LG TRAINING CENTER

42LG70

Direct View LCD

FULL HD 1080P

LG

Life's Good

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 Board
- Main Board
- T-CON Board
- Ft Control Board

42LG70 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.

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 CS Academy	**lgcsacademy.com**
LG Web Training	**lge.webex.com**

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Huntsville, AL, 35813.

Safety & Handling Regulations

1. Approximately 20 minute pre-run time is required before any adjustments are performed.
2. Refer to the Voltage Sticker on the Switch Mode Power Supply silk screening. (+/- ½ volt).
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 these IC and circuits.
5. Exercise care when making voltage and waveform checks to prevent costly short circuits from damaging the unit.
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.

42LG70 Product Information

This section of the manual will discuss the specifications of the 42LG70 LCD Direct View Display Panel.

- Full HD 1080p Resolution (1920 x 1080)
- 50,000:1 Dynamic Contrast Ratio
- TruMotion 120Hz
- 4x HDMI™ V.1.3 with Deep Color
- Intelligent Sensor
- 24p Real Cinema
- AV Mode (Cinema, Sports, Game)
- Clear Voice
- LG SimpLink™ Connectivity
- Invisible Speaker System
- USB 2.0 (JPEG, MP3)
- ISFccc

Basic Specifications (LOGO Familiarization) Page 1

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

TruMotion 120Hz
Advance 120Hz panel provides clear, smooth images, even during fast action scenes creating a stable structure for a crisper picture.

Intelligent Sensor
Unlike other sensors which can only sense brightness of ambient light, LG's "Intelligent Sensor" uses 4,096 sensing steps to evaluate its surroundings. Using a sophisticated algorithm, the LG processes picture quality elements including brightness, contrast, color, sharpness and white balance. The result is a picture optimized for it's surroundings, more pleasing to watch and which can also save up to 50% in power consumption.

24p Real Cinema
Hi-def movies run at exactly 24 frames per second speed that they were originally filmed in, making your home-cinema experience one step closer to a "Real Cinema" experience.

Basic Specifications (LOGO Familiarization) Page 2

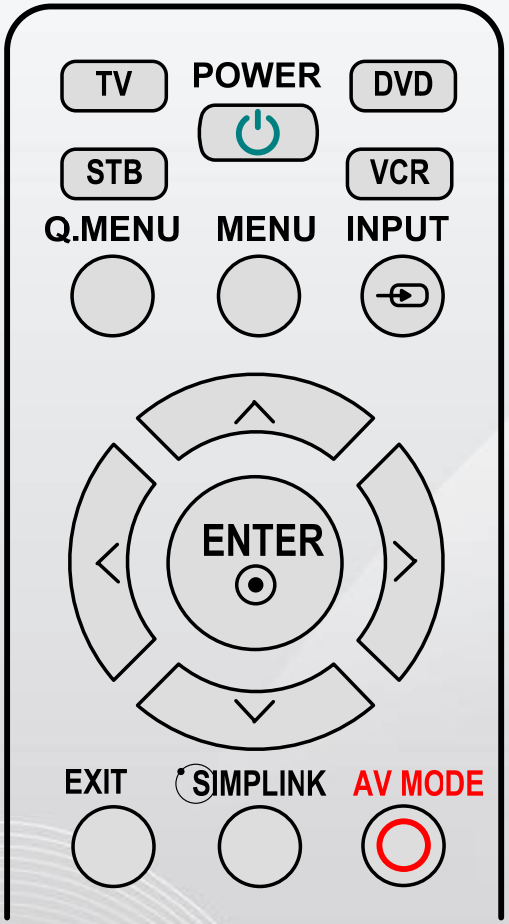
Clear Voice Technology
Automatically enhances and amplifies the sound of the human voice frequency range to provide high-quality dialogue when background noise swells.

SIMPLINK
Allows for convenient control of other LG SimpLink products using the existing HDMI connection.

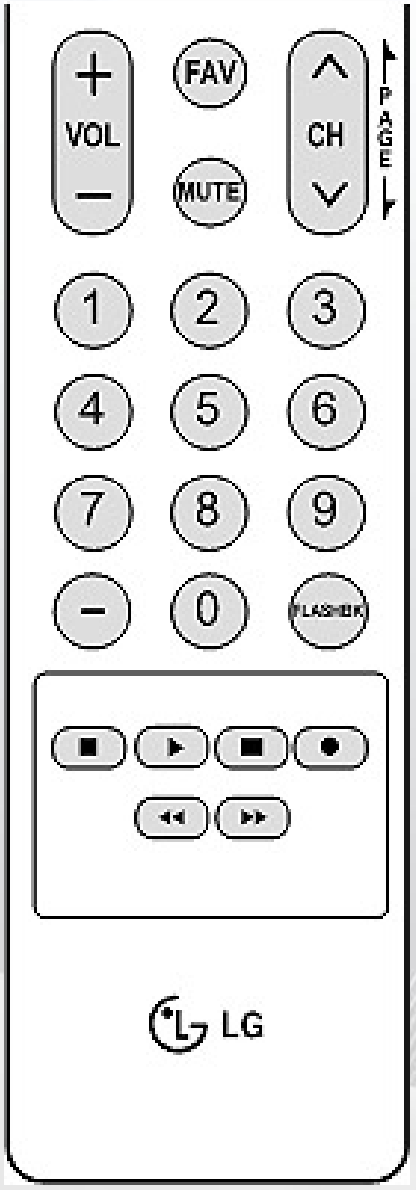
Invisible Speaker System
A new invisible speaker system tuned by renowned audio expert, Mr. Mark Levinson. This unique system incorporates speaker actuators around the perimeter of the entire bezel, eliminating traditional speaker drivers and associated grills. This not only allows for a sleek, finished look, but also offers a wider “sweet spot” by creating a virtual “wall” of sound.

Remote Control Familiarization

TOP PORTION

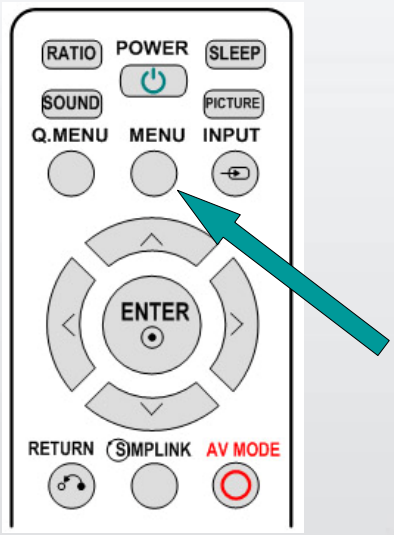


BOTTOM PORTION



Accessing the Service Menu

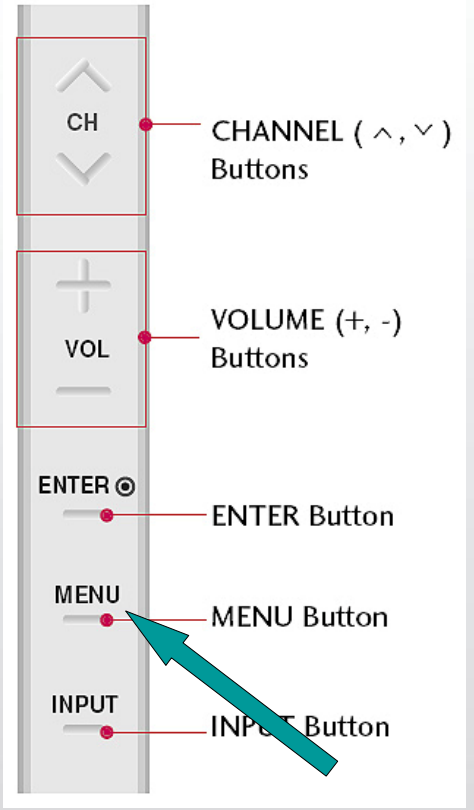
REMOTE TOP PORTION



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

SIDE KEYS



Note: It is possible, dependant upon the Software Version, a Password may be required to enter the Service Menu. If a password is required, enter **0000**

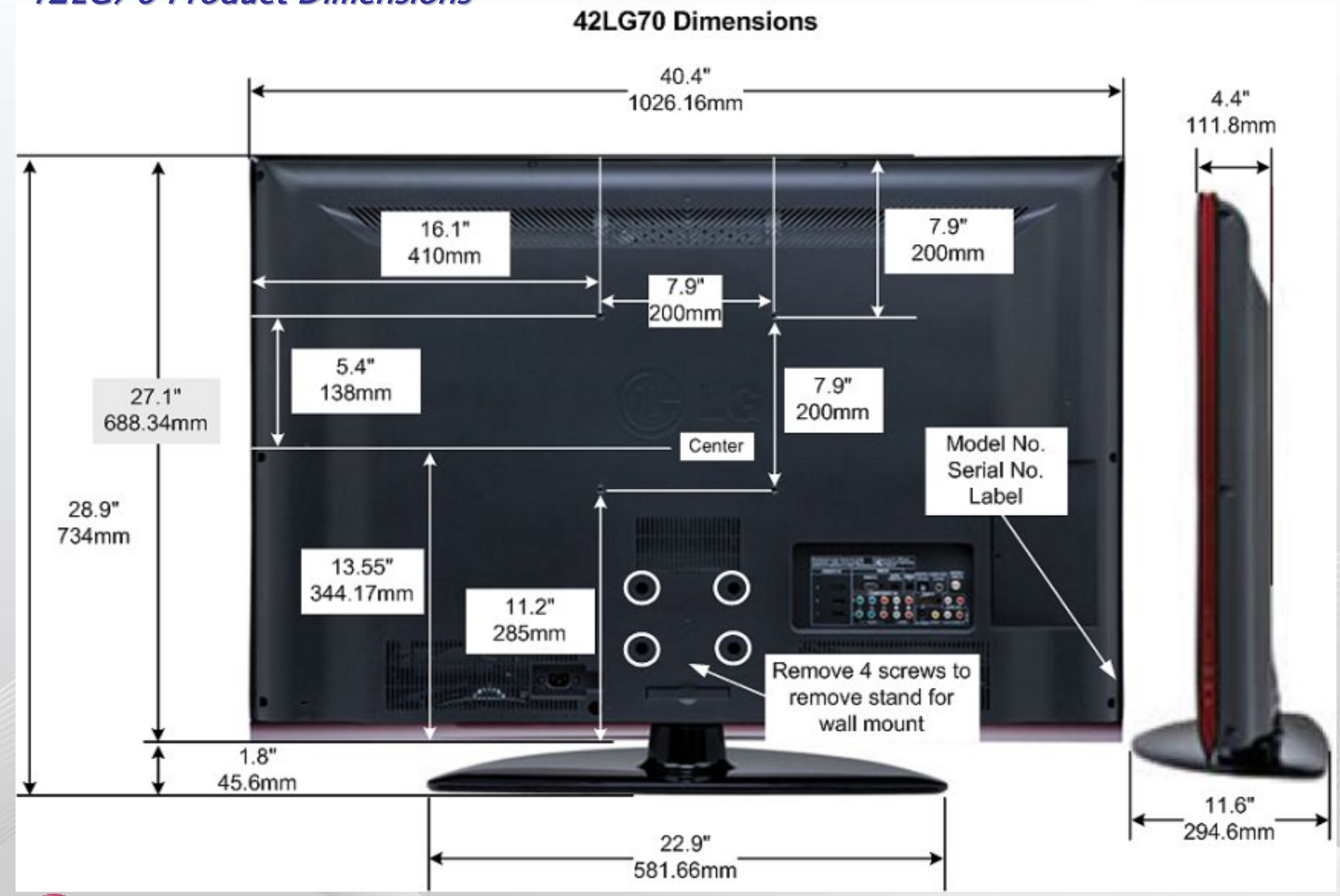
Rear and Side Input Jacks

Rear Input Jacks

Side Input Jacks

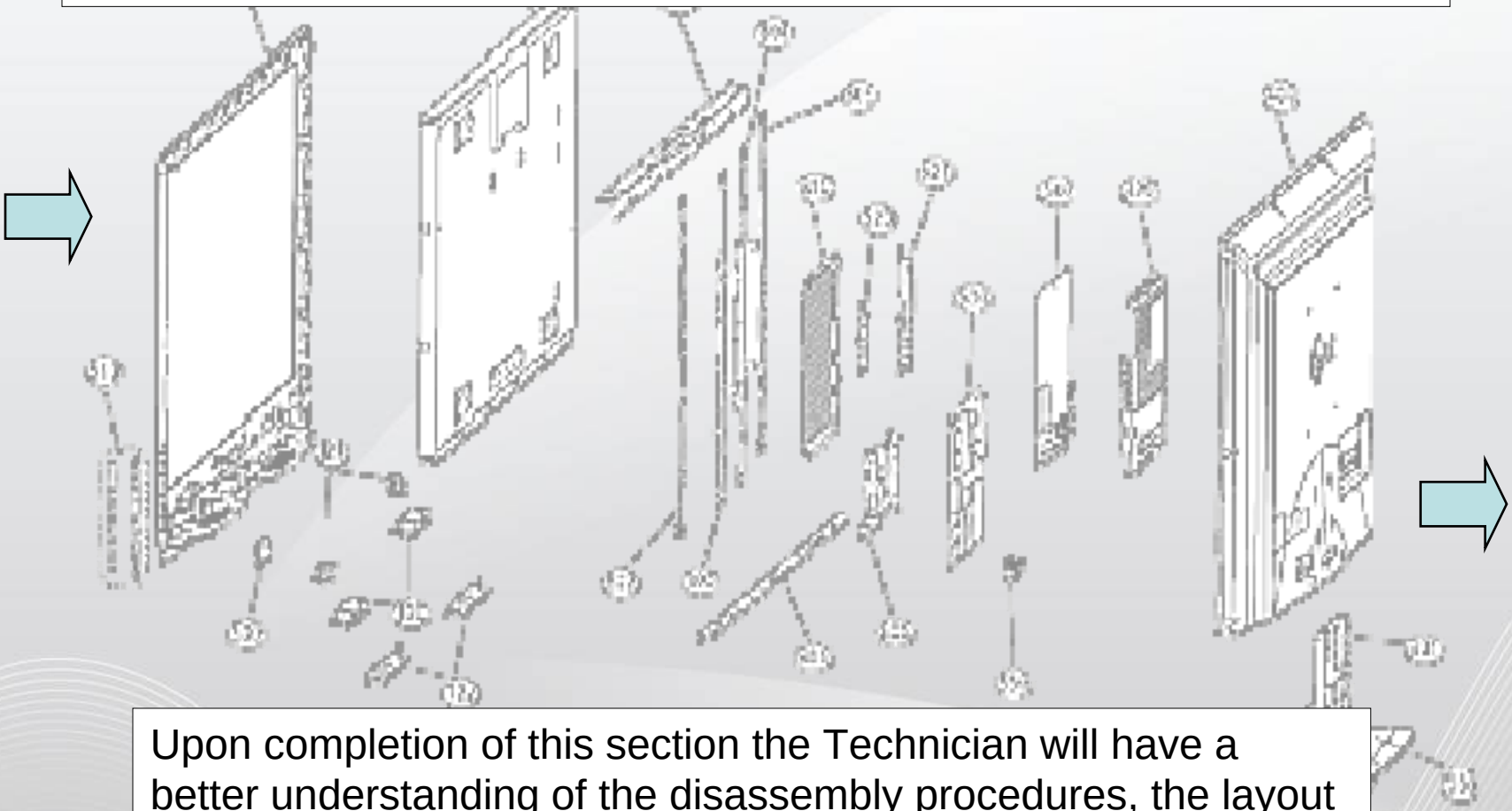
Main PWB
Orientation

42LG70 Product Dimensions



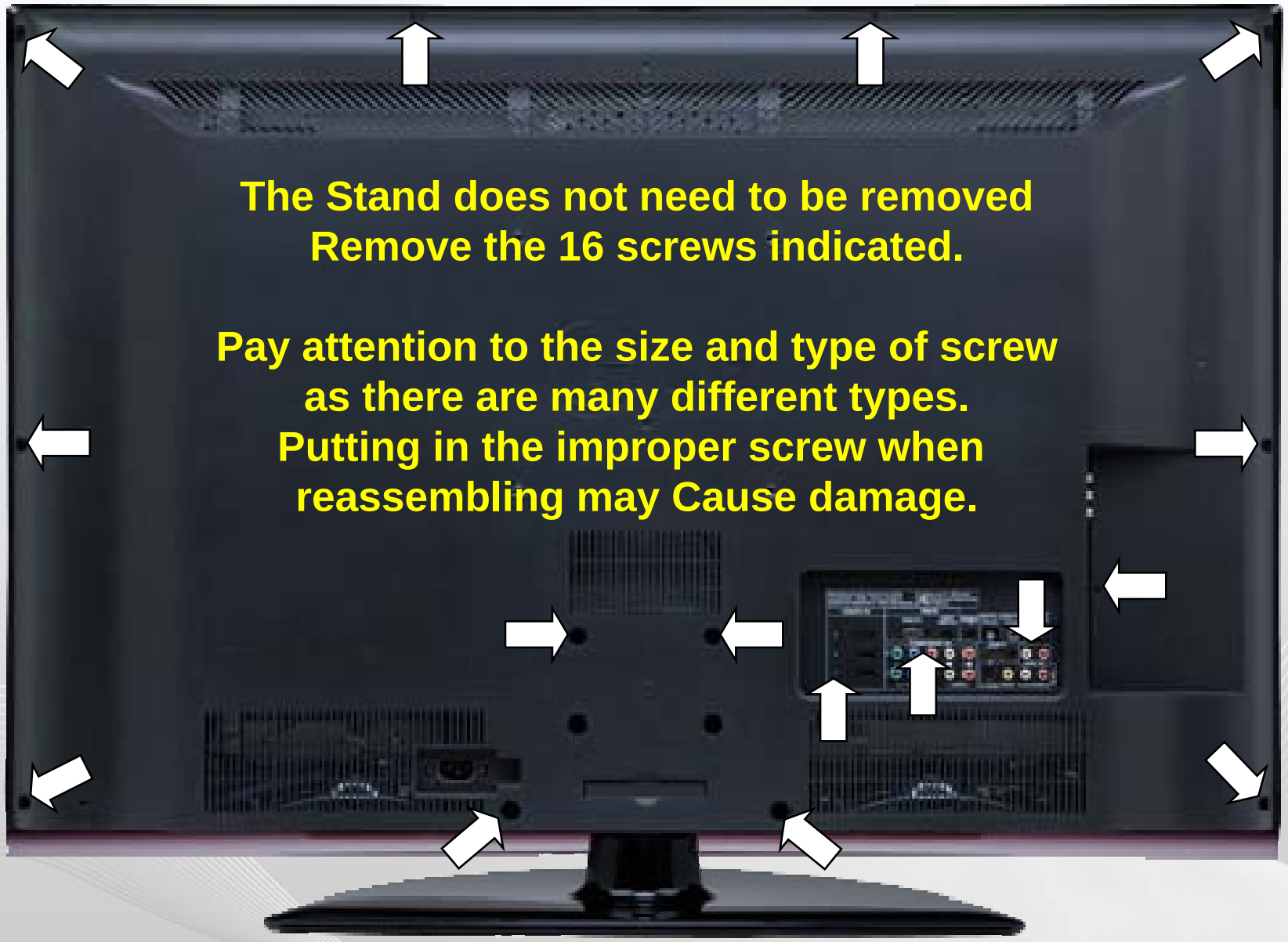
DISASSEMBLY SECTION

This section of the manual will discuss Disassembly, Layout and Circuit Board Identification, of the 42LG70 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.

