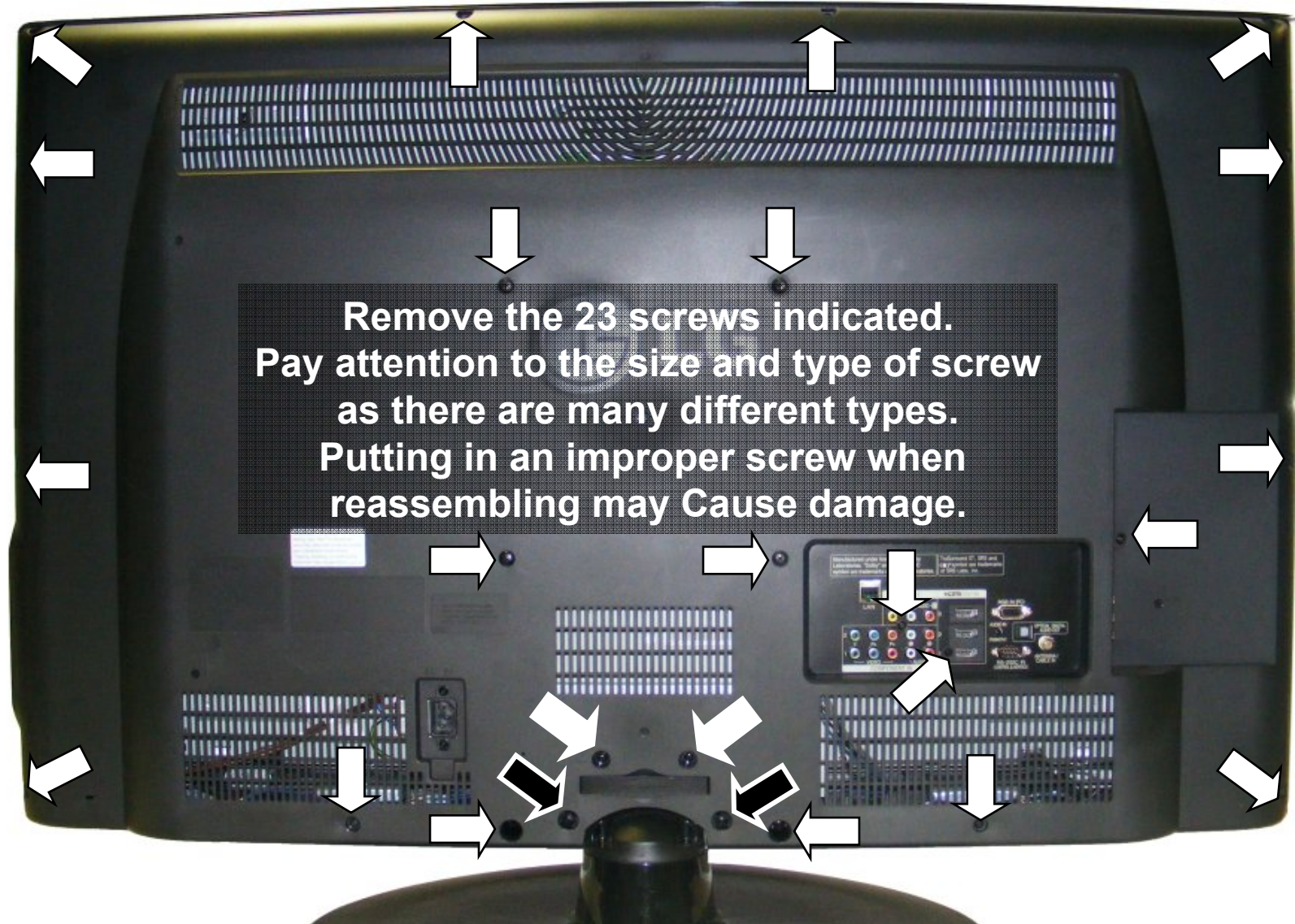
Upon completion of this section the Technician will have a better understanding of the disassembly procedures, the layout of the printed circuit boards and be able to identify each board.

Troubleshooting:

This section of the manual will also discuss troubleshooting.

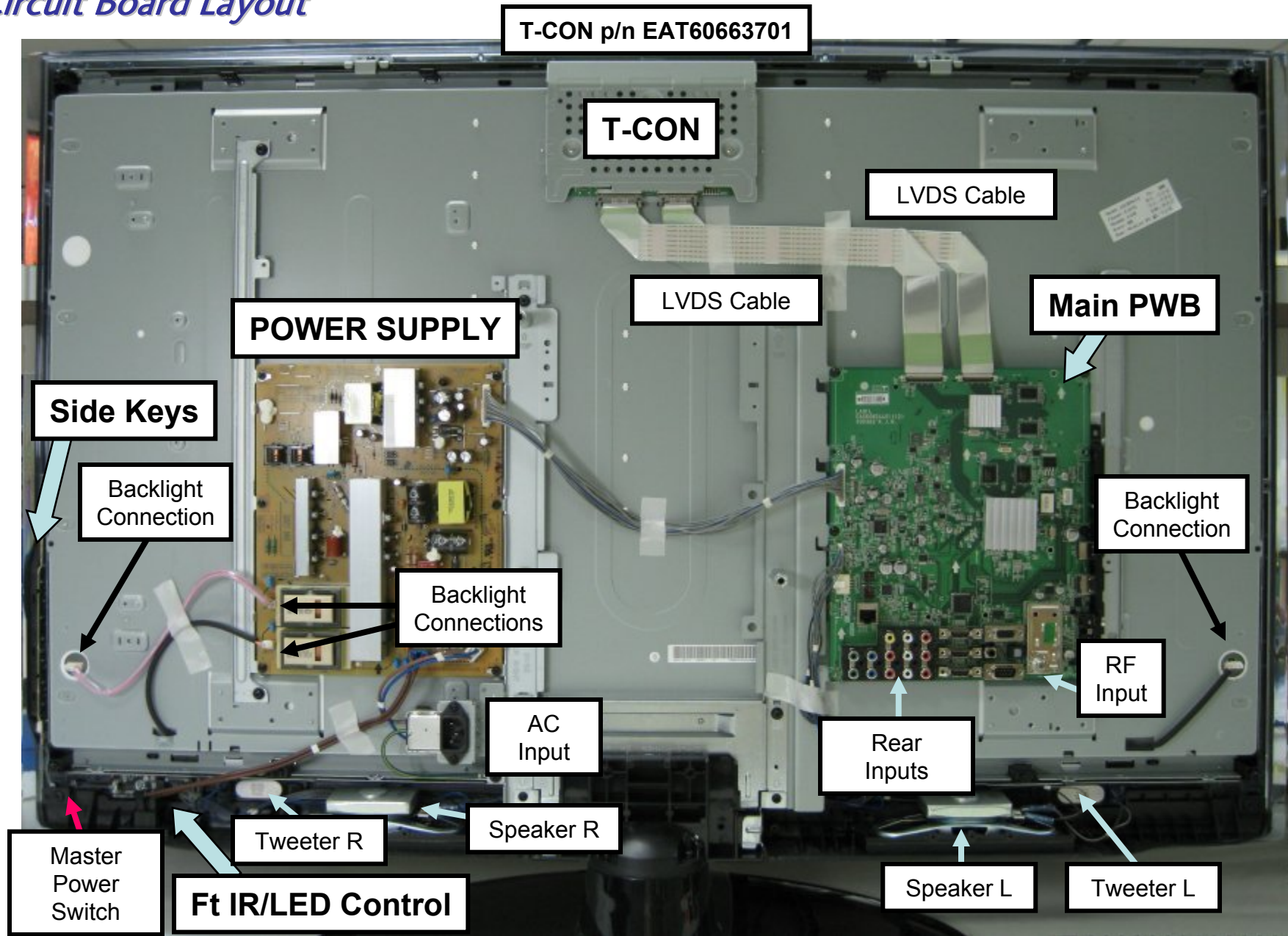
Upon completion of this section the Technician will have a better understanding of how to diagnosis and resolve problems.

Removing the Back Cover



The Stand and its bottom two screws do not need to be removed before removing the back.

Circuit Board Layout



POWER SUPPLY SECTION

Note: If the Master Power Switch is off, this power supply is completely off.

**This switch mode power supply has the ballast section built in.
The power supply develops Stand By 5V, 12V and 24V for the Main board.**

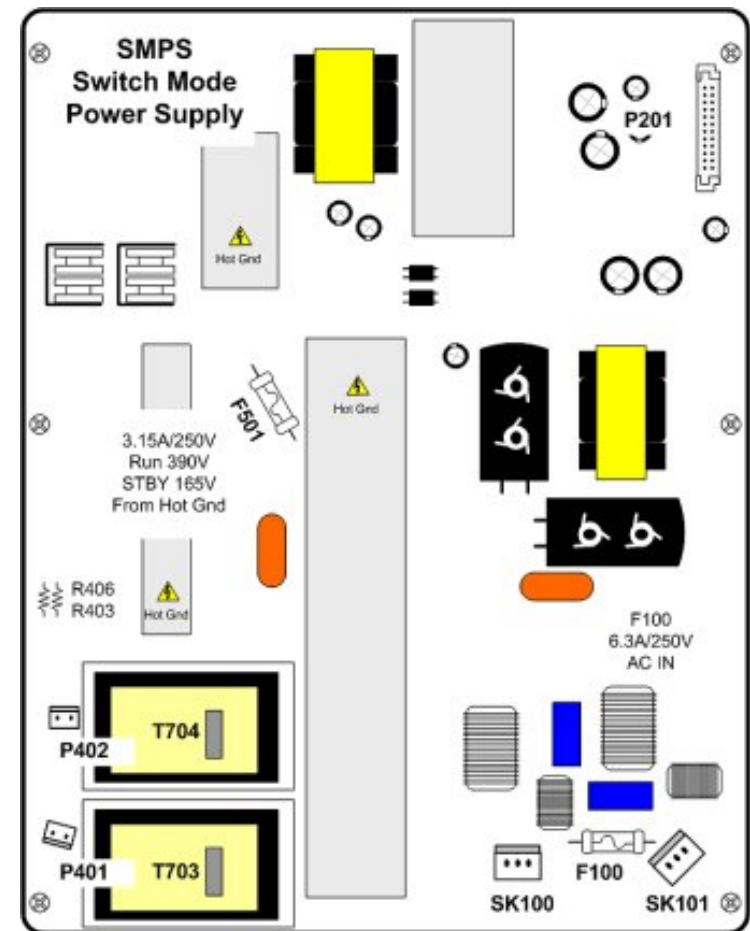
This power supply draws a little less than 1 watt during stand by mode. The fuse F501 reads 73VDC (from hot ground) during this time. When the controller chip (on the back) receives the PWR-ON command via P201 Pin 19, the primary section increases its current supplying ability. The Primary fuse F501 now reads 390V.

12V is routed out P201 pins 5 and 6 and

24V is routed out P201 pins 1 and 2.

Internally, the power supply also sends B+ (390V) voltage to the Ballast section but it is not turned on at this time.

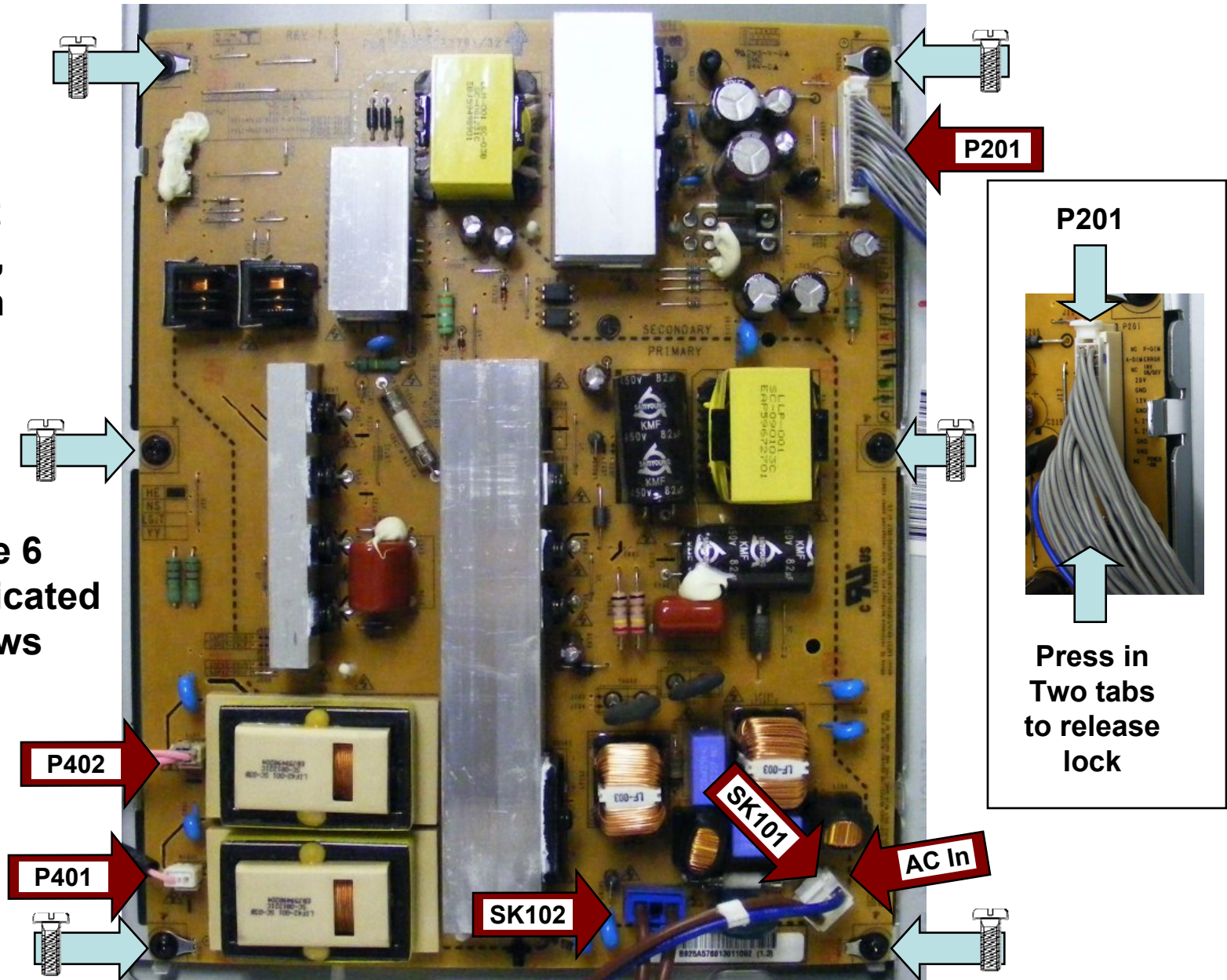
When the power supply receives the INV-ON command via P201 pin 20, it is routed to the driver for the ballast (on the back of the board). The driver now starts to deliver drive information to the output FETs (on the far left hand heat sink) which in turn switch the primary sides of the two ballast transformers T703 and T704. They output 1.2Kv (48Khz) pulses to the backlights via P401 and P402.



Power Supply PWB Removal

Disconnect P201, P401, P402, AC In SK101 and SK102.

Remove the 6 screws indicated by the arrows w/screw.



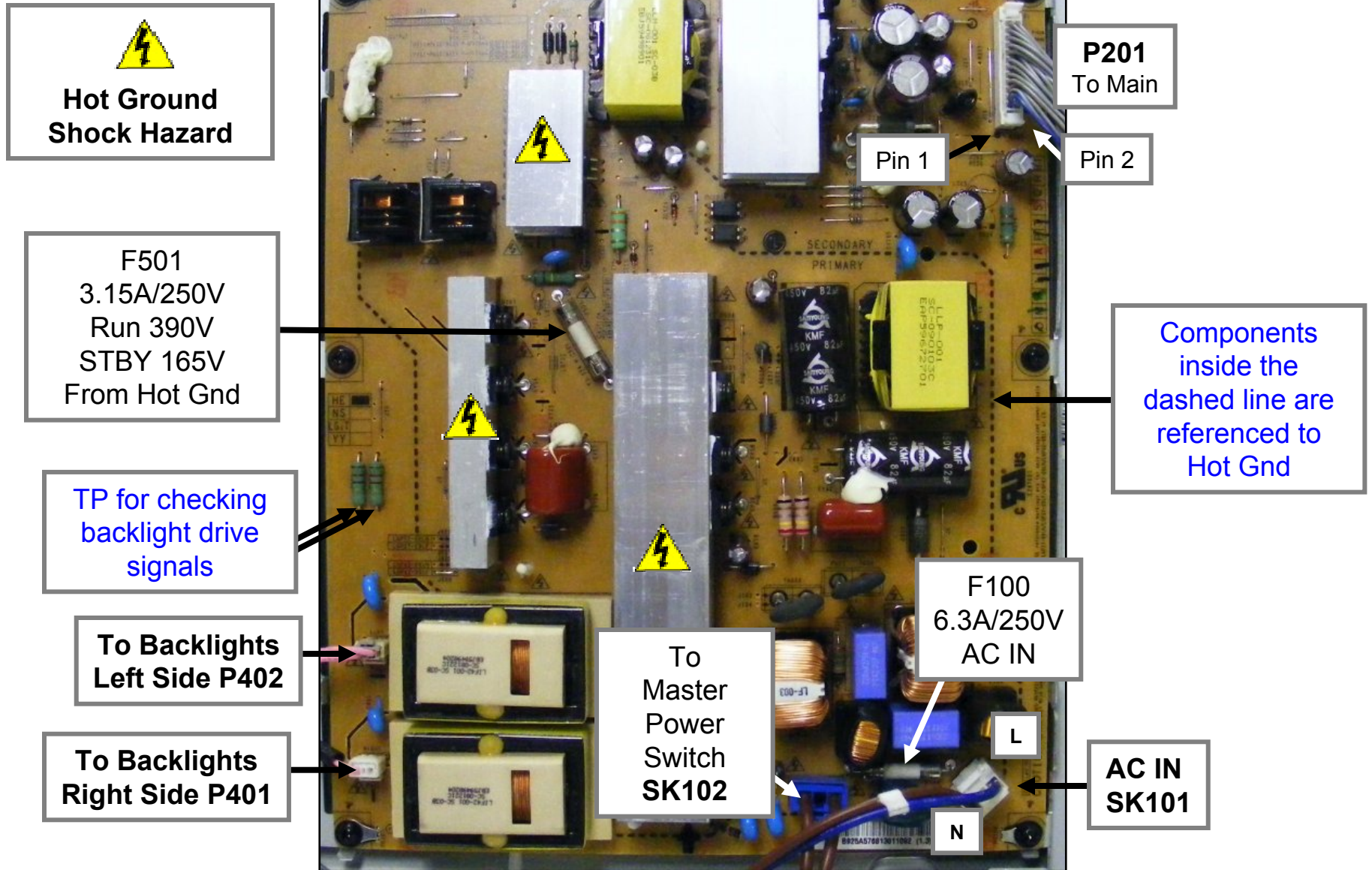
Power Supply (Master Power Switch) Location

If the TV won't come on,
be sure to check the
Master Power Switch
before assuming a failure
has occurred.

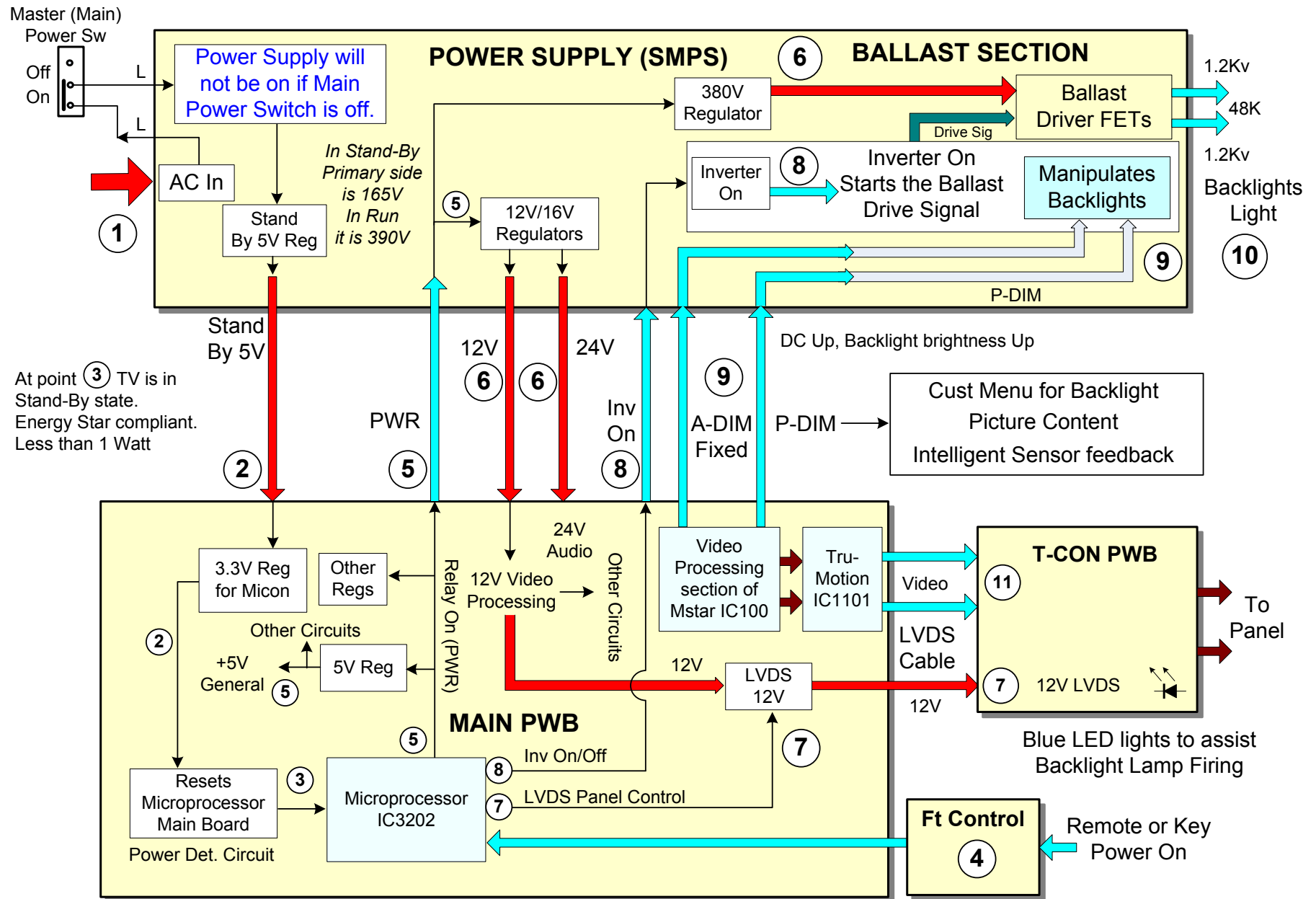


MASTER AC
SWITCH LOCATION
(Bottom Right Side)

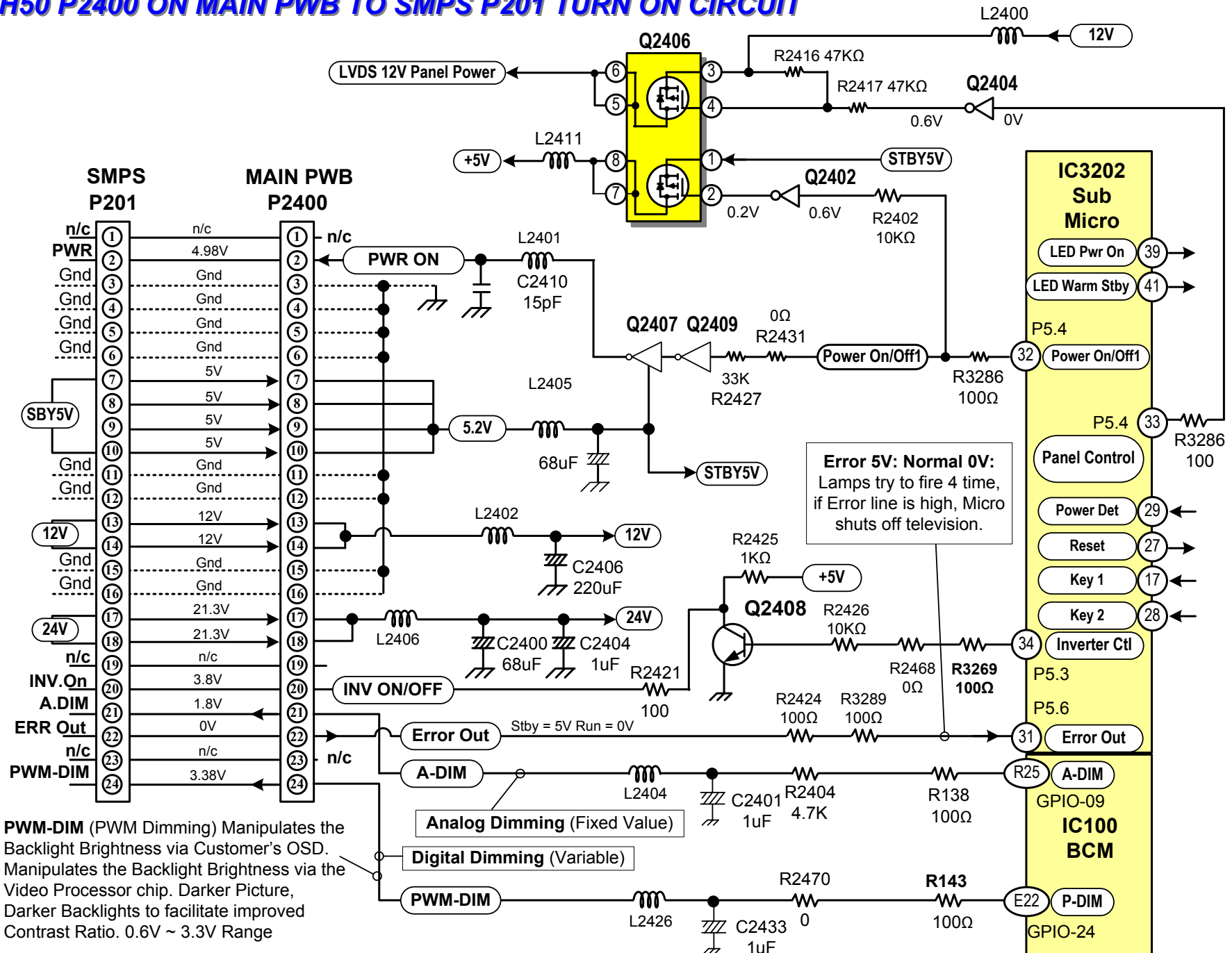
Power Supply (SMPS) PWB Layout



42LH50 POWER SUPPLY TURN ON COMMANDS FROM MAIN PWB



42LH50 P2400 ON MAIN PWB TO SMPS P201 TURN ON CIRCUIT



TEST 1 Power Supply PWB Low Voltage Test

AC Should not be applied at any time while adding resistors or while unplugging connectors as damage to the circuit PWB may occur.

- a) The SMPS PWB “MUST” be producing STBY 5V on all of the pins 7, 8, 9 or 10 (5V).

If 5V Standby is not being generated, the SMPS PWB is defective and must be replaced. There is no need to continue with the next test.

- (b) Unplug P2400 on the Main PWB.

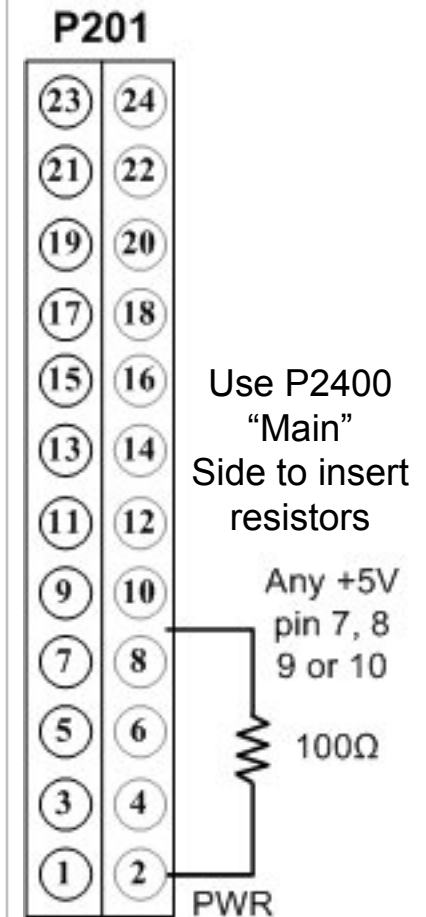
TEST 1:

- (1) Add a 100Ω resistor between (5V STBY) pin 7, 8, 9 or 10 and Pin 2 (PWR). Apply AC. This will turn on the power supply.

- a) **Check that the 24V and 12V power supplies are turned on,**

- **P201 (24V pins 17 and 18)**
- **P201 (12V pins 13 and 14)**

- (2) Remove AC power.



TEST 2 Power Supply PWB Backlights Test

P2400 Connector disconnected from the Main PWB. Apply AC after adding jumper.

Continue if the 1st test was OK. Leave original resistor in place.

(3) Add another 100Ω resistor between (5V) pin 7, 8, 9 or 10 and Pin 20 (INV On).

(4) Apply AC Power. Simulating a Power and Backlight On command.

Backlights Normal:

a) If normal, the backlights should turn on. SMPS OK.

Backlights Abnormal:

a) Recheck all connections.

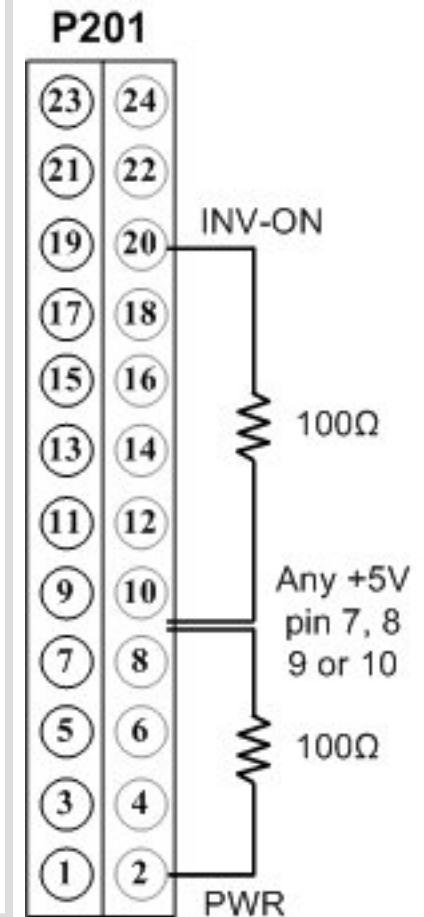
b) Confirm the INV On/Off line pulling up to at least 3V.

REMOVE AC POWER:

c) Check the connections to the Backlights.

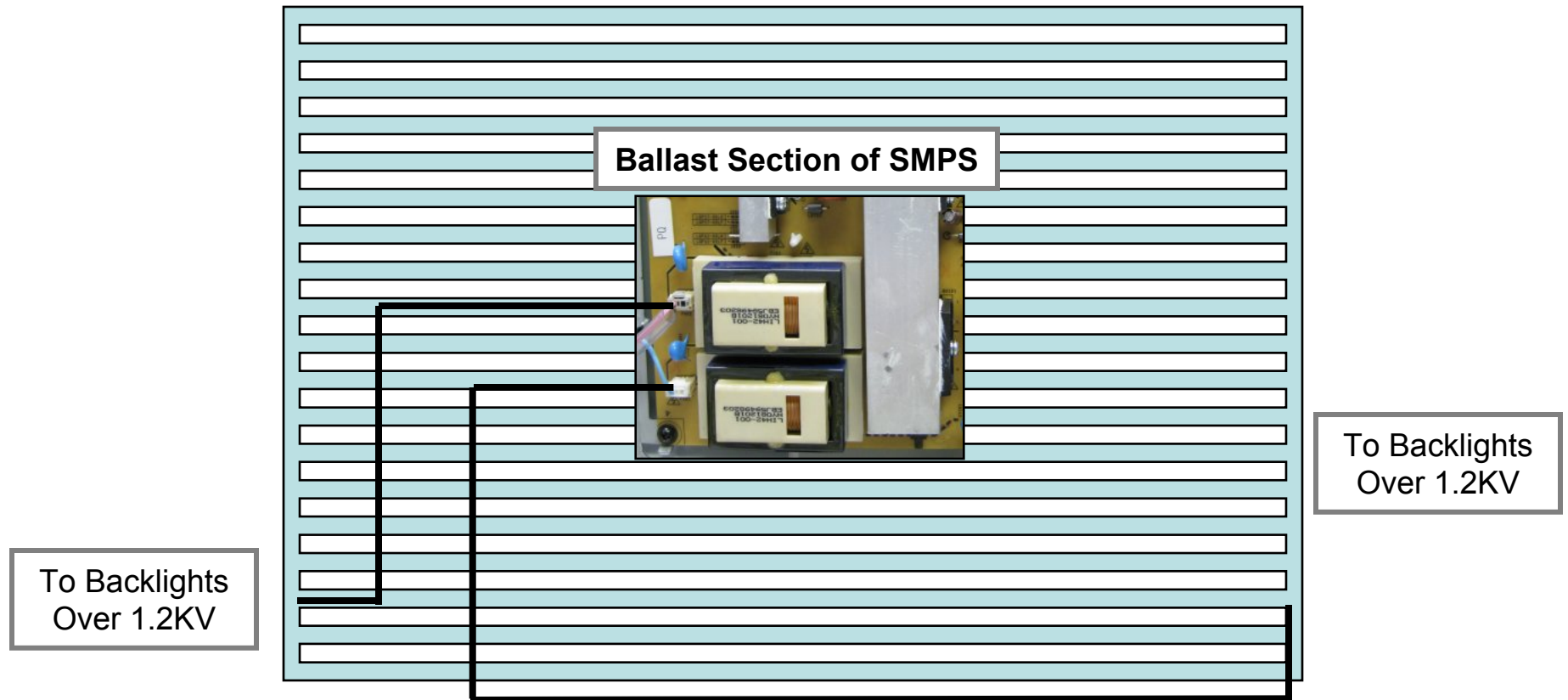
DO NOT check these when AC is applied as they carry 1.2Kv each.

Note, either of the connections are unplugged, the backlights will not light.



Use P2400 "Main"
Side to insert
resistors

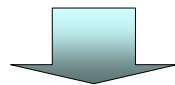
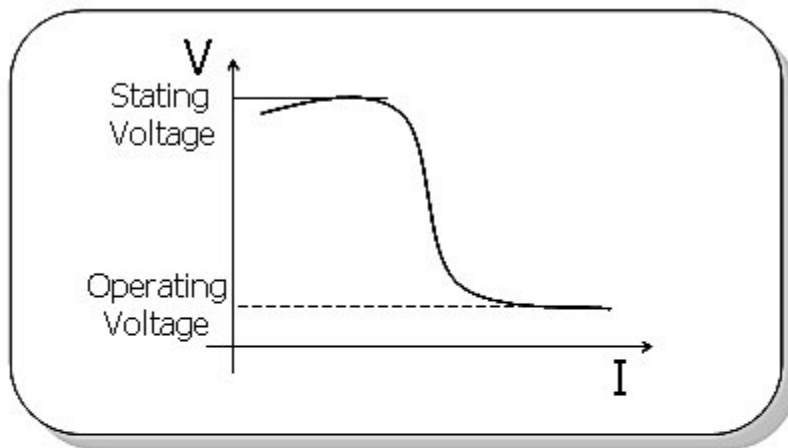
General Backlight Information



EEFL (External Electrode Fluorescent Lamp)
LOW COST Large number of lamps driven by a single inverter

Introducing EEFL

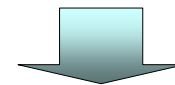
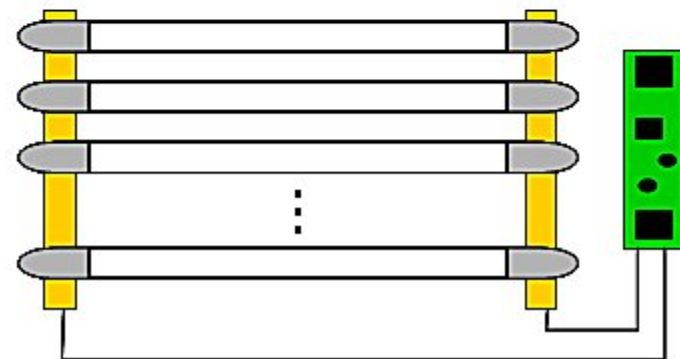
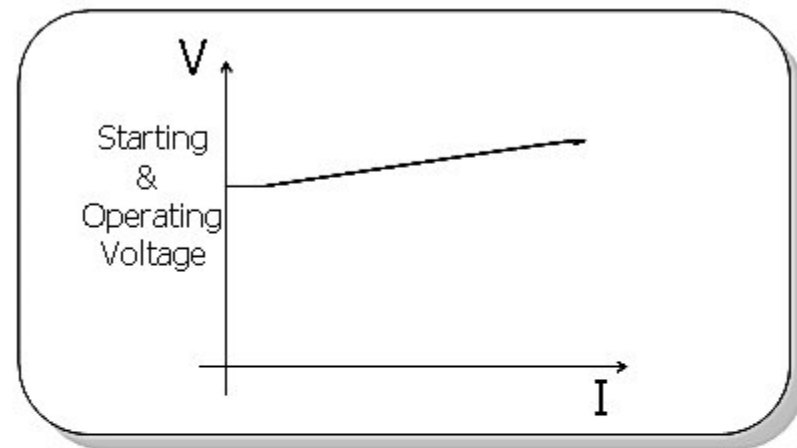
CCFL (Cold Cathode Fluorescent Lamp)



Complicated structure

Simple structure, Low price

EEFL (External Electrode Fluorescent Lamp)



Simple structure

Lamp manufacturing process
Lamp assembly structure

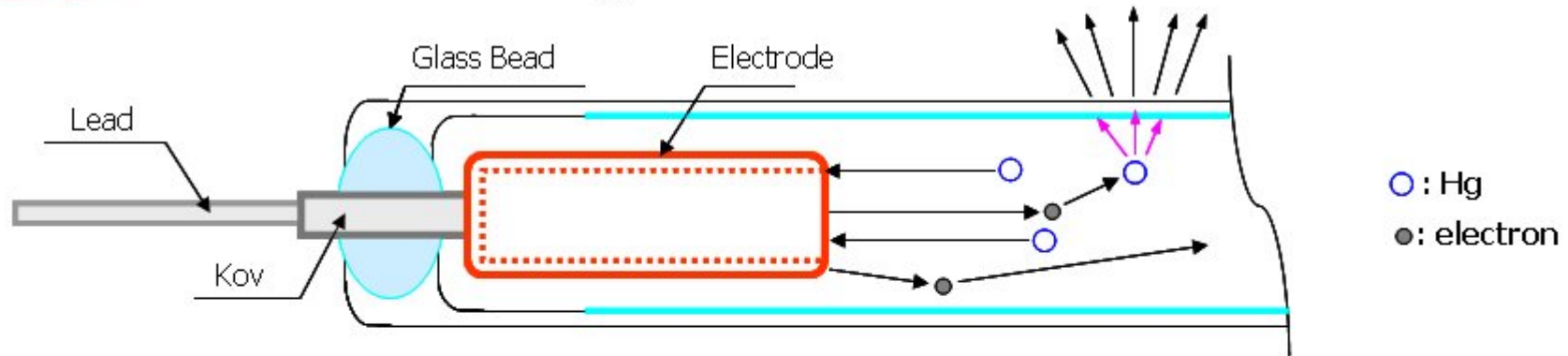
Low Cost

Large number of Lamp
Drive by single inverter

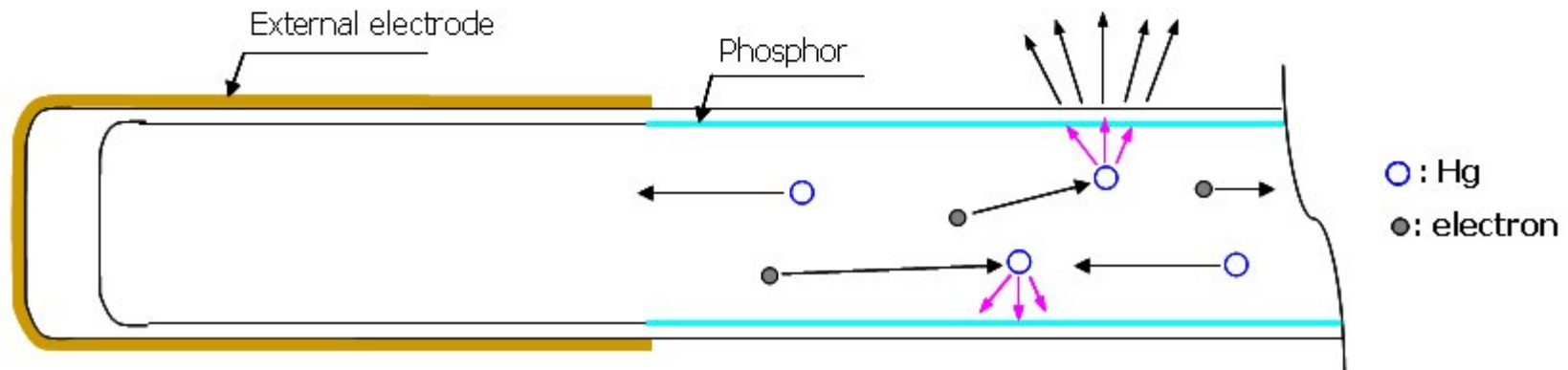
Introducing EEFL Contacts (Bulb Design)

Key: Long Life Time

CCFL (Cold Cathode Fluorescent Lamp)



EEFL (External Electrode Fluorescent Lamp)



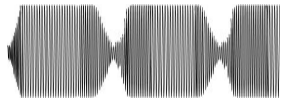
- For CCFL, Hg gas is consumed mainly near the internal electrode
- For EEFL, longer life time is expected because there is no internal electrode consuming Hg gas

Ballast PWB Layout

Viewed from rear

SMPS PWB

Backlights
Test Point
Bottom of
R406 or R403
38V P/P

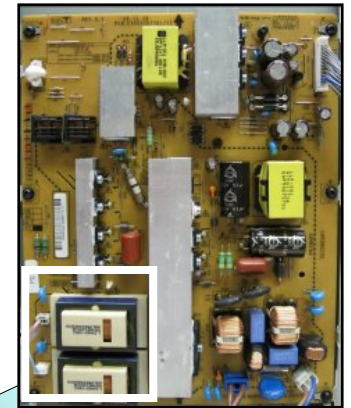
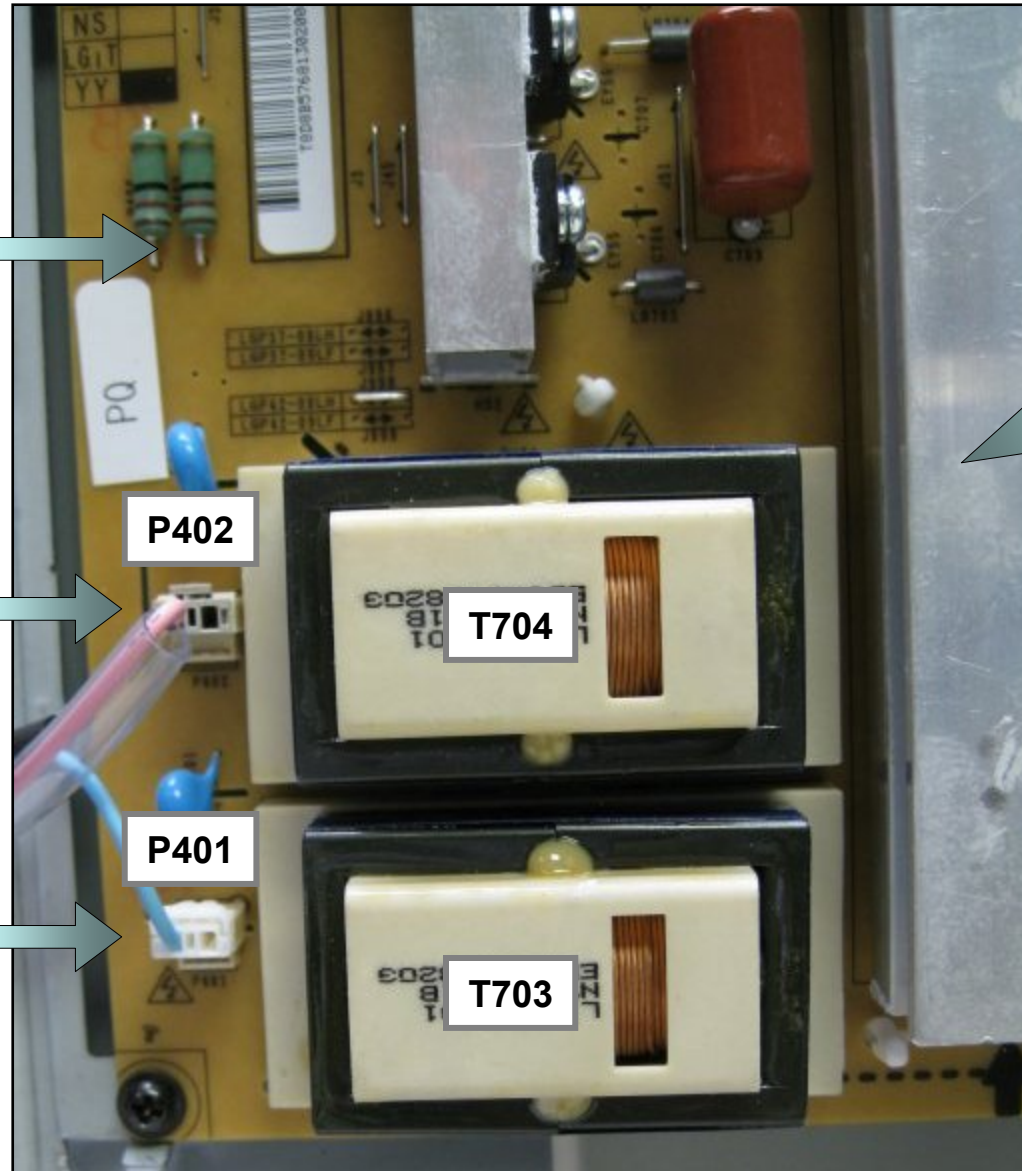