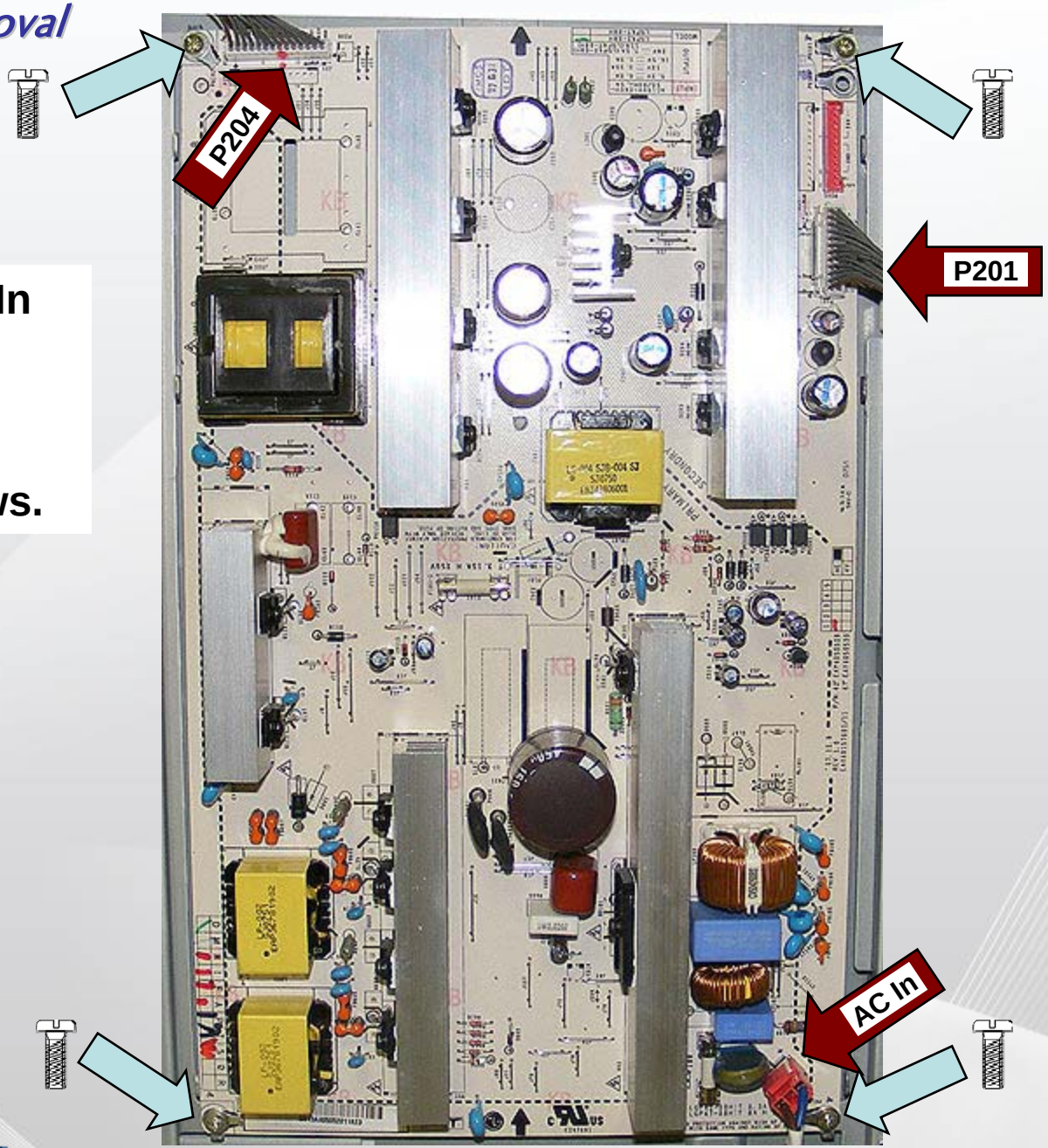
Removing the Back Cover



Power Supply PWB Removal

Disconnect P201, AC In and P204.

Remove the 4 screws indicated by the arrows.

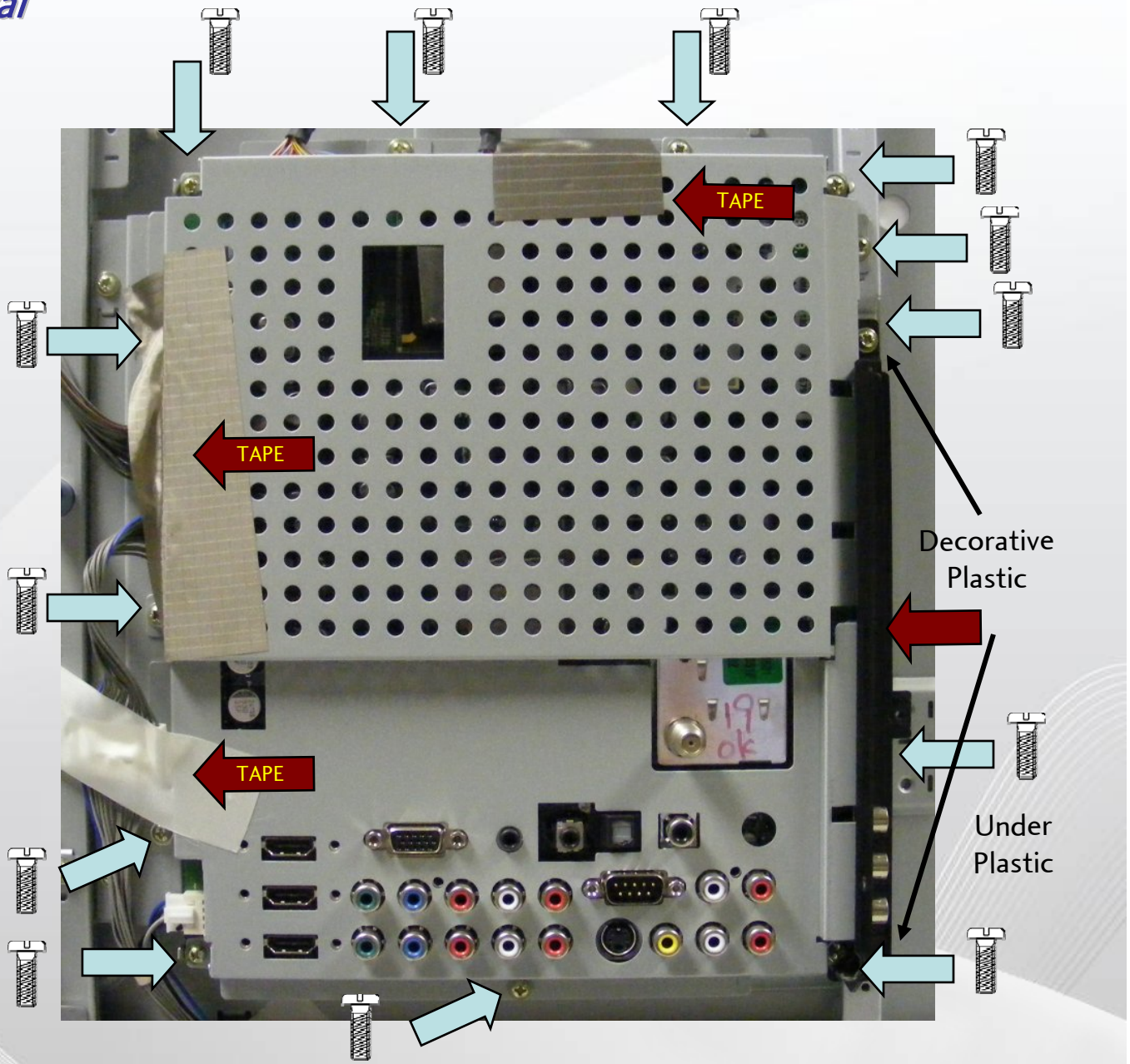


Main PWB Shield Removal

Remove the two screws holding the Decorative plastic piece on the right side. Remove the plastic piece.

Remove the two pieces of tape on the left side holding down the cables and the one at the top.

Remove the remaining 11 screws indicated by the arrows.



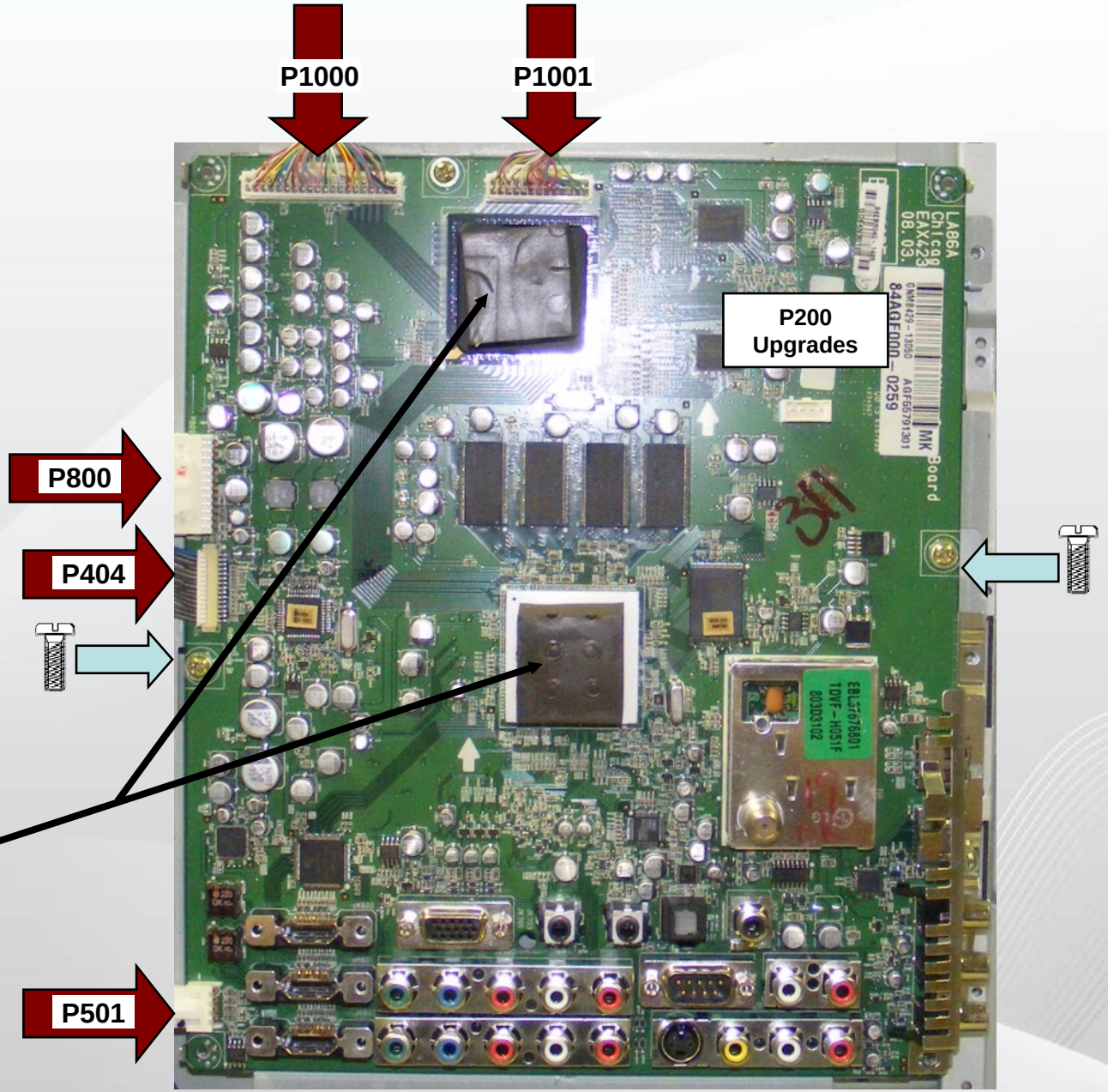
MAIN PWB Removal

Disconnect P1000, P1001, P800, P404 and P501
Note: In the top right is a connector P200. This is an open connection.

Remove the 2 screws securing the Main PWB.

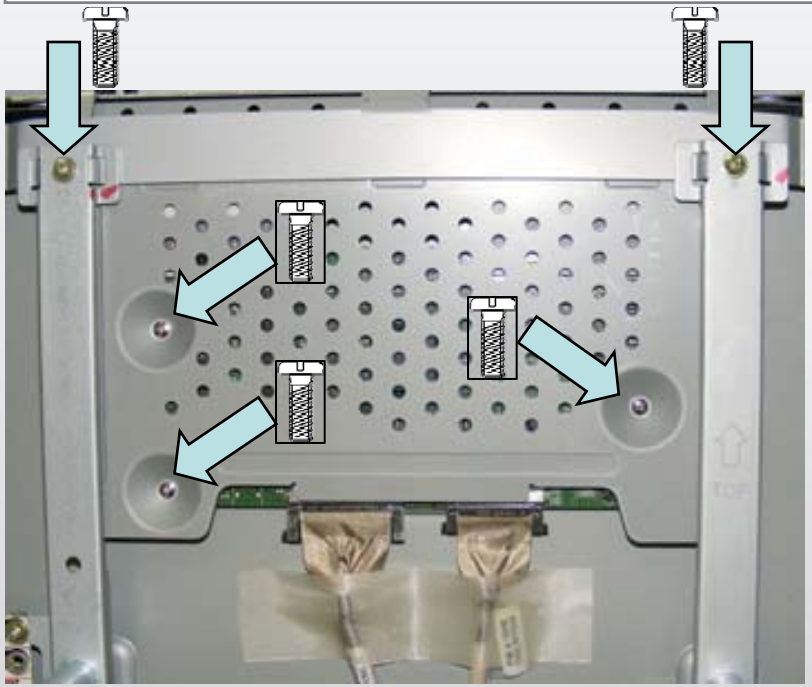
Note: The top 2 and bottom 2 screws were removed during the shield removal process.

NOTE: Look carefully on top and behind the BCM and Micronas IC. Look for a piece of Chocolate (Heat Transfer Material). Be sure to transfer to new PWB if replaced.

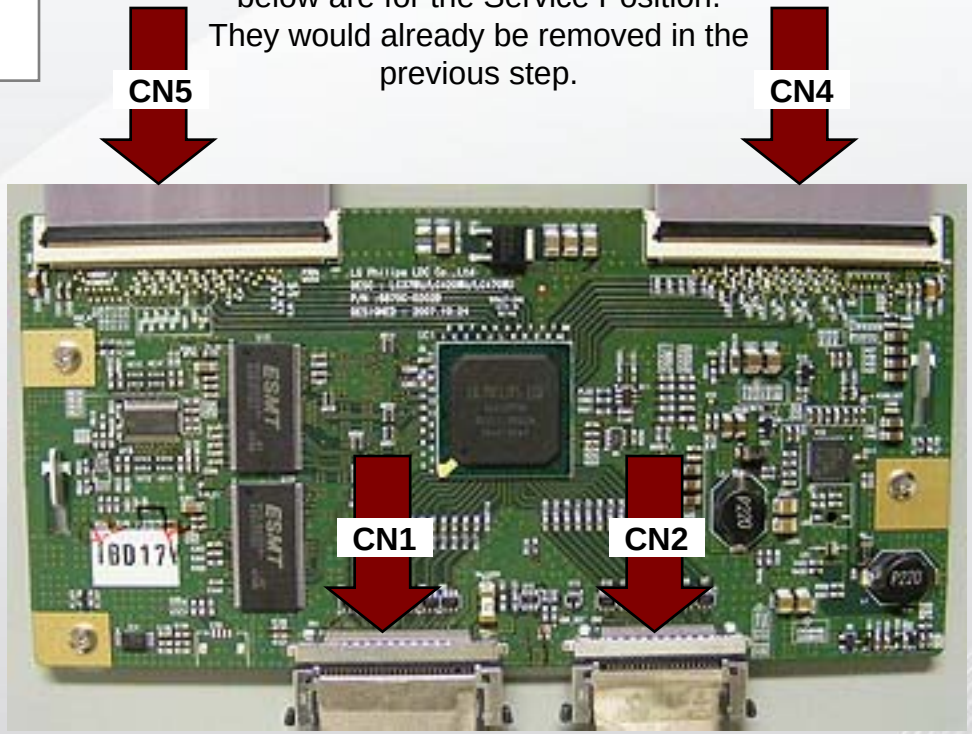


T-CON (TFT Drive) PWB Removal

Remove the 2 screws at the top of each bracket. Remove the 3 Screws in the T-CON shield. Lift up the left bracket and work the shield out and off.



The three screws shown in the picture below are for the Service Position. They would already be removed in the previous step.



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

Remove and save the tape over the LVDS Cables

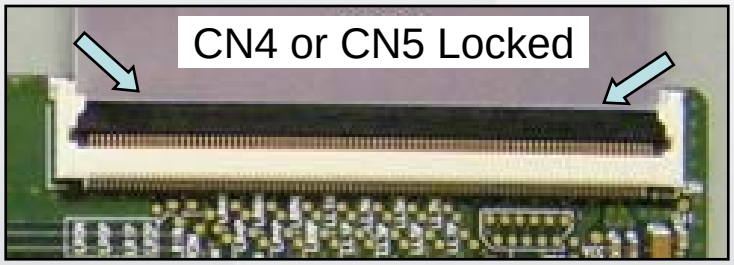
T-CON (TFT DRIVE) PWB REMOVAL CONTINUED:

UNLOCKING CN1, CN2, CN4 and CN5

To remove the flex cables to the TFT Panel, CN4 or CN5: Place a soft sharp object like a fingernail underneath the black locking tab and gently lift upward.