48Khz

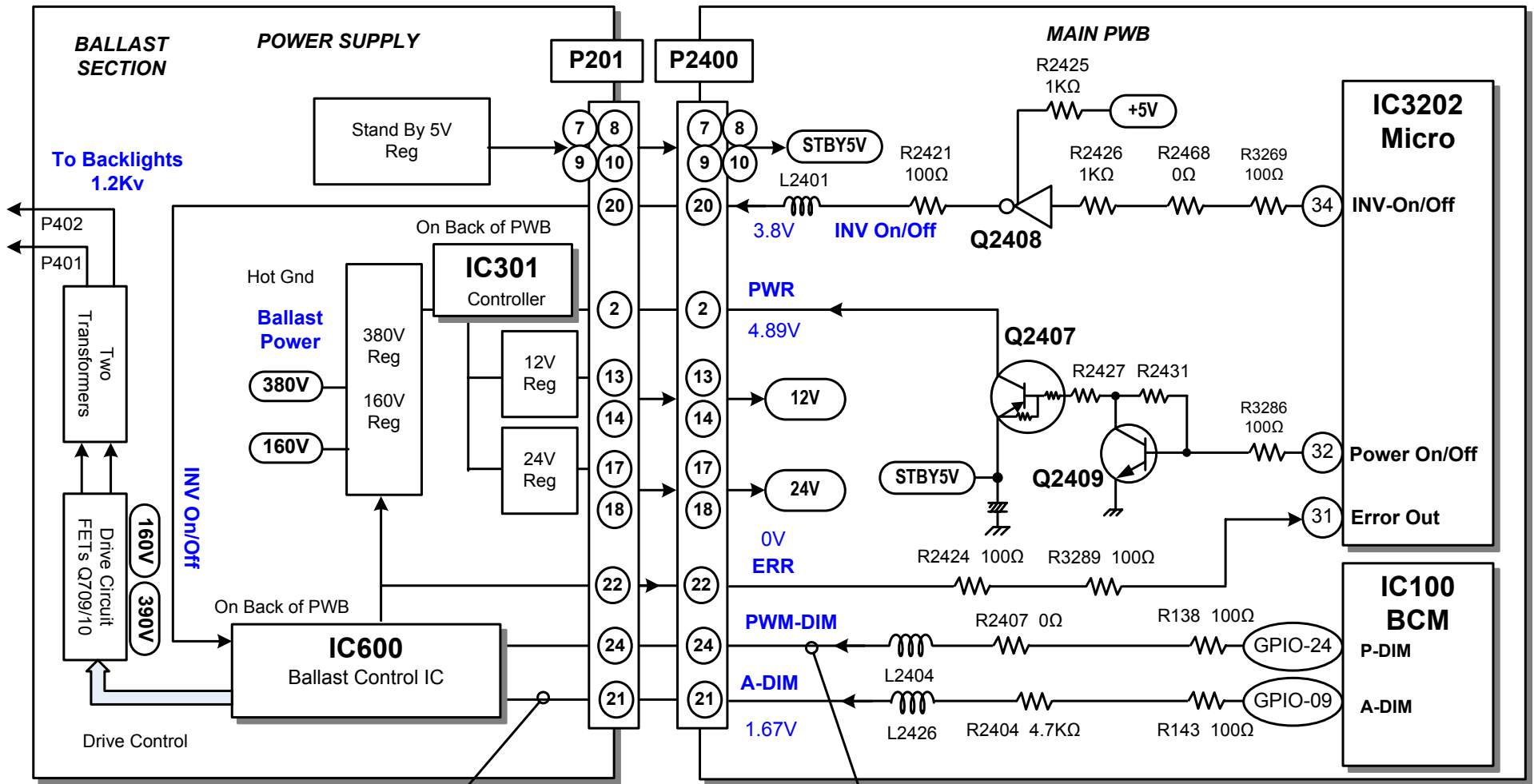
To Backlights
Left Side

1.2Kv

To Backlights
Right Side



42LH50 P2400 on Main PWB To Power Supply P201 Ballast Turn On Circuit



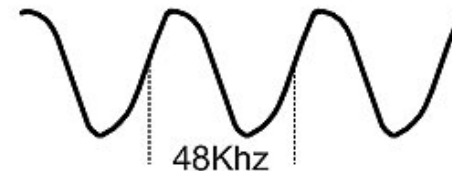
VBR-A (Analog Dimming)
This line is a fixed voltage and not used.

VBR-B (PWM Dimming) Manipulates the Backlight Brightness via Customer's OSD. Manipulates the Backlight Brightness via the BCM Chip. Darker Picture, Darker Backlights to facilitate improved Contrast Ratio. 0.6V ~ 3.3V Range. Manipulated by the Video Processor IC100

Power Supply Backlight Drive Signal Effects

Waveform taken from loose coupling.
Probe clamped on one of the Backlight Wires.
Use caution, 1.2Kv
Slow scope setting to 2.5mS to see PWM results.
The PWM amount can cause the frequency to be measured differently.

100% on Backlight Bar In Customer's
OSD (3.32V PDIM) Pin 24 P201



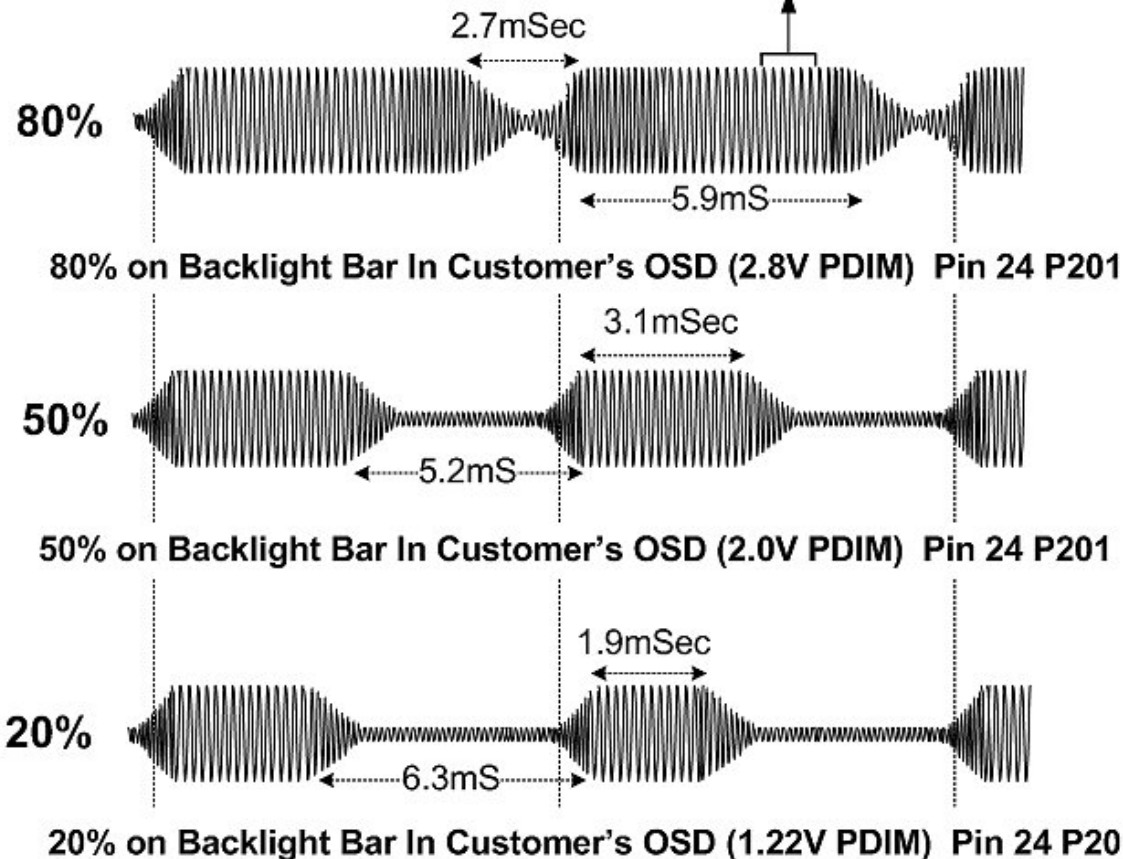
Note:
Backlights will attempt to fire 4 time. During these attempts, the Error line will change from 5V to 0V.

**0V when lamp tries to fire or is lit.
5V when the lamps are not lit.**

After 4 attempts, if the Error Out line returns to 5V, this tells the Micro to turn the set off.

PWMDIM manipulates the Burst Triangle Oscillator in the ballast drive IC.

ADIM also manipulates the Burst Triangle Oscillator But it is not used.



Power Supply Connector P201 Voltage and Diode Check

P201 Odd "SMPS" to P2400 "Main PWB"

P201	Pin	Label	STBY	Run	Diode Check
23	23	nc	nc	nc	nc
21	21	¹ A.DIM	0V	1.75V	Open
19	19	nc	nc	nc	nc
17	17	24V	0V	21.4V	0.81V
15	15	Gnd	Gnd	Gnd	Gnd
13	13	12V	0V	12.3V	1.2V
11	11	Gnd	Gnd	Gnd	Gnd
9	9	5V	5.06V	5.06V	2.85V
7	7	5V	5.06V	5.06V	2.85V
5	5	Gnd	Gnd	Gnd	Gnd
3	3	Gnd	Gnd	Gnd	Gnd
1	1	nc	nc	nc	nc

¹ADIM Pin 21 Fixed and not used

P201 Even "SMPS" to P2400 "Main PWB"

P201	Pin	Label	STBY	Run	Diode Check
24	24	² PDIM	0V	3.3V	Open
22	22	Err Out	0V	0V	Open
20	20	INV.ON	0V	4.5V	2.25V
18	18	24V	0V	21.4V	0.81V
16	16	Gnd	Gnd	Gnd	Gnd
14	14	12V	0V	12.3V	1.2V
12	12	Gnd	Gnd	Gnd	Gnd
10	10	5V	5.06V	5.06V	2.85V
8	8	5V	5.06V	5.06V	2.85V
6	6	Gnd	Gnd	Gnd	Gnd
4	4	Gnd	Gnd	Gnd	Gnd
2	2	PWR-ON	0V	4.5V	1.19V

²PDIM 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 video processor IC100.

Diode Mode values taken with all Connectors Removed

Power Supply Connector SK100 and SK101 Voltage and Resistance

Diode Mode values taken with all Connectors Removed

SK100 "SMPS" to AC IN

Pin	Label	STBY	Run	Diode Check
1	L	120Vac		OL
2	N			OL

AC Voltage Readings Across Pins 1 and 2 for STBY and RUN.

SK101 "SMPS" to MASTER POWER SWITCH

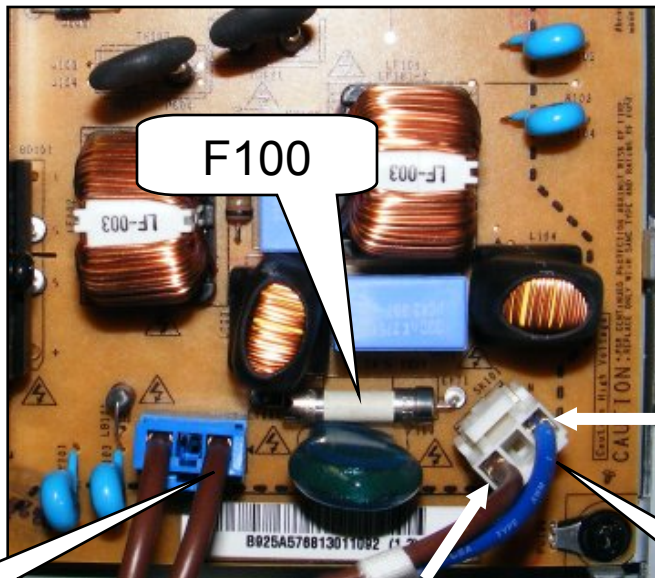
Pin	Label	STBY	Run	Diode Check
1	n/a	120Vac		OL
2	n/a			OL

AC Voltage Readings for either pin 1 or pin 2 in STBY and RUN with one lead on Neutral of SK100.

With the Master Power Switch Closed (On) AC flows. When Open (Off) AC open and does not flow.

F100
6.3A/250V
AC IN

Bottom
Right of
SMPS



SK101

Live

Neutral

SK100

LCD Controller Board

The T-Con IC UC1 receives from the Main Board at CN1 12 Bit and CN2 12 Bit LVDS Signals (Video) which it processes into TFT Drive Signals. It delivers its output signals through connectors CN4 and CN5 to control the LCD Panel.

12V is supplied to the T-Con Board on connector CN1 from the Main Board (easily measured at fuse F1).

Diode LD1 is a boot up indicator and is helpful in troubleshooting as a quick indication of a loss of supply and or a Boot up problem. The main purpose of LD1 is to aid in the firing of the EEFL backlights when room light is minimum. It helps to excite the selenium in the EEFL lamp which is highly sensitive to Blue light. Once this lamp fires, it helps to excite the others.

There is one regulator that creates 1.19V developed at pin 2 (Center Leg) of U11.

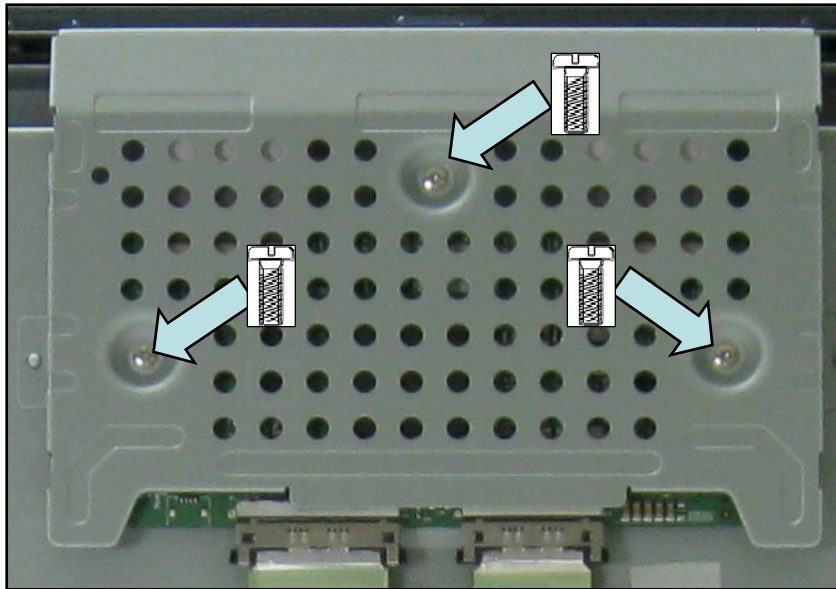
U5 is a DC to DC converter IC which develops the Panels driver voltages. 16V, 3.3V, -5V and 26V.

These voltages can be read at the ribbon connector or at test points on the board.

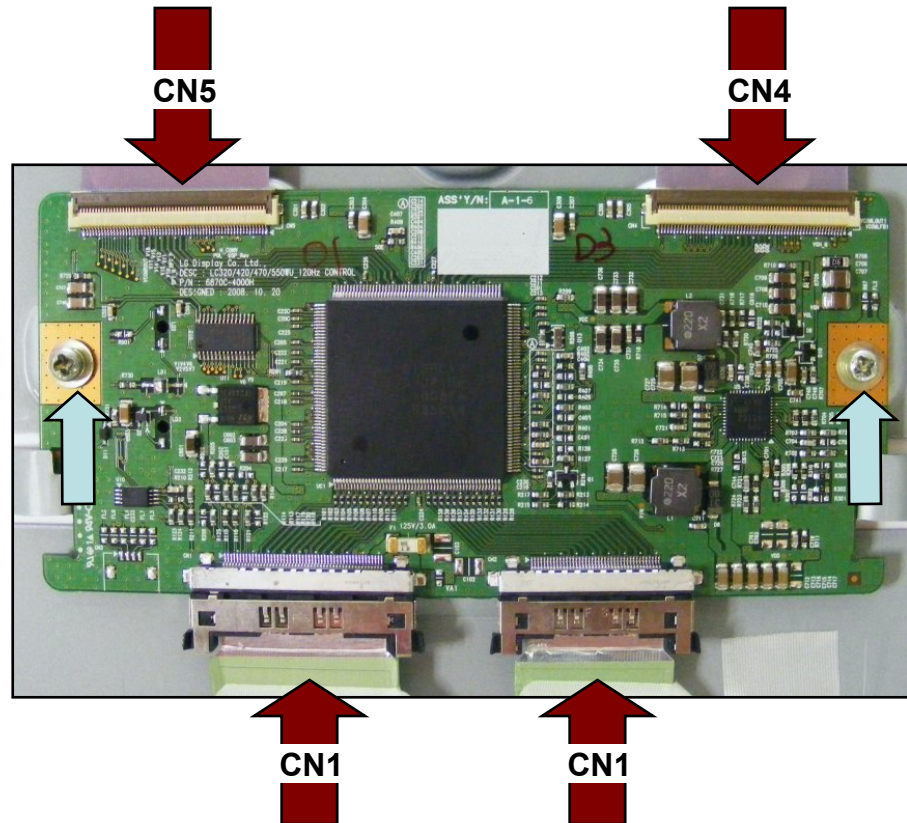
T-CON (TFT Drive) PWB Removal

STEP (1)

Remove the 3 Screws in the T-CON shield and remove the shield



The two screws shown in the picture below are for the Service Position. They would have been removed when removing the shield. Be sure to reinstall them if servicing the T-CON PWB.

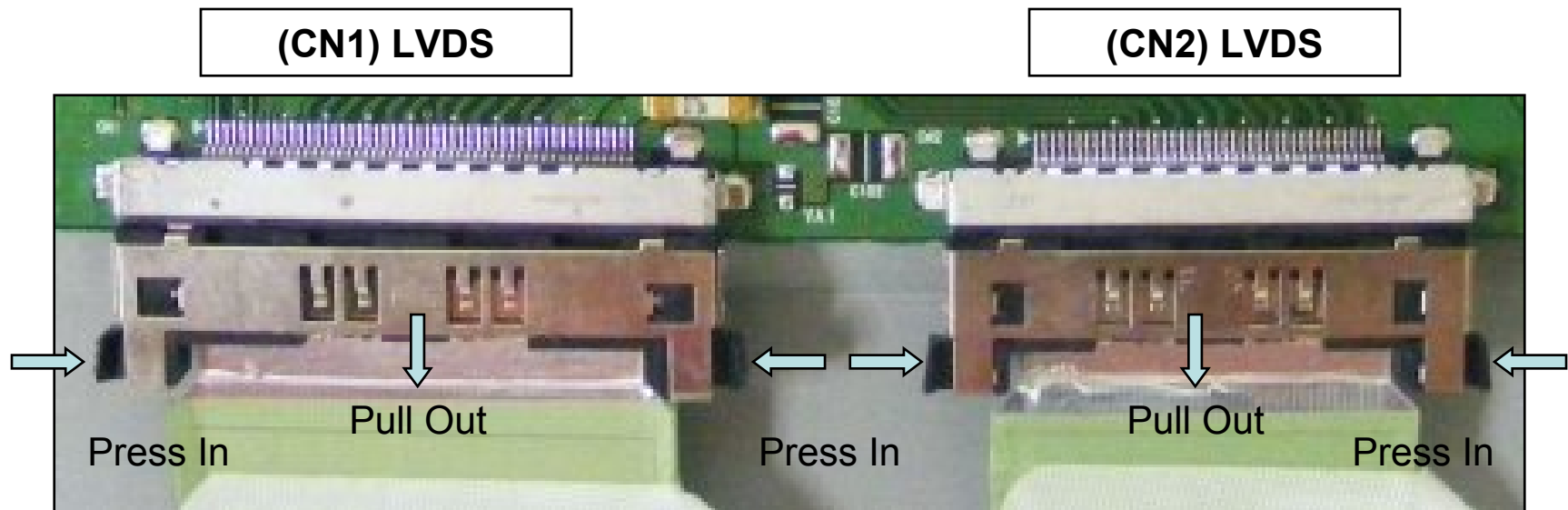


STEP (2)

Disconnect CN1, CN2, CN4 and CN5. See next slide for details about removing cables.