(Shown by the arrows in Fig 1)

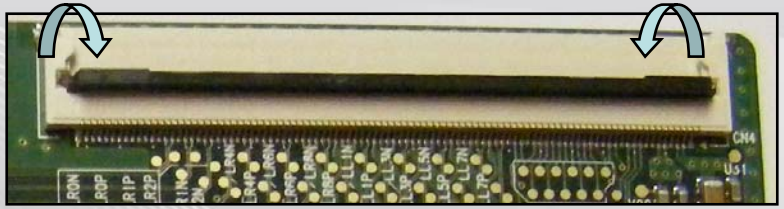
Fig 1



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

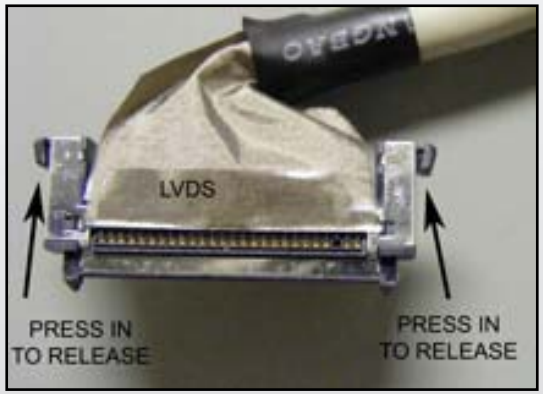
Unlocked

Fig 2



The locking tab is flipped upward

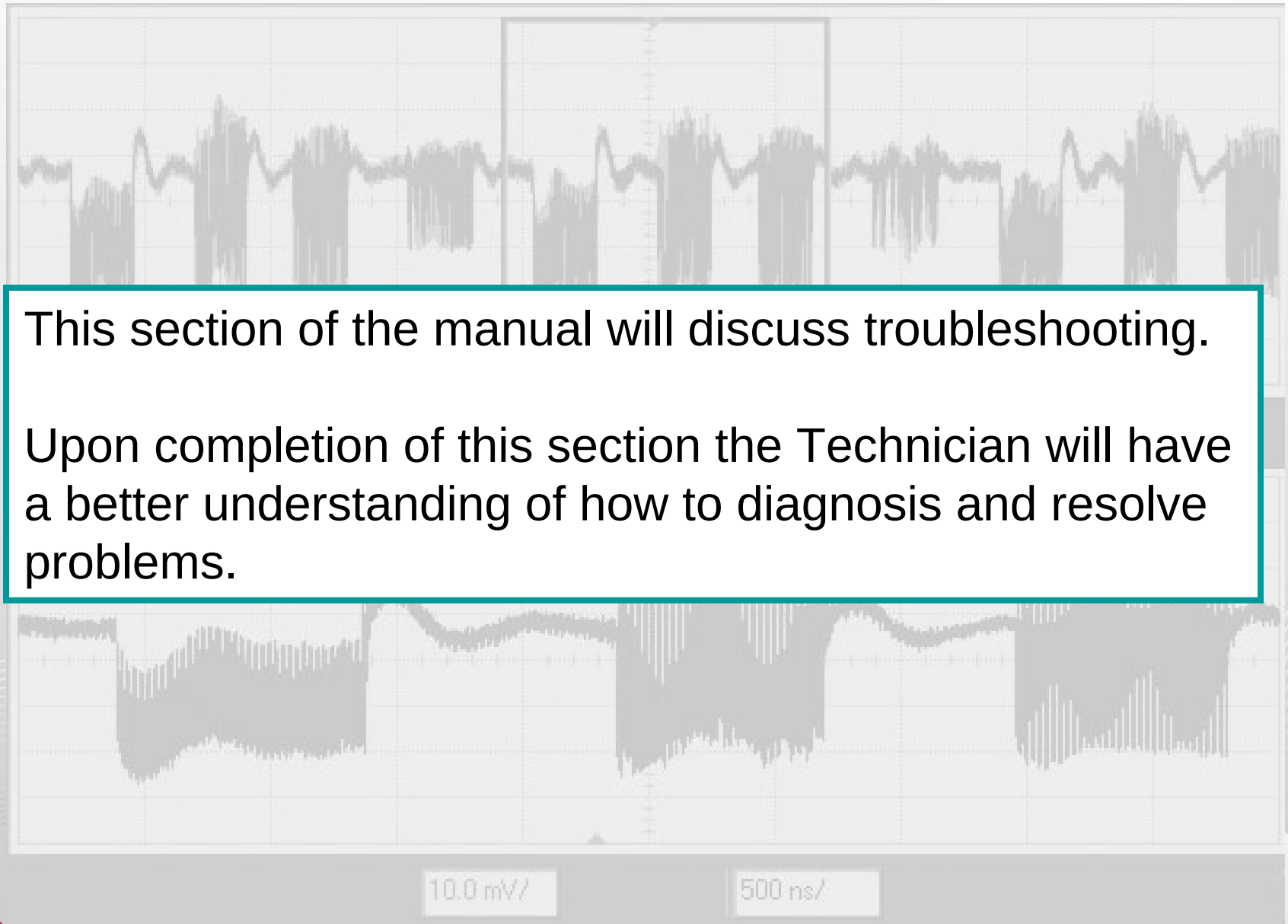
Fig 3



To remove the LVDS cables for CN1 or CN2; Press in on the two tabs and slowly rock the cable out of the connector.

(Shown by the arrows in Fig 3)

TROUBLESHOOTING SECTION



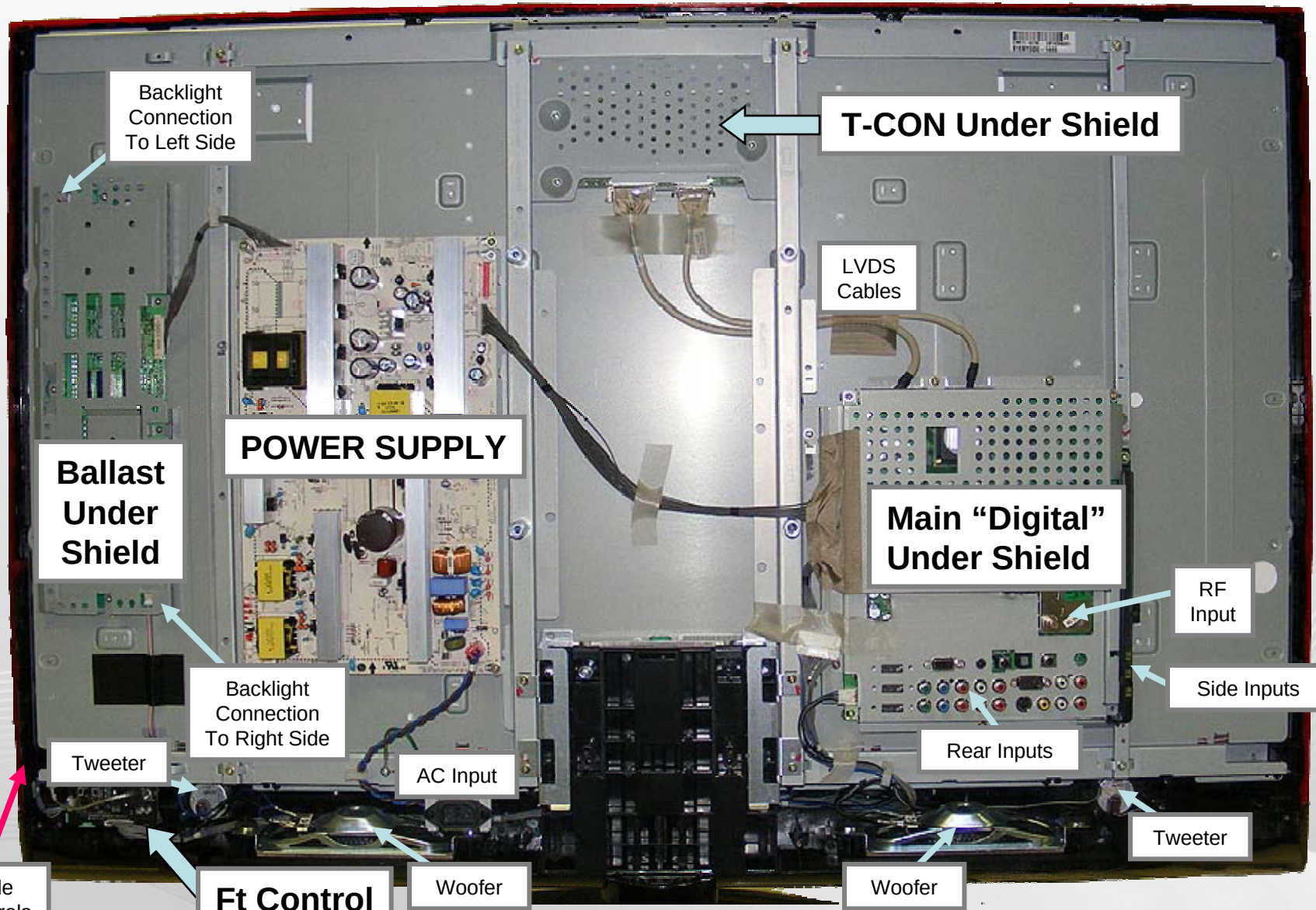
This section of the manual will discuss troubleshooting.

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

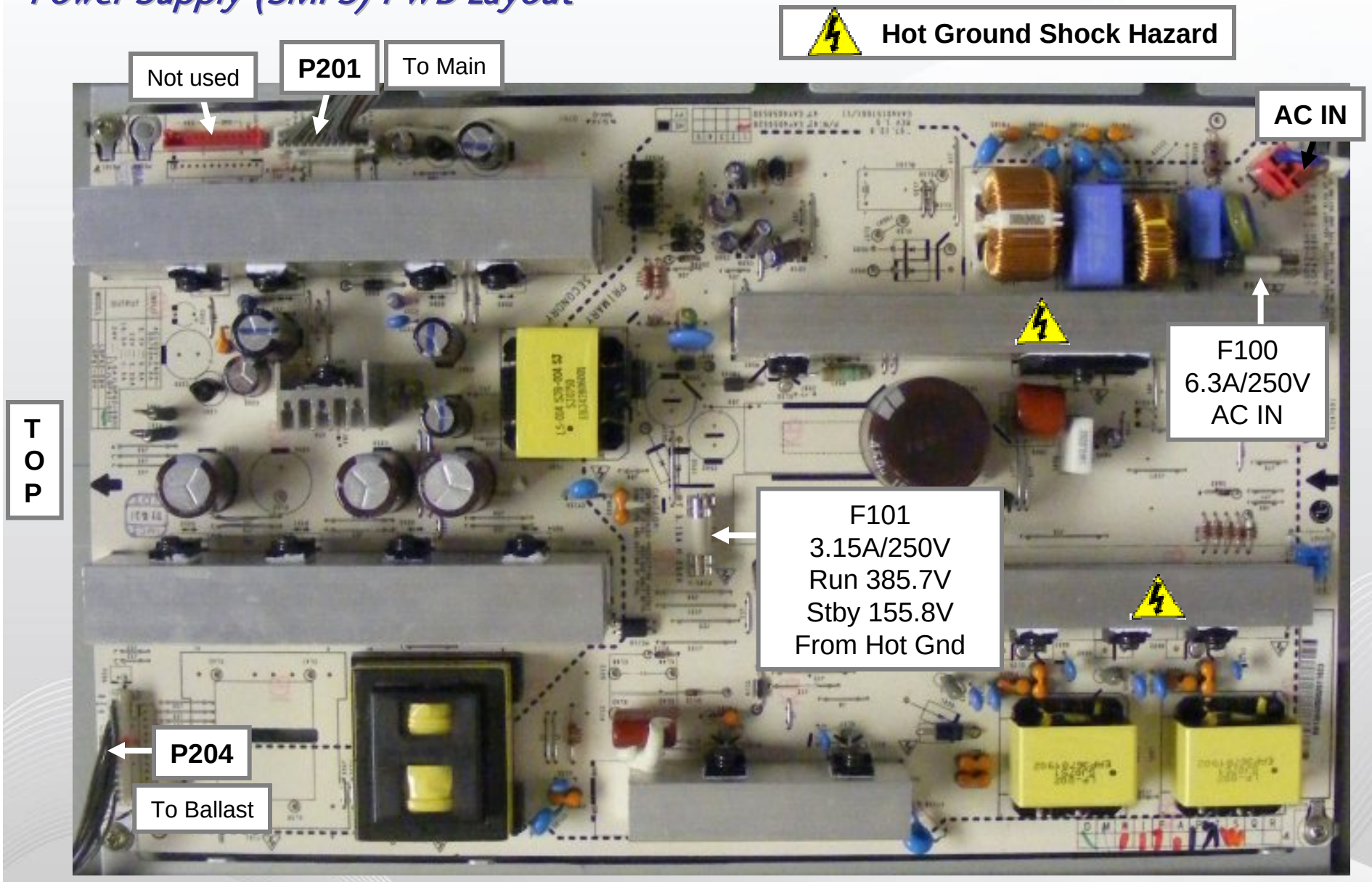
Circuit Board Layout

BALLAST p/n EAY56798701

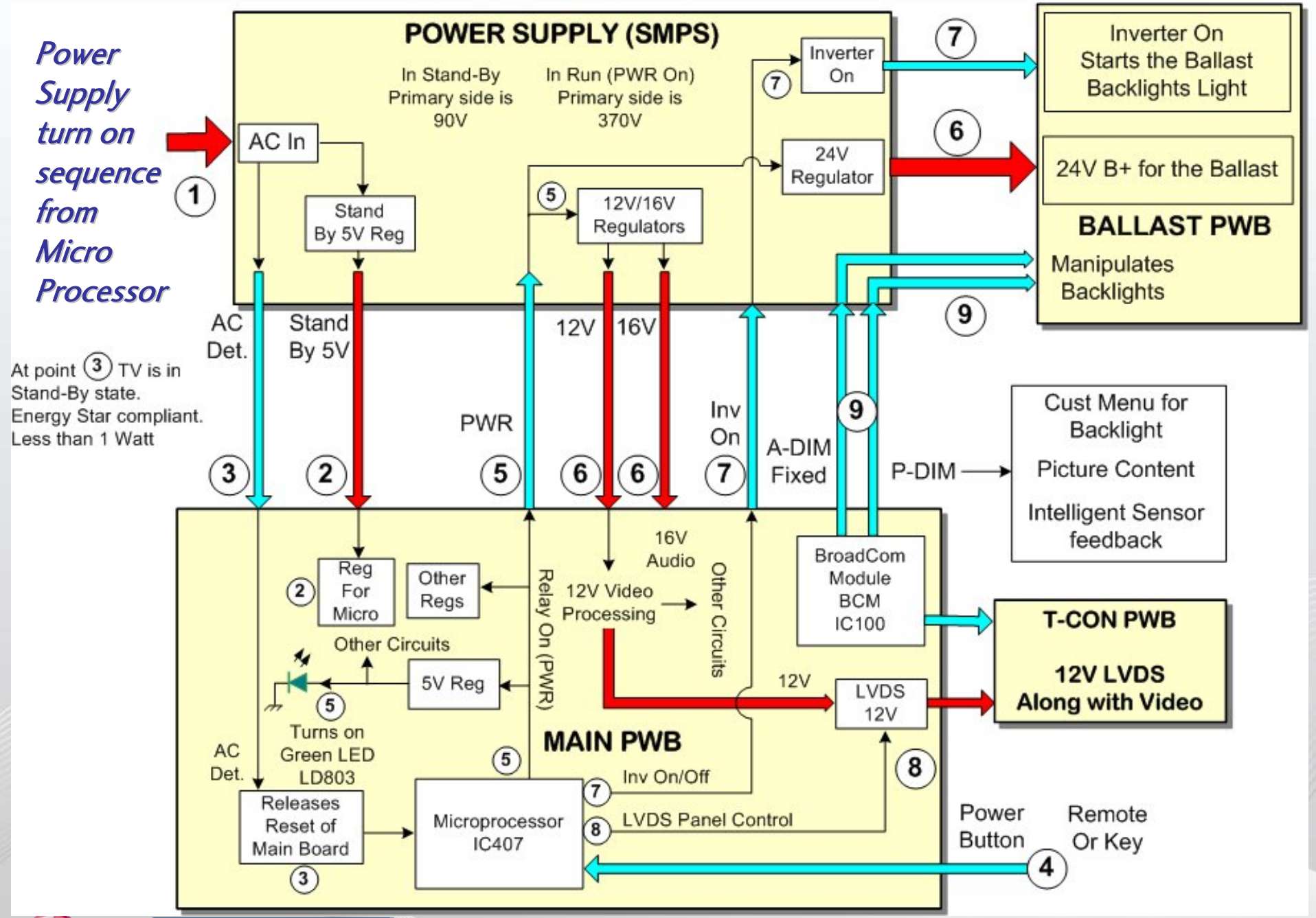
T-CON p/n EAT56803001

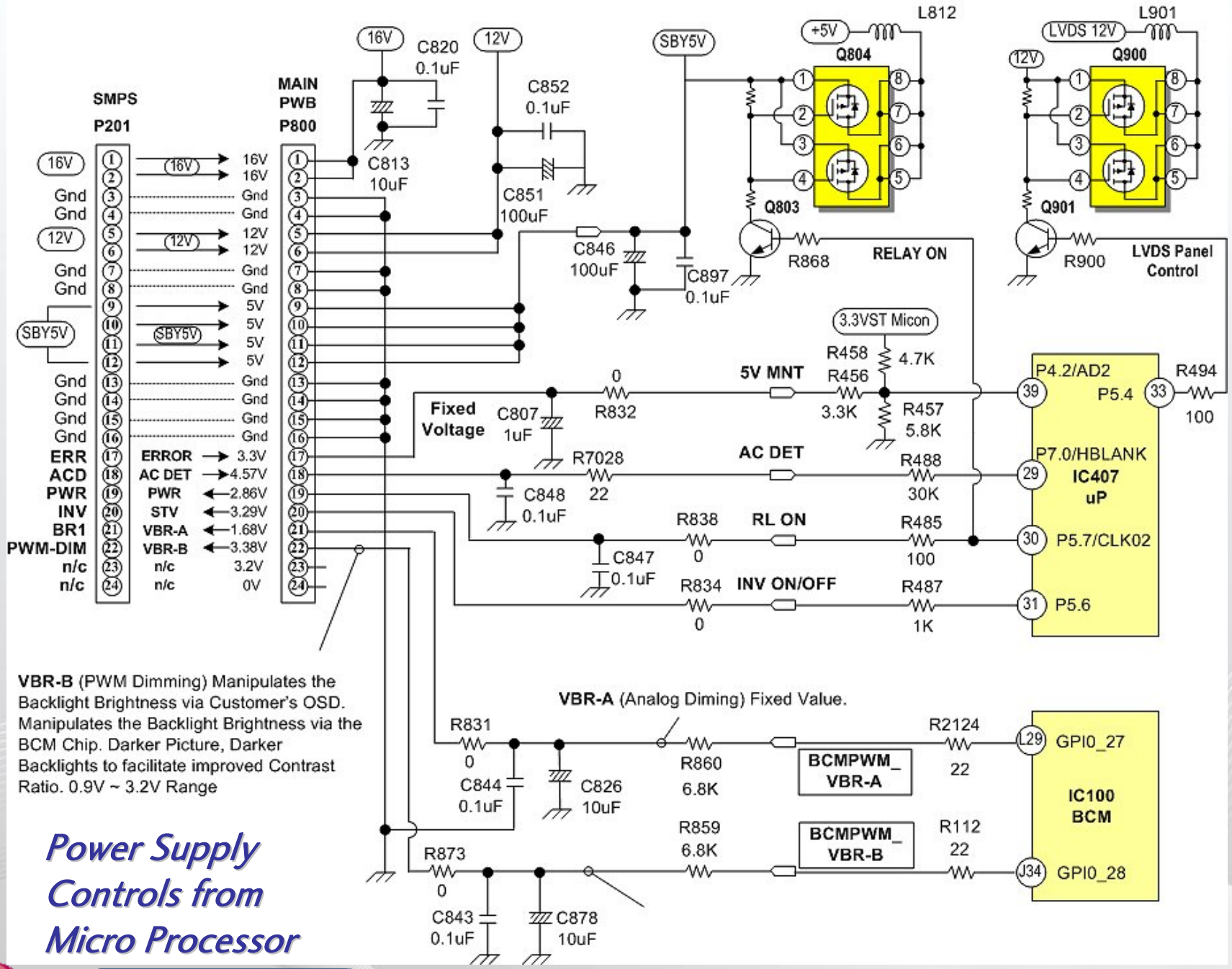


Power Supply (SMPS) PWB Layout



Power Supply turn on sequence from Micro Processor





Power Supply Controls from Micro Processor

Power Supply Troubleshooting

Ac voltage is supplied to the Power Supply at Connector SC100. AC Detect is generated and should be present at connector P201 pin 8 (5V). The AC input also generates a Hot Ground primary power supply that runs in two states, Stand-By (156V) and Run (386V) measured at Fuse F101. This primary voltage develops all other voltages that are output from the power supply. During Stand-By, the 5 Volt Standby should be present at connector P201, Pins 9,10,11 or 12. If Missing remove AC Power and unplug Connector P201, apply AC Power and recheck for presence of both 5 Volt Standby and AC Detect. Loss of either 5 Volt Standby or AC Detect would be a Power Supply Failure. Presence of 5 Volt Standby and AC Detect would be an indication of a failure on the Main Board. Suspect a possible short circuit loading the supply. **Remember to observe the Front Power Indicating LED this may save some time a lit LED indicates the Stand-By 5V voltage is present!**

The Main Board sends two commands to the Power Supply Board one being PWR the other is INV ON. These two voltages are used to control the power on turn on sequence. First via PWR (Pin 19) also known as RL ON activates the 24Volt to the Ballast and the 16 Volt and 12 Volt lines to the Main board. The 2nd command is INV ON. It passes through the Power Supply to the Ballast Board as a Lamp Lighting Command Signal.