T-CON (TFT DRIVE) PWB REMOVAL CONTINUED:

UNLOCKING CN1 and CN2 LVDS Cables

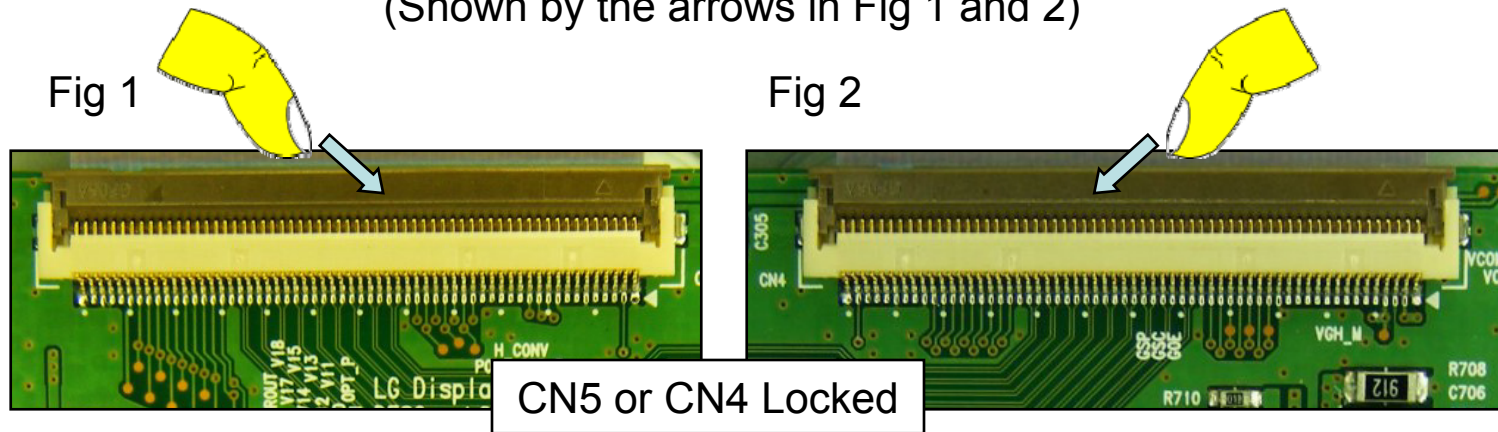


To remove the LVDS cables CN1 and CN2;
Press in on the two tabs and slowly rock the cable out of the connector.
(Shown by the arrows in Figure above)

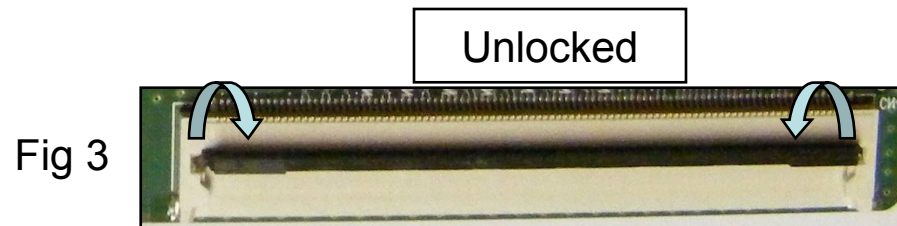
T-CON (TFT DRIVE) PWB REMOVAL CONTINUED: UNLOCKING CN4 and CN5

To remove the flex cables to the TFT Panel, CN4 or CN5, place a soft thin object like a fingernail underneath the black locking tab and gently pull forward.

(Shown by the arrows in Fig 1 and 2)

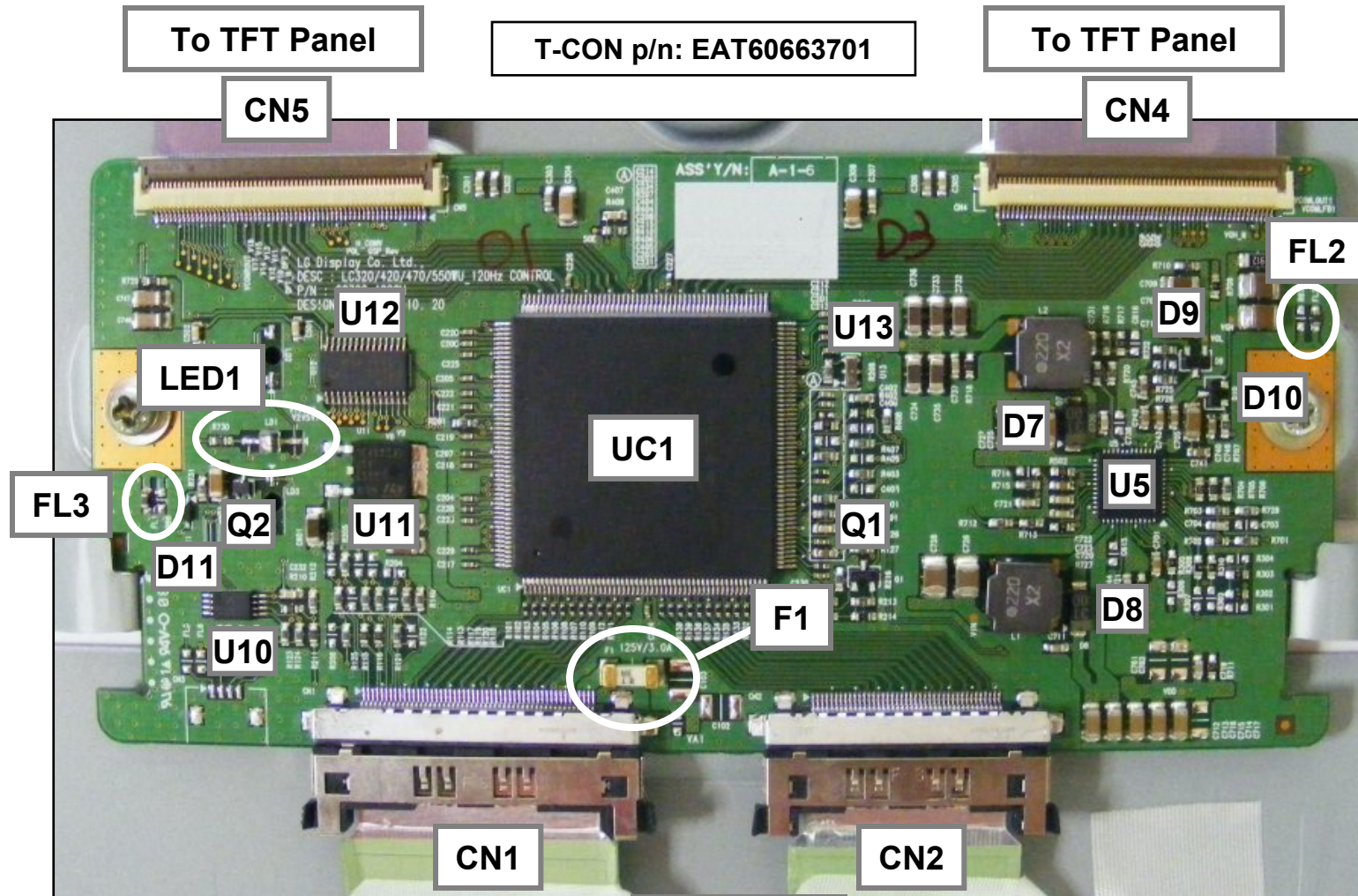


Flip the lock up and back from the flex cable.
Then the flex cable can be easily removed.



The locking tab is flipped down

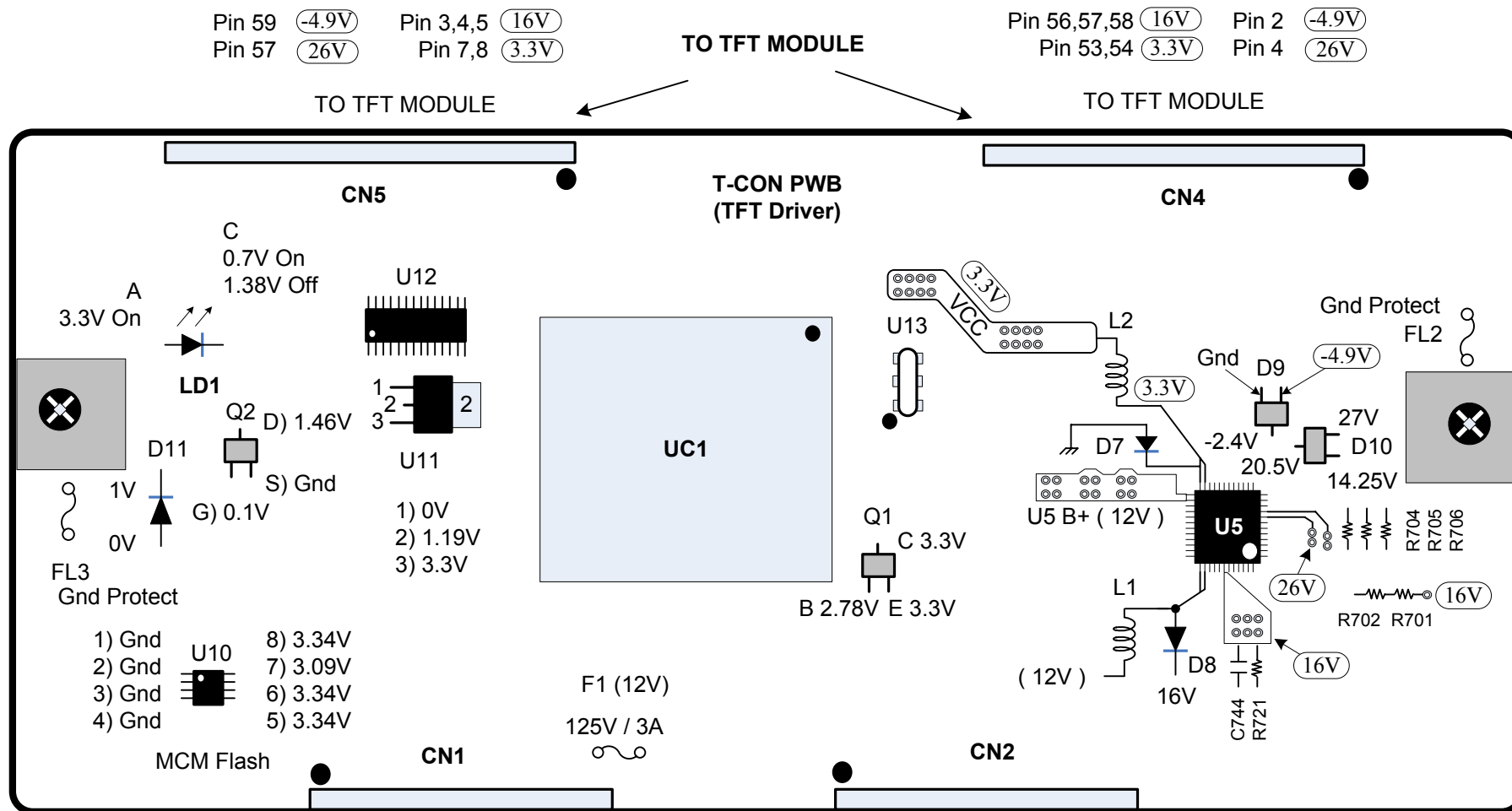
T-CON (TFT Drive) PWB (Shield Removed)



Remember to replace screws for ground purposes if testing the PWB.

To Main PWB

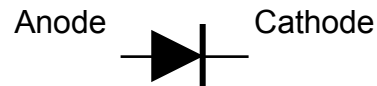
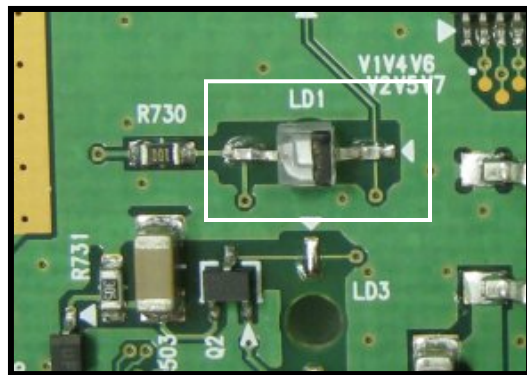
42LH50 T-CON (TFT Drive) PWB Drawing (Components and Voltages Identified)



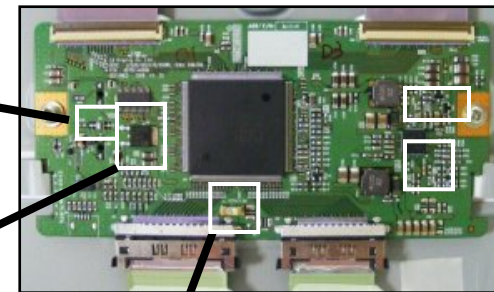
T-CON (TFT Drive) PWB Checks

Use LD1 to determine if the boot up sequence of the T-CON is OK. This LED will turn bright Blue shortly after power is applied then will go out in about 30 seconds. This assist the backlights in firing.

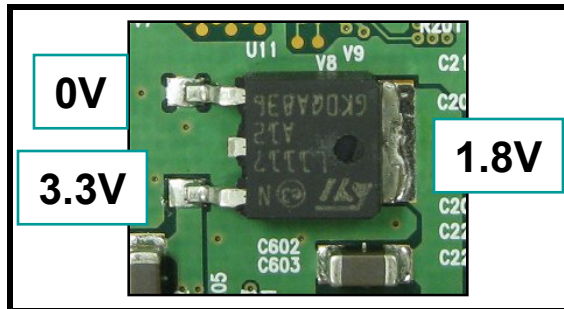
LD1



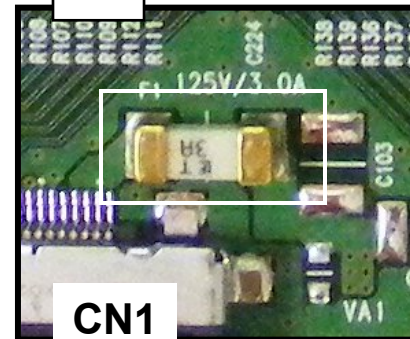
Power Off	Power 1 st On	Power On
Anode 0V Cathode 0V	Anode 3.3V Cathode 0.7V	Anode 3.3V Cathode 1.4V
LED OFF	LED ON	LED OFF



Check the Regulator
U11 for Correct Voltage



F1

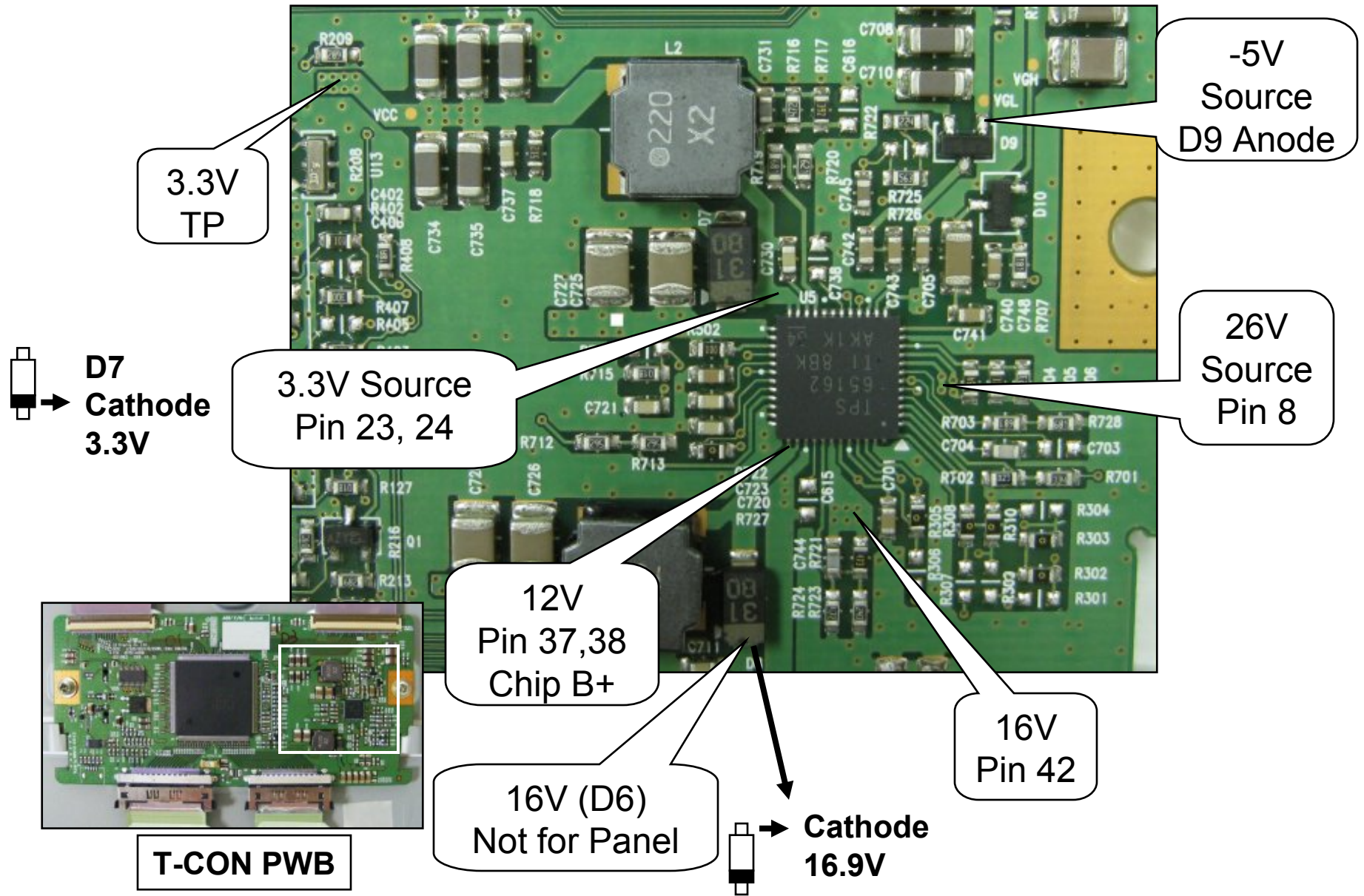


T-CON PWB

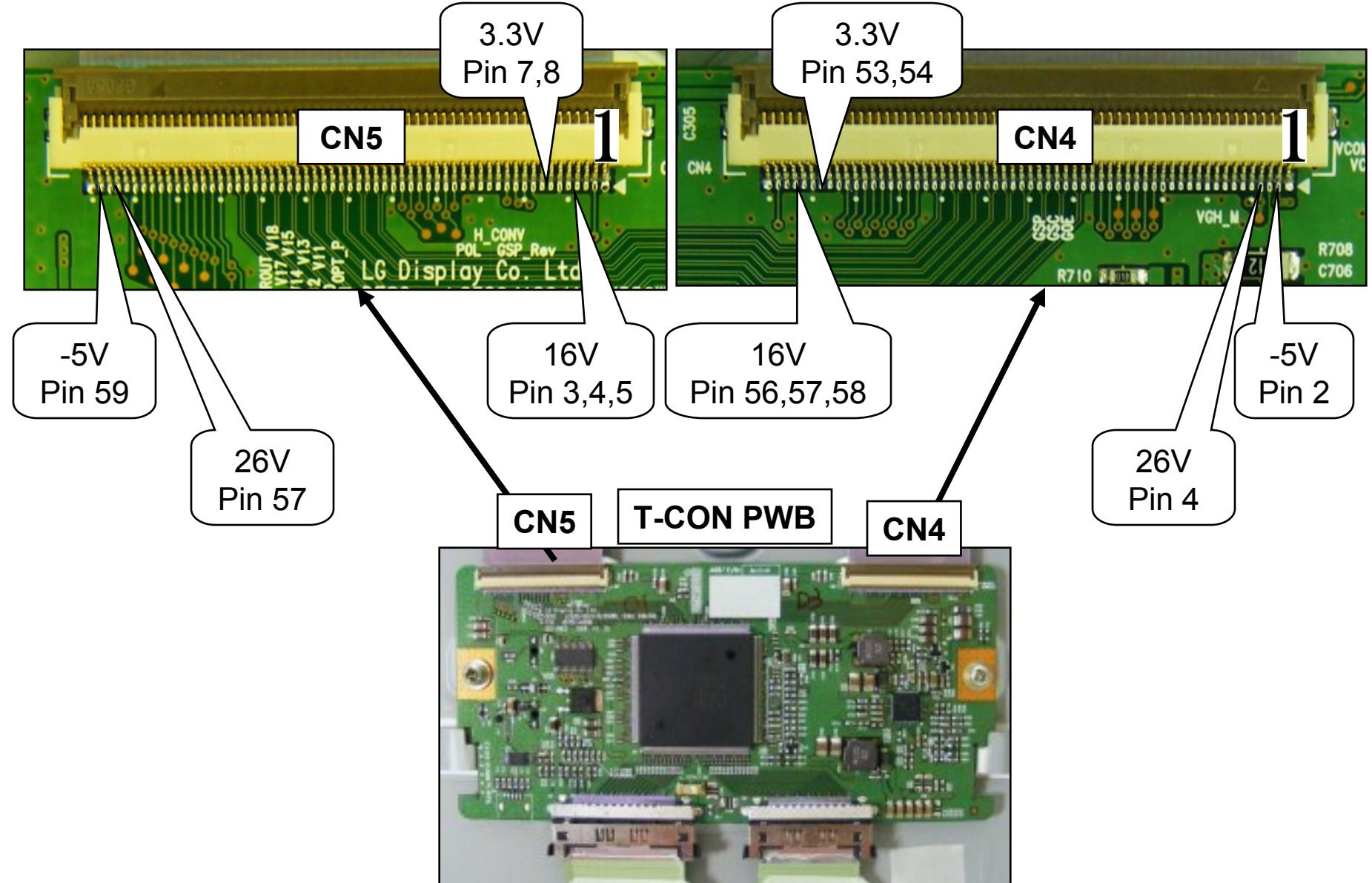
Check Fuse
F1 for 12V

From Pins
48~51

T-CON (TFT Driver) Board CN4 and CN5 (Voltage Sources)



T-CON (TFT Driver) Board CN4 and CN5 (Voltage Check)



T-CON PWB Connector CN1 to the Main PWB (Voltage and Diode Check)

CN1 "T-CON" to P1100 CONNECTOR "Main"

Diode Mode values taken with all Connectors Removed

Pin	Label	Run	Diode Test
1	Gnd	Gnd	Gnd
2	n/c	n/c	n/c
3	n/c	n/c	n/c
4	n/c	n/c	n/c
5	n/c	n/c	n/c
6	n/c	n/c	n/c
7	LVDS-Sel	0V	Gnd
*8	*PWM-DIM	3.3V	Open
9	OPC-Out	3.3V	Open
10	OPC-EN	0.7V	Open
11	OPC-Out2	n/c	Open
12	URSA-A0P	1.3V	Open
13	URSA-A0M	1.2V	Open
14	URSA-A1P	1.3V	Open
15	URSA-A1M	1.2V	Open
16	URSA-A2P	1.4V	Open
17	URSA-A2M	1.4V	Open
18	Gnd	Gnd	Gnd
19	URSA-ACKP	1.25V	Open
20	URSA-ACKM	1.26V	Open

Pin	Label	Run	Diode Test
21	Gnd	Gnd	Gnd
22	URSA-A3P	1.4V	Open
23	URSA-A3M	1.1V	Open
24	URSA-A4P	1.4V	Open
25	URSA-A4M	1.1V	Open
26	Gnd	Gnd	Gnd
27	n/c	n/c	n/c
28	URSA-B0P	1.4V	Open
29	URSA-B0M	1.1V	Open
30	URSA-B1P	1.4V	Open
31	URSA-B1M	1.1V	Open
32	URSA-B2P	1.21V	Open
33	URSA-B2M	1.22V	Open
34	Gnd	Gnd	Gnd
35	URSA-BCKP	1.21V	Open
36	URSA-BCKM	1.22V	Open
37	Gnd	Gnd	Gnd
38	URSA-B3P	1.2V	Open
39	URSA-B3M	1.21V	Open
40	URSA-B4P	1.44V	Open

Pin	Label	Run	Diode Test
41	URSA-B4M	1.09V	Open
42	Gnd	Gnd	Gnd
43	Gnd	Gnd	Gnd
44	Gnd	Gnd	Gnd
45	Gnd	Gnd	Gnd
46	Gnd	Gnd	Gnd
47	n/c	n/c	n/c
48	LVDS 12V	12V	Open
49	LVDS 12V	12V	Open
50	LVDS 12V	12V	Open
51	LVDS 12V	12V	Open

*Pin 8 (PWM-DIM) is not used by the T-CON board.