If either command voltage (PWR or INV ON) is missing it will result in a no picture symptom. These voltages can easily be checked with the volt meter! Remove AC Power, unplug Connector P204, reapply AC Power and press the ON-OFF Button on either the Remote Control or Power Button on the Unit. Watch for the Power ON LED to change color from red to blue. This is an indication the PWR Signal was created on the the Main board. Check P800 or P201 pin 19 for the PWR command (2.8V) to the Power Supply. Check P201 for 16V (Pins 1 or 2) and 12V (Pins 5 or 6). Check P204 Pins 1,2,3,4 or 5 for the presence of the 24 Volt Supply. Confirm Pin 12 of P204 went to 3.3V. This is the INV ON signal needed to light the Lamps.

Problems with either voltage can be easily solved by following the simple steps on the next page.

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.

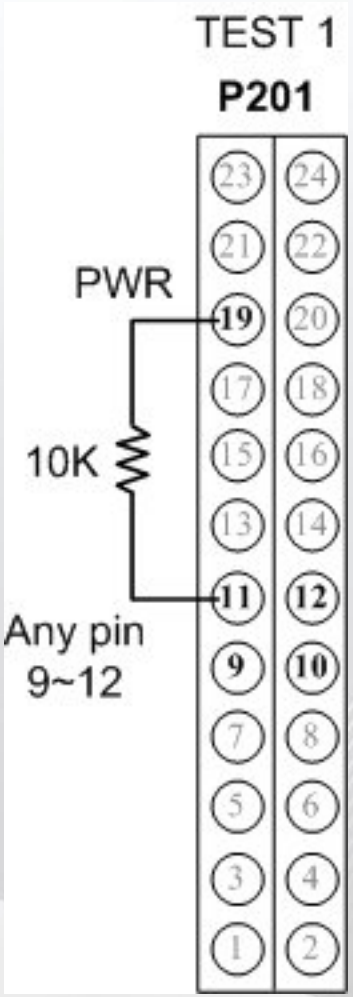
a) The SMPS PWB “MUST” be producing STBY 5V on either pin 9, 10, 11 or 12 (5V).
b) The SMPS PWB “MUST” be generating ACD (AC Detect).

If the conditions (a) or (b) above are not met, the SMPS PWB is defective and must be replaced. There is no need to continue with the test.

(c) Unplug P201 or P800 and P204 to the ballast.

TEST 1:

(2) Add a 10K resistor between (5V STBY) pin 9, 10, 11 or 12 and Pin 19 (PWR). Apply AC. This will turn on the power supply.
a) **Check that the 16V and 12V power supplies are turned on, P201 (16V pins 1 and 2) (12V pins 5 and 6)**
b) Check that the 24V on P204 pins 1~5 (Ballast Voltage) is turned on.
(3) Remove AC power. Reinsert the plug P204 to the ballast.



TEST 2 Power Supply PWB Backlights Test

P2 Connector disconnected from the Main PWB. Apply AC after adding jumper.

Continue if the 1st test was successful. Leave original 10K resistor in place.

(4) Add a jumper wire between Pin 20 (INV On/Off) to Pin 19 (PWB).

(5) Apply AC Power. This simulates a Power On and Backlight On command.

Observe the Backlights.

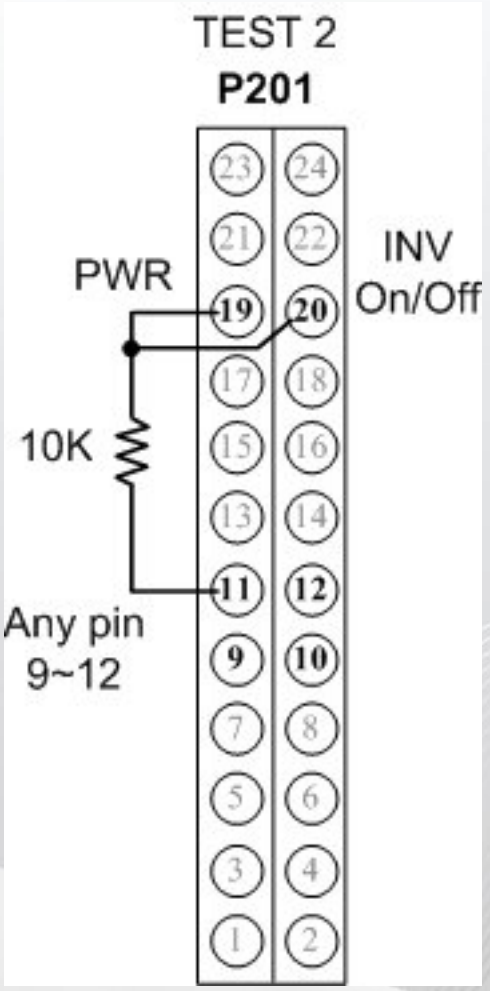
a) If normal, the backlights should turn on.

b) If only ½ the backlights light, (Right side or Left Side), confirm connectors are OK. If yes, panel defective.

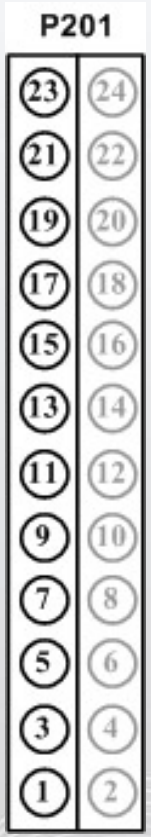
c) If no backlight activity, reconfirm the 24V is being generated and output on P204 connector Pin 1~5. If not, unplug P204 and recheck. If not SMPS is defective. If yes, Ballast is loading down the 24V line.

d) Confirm the INV On/Off line Pin 12 is going to 3V.

NOTE: Pin 11 and 12 on P204 or Pin 12 and 13 on P201 (ADIM/PDIM) must be above 1V or the backlights will be extremely dim. This is controlled by the Customer's OSD settings. 0% (0.9V) to 100% (3.3V). Manipulated by the BCM Chip. (Video Processor)



Power Supply Connector P201 Voltage and Resistance



P201 Odd "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
1	16V	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	ERR	0V	0V	0V
19	PWR	0V	2.8V	1.6V
21	[1]ADIM	0V	1.7V	0V
23	SEL	0V	0V	0V

[1]ADIM Pin 21 Fixed and not used

P201 Even "SMPS" to P800 "Main PWB"

Pin	Label	STBY	Run	Diode Check
2	16V	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	0V	3.2V	0V
22	[2]PDIM	0V	1.4V	0V
24	SYNC	0V	0V	0V

[2]PDIM Pin 22 can vary according to type of signal being processed, OSD Backlight setting. 0.9V 0% to 3.3V 100% and the Intelligent Sensor. Output from the BCM chip.

Diode Mode values taken with all Connectors Removed

Power Supply Connector P204 and SC100 Voltage and Resistance

P204 MCN1 "SMPS" to MCN1 "BALLAST"

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	On/Off	0V	3.2V	OL
13	*PWM-DIM	0V	1.4V	OL

SC100 "SMPS" to AC IN

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

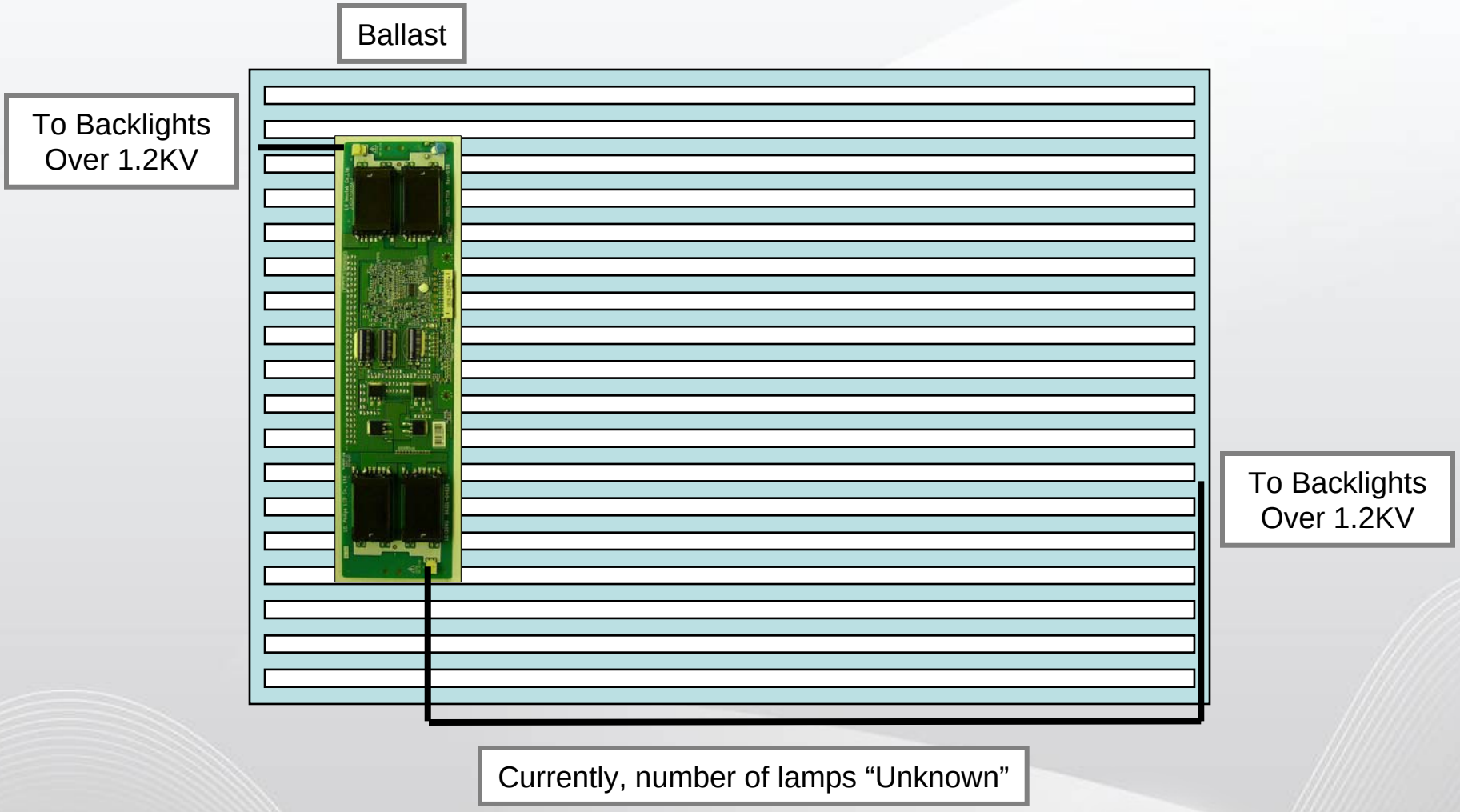
READING FROM PIN 1 TO PIN 2 for STBY and RUN voltages.

[1]BR1 (ADIM Pin 21) Fixed and not used

[2]PWM-DIM (PDIM Pin 22) can vary according to type of signal being processed, OSD Backlight setting. 0.9V 0% to 3.3V 100% and the Intelligent Sensor. Output from the BCM chip.

Diode Mode values taken with all Connectors Removed

General Backlight Information



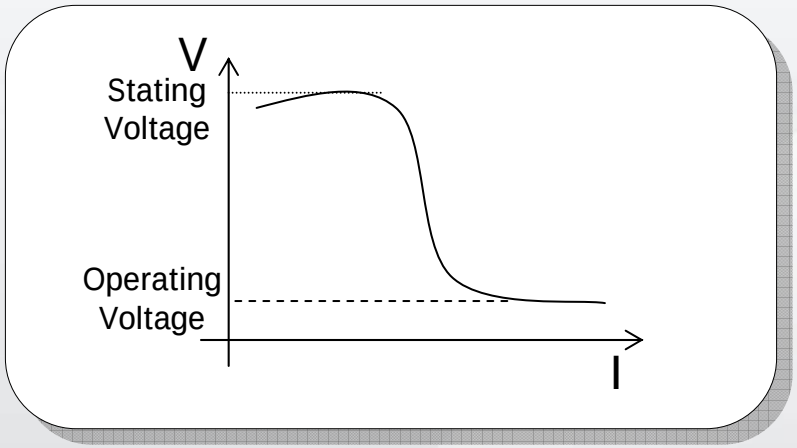
EEFL (External Electrode Fluorescent Lamp)

LOW COST Large number of lamps driven by a single inverter

Introducing EEFL

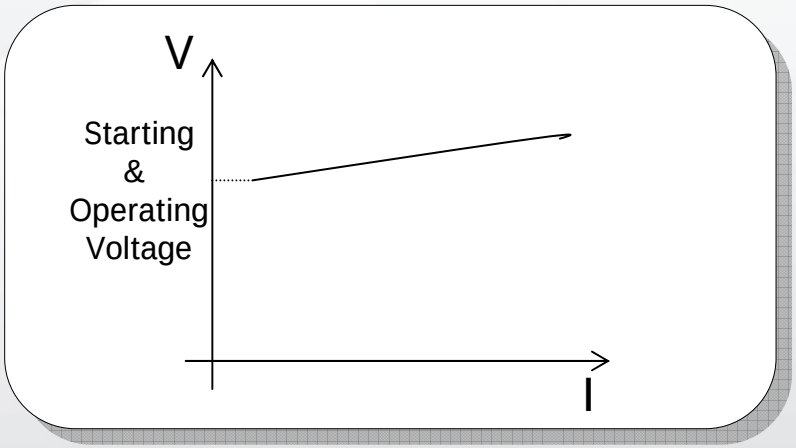
Simple structure, Low price

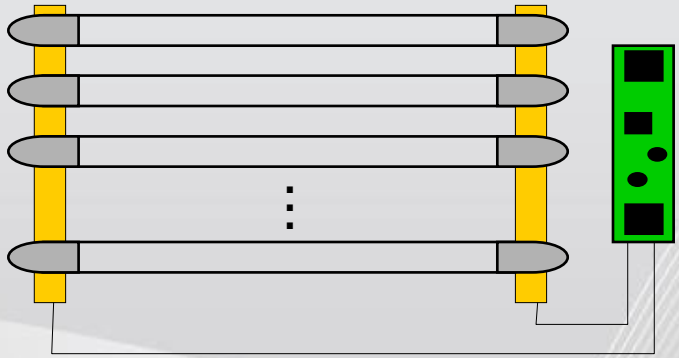
CCFL (Cold Cathode Fluorescent Lamp)



Complicated structure

EEFL (External Electrode Fluorescent Lamp)





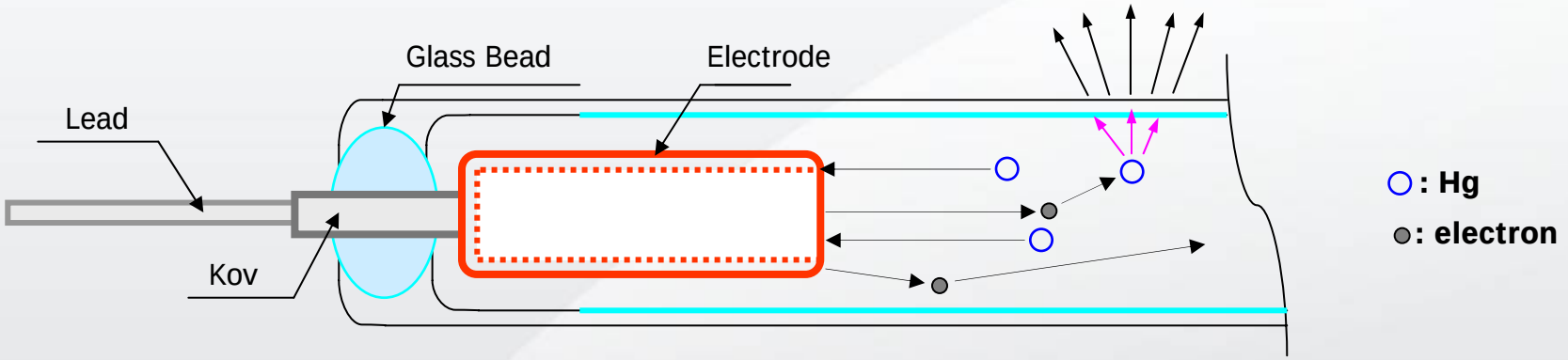
Simple structure
Lamp manufacturing process
Lamp assembly structure

Low Cost
Large number of Lamp
Drive by single inverter

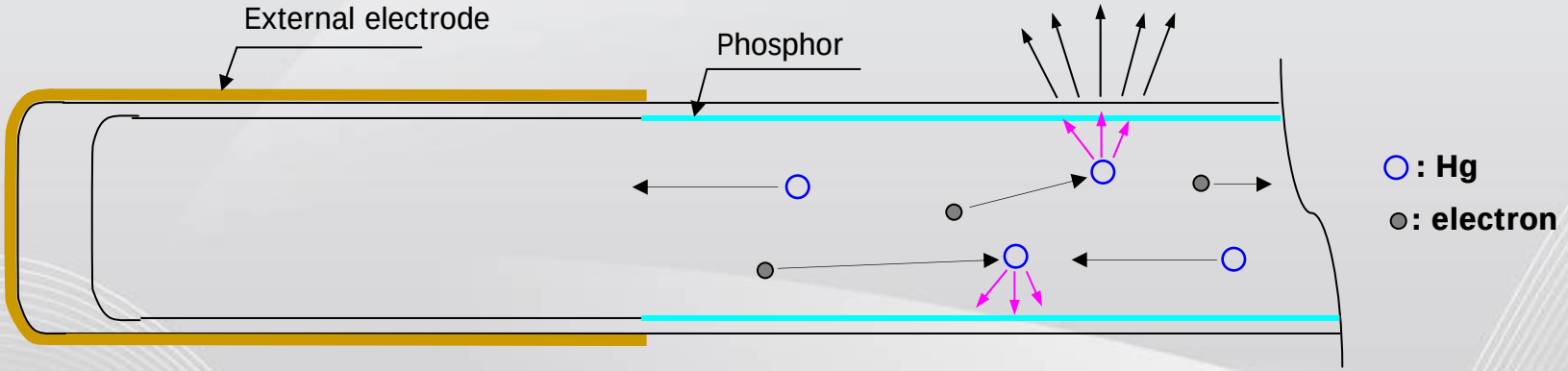
Introducing EEFL Contacts (Bulb Design)

Key: Long Life Time

CCFL (Cold Cathode Fluorescent Lamp)