T-CON PWB Connector CN2 to the Main PWB (Voltage and Diode Check)

CN2 "T-CON" to P1101 CONNECTOR "Main"

Pin	Label	Run	Diode Test
1	n/c	n/c	n/c
2	n/c	n/c	n/c
3	n/c	n/c	n/c
4	n/c	n/c	n/c
5	n/c	n/c	n/c
6	n/c	n/c	n/c
7	n/c	n/c	n/c
8	n/c	n/c	n/c
9	Gnd	Gnd	Gnd
10	URSA-C0P	1.28V	Open
11	URSA-C0M	1.2V	Open
12	URSA-C1P	1.3V	Open
13	URSA-C1M	1.2V	Open
14	URSA-C2P	1.3V	Open
15	URSA-C2M	1.2V	Open
16	Gnd	Gnd	Gnd
17	URSA-C2P	1.23V	Open
18	URSA-C2M	1.23V	Open
19	Gnd	Gnd	Gnd
20	URSA-C3P	1.3V	Open

Diode Mode values taken with all Connectors Removed

Pin	Label	Run	Diode Test
21	URSA-C3M	1.2V	Open
22	URSA-C4P	1.13V	Open
23	URSA-C4M	1.18V	Open
24	Gnd	Gnd	Gnd
25	Gnd	Gnd	Gnd
26	URSA-D0P	1.29V	Open
27	URSA-D0M	1.25V	Open
28	URSA-D1P	1.29V	Open
29	URSA-D1M	1.3V	Open
30	URSA-D2P	1.3V	Open
31	URSA-D2M	1.2V	Open
32	Gnd	Gnd	Gnd
33	URSA-DCKP	1.23V	Open
34	URSA-DCKM	1.29V	Open
35	Gnd	Gnd	Gnd
36	URSA-D3P	1.3V	Open
37	URSA-D3M	1.25V	Open
38	URSA-D4P	1.4V	Open
39	URSA-D4M	1.15V	Open
40	Gnd	Gnd	Gnd
41	Gnd	Gnd	Gnd

MAIN PWB SECTION

The Main PWB processes all video signal input types, Tuner (VSB, 8VSB and QAM), Component, Composite, S-In, HDMI and RGB (PC).

There are two LVDS cable feeds that go to the T-CON. Each one carries dual 12 bit LVDS Video signals that have been prepared for the T-CON board (TFT Driver Control board).

The Main board receives its operational B+ from the Power Supply via P2400.

STAND-BY

- STBY 5V pins 7~10

RUN

- 12V pins 13 and 14
- 24V pins 17 and 18.

The Main board also develops several B+ sources on the board.

LVDS

- LVDS 12V (Actually just switched 12V input from the power supply).

AUDIO

- 3.3V
- 1.8V

GENERAL

- 5V (Actually just switched STBY 5V input from the power supply).

BCM VIDEO PROCESSOR

- 1.2V, 1.26V, 1.8V, and 3.3V

TUNER and VSB CIRCUIT

- 9V
- 5V
- 3.3V
- 1.2V

Removing the Main PWB

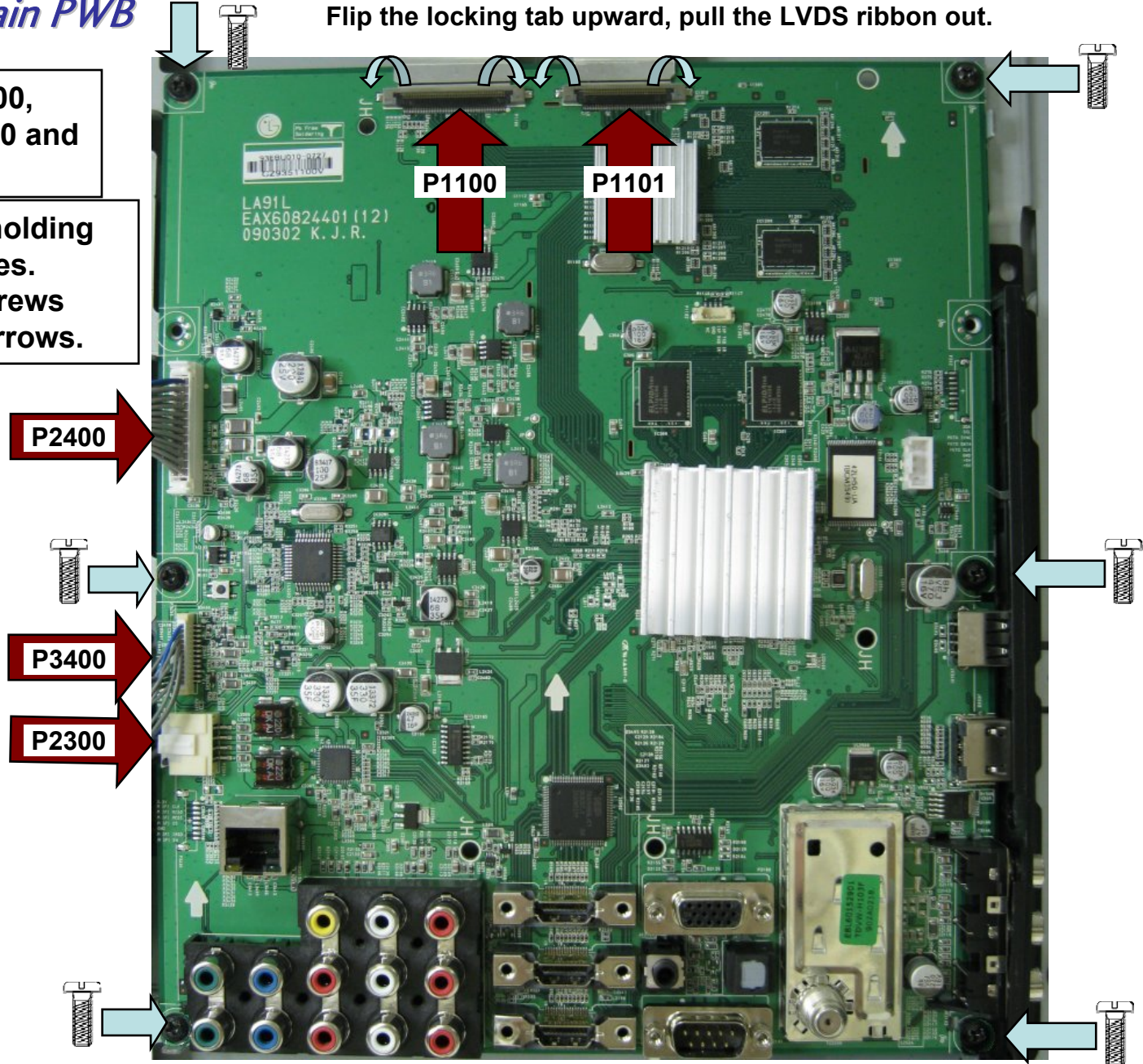
**Disconnect P2400,
P3400, P2300, P1100 and
P1101.**

Remove any tape holding down any cables.
Remove the 6 screws indicated by the arrows.






























**Press in on the top
and bottom release
tabs to remove
P2400.**

NOTE: Be sure to check on top and behind the Video and Tru-Motion Processor ICs. Look for a piece of Chocolate (Heat Transfer Material). Be sure to transfer to new PWB if present on the old one.

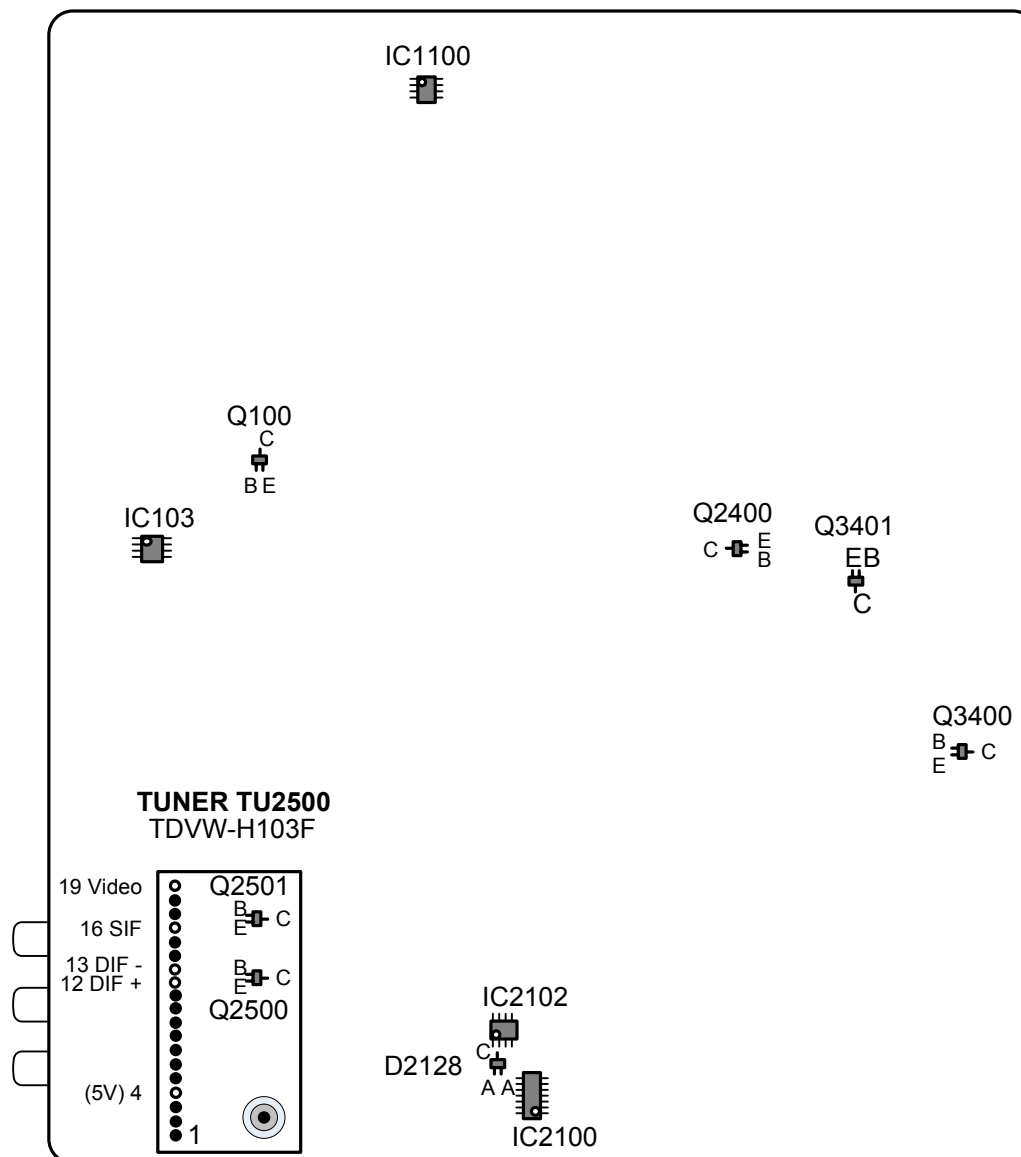
Flip the locking tab upward, pull the LVDS ribbon out.





42LH50 MAIN (FRONT SIDE) SIMICONDUCTORS



IC102 BCM Reset  Pin 1 3.3V 2 Gnd 3 3.29V	IC2400 1.2V Core  Pin [1] Gnd [2] 5V [3] Gnd [4] 0.8V [5] 0.9V [6] 3.23V [7] [8] 1.2V	IC2404 3.3V-ST  Pin 3.3V-VDDP-ST 1 Gnd 2 3.3V 3 5V	IC2500 9V Reg  Pin for Tuner [1] 12.3V [2] 8.9V [3] Gnd	IC501 HDMI Remote  Pin [1] 3.3V [2] 3.3V [3] n/c [4] n/c [5] n/c [6] 3.19V	Q2406 5V and  Pin LVDS 12V Switch [1] 5V [2] 0.2V [3] 12.3V [4] 6V [5] 12.3V [6] 12.3V [7] 5V [8] 5V
IC2101 RGB Sync  Pin [1] 1.9V [2] 1.9V [3] 4.38V [4] 1.9V [5] 1.9V [6] 4.5V [7] Gnd [8] n/c [9] 1.9V [10] 1.9V [11] 4.38V [12] 1.9V [13] 1.9V [14] 5V	IC2401 5V USB Fan  Pin [1] 0V [2] 12V [3] Gnd [4] 0.8V [5] 0.8V [6] 5V [7] 5V [8] 5V	IC2405 1.8V-DDR Reg  Pin [1] 0.58V [2] 1.8V [3] 3.3V	IC2502 5V Reg Pin for Tuner  Pin [1] 8.98V [2] 1.9V [3] 5V [4] 0V [5] 0V	Q2401 24V PWR Sw  Pin Q2405 B 0.59V C 0V E 0V	Q2407 POW On/Off2  Pin B 3.37V C 4.7V E 5V
IC2300 1.8V Amp Audio  Pin 1 Gnd 2 1.8V 3 3.3V	IC2402 1.8V-MEMC  Pin [1] Gnd [2] 5V [3] Gnd [4] 0.8V [5] 1V [6] 4.98V [7] 1.89V [8] 1.89V	IC2406 1.26V-MEMC Reg  Pin [1] n/c [2] 1.87V [3] 1.87V [4] n/c [5] n/c [6] 1.27V [7] 0.8V [8] Gnd	IC3200 Micro Reset  Pin [1] 3.3V [2] Gnd [3] 0.6V	Q2402 5V Sw Ctl  Pin Q2406 B 0.59V C 0V E 0V	Q2408 INV Ctl  Pin B 0V C 4.55V E 0V
IC2103 RS232 Rx/Tx  Pin [1] 3.25V [2] 3.27V [3] n/c [4] n/c [5] n/c [6] Gnd [7] n/c [8] Gnd [9] Gnd [10] 4.76V [11] 4.76V [12] 3.17V [13] 3.3V [14] 3.3V [15] 3.3V [16] 5V	IC2403 3.3V/A3.3V Reg  Pin [1] Gnd [2] 12V [3] Gnd [4] 0.8V [5] 0.9V [6] 3.23V [7] 3.37V [8] 3.37V	IC2407 A2.5V Reg  Pin [1] n/c [2] 3.23V [3] 3.3V [4] n/c [5] n/c [6] 2.53V [7] 0.53V [8] Gnd	IC3201 uP EEPROM  Pin [1] Gnd [2] Gnd [3] 3.29V [4] Gnd [5] 3.3V [6] 3.3V [7] 0V [8] 3.3V	Q2404 LVDS Sw Ctl  Pin Q2406 B 0.59V C 0V E 0V	Q3204 Micro Reset Sw.  Pin B 0.59V C 0V E 0V
D500 IC501 shunt  Pin A1 0V C 3.1V A2 3.29V	LD2400 A3.3V OK  Pin CA1 n/c C Gnd A2 1.62V	ZD3400 IR Clamp  Pin C 2.68V A Gnd	ZD3401 Key2 Clamp  Pin C 3.3V A Gnd	ZD3402 Key1 Clamp  Pin A Gnd C 3.3V	


42LH50
Main Board
(Back Side)
Component Layout





42LH50 MAIN (BACK SIDE) SIMICONDUCTORS


IC103	BCM EEPROM	IC2102	RGB EEPROM
	Pin		Pin
[1]	Gnd	[1]	Gnd
[2]	Gnd	[2]	Gnd
[3]	Gnd	[3]	Gnd
[4]	Gnd	[4]	Gnd
[5]	3.3V	[5]	3V
[6]	3.3V	[6]	3.7V
[7]	Gnd	[7]	4.8V
[8]	3.3V	[8]	4.49V


IC1100	SPI Flash	D2128	5V to IC2102
	Pin		Pin
[1]	0V	A1	5V
[2]	1.4V	C	4.5V
[3]	3.3V	A2	0V
[4]	Gnd		
[5]	0V		
[6]	0.34V		
[7]	3.3V		
[8]	3.3V		


IC2100	RS232
	Pin
[1]	3.3V
[2]	5.4V
[3]	0V
[4]	0V
[5]	(-5V)
[6]	(-5V)
[7]	(-5V)
[8]	0V
[9]	3.29V
[10]	3V
[11]	n/c
[12]	n/c
[13]	0V
[14]	5.4V
[15]	Gnd
[16]	3.3V


Q100	IC101 Flash
	Pin
B	0V
C	3.3V
E	0V

Q2400	12V PWR Ctl
	Pin
B	0V
C	0V
B	0.778V

Q2500	Tuner SIF
	Pin
B	0.898V
C	0V
E	0.246

Q2501	Tuner Video
	Pin
B	3.4V
C	0V
E	2.79V

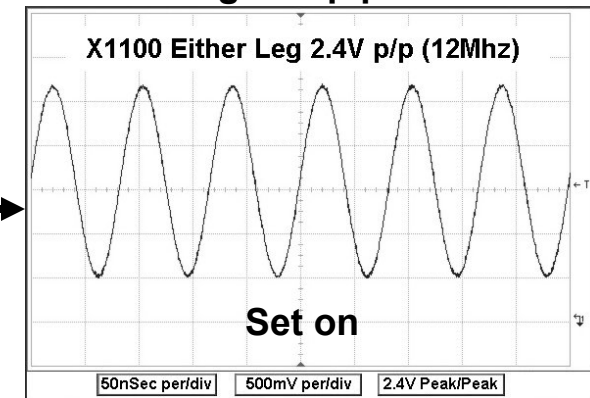
Q3400	LED PWR On
	Pin
B	0V
C	3.3V
E	0V

Q3401	EDID WP
	Pin
B	0V
C	4.8V
E	0V

Main PWB X100, X1100 and X1005 Crystal Check

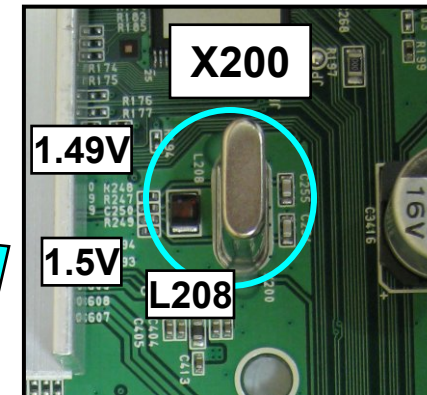
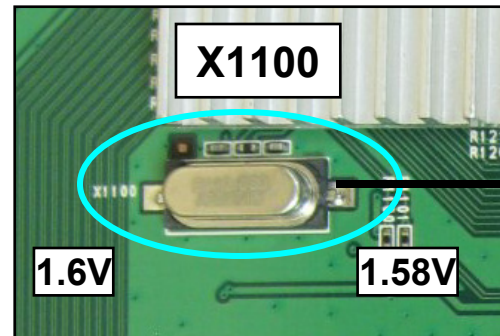
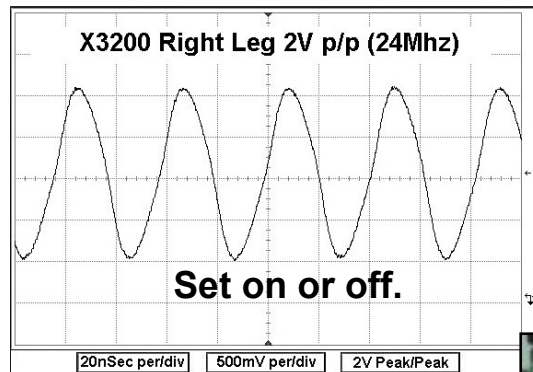
TruMotion IC1100 Crystal