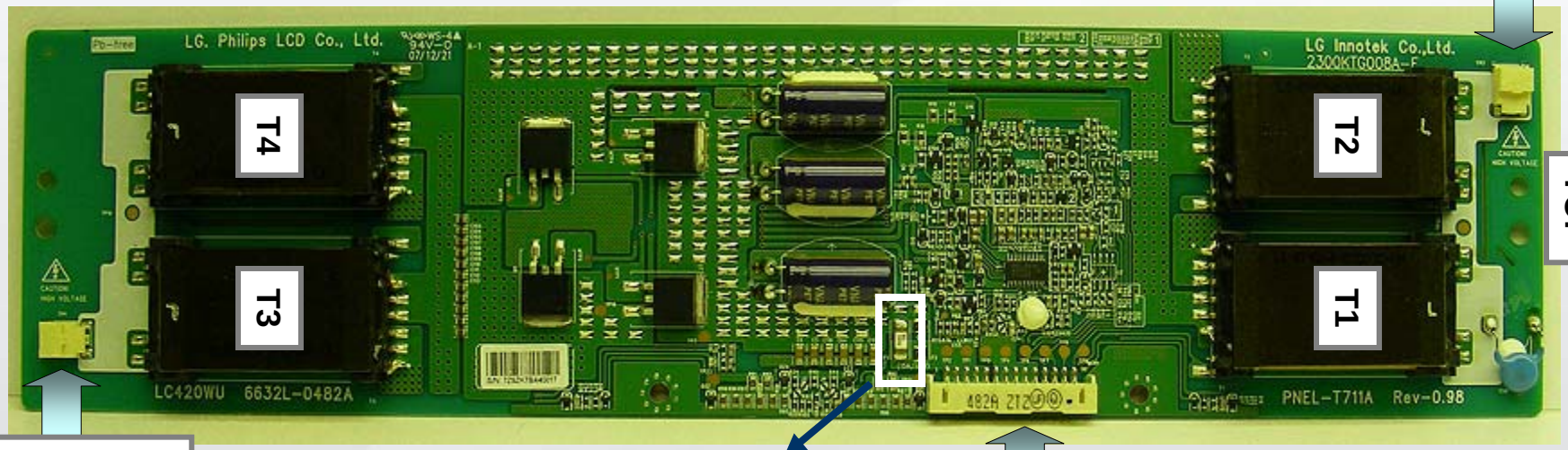
EEFL (External Electrode Fluorescent Lamp)



- 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

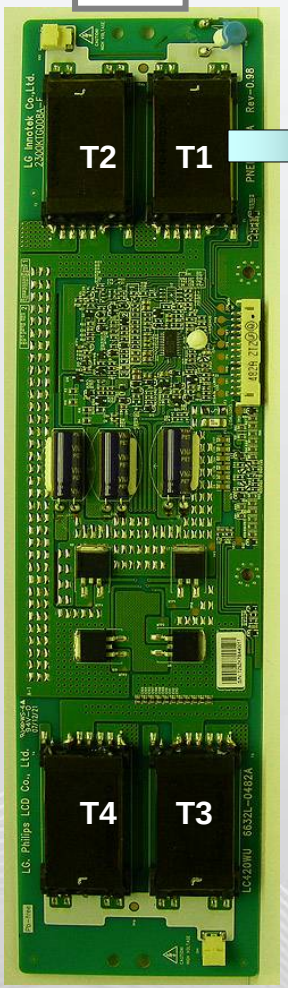
Ballast PWB Layout

BALLAST p/n EAY56798701



Ballast PWB Transformer Check

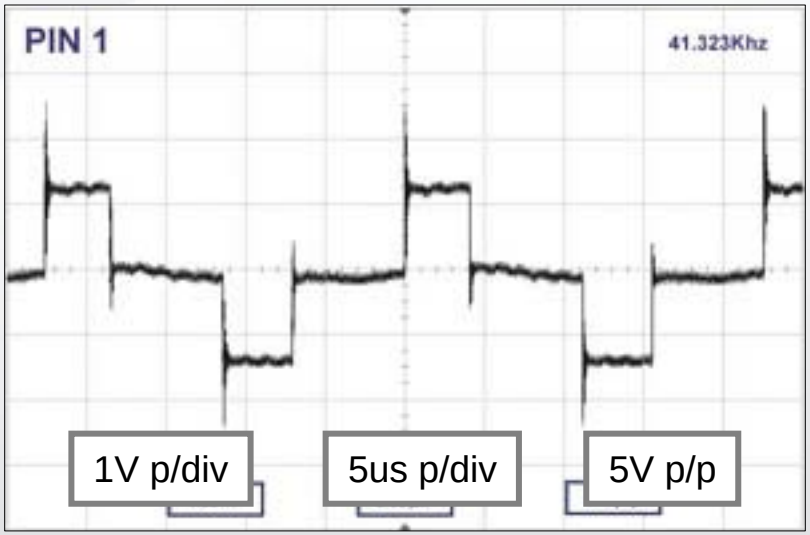
TOP

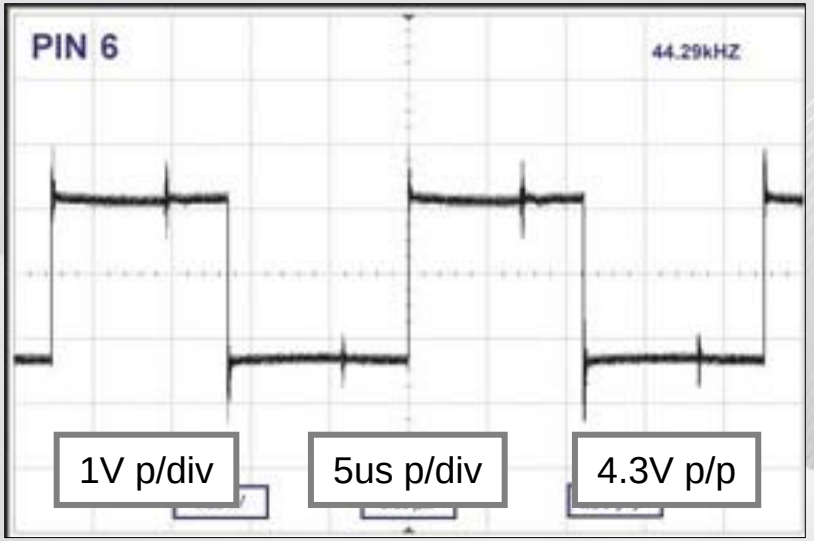


Caution: Over 1.2kV

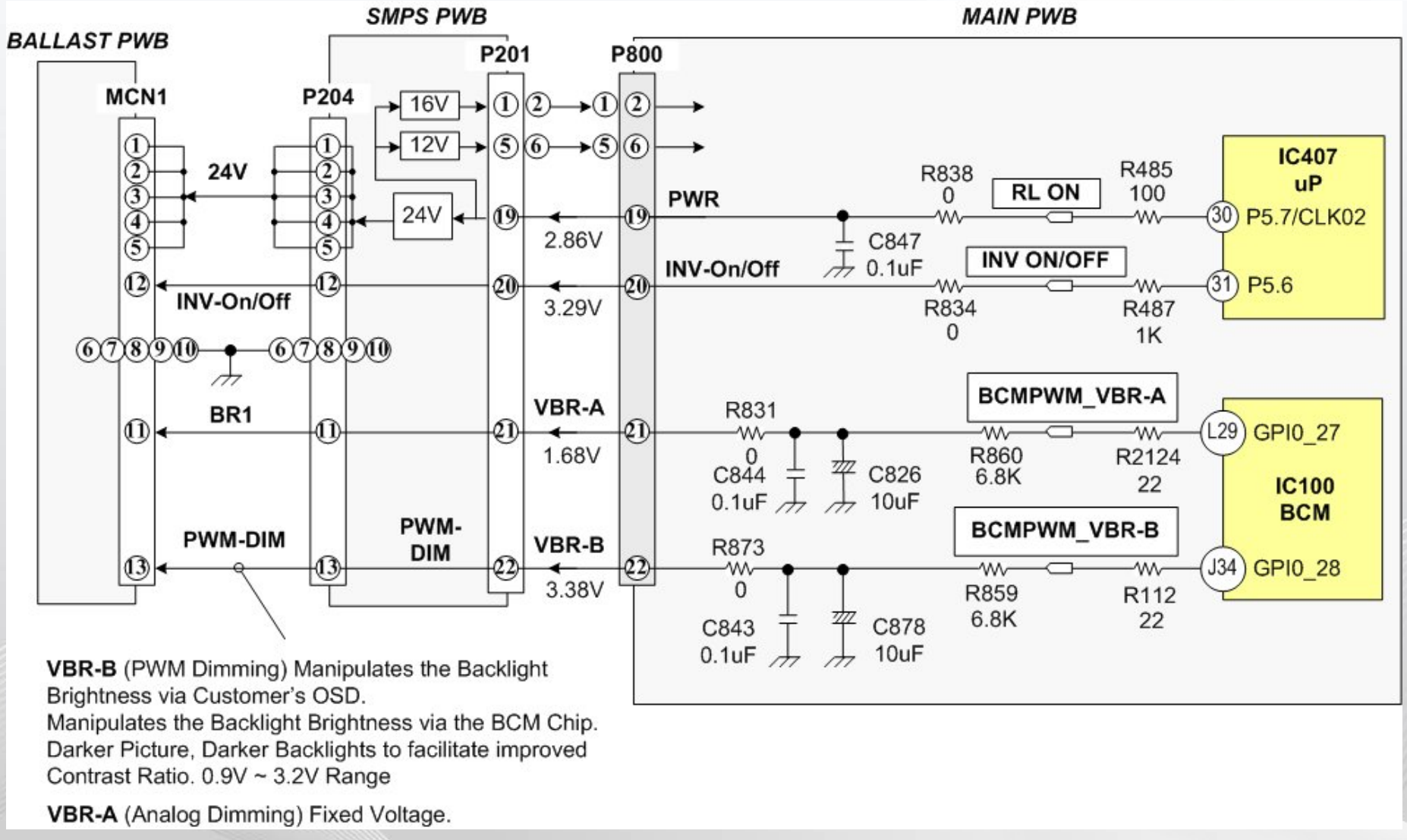
1 2 3 4 5 6 7

ANY TRANSFORMER PRIMARY SIDE WAVEFORM CHECK





Ballast Control Signals Circuit Diagram

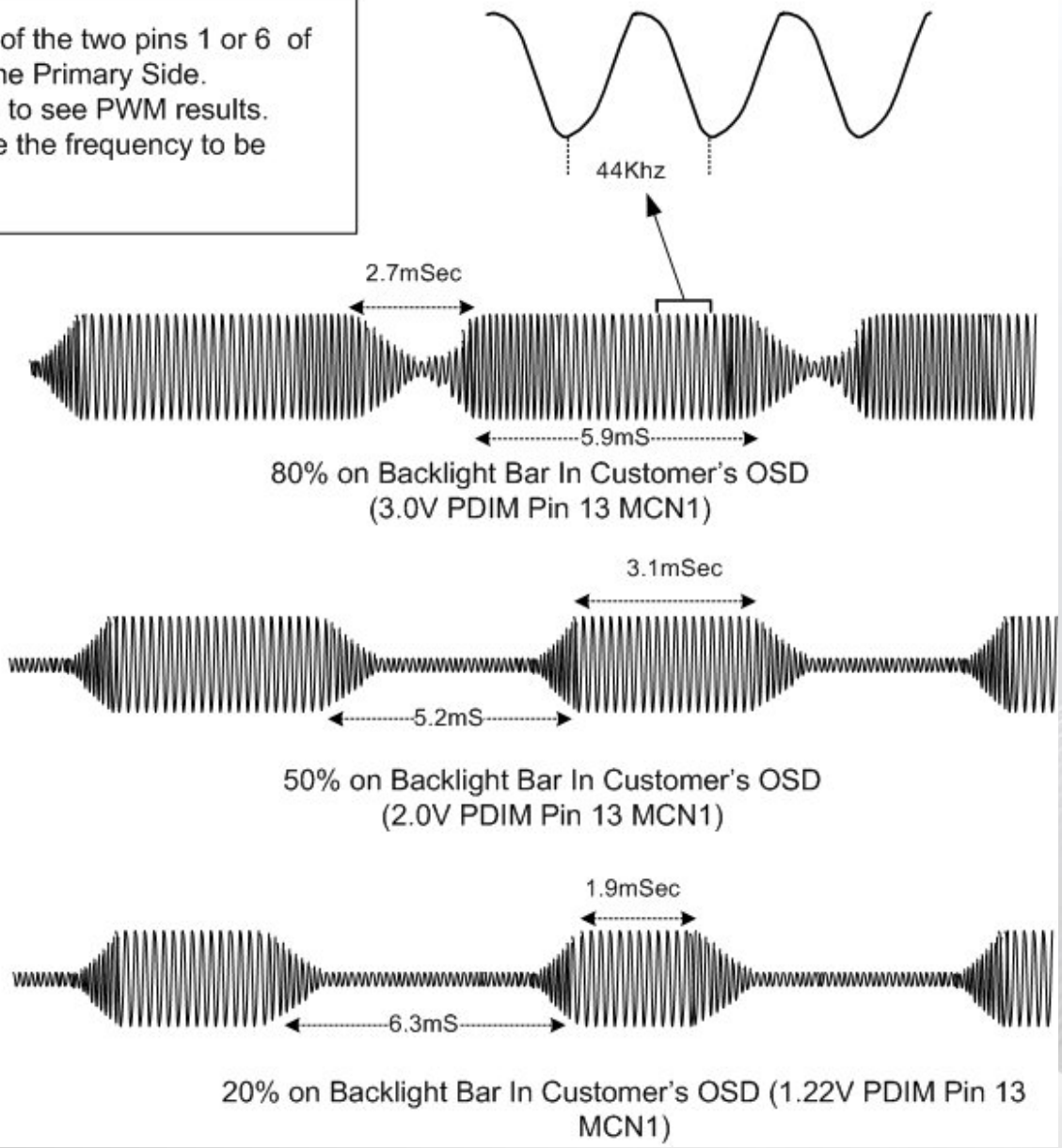


VBR-B (PWM Dimming) Manipulates the Backlight Brightness via Customer's OSD.
Manipulates the Backlight Brightness via the BCM Chip.
Darker Picture, Darker Backlights to facilitate improved Contrast Ratio. 0.9V ~ 3.2V Range

VBR-A (Analog Dimming) Fixed Voltage.

Power Supply Backlight Drive Signal Effects

Waveform taken from either of the two pins 1 or 6 of the Ballast Transformer on the Primary Side.
Slow scope setting to 2.5mS to see PWM results.
The PWM amount can cause the frequency to be measured differently.

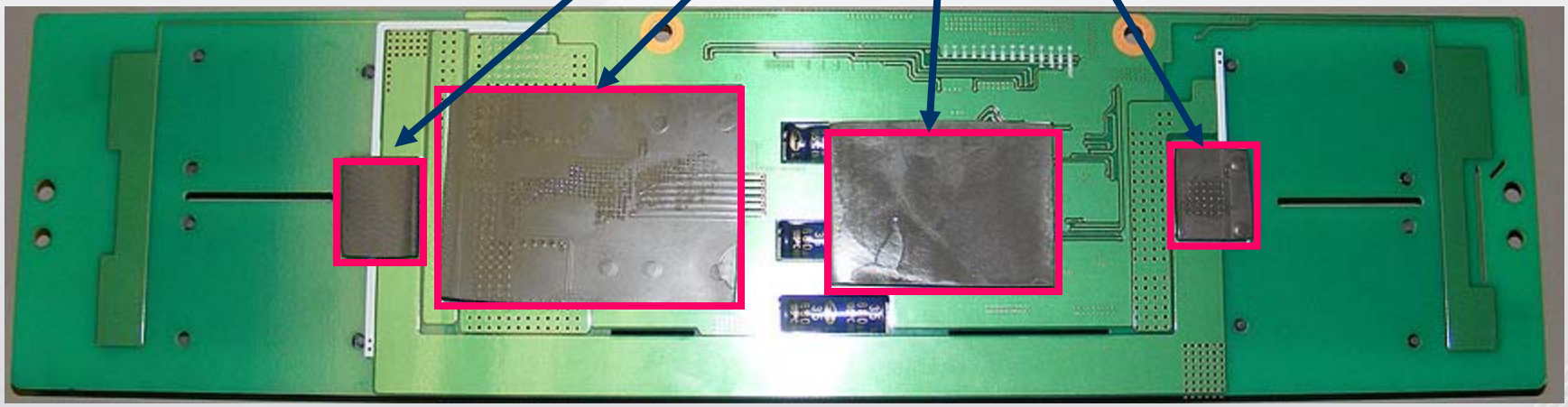


VBR-B
PWMDIM manipulates the Burst Triangle Oscillator in the ballast drive IC.

VBR-A
BR1 (ADIM) also manipulates the Burst Triangle Oscillator But it is not used.

Ballast PWB Layout Back View (RF Noise Dampening Pads)

RF NOISE DAMPENING AND HEAT TRANSFER MATERIAL PADS. MAKE SURE TO SAVE THESE IF REPLACING THE BALLAST.



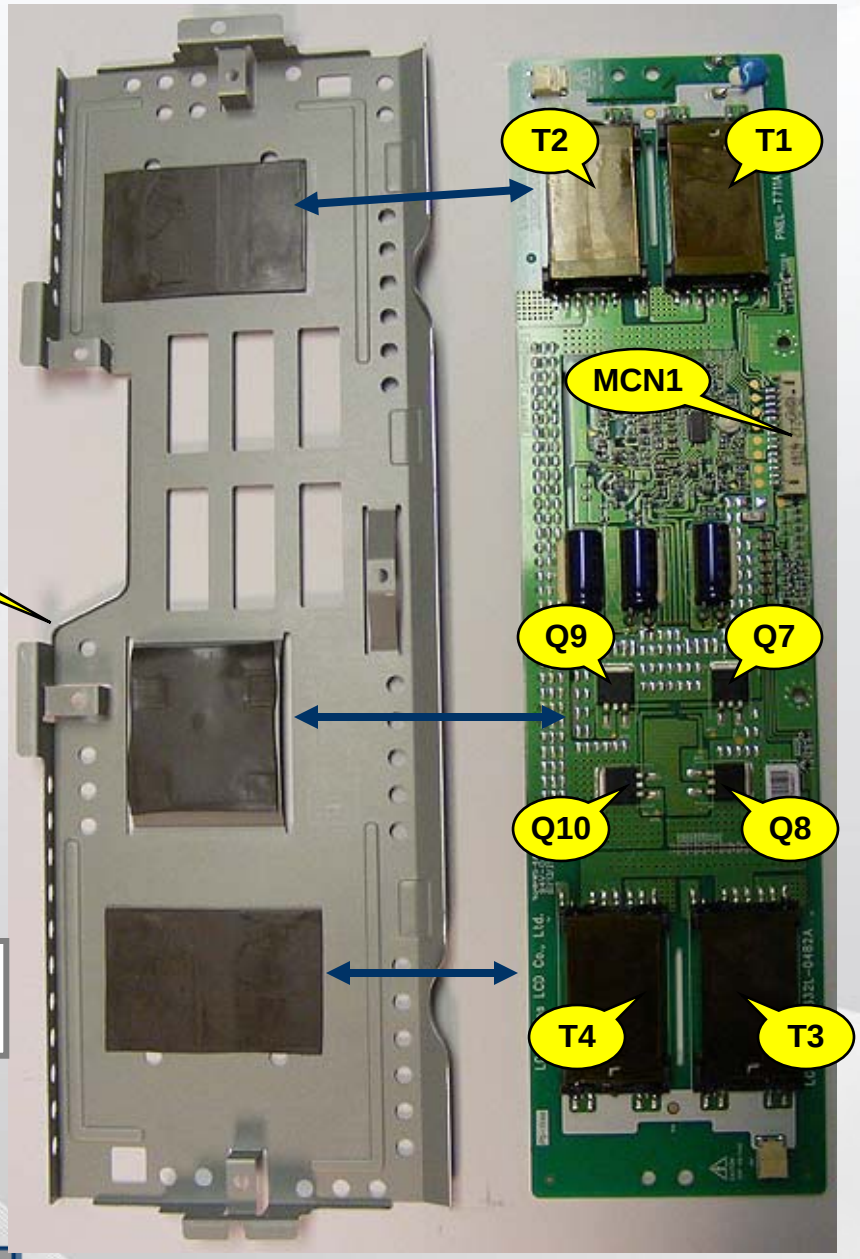
There is a white box outlined on the PWB silk screen indicating where the Chocolate goes.