Either leg 2.4Vp/p 12Mhz



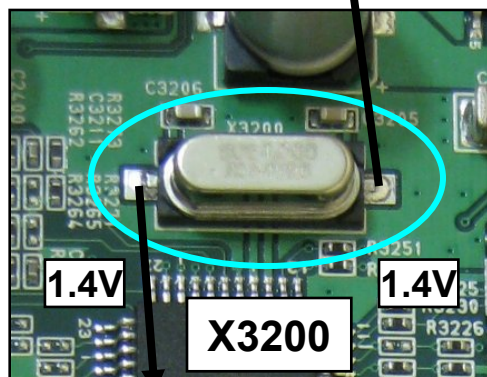
IC3202 Microprocessor Crystal

2Vp/p 24Mhz Right Leg

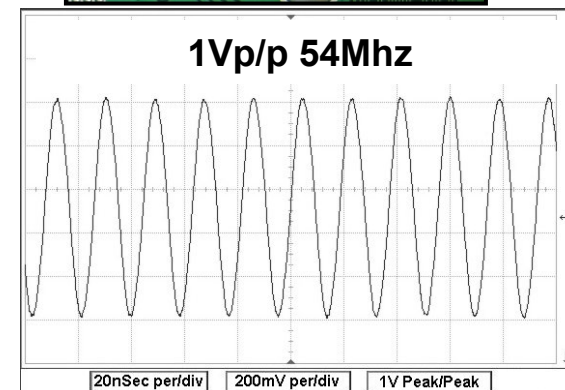
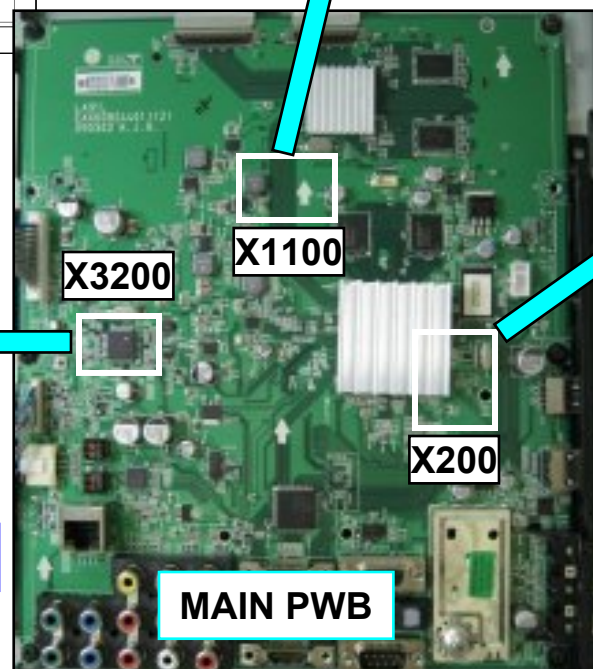


BCM
Crystal
X200

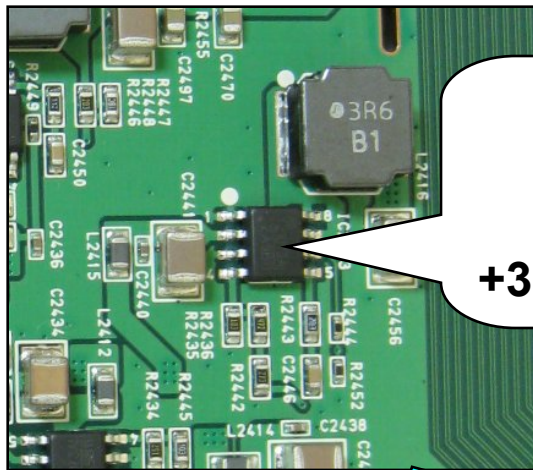
Set on. Use
bottom leg
of L208



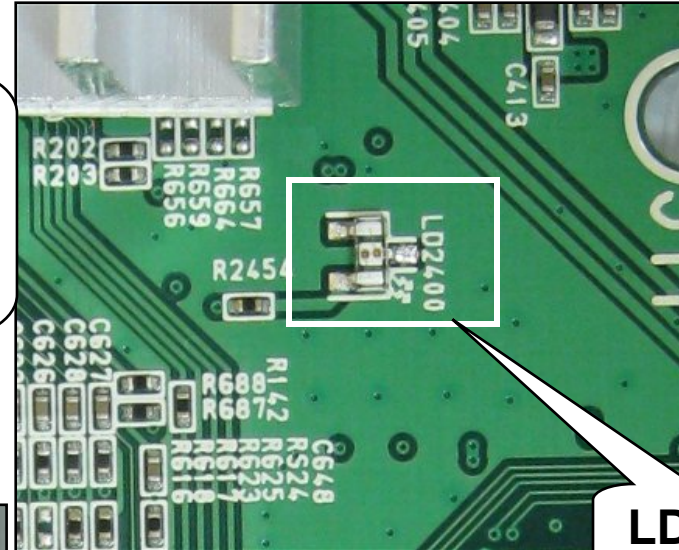
1.8Vp/p 24Mhz Left Leg



Main PWB LD2400 Function and Voltages



IC2403
A3.3V
+3.3V
+3.3-MEMC Reg.



LD2400

Q2405
12V PWR

IC2403

Pin	
[1]	Gnd
[2]	12V Input
[3]	Gnd
[4]	0.8V Feedback
[5]	0.9V
[6]	3.23V Turn On
[7]	3.37V Output
[8]	3.37V Output

LD2400 A3.3V OK

Pin	
A1	n/c
C	Gnd
A2	1.62V

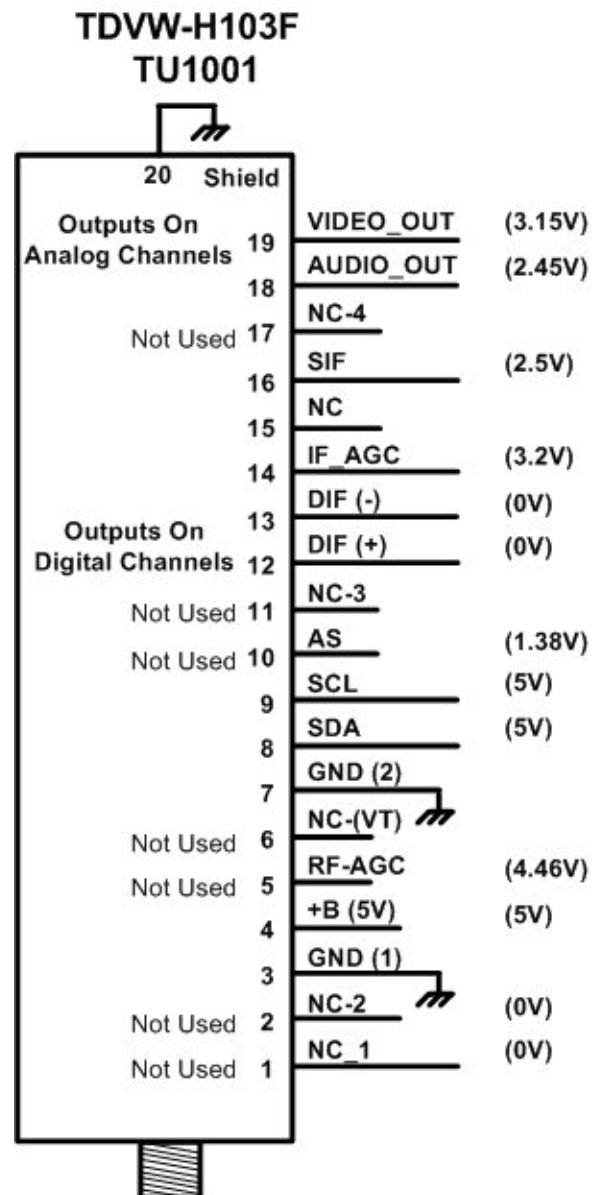
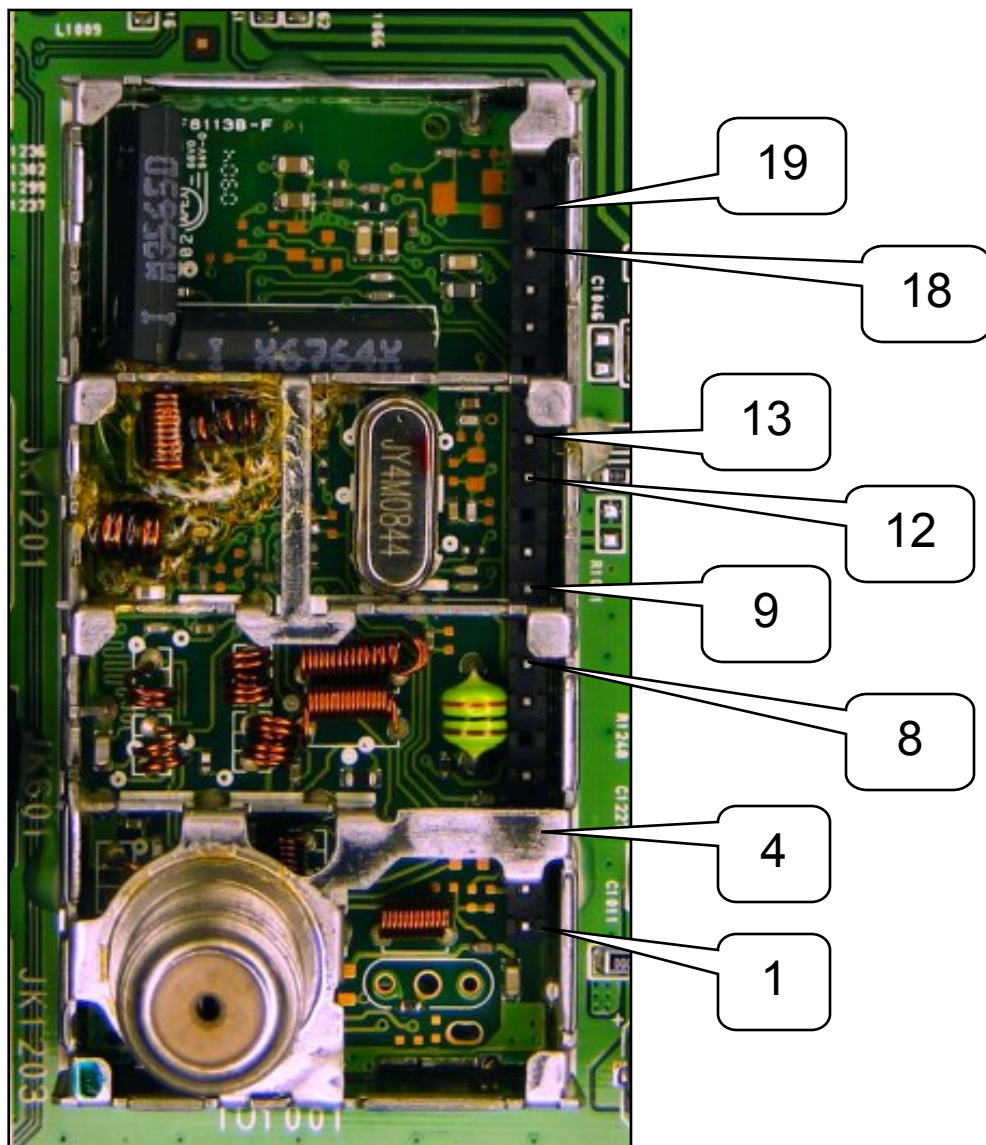
Use LD2400 as a visual aid.

This lets you know;

- 12V from Power Supply is arriving.
- Q2405 (12V PWR) switch is working.
- IC2403 is outputting voltage.
 - (A3.3V regulator)
 - (+3.3V regulator)
 - (+3.3V-MEMC regulator)

Main PWB LD2400 and IC2403 Locations

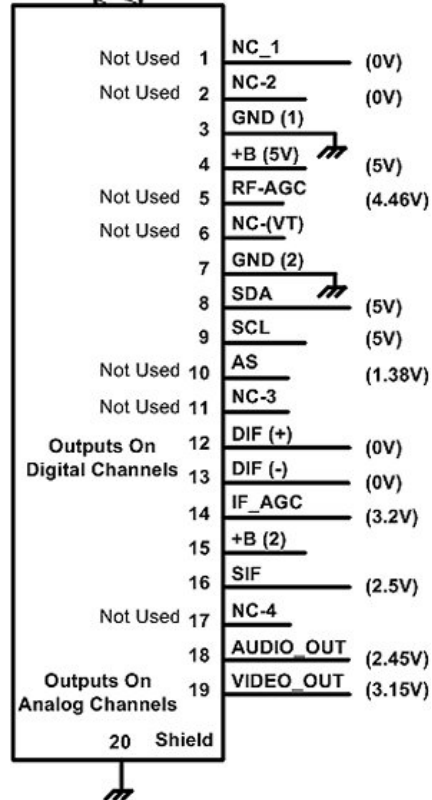
Main PWB Tuner with Shield Off (Pin ID)



Main PWB Tuner Video and SIF Output Check

USING COLOR BAR SIGNAL INPUT

TDVW-H103F
or UCA36AL
TU2500



MAIN PWB Tuner Location

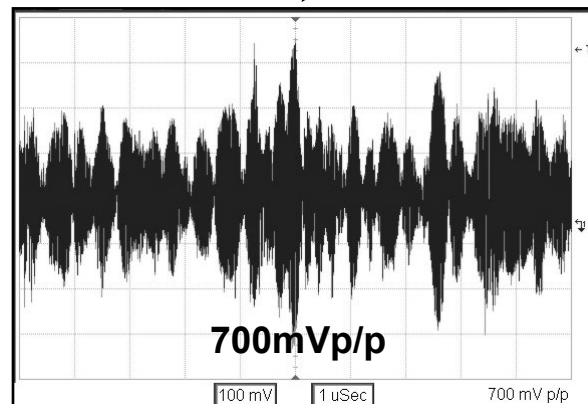
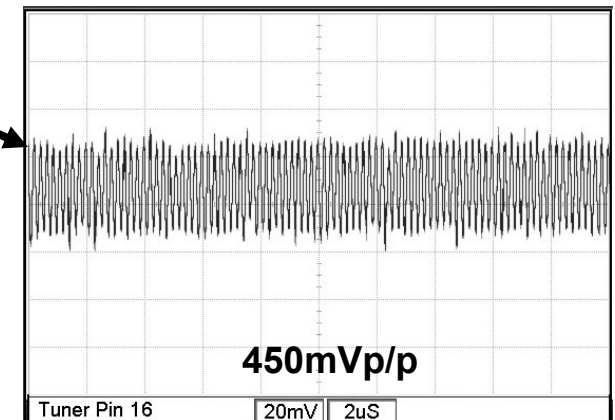
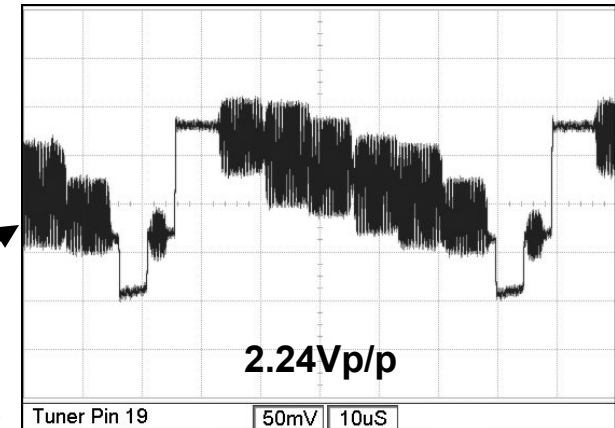


Pin 19
"Video"
Signal

Pin 16
"SIF"
Signal

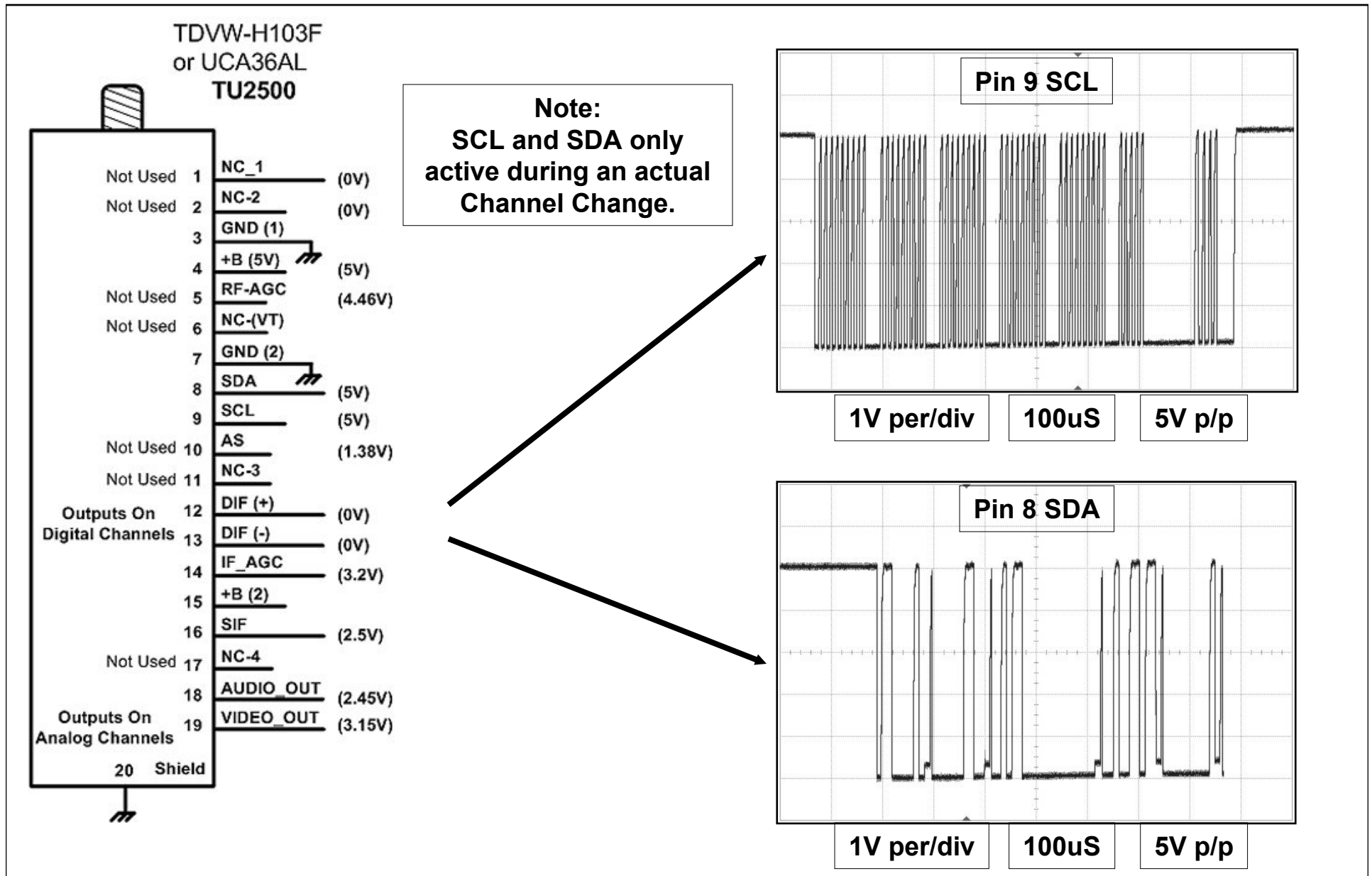
Pin 12 and Pin 13
"Dig IF" Signal

Note: "Video Out" Signal only when receiving an analog Channel.



Note:
"Dig IF" Signal only when receiving a Digital Channel.

Main PWB Tuner Clock and Data Lines



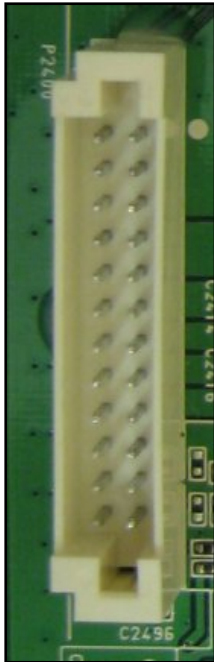
Main PWB Connector P2400 to Power Supply Voltage and Diode Check

P2400 "Main PWB" to P201 "SMPS PWB"

Odd Pins

Even Pins

P2400



Pin	Label	STBY	Run	Diode Check
1	nc	nc	nc	nc
3	Gnd	Gnd	Gnd	Gnd
5	Gnd	Gnd	Gnd	Gnd
7	5V	5.06V	5.06V	1.54V
9	5V	5.06V	5.06V	1.54V
11	Gnd	Gnd	Gnd	Gnd
13	12V	0V	12.3V	Open
15	Gnd	Gnd	Gnd	Gnd
17	24V	0V	21.4V	Open
19	nc	nc	nc	nc
21	¹ A.DIM	0V	1.75V	Open
23	nc	nc	nc	nc

Pin	Label	STBY	Run	Diode Check
2	PWR-ON	0V	4.5V	Open
4	Gnd	Gnd	Gnd	Gnd
6	Gnd	Gnd	Gnd	Gnd
8	5V	5.06V	5.06V	1.54V
10	5V	5.06V	5.06V	1.54V
12	Gnd	Gnd	Gnd	Gnd
14	12V	0V	12.3V	Open
16	Gnd	Gnd	Gnd	Gnd
18	24V	0V	21.4V	Open
20	Inv.Out	0V	4.5V	2.2V
22	Err Out	0V	0V	1.23V
24	² PWM-DIM	0V	3.3V	Open

¹ADIM Pin 21 Fixed and not used

²PDIM Pin 24 can vary according to type of signal being processed, OSD Backlight setting. 0.6V 0% to 3.3V 100% and the Intelligent Sensor. Output from the Video Processor IC100.

Diode Mode values taken with all Connectors Removed

Main PWB Connector P1100 to the T-CON Voltage and Diode Check

P1100 CONNECTOR "Main" to CN1 "T-CON"

Diode Mode values taken with all Connectors Removed

Pin	Label	Run	Diode Test
1	LVDS 12V	12V	Open
2	LVDS 12V	12V	Open
3	LVDS 12V	12V	Open
4	LVDS 12V	12V	Open
5	n/c	n/c	n/c
6	Gnd	Gnd	Gnd
7	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd
9	Gnd	Gnd	Gnd
10	Gnd	Gnd	Gnd
11	URSA-B4M	1.09V	1.23V
12	URSA-B4P	1.44V	0.875V
13	URSA-B3M	1.09V	1.23V
14	URSA-B3P	1.44V	1.23V
15	Gnd	Gnd	Gnd
16	URSA-BCKM	1.22V	1.14V
17	URSA-BCKP	1.21V	1.25V
18	Gnd	Gnd	Gnd
19	URSA-B2M	1.13V	1.23V
20	URSA-B2P	1.4V	0.87V

Pin	Label	Run	Diode Test
21	URSA-B1M	1.1V	0.87V
22	URSA-B1P	1.4V	1.2V
23	URSA-B0M	1.1V	1.22V
24	URSA-B0P	1.4V	0.88V
25	n/c	n/c	n/c
26	Gnd	Gnd	Gnd
27	URSA-A4M	1.1V	0.87V
28	URSA-A4P	1.4V	1.23V
29	URSA-A3M	1.1V	1.23V
30	URSA-A3P	1.4V	1.23V
31	Gnd	Gnd	Gnd
32	URSA-ACKM	1.26V	1.20V
33	URSA-ACKP	1.25V	1.2V
34	Gnd	Gnd	Gnd
35	URSA-A2M	1.4V	0.88V
36	URSA-A2P	1.4V	1.22V
37	URSA-A1M	1.2V	1.11V
38	URSA-A1P	1.3V	1.23V
39	URSA-A0M	1.2V	1.18V
40	URSA-A0P	1.3V	1.05V

Pin	Label	Run	Diode Test
41	OPC-Out2	n/c	Open
42	OPC-EN	0.7V	1.09V
43	OPC-Out	3.3V	Open
44	*PWM-DIM	3.3V	Open
45	LVDS-SeI	0V	Gnd
46	n/c	n/c	n/c
47	n/c	n/c	n/c
48	n/c	n/c	n/c
49	n/c	n/c	n/c
50	n/c	n/c	n/c
51	Gnd	Gnd	Gnd

PWM-DIM (Pin 44) is not used by the T-CON PWB.