Ballast PWB and Shield (Heat Transfer and RF Insulation Material Pads).

Insulates and Heat Transfer for T1 and T2

Insulates and Heat Transfer for Q7, Q8, Q9 and Q10

Insulates and Heat Transfer for T3 and T4



RF NOISE DAMPENING AND HEAT TRANSFER MATERIAL PADS. MAKE SURE TO SAVE THESE IF REPLACING THE BALLAST.

MAKE SURE THEY ARE PLACED IN THE CORRECT LOCATION BEFORE REINSTALLING THE SHIELD.

Ballast Connector MCN1 Voltage and Resistance

Diode Mode values taken with all Connectors Removed

MCN1 "Ballast" to P204 "SMPS"

Pin	Label	STBY	Run	Diode Check
1	**VIN**	0V	24V	OL
2	**VIN**	0V	24V	OL
3	**VIN**	0V	24V	OL
4	**VIN**	0V	24V	OL
5	**VIN**	0V	24V	OL
6	**Gnd**	Gnd	Gnd	Gnd
7	**Gnd**	Gnd	Gnd	Gnd
8	**Gnd**	Gnd	Gnd	Gnd
9	**Gnd**	Gnd	Gnd	Gnd
10	**Gnd_1**	Gnd	Gnd	Gnd
11	**[1]VBR_A**	0V	1.7V	OL
12	**On/Off**	0V	3.2V	OL
13	**[2]VBR_B**	0V	1.4V	OL
14	**ERROR-OUT**	0V	0V	OL

[1]VBR-A Pin 11 Fixed and not used

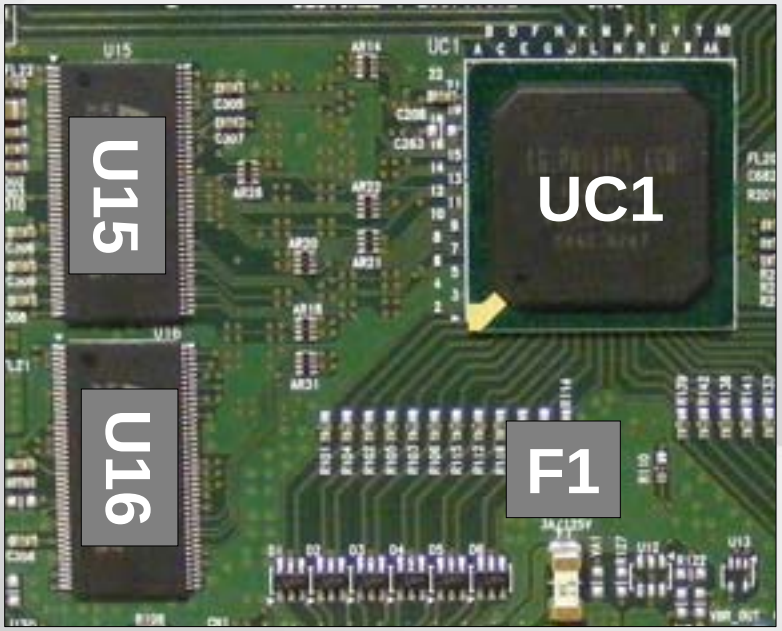
[2]VBR-B Pin 13 can vary according to type of signal being processed, OSD Backlight setting. 0.9V 0% to 3.3V 100% and the Intelligent Sensor. Output from the BCM chip.

LCD Controller Board

The T-Con IC UC1 receives from the Main Board at CN1 and CN2 Quadruple 12 Bit LVDS Signals which it processes into TFT Drive Signals which through connectors CN4 and CN5 controls the LCD Panel. IC's U15 and U16 are "Dynamic Ram IC's which are High Speed Storage Devices used to store the data until it is time to be addressed. 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.

Next 2 Slide gives greater layout details

LG Philips LCD Drive IC



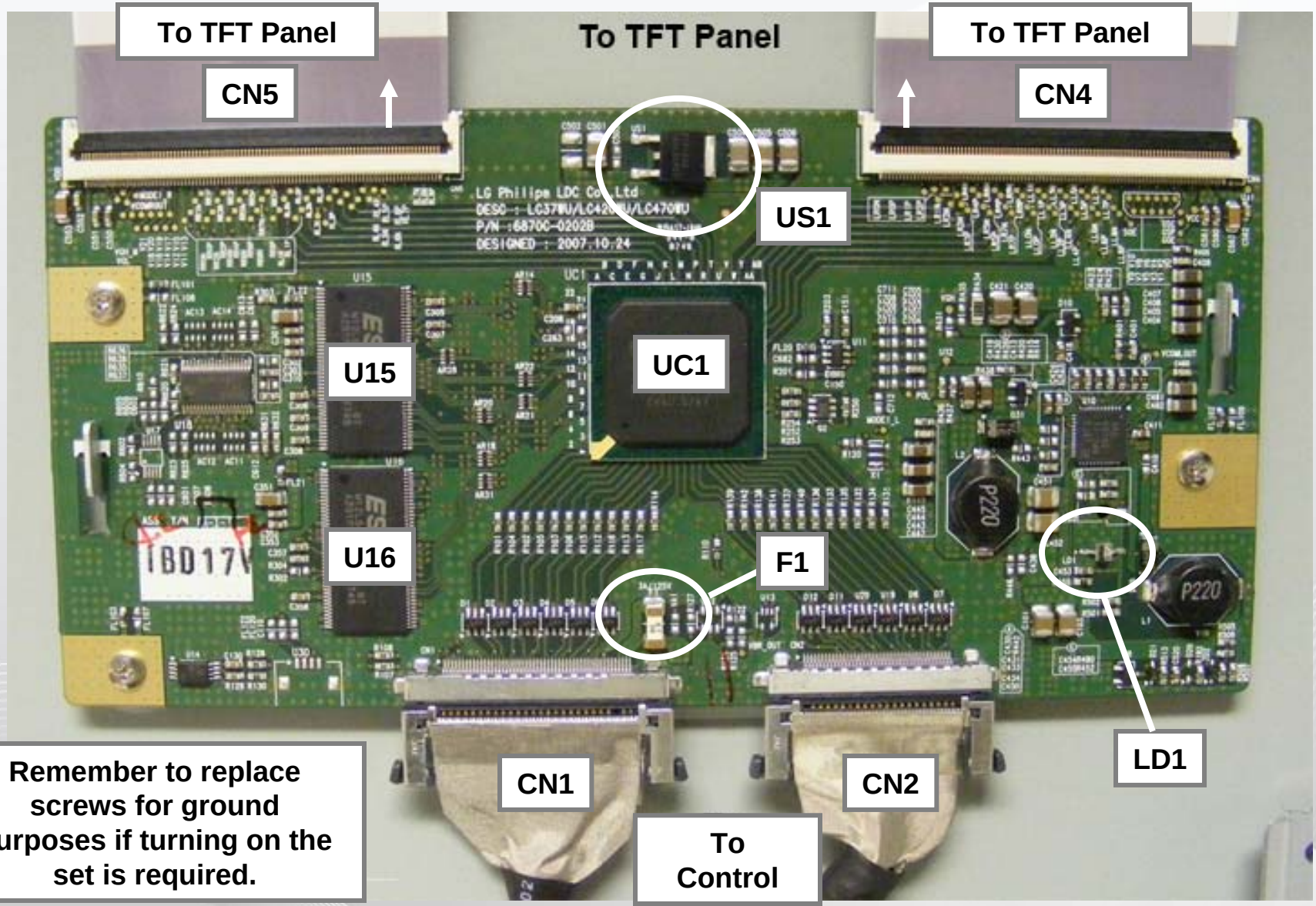
T CON IC TL22970D

T-CON (TFT DRIVE) PWB WITH SHIELD

Two LVDS feeds from Main PWB

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

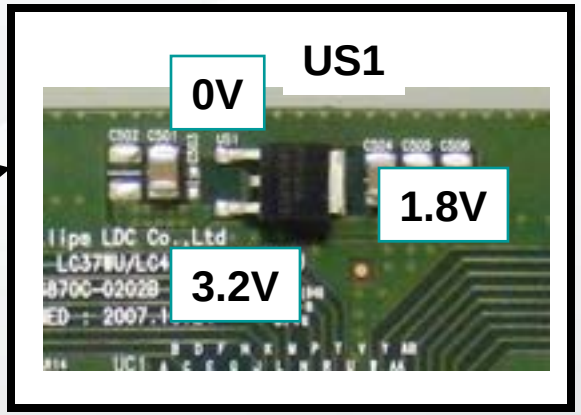
T-CON p/n EAT56803001

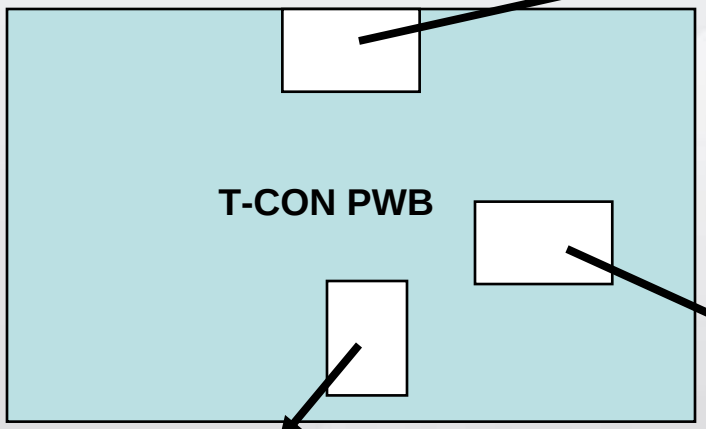


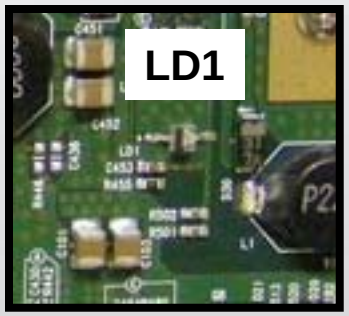
Remember to replace screws for ground purposes if turning on the set is required.

T-CON (TFT Drive) PWB Checks

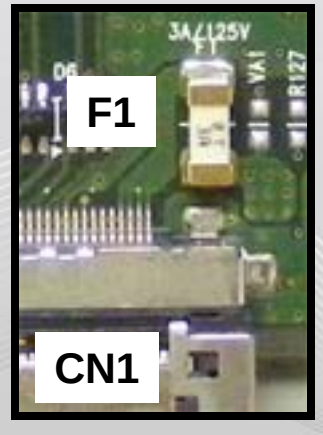
Check the Regulator US1 for Correct Voltage







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 go out shortly after backlights illuminate if all is OK.



Check Fuse F1 for 12V

Power Off	Power 1st On	Power On
Anode 0V	Anode 11.6V	Anode 11.6V
Cathode 0V	Cathode 0V	Cathode 9.5V
LED OFF	LED ON	LED OFF

Input Signal Processing

The Broadcom or BCM Chip IC1000 is the main signal processor and is responsible for :

- ATSC, NTSC, and QAM reception and processing
- RS 232 service only Port (software upgrades and home theater environment).
- Wired Remote Port
- (2) Component Inputs Y, Pr, Pb and Audio L R
- (3) HDMI Inputs (back) (1) HDMI (Side Input)
- RGB PC
- USB (Side Input) (software upgrades using flash drive)
- AV Composite
- SIF and SAP

Output Signals

- Quadruple 12 Bit LVDS to the T-CON Board
- Audio output signals to the Speakers
- Digital Audio Output Coaxial and Optical
- ON OFF Controls to the SMPS turning on low voltage generation and Backlights
- Backlight intensitiy control signals

Main PWB Micronas IC1000 Chip Overview

The Main PWB contains the **MICRONAS** chip IC1000.
This IC is a Full-HD Rate Converter with Motion Blur Removal and Film De-Juddering for 1080p 100/120 Hz LCD panels.

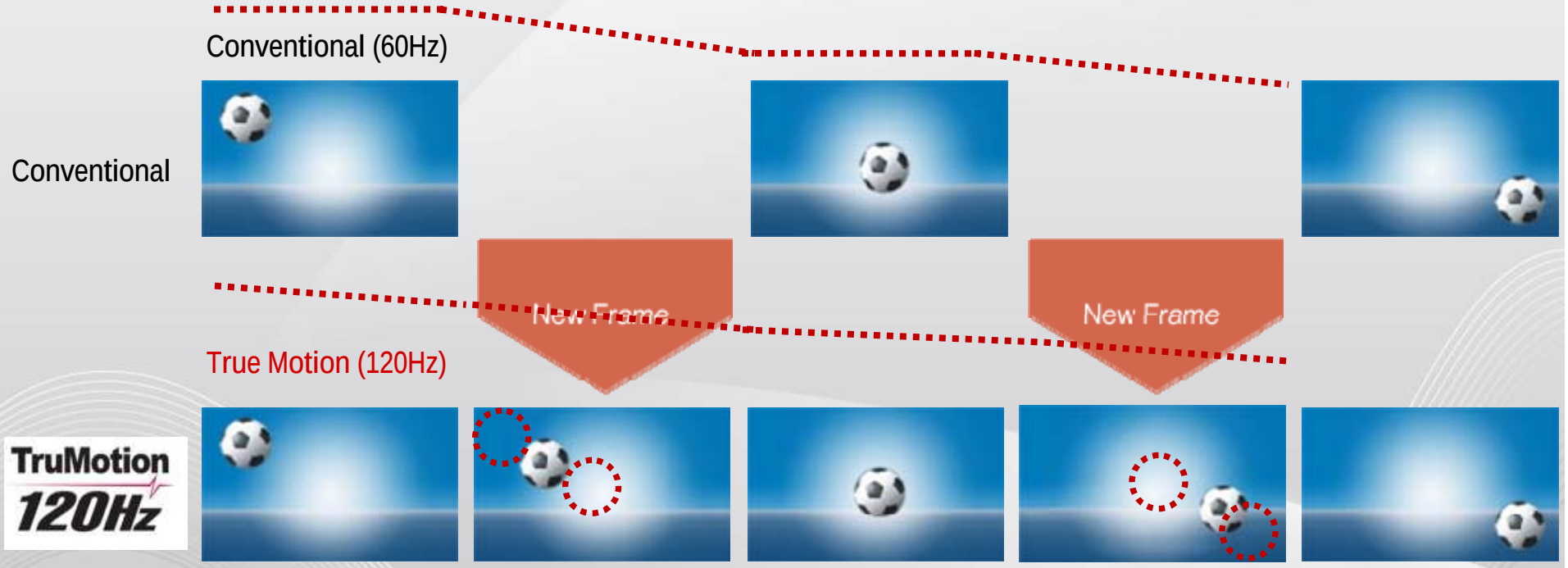
- **Vector Based Motion Compensation with Frame Rate Conversion (eliminates the need for 3:2 Pull Down)**
- **Internal Dual 10 bit LVDS input**
- **Quadruple 12 bit LVDS output**

Motion Blur Removal increases the video frames by Interpolating a new image frame between each original frame (Motion Estimated Data Insertion) **MEDI.**

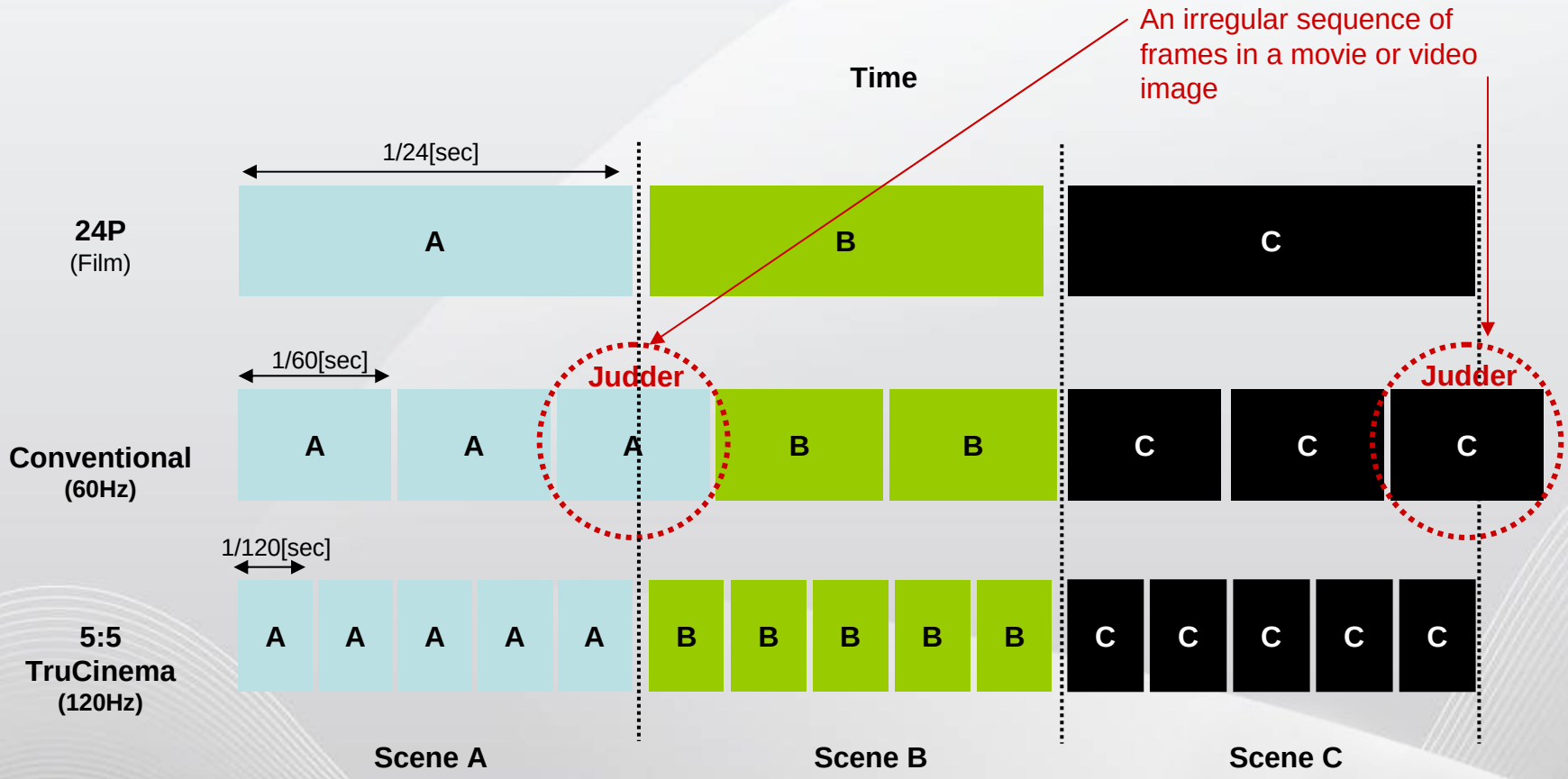
Juddering is a phenomenon which appears on film based programming due to the 24 frames per second system used for recording, the picture develops visual artifacts when converted to 60 frames per second. 3:2 Pull Down was developed to eliminate this problem. Frame Rate Conversion (Real Cinema) eliminates the need for 3:2 Pull Down.