Main PWB Connector P1101 to the T-CON PWB Voltage and Diode Check

P1101 CONNECTOR "Main" to CN2 "T-CON"

Pin	Label	Run	Diode Test
1	Gnd	Gnd	Gnd
2	Gnd	Gnd	Gnd
3	URSA-D4M	1.15V	1.18V
4	URSA-D4P	1.4V	1.24V
5	URSA-D3M	1.25V	0.87V
6	URSA-D3P	1.3V	1.12V
7	Gnd	Gnd	Gnd
8	URSA-DCKM	1.29V	1.22V
9	URSA-DCKP	1.3V	1.23V
10	Gnd	Gnd	Gnd
11	URSA-D2M	1.2V	0.87V
12	URSA-D2P	1.3V	0.87V
13	URSA-D1M	1.3V	1.23V
14	URSA-D1P	1.29V	0.87V
15	URSA-D0M	1.25V	1.23V
16	URSA-D0P	1.29V	0.87V
17	Gnd	Gnd	Gnd
18	Gnd	Gnd	Gnd
19	URSA-C4M	1.18V	1.08V
20	URSA-C4P	1.13V	1.07V

Pin	Label	Run	Diode Test
21	URSA-C3M	1.2V	1.2V
22	URSA-C3P	1.3V	1.23V
23	Gnd	Gnd	Gnd
24	URSA-C2M	1.3V	0.87V
25	URSA-C2P	1.23V	0.87V
26	Gnd	Gnd	Gnd
27	URSA-C2M	1.2V	1.03V
28	URSA-C2P	1.3V	0.87V
29	URSA-C1M	1.2V	0.87V
30	URSA-C1P	1.3V	1.23V
31	URSA-C0M	1.2V	1.20V
32	URSA-C0P	1.28V	0.87V
33	Gnd	Gnd	Gnd
34	n/c	n/c	n/c
35	n/c	n/c	n/c
36	n/c	n/c	n/c
37	n/c	n/c	n/c
38	n/c	n/c	n/c
39	n/c	n/c	n/c
40	n/c	n/c	n/c
41	n/c	n/c	n/c

Diode Mode values taken with all Connectors Removed

Main PWB Connector P3400 to (Ft. IR/LED Control) Voltage and Diode Check

P3400 CONNECTOR "MAIN PWB" to P1 "Front IR / LED PWB Assy"

Pin	Label	STBY	Run	Diode Check
1	SCL	3.3V	3.3V	Open
2	SDA	3.3V	3.3V	Open
3	Gnd	Gnd	Gnd	Gnd
4	Key1	3.3V	3.3V	1.91V
5	Key2	3.3V	3.3V	1.91V
6	5V ST	5.05V	5.05V	1.5V
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	IR	2.69V	2.69V	1.3V
10	Gnd	Gnd	Gnd	Gnd
11	3.3V_ST	3.29V	3.3V	0.69V
12	LED On/Off	0V	3.3V	Open

Diode Mode values taken with all Connectors Removed

Main PWB Connector P2300 to Speakers Voltage and Diode Check

P2300 CONNECTOR "Main" to "Speakers"

Pin	LABEL	SBY	Run	Diode Check
1	SPK-R (-)	0V	10.7V	Open
2	SPK-R (+)	0V	10.7V	Open
3	SPK-L (-)	0V	10.7V	Open
4	SPK-L (+)	0V	10.7V	Open

Use speaker out to test for defective Audio Amp IC2301

Diode Mode values taken with all Connectors Removed

FRONT CONTROL (IR, INTELLIGENT SENSOR and KEY BOARD) SECTION

The Front Control PWB (located on the bottom left as viewed from the rear) contains the IR (Infrared Remote Sensor) and the Intelligent Sensor plus the front Power LEDs. This board also connects with the Side Key PWB.

This board receives its operating B+ via pin 6 (STBY 5V) and pin 11 (STBY 3.3V) on connector P1. It is received from the Main PWB via the connector P1200.

The Intelligent Sensor communicates with the Video Processor IC100 via clock and data lines on the same connector pins 1 and 2.

The IR pulses (5V p/p) are sent to the Microprocessor (same IC100) via pin 9.

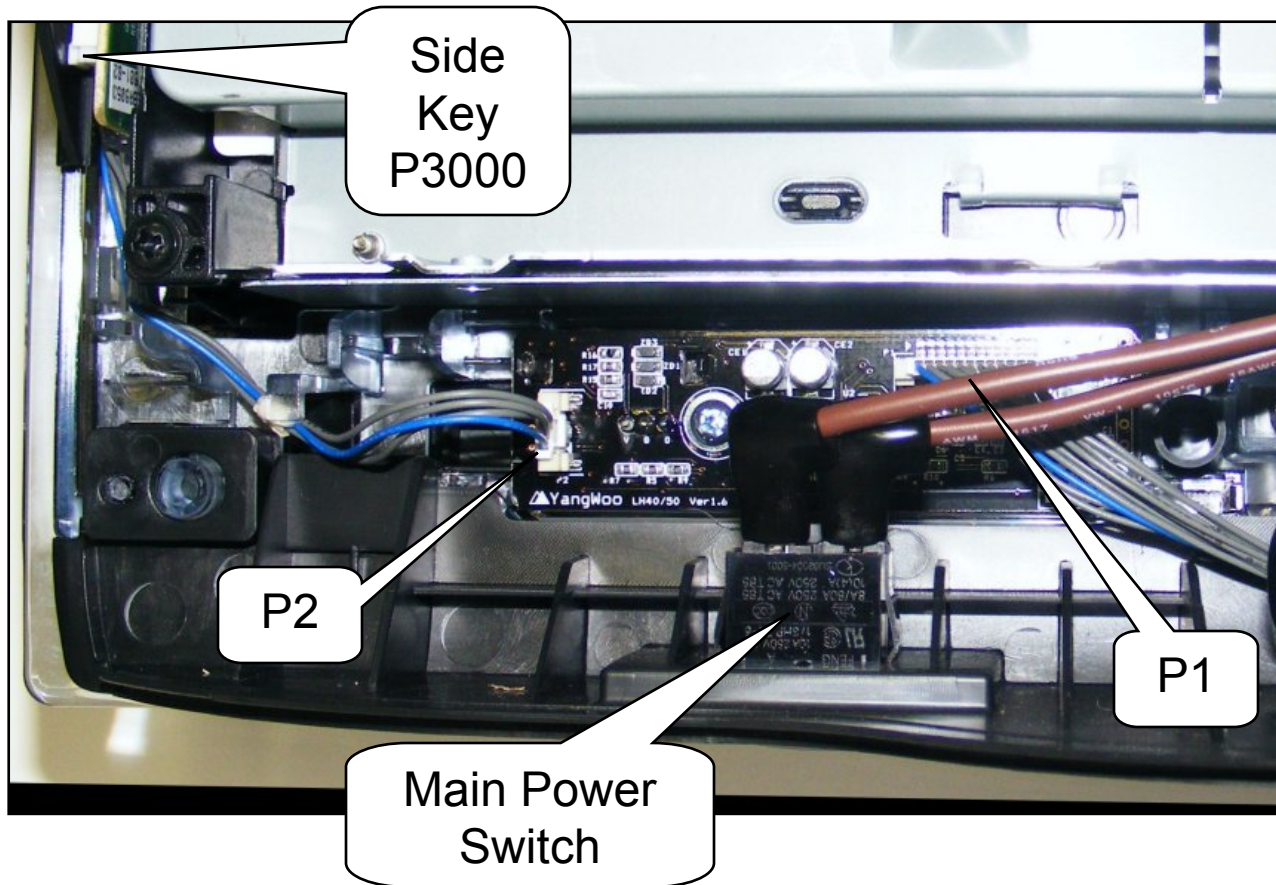
The Key board connector P3000 is routed to the Ft control board via P2. Then through the front Control board and out P2 to P1200 pins 4 and 5 and then to the Microprocessor.

Finally, the front Power LEDs are controlled by P1 connector pin 12 and pin 8.

FRONT CONTROL BOARD CONNECTIONS IDENTIFIED

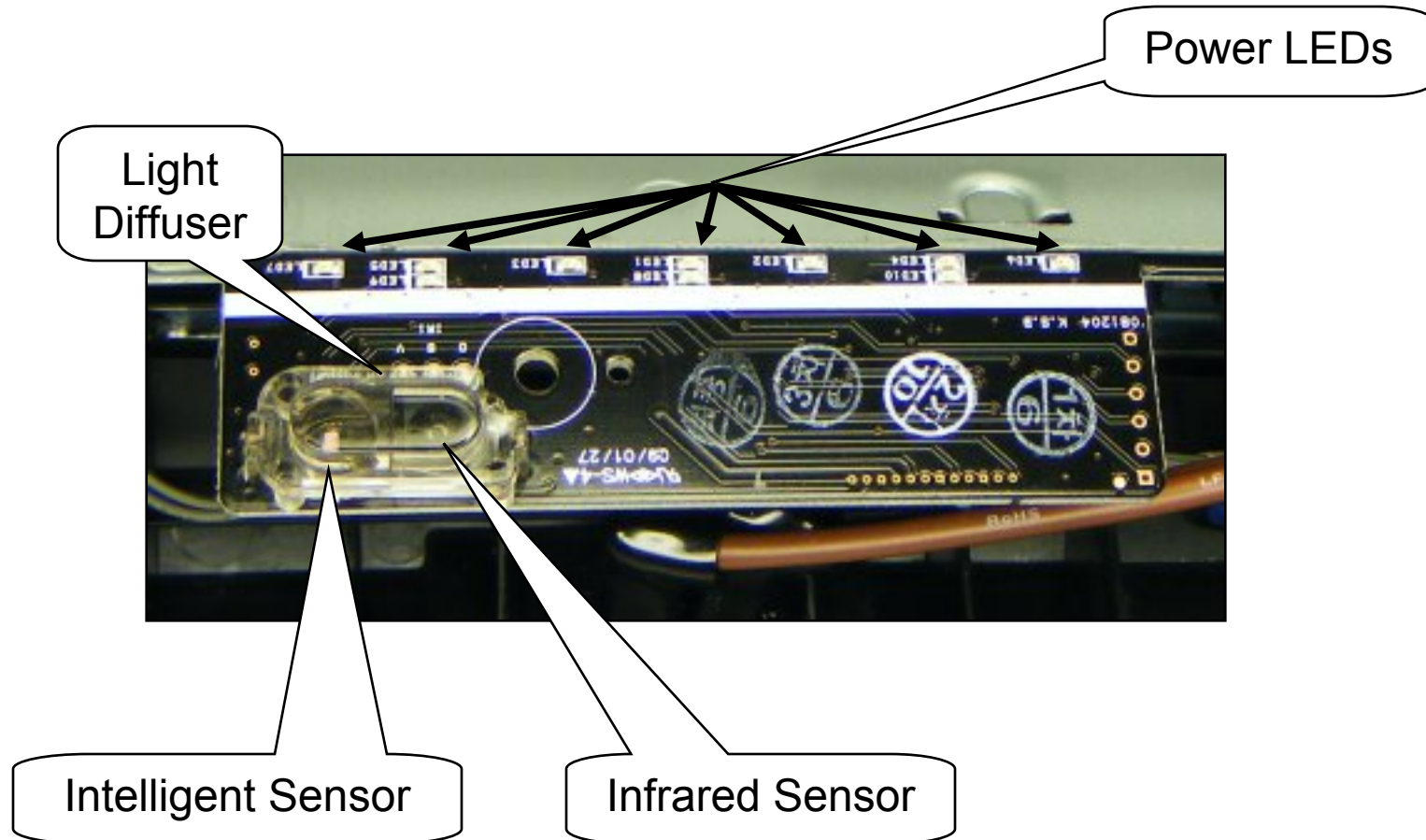
The below picture shows the connections to the Front Control board.

p/n EBR59216901



FRONT CONTROL (IR and INTELLIGENT SENSOR) IDENTIFIED

The Front Control PWB (located on the bottom left as viewed from the rear) contains the IR (Infrared Remote Sensor) and the Intelligent Sensor plus the front Power LEDs.



Ft. IR / LED Control Connector P1 and P2 Voltage and Diode Check

P1 CONNECTOR "Front IR / LED PWB Assembly" to P3400 "MAIN PWB"

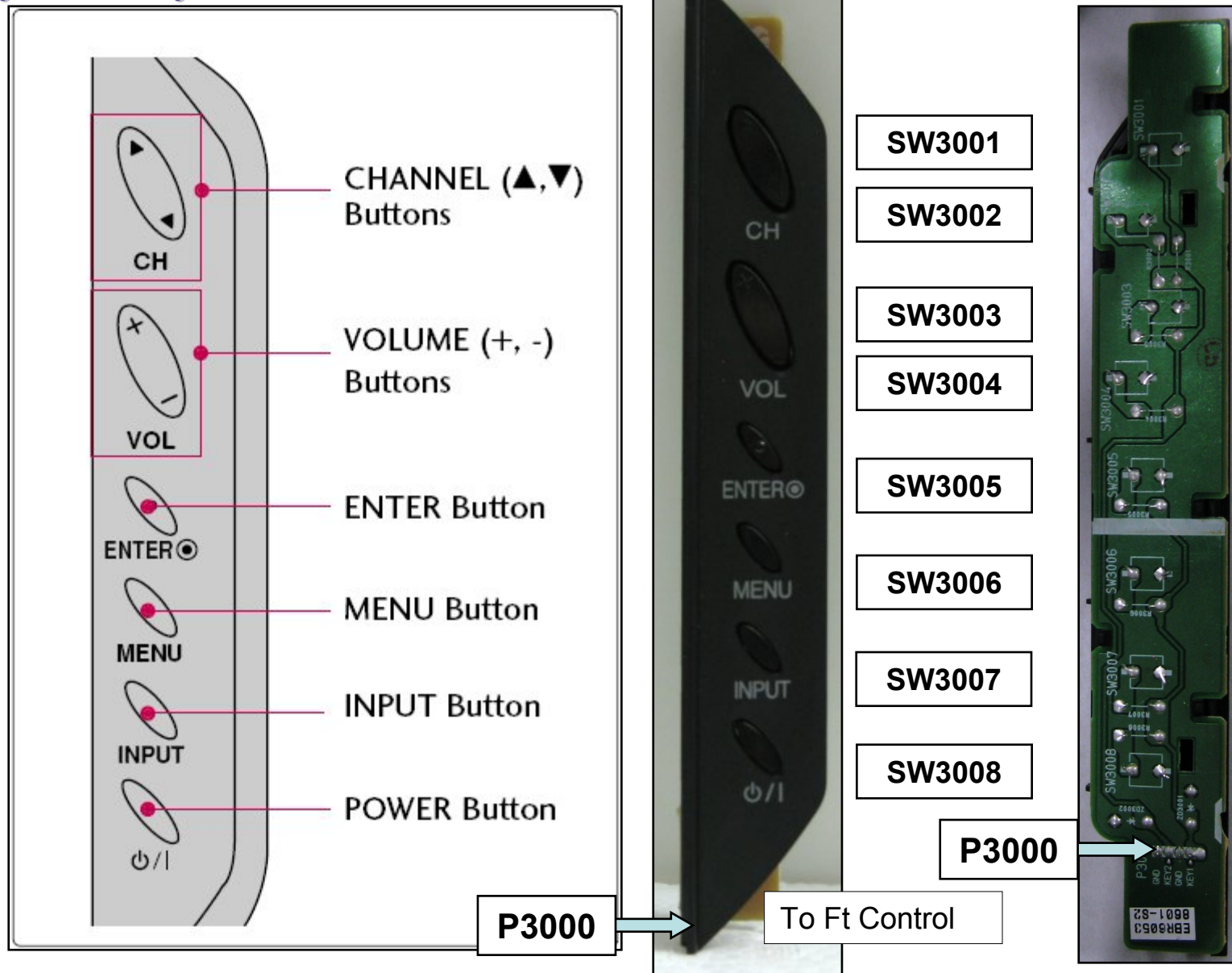
Pin	Label	STBY	Run	Diode Check
1	SCL	3.3V	3.3V	Open
2	SDA	3.3V	3.3V	Open
3	Gnd	Gnd	Gnd	Gnd
4	Key1	3.3V	3.3V	Open
5	Key2	3.3V	3.3V	Open
6	5V ST	5.05V	5.05V	1.13V
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	IR	2.67V	2.67V	Open
10	Gnd	Gnd	Gnd	Gnd
11	3.3V_ST	3.29V	3.3V	Open
12	LED On/Off	0V	3.3V	Open

P2 Connector to "Side Key" P1

Pin	Label	STBY	Run	Diode Check
1	Key 1	3.3V	3.3V	Open
2	Gnd	Gnd	Gnd	Gnd
3	Key 2	3.3V	3.3V	Open
4	Gnd	Gnd	Gnd	Gnd

Diode Mode values taken with all Connectors Removed

Side Key Assembly



Side Key Assembly P3000 Voltage and Diode Check

P3000 Resistance Measurements with Key pressed.

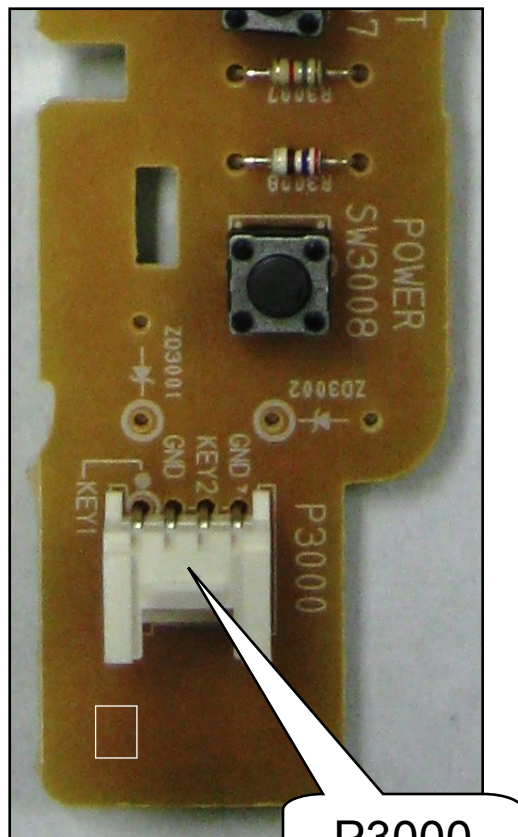
KEY	Pin 1 measured from Gnd		KEY	Pin 3 measured from Gnd
Power	270.5 Ohms		Volume (-)	270.5 Ohms
Input	1.8K Ohms		Volume (+)	1.8K Ohms
Menu	4.8K Ohms		CH (Dn)	4.8K Ohms
Enter	10K Ohms		CH (Up)	10K Ohms

P3000 Voltage Measurements with Key pressed.