TruMotion 120Hz (Vector Based Motion Compensation)

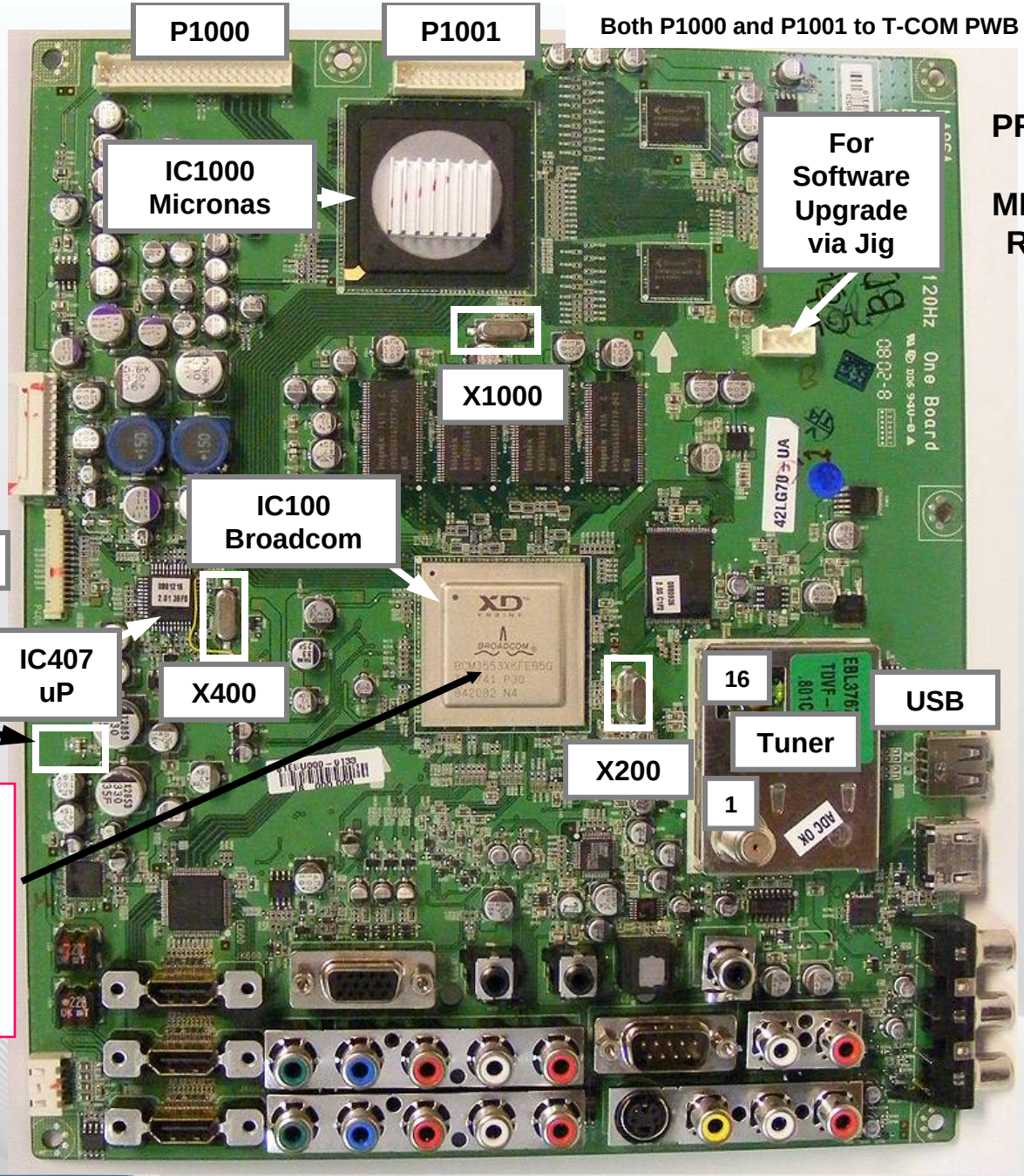
TruMotion 120 Hz can reduce blurring on fast moving scenes. TruMotion carefully analyses the picture signal by using advanced algorithms to automatically calculate a new image frame between each original frame (MEDI).



Frame Rate Conversion eliminates the need for 3:2 Pull Down Conversion



Main PWB Layout



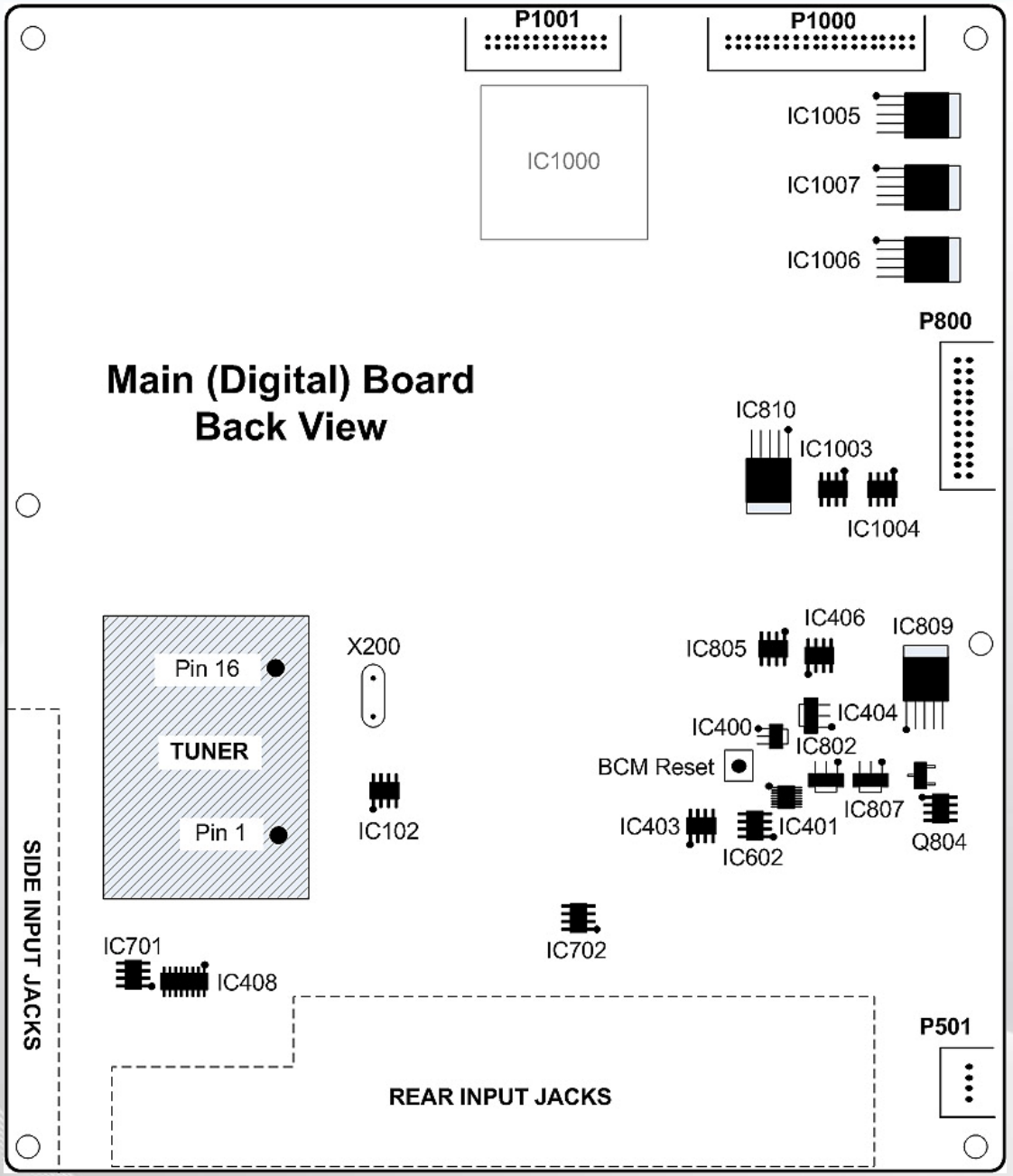
VIDEO PROCESSOR BCM IC100 and MICRONAS IC1000 RUNS HOT, THIS IS NORMAL.

If odd Video problems are found, use some freeze spray around IC100/IC1000 and its circuits, If video returns to normal, PWB needs to be replaced.

Look carefully on top and behind the BCM IC and Micronas IC for Chocolate (Heat Transfer) material.
Be sure to transfer to new PWB if replaced.

Main PWB (Back View)

Voltages given on the 11X17 foldout "Interconnect Diagram"



Main PWB (Front Side Regulators)

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

Main PWB (Back Side Regulators) Slide 1

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			

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

Main PWB (Back Side Regulators) Slide 2

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

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

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 Power-CTL 2.6V
Pin 3	Gnd	Gnd	Gnd
Pin 4	n/c	3.3V	ADJ
Pin 5	Gnd	5V	Output

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

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

Main PWB (Back Side Regulators) Slide 3

IC702	STBY	RUN	Label
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

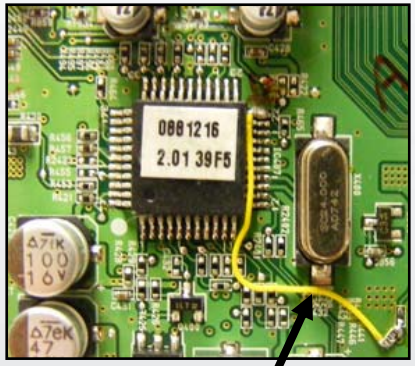
IC1005	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	3.4V
Pin 3	0V	0V
Pin 4	0V	1.4V
Pin 5	0V	1.2V

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

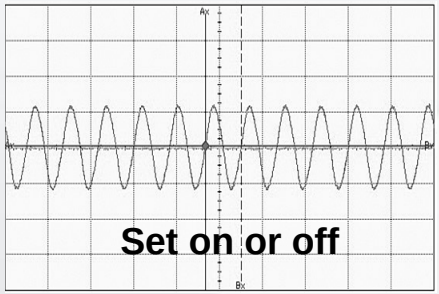
Main PWB X400 X200 and X1000 Check

Microprocessor Crystal

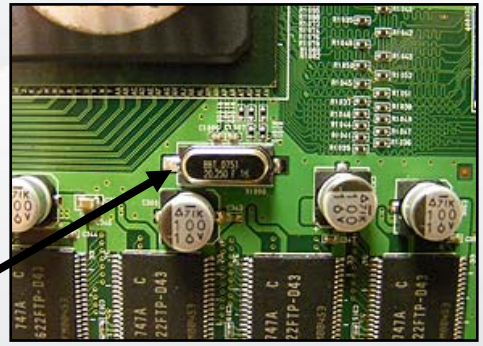


X400

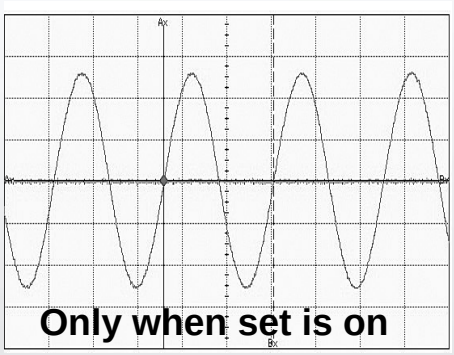
2.4Vp/p
24Mhz



X1000

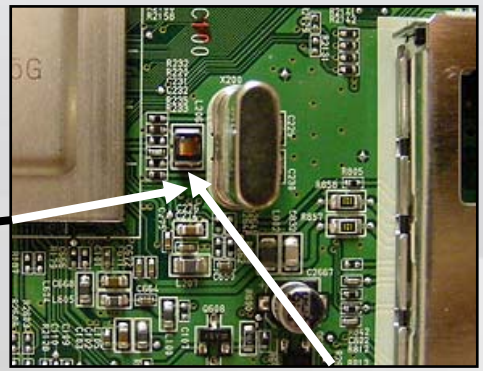


1Vp/p
20.25Mhz

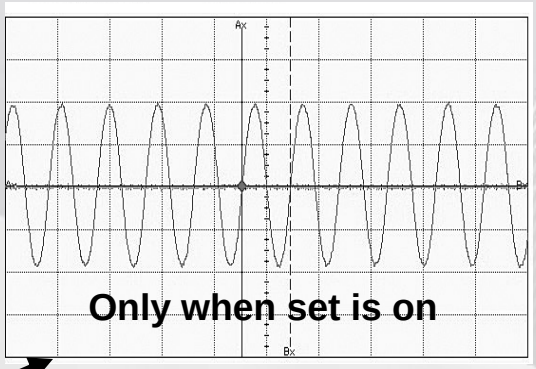


Micronas Crystal

X200



780mVp/p 54Mhz



X1000 Location

X400 Location

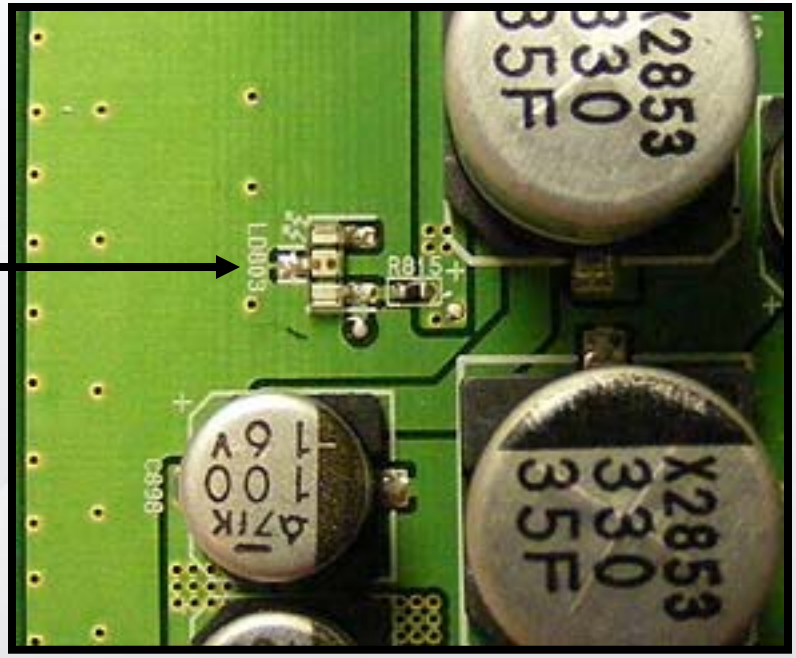
X200 Location

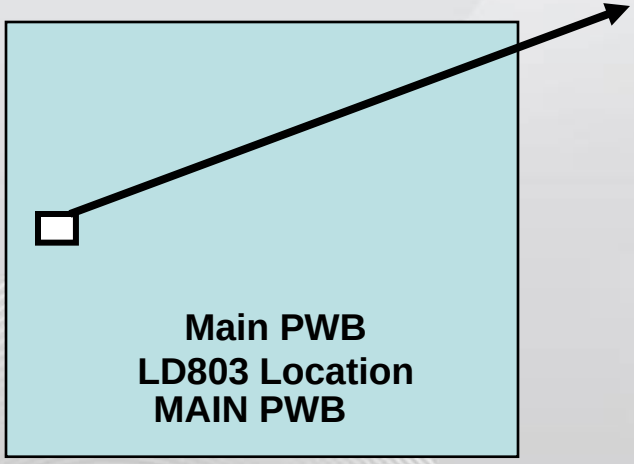
MAIN PWB

Video Processor (BCM) Crystal

Use bottom of L206

Main PWB LD803 Function



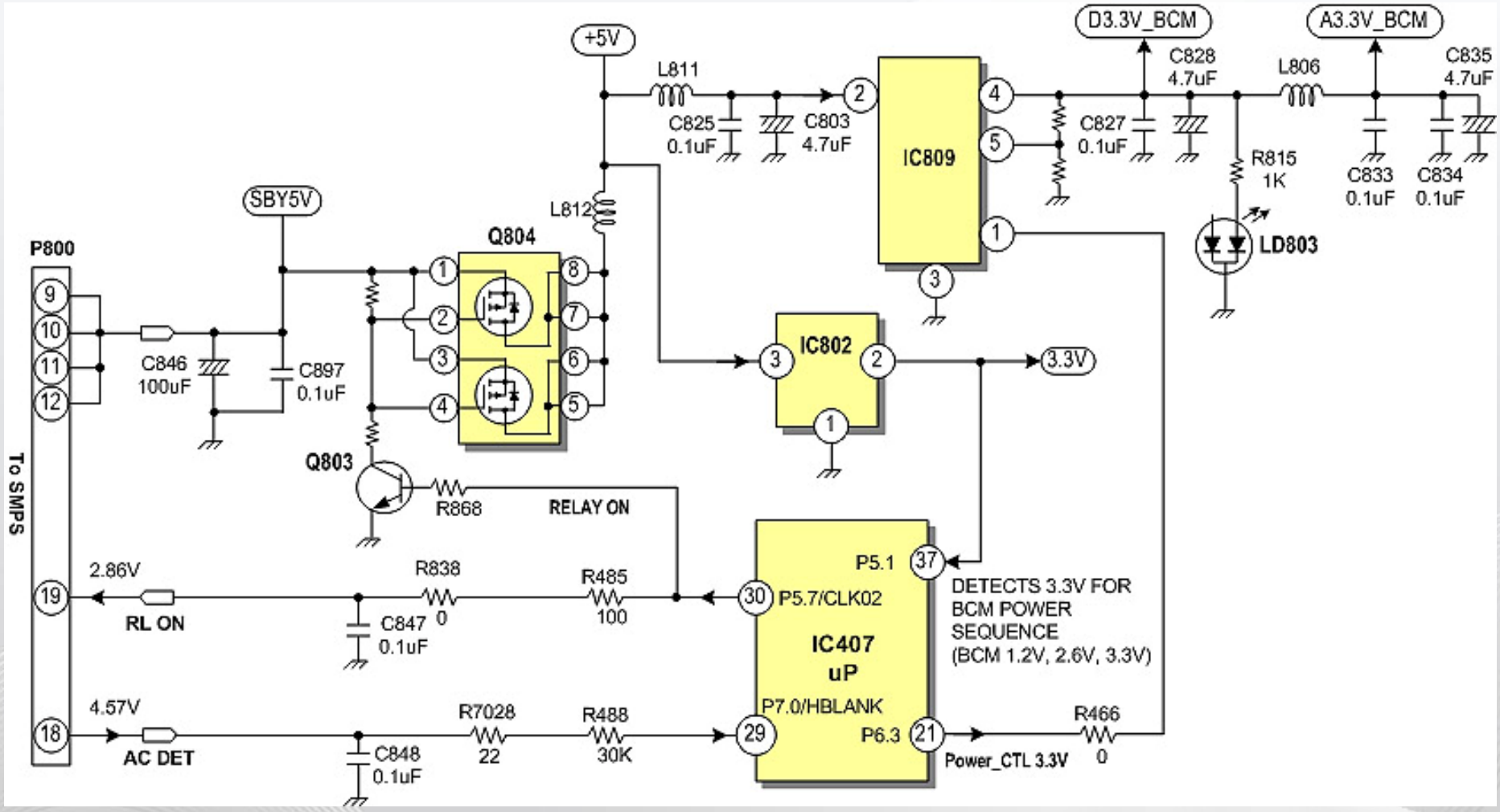


Use LD803 as a visual aid.
This lets you know if the +5V is being converted to 3.3V for the BCM chip IC100.
If LD803 is illuminated GREEN, +3.3V is OK.