KEY	Pin 1 measured from Gnd		KEY	Pin 3 measured from Gnd
Power	0.179V		Volume (-)	0.179V
Input	0.906V		Volume (+)	0.906V
Menu	1.65V		CH (Dn)	1.65V
Enter	2.24V		CH (Up)	2.24V

P3000 Connector "Side Key" to "IR/LED Control"

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



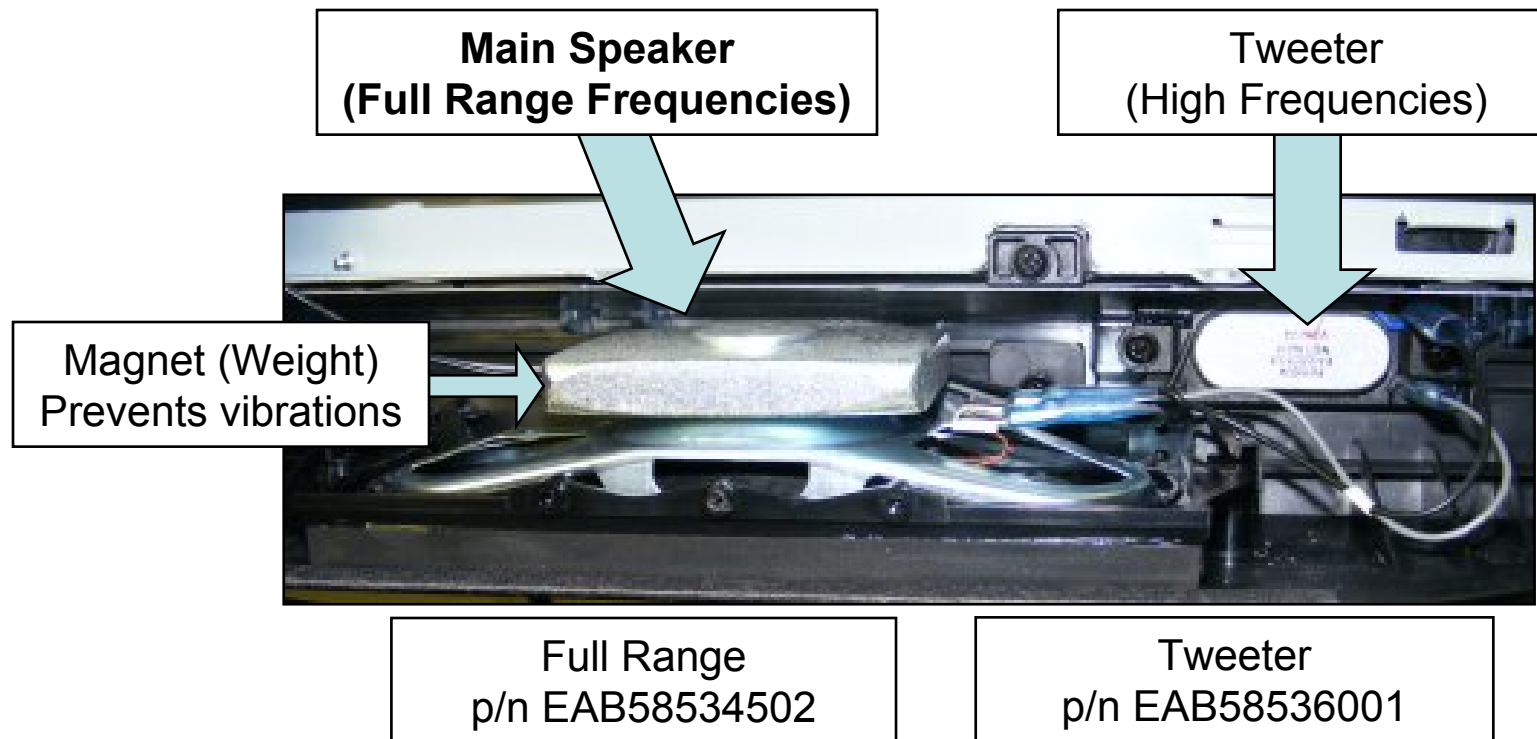
P3000

AUDIO SECTION (Cabinet Speakers)

The following section covers the Speakers used in the 42LH50

Invisible Speaker System Overview (Full Range Speakers)

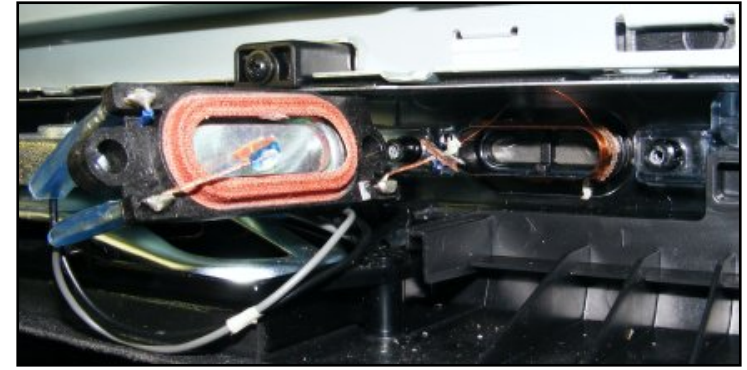
The 42LH50 contains the full progression of the Invisible Speaker system. First: The woofer layout is the basic system. The Full Range Speakers point downward, so there is no front viewable speaker grill or air ports.



Invisible Speaker System Overview (Tweeters) and Warning

**2nd: Progression
Elimination of the
conventional
speaker.**

Invisible Speaker has a
sticky surface which
adheres to front bezel.



**WARNING: Removing the Tweeter will
destroy the speaker as shown above.
The diaphragm/spider is glued to the
front bezel. When removing, it will tear.**

The front bezel is shown below. Note: the outlined
circle is the location for the front sticky pad on the
Invisible Speaker. (Some remained)
This prevent the coil from bouncing off the plastic
causing vibrations.

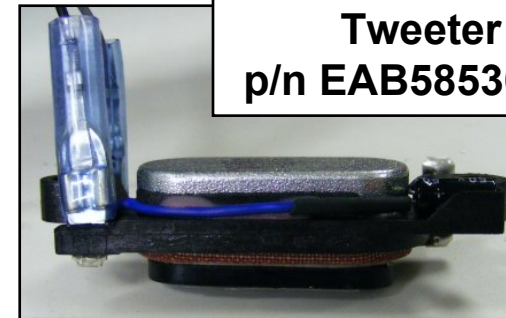


Speaker
Attachment
post

Cabinet works as
a diaphragm.

Outlined
Circle

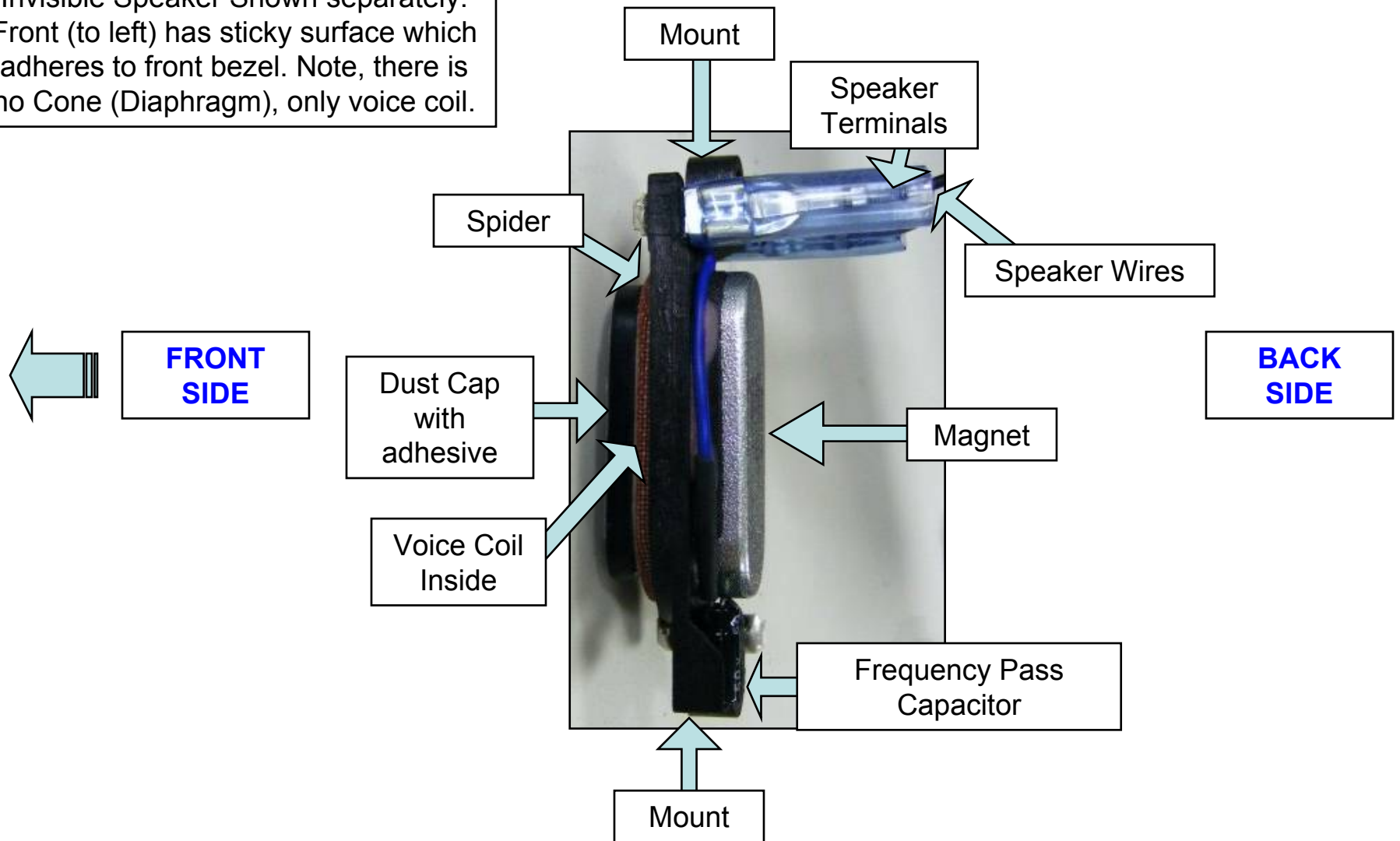
**Tweeter
p/n EAB58536001**



Invisible Speaker Tweeter
shown separately. The Front (down)
has sticky surface which adheres to
front bezel. Note, there is no
diaphragm, only voice coil.

Invisible Speaker System Overview

Invisible Speaker Shown separately.
Front (to left) has sticky surface which adheres to front bezel. Note, there is no Cone (Diaphragm), only voice coil.



11 X 17 FOLDOUT SECTION

This section shows the 11X17 foldout that's available in the Paper and Adobe version of the Training Manual.

The Adobe version of this Training Manual allows the viewer to zoom in and out making reading of the small text easier.

This Power Point shows a graphical representation of the 11 X 17 foldout page so clarity is limited.

42LH50 INTERCONNECT DIAGRAM

P201 "SMPS" to P2400 "Main PWB"

Pin	Label	STBY	Run	Diode Check
24	2 PDIM	0V	3.2V	Open
23	nc	nc	nc	nc
22	Err Out	0V	0V	Open
21	1 A.DIM	0V	1.66V	Open
20	INV.ON	0V	3.8V	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	5V	5.14V	5.14V	2.85V
3,4,5,6	Gnd	Gnd	Gnd	Gnd
2	PWR-On	0V	4.98V	1.19V
1	nc	nc	nc	nc

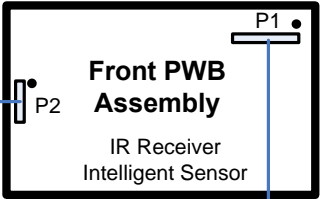
- 1 ADIM Pin 21 Fixed and not used
2 PDIM Pin 24 can vary according to type of signal being processed and the OSD Backlight setting. 0.6V 0% to 3.3V 100%. Output from the BCM chip.

R406 / R403
Bottom leg
48Khz
53V p/p

P3400 CONNECTOR "MAIN PWB" to J1 "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	3.3V	3.3V	1.4V
5	Key2	3.3V	3.3V	1.1V
6	5V ST	5.1V	5.1V	1.5V
7	Gnd	Gnd	Gnd	Gnd
8	Gnd	Gnd	Gnd	Gnd
9	IR	4.8V	4.8V	Open
10	Gnd	Gnd	Gnd	Gnd
11	3.3V_ST	3.29V	3.29V	0.76V
12	POWER On/Off	0V	3.29V	Open

Side (Key) Controls



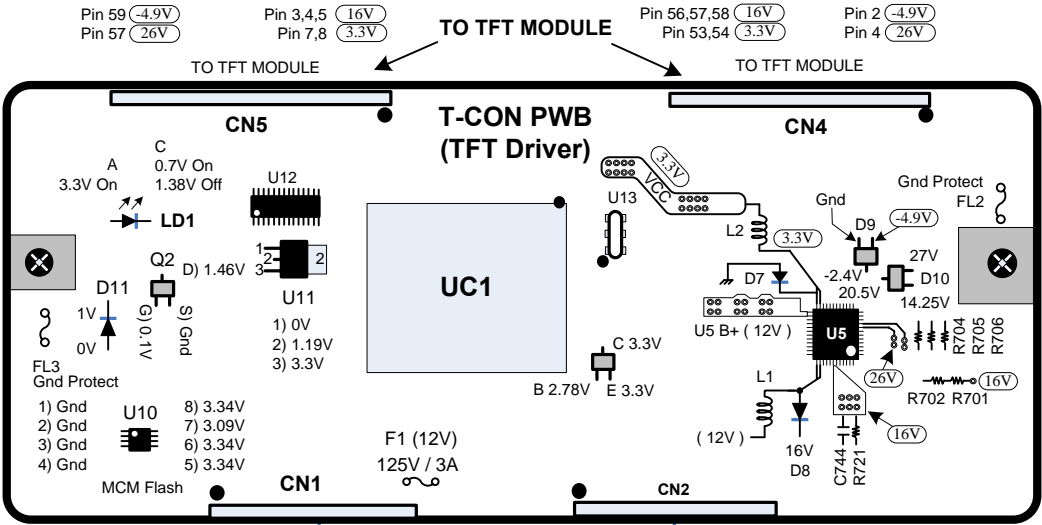
P2 "Front IR / LED PWB to P3000 Keys

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

UC1 drives Q2 which drives LD1 to assist the backlights during start up.

Stby = Off
Both Anode / Cathode 0V

On
Anode 3.3V Cathode 0.7V
30 Seconds later
Off
Anode 3.3V Cathode 1.38V



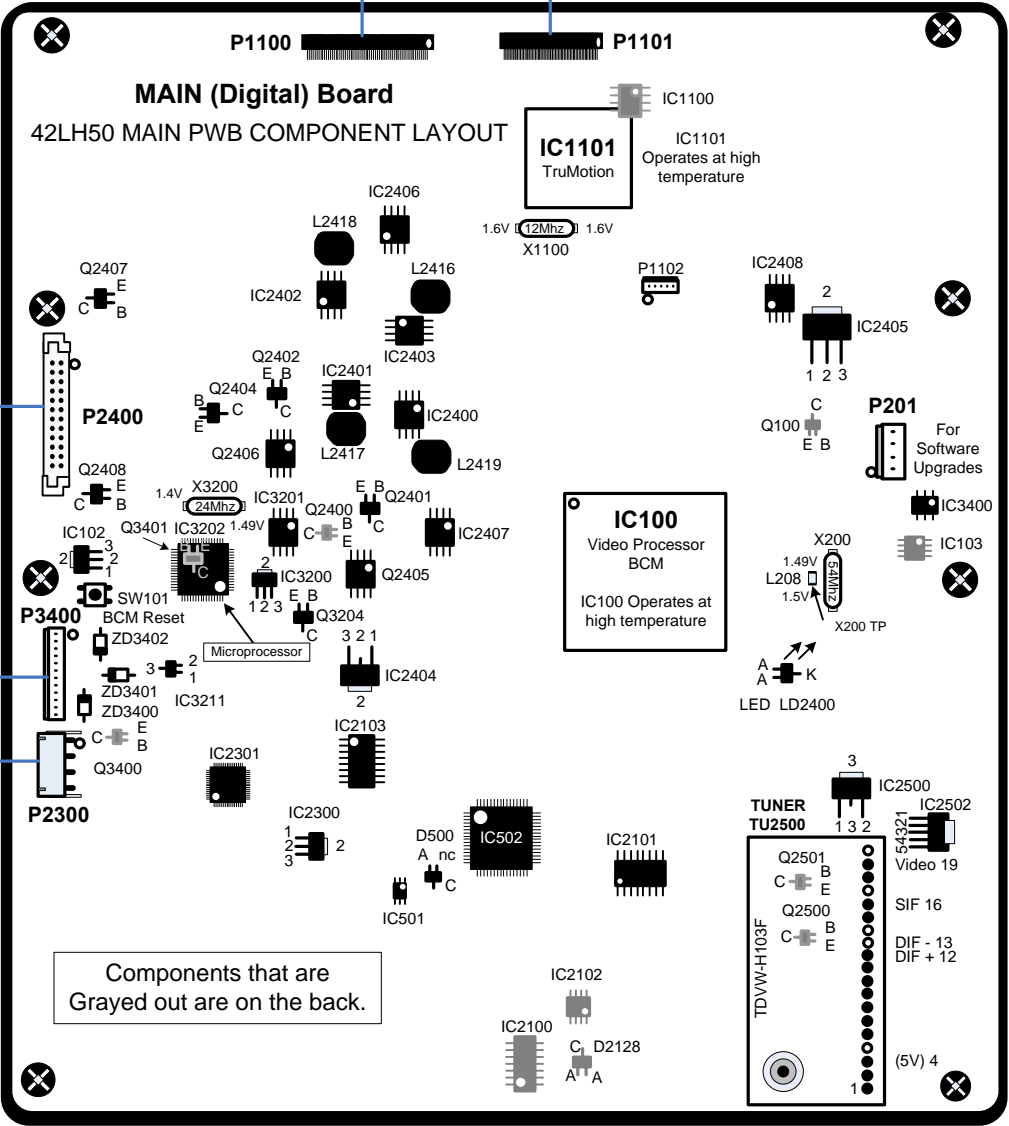
P2400 "Main PWB" to P201 "SMPS"

For Voltages see P201

Pin	Label	STBY	Run	Diode Check
24	2 PDIM	0V	3.2V	Open
23	nc	nc	nc	nc
22	Err Out	0V	0V	Open
21	1 A.DIM	0V	1.66V	Open
20	INV.ON	0V	3.8V	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	5V	5.14V	5.14V	2.85V
3,4,5,6	Gnd	Gnd	Gnd	Gnd
2	PWR-On	0V	4.98V	1.19V
1	nc	nc	nc	nc

SMPS TEST 1: To Force Power Supply On. Disconnect P700 on Main PWB. Jump pin 7,8,9 or 10 (5V) to pin 2 using a 100Ω resistor. (Test Voltage Outputs 12V, and 24V).

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



42LH50 MAIN (FRONT SIDE) SIMICONDUCTORS

IC102 BCM Reset Pin 3 1 3.3V 2 2 Gnd 1 3 3.29V	IC2103 RS232 Rx/Tx Pin [1] 3.25V [2] 3.27V [3] n/c [4] n/c [5] n/c [6] Gnd [7] n/c [8] Gnd [9] Gnd [10] 4.76V [11] 4.76V [12] 3.17V [13] 3.3V [14] 3.3V [15] 3.3V [16] 5V	IC2401 5V USB Fan Pin [1] 0V [2] 12V [3] Gnd [4] 0.8V [5] 0.8V [6] 5V [7] 5V [8] 5V	IC2404 3.3V-ST Pin 3.3V-VDDP-ST 3 2 1 1 Gnd 2 3.3V 3 5V	IC2407 A2.5V Reg Pin [1] n/c [2] 3.23V [3] 3.3V [4] n/c [5] n/c [6] 2.53V [7] 0.53V [8] Gnd	IC2502 5V Reg Pin for Tuner 54321 [1] 8.98V [2] 1.9V [3] 5V [4] 0V [5] 0V	IC3211 Power Det Pin [1] Gnd [2] 3.3V [3] 3.36V	Q2401 24V PWR Sw Pin Q2405 EB B 0.59V C 0V IC E 0V	Q2406 5V and Pin LVDS 12V Switch [1] 5V [2] 0.2V [3] 12.3V [4] 6V [5] 12.3V [6] 12.3V [7] 5V [8] 5V
IC2101 RGB Sync Pin [1] 1.9V [2] 1.9V [3] 4.38V [4] 1.9V [5] 1.9V [6] 4.5V [7] Gnd [8] n/c [9] 1.9V [10] 1.9V [11] 4.38V [12] 1.9V [13] 1.9V [14] 5V		IC2402 1.8V-MEMC Pin [1] Gnd [2] 5V [3] Gnd [4] 0.8V [5] 1V [6] 4.98V [7] 1.89V [8] 1.89V	IC2405 1.8V-DDR Pin Reg 2 [1] 0.58V [2] 1.8V [3] 3.3V	IC2408 1.8V-DDR Pin Reg [1] Gnd [2] 3.3V [3] 0.89V [4] 0.9V [5] 1.8V [6] 3.3V [7] 1.8V [8] 0.89V	IC3200 Micro Reset Pin 2 [1] 3.3V [2] Gnd [3] 0.6V	IC3400 USB 5V Pin [1] 5V [2] 0V [3] 3.3V [4] 3.3V [5] 0V [6] 5V	Q2402 5V Sw Ctl Pin Q2406 EB B 0.59V C 0V IC E 0V	Q2407 POW On/Off2 Pin B 3.37V C 4.7V E 5V
IC2300 1.8V Amp Audio Pin 1 1 Gnd 2 2 1.8V 3 3 3.3V	IC2400 1.2V Core Pin [1] Gnd [2] 5V [3] Gnd [4] 0.8V [5] 0.9V [6] 3.23V [7] [8] 1.2V	IC2403 3.3V/A3.3V Pin Reg [1] Gnd [2] 12V [3] Gnd [4] 0.8V [5] 0.9V [6] 3.23V [7] 3.37V [8] 3.37V	IC2406 1.26V-MEMC Pin Reg [1] n/c [2] 1.87V [3] 1.87V [4] n/c [5] n/c [6] 1.27V [7] 0.8V [8] Gnd	IC2500 9V Reg Pin for Tuner 3 [1] 12.3V [2] 8.9V [3] Gnd	IC3201 uP EEPROM Pin [1] Gnd [2] Gnd [3] 3.29V [4] Gnd [5] 3.3V [6] 3.3V [7] 0V [8] 3.3V	IC501 HDMI Remote Pin [1] 3.3V [2] 3.3V [3] n/c [4] n/c [5] n/c [6] 3.19V	Q2404 LVDS Sw Ctl Pin Q2406 B 0.59V C 0V E 0V	Q2408 INV Ctl Pin B 0V C 4.55V E 0V
				D500 IC501 shunt Pin A1 0V A2 3.29V C 3.1V	LD2400 A3.3V OK Pin A1 n/c C Gnd A2 1.62V	ZD3400 IR Clamp Pin C 2.68V A Gnd	Q2405 24V PWR Pin 12V PWR [1] 21.28V [2] 12.31V [3] 12.31V [4] 6V [5] 12.31V [6] 12.31V [7] 21.28V [8] 21.28V	Q3204 Micro Pin Reset Sw. EB B 0.59V C 0V IC E 0V

42LH50 MAIN (BACK SIDE) SIMICONDUCTORS

IC103 BCM EEPROM Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3.3V [6] 3.3V [7] Gnd [8] 3.3V	IC2102 RGB EEPROM Pin [1] Gnd [2] Gnd [3] Gnd [4] Gnd [5] 3V [6] 3.7V [7] 4.8V [8] 4.49V	IC2100 RS232 Rx/Tx Pin [1] 3.3V [2] 5.4V [3] 0V [4] 0V [5] (-5V) [6] (-5V) [7] (-5V) [8] 0V [9] 3.29V [10] 3V [11] n/c [12] n/c [13] 0V [14] 5.4V [15] Gnd [16] 3.3V	Q100 IC101 Flash Pin Write Protect C B 0V C 3.3V BE E 0V	Q2501 Tuner Video Pin Buffer B 3.4V C 0V E 2.79V
IC1100 SPI Flash Pin [1] 0V [2] 1.4V [3] 3.3V [4] Gnd [5] 0V [6] 0.34V [7] 3.3V [8] 3.3V	D2128 5V to IC2102 Pin A1 5V C 4.5V A2 0V		Q2400 12V PWR Ctl Pin Q2405 B 0V C 0V B 0.778V	Q3400 LED PWR On Pin B 0V C 3.3V E 0V
			Q2500 Tuner SIF Pin Buffer B 0.898V C 0V E 0.246	Q3401 EDID WP Pin B 0V C 4.8V E 0V