Note: Only ½ of the dual LED is used.

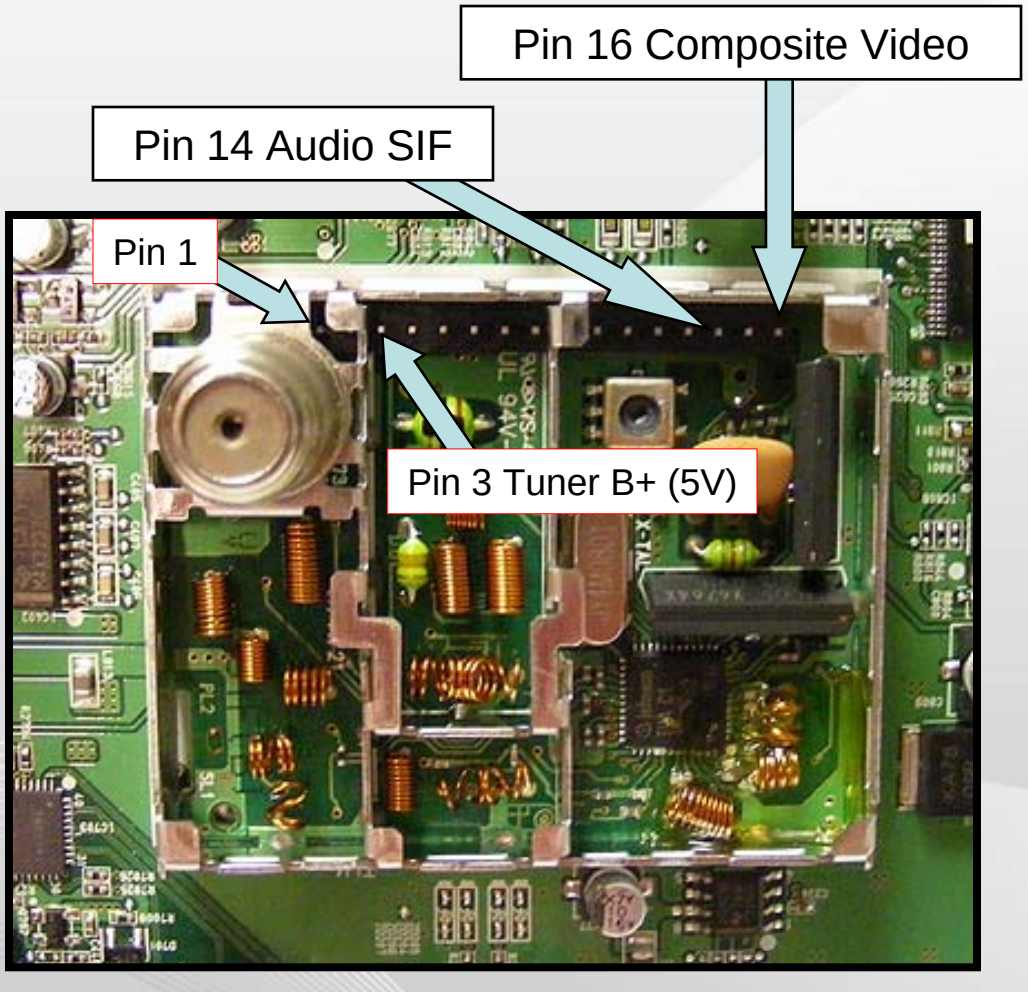
Circuit turning on LD803 shown on next slide

Main PWB LD803 Circuit Details



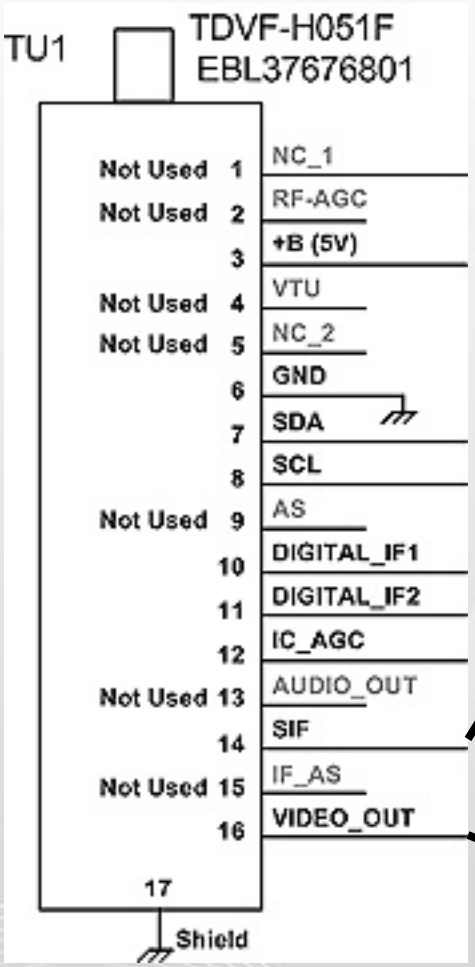
Main PWB Tuner Video and SIF Output Check Pin Location

For Easy Access, pop the shield off the tuner



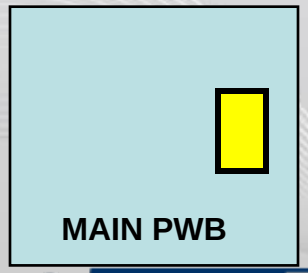
If you leave the shield on you can still access the same pins.
Be careful not to accidentally ground out your test lead on the shield.
(Note: This is a picture from a different model, but the concept is the same)

Main PWB Tuner Video and SIF Output Check



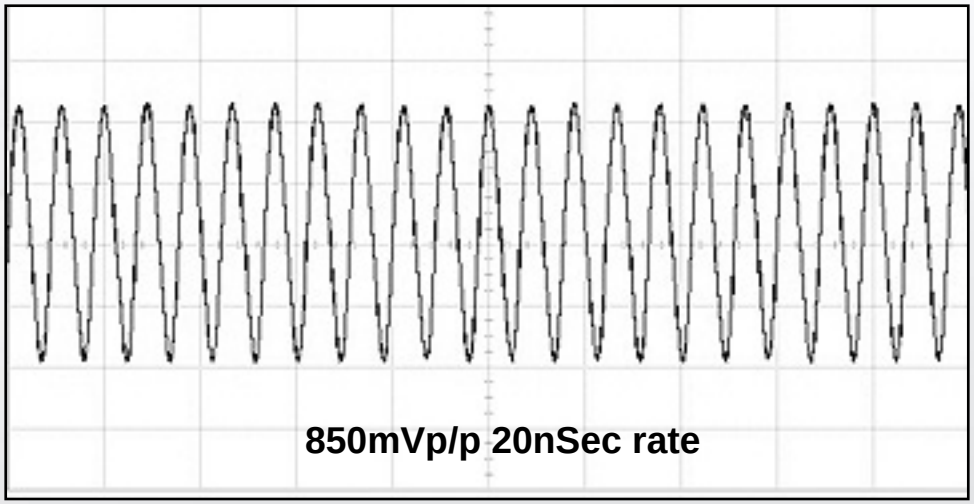
Pin 14 "SIF" Signal

Pin 16 "Video" Signal

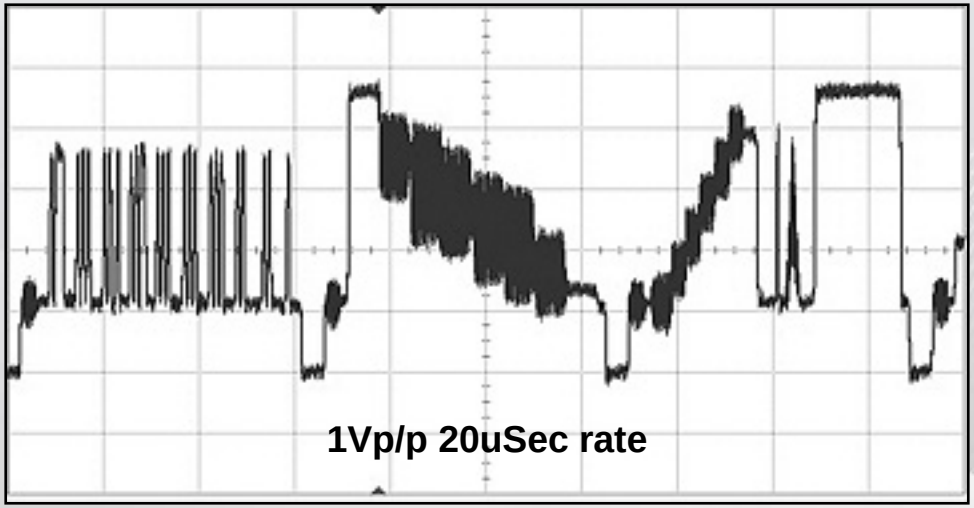


Tuner Location

USING SMTE COLOR BAR SIGNAL INPUT



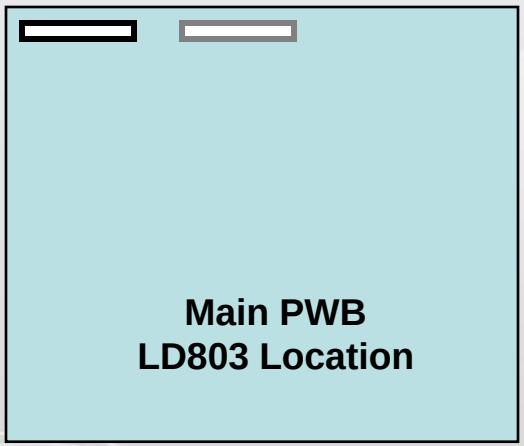
850mVp/p 20nSec rate



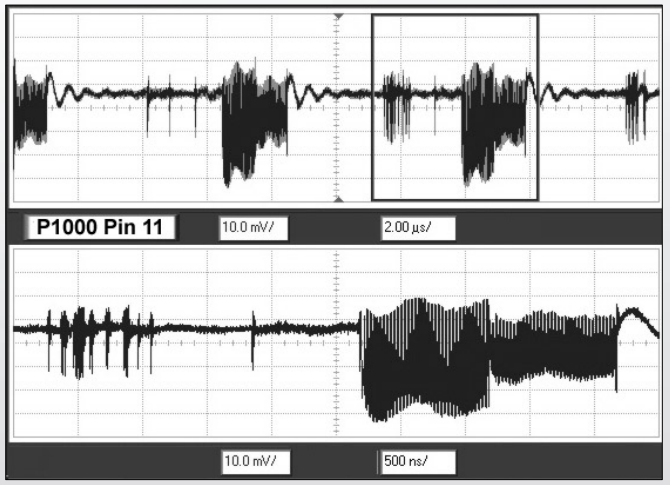
1Vp/p 20uSec rate

Main PWB LVDS P1000 Output Check

To confirm that the Main PWB is outputting Picture Content signals, check P1000 (LVDS) cable for output. Check pins 11-22 and 27-38. This signals vary from each other, but looking for signals like the ones shown below on any of these pins will confirm the output of video content. This signal is using standard SMTE Color Bar output from a generator as the input source.



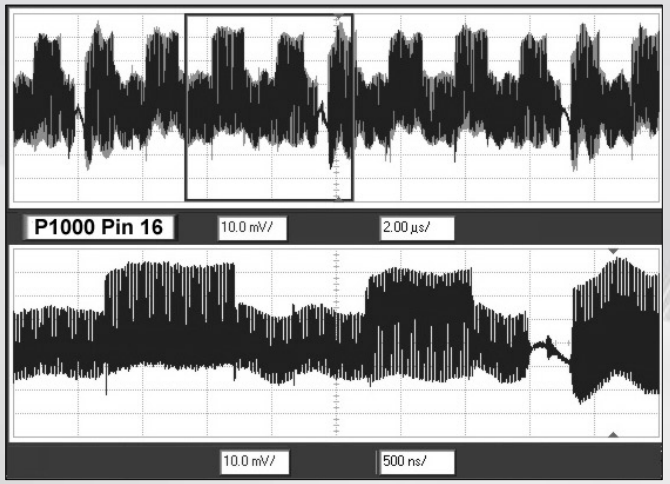
Pin 11



2us

500us

Pin 16



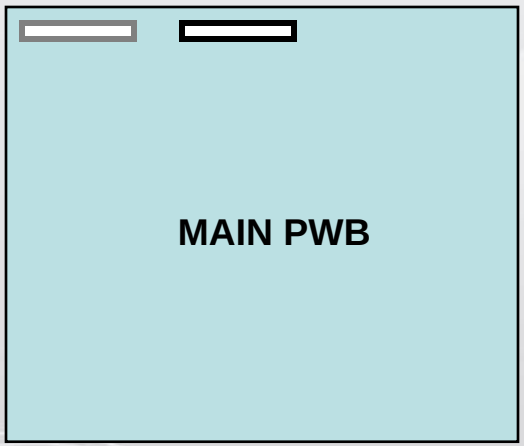
2us

500us

This is just a sample of two pins on the LVDS. There are 24 pins on P1000 carrying video.

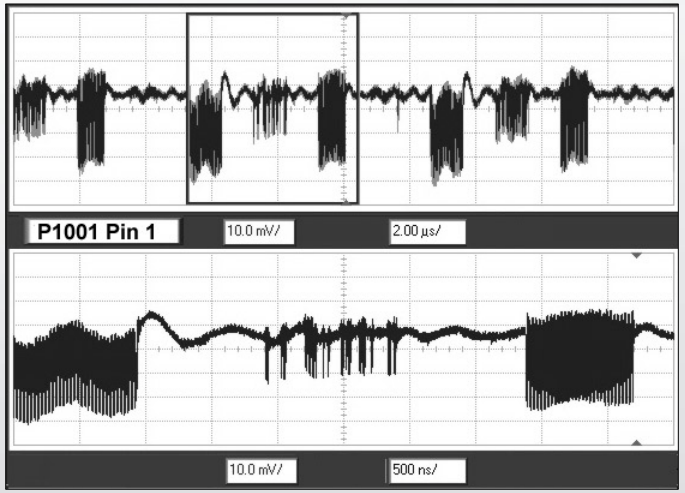
Main PWB LVDS P1001 Output Check

To confirm that the Main PWB is outputting Picture Content signals, check P1001 (LVDS) cable for output. Check pins 1-12 and 15-26. This signals vary from each other, but looking for signals like the ones shown below on any of these pins will confirm the output of video content. This signal is using standard SMTE Color Bar output from a generator as the input source.



This is just a sample of two pins on the LVDS. There are 24 pins on P1001 carrying video.

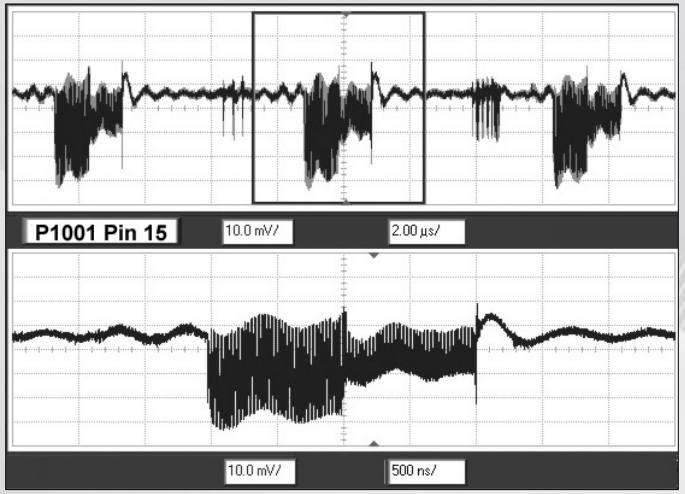
Pin 1



2us

500us

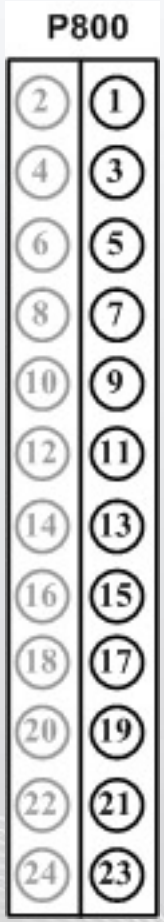
Pin 15



2us

500us

Main PWB Connector P800 Odd Pins Voltage and Resistance



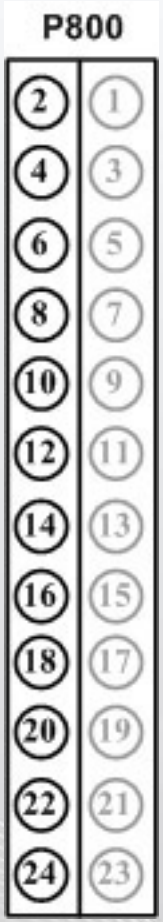
P800 CONNECTOR "Main" Odd Pins to P201 "SMPS PWB"

Pin	Label	STBY	Run	Diode Check
1	16V	0V	16V	OL
3	Gnd	Gnd	Gnd	Gnd
5	12V	0V	12.3V	3.1V
7	Gnd	Gnd	Gnd	Gnd
9	ST-5V	ST-5V	5.1V	1.48V
11	ST-5V	ST-5V	5.1V	1.48V
13	Gnd	Gnd	Gnd	Gnd
15	Gnd	Gnd	Gnd	Gnd
17	5V-MNT	0V	0V	2.86V
19	RL-ON	0V	2.8V	1V
21	*PWM-VBRA	0V	1.7V	OL
23	n/c	0V	0V	OL

Pin 21 PWM-VBRA (ADIM) Is Fixed and is not used

Diode Mode values taken with all Connectors Removed

Main PWB Connector P800 Even Pins Voltage and Resistance



P800 CONNECTOR "Main" Even Pins to P201 "SMPS PWB"

Pin	Label	STBY	Run	Diode Check
2	16V	0V	16V	OL
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	12.3V	3.1V
8	Gnd	Gnd	Gnd	Gnd
10	ST-5V	ST-5V	5.1V	1.48V
12	ST-5V	ST-5V	5.1V	1.48V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	AC-Det	5V	5V	OL
20	INV On/Off	0V	3.2V	1.89V
22	PWM-VBRB	0V	1.4V	OL
24	n/c	0V	0V	OL

Pin 22 PWM-VBRB (VBR-B) can vary according to type of signal being processed, OSD Backlight setting. (0.9V 0% to 3.3V 100%) and the Intelligent Sensor. Output from the BCM chip.

Diode Mode values taken with all Connectors Removed

Main PWB Connector P1000 "Odd Pins" Voltage and Resistance

P1000 CONNECTOR "Main" Odd Pins to CN1 "T-CON PWB"

	Pin	SBY	Run	Diode Check
Switched LVDS 12V	1	0V	12.2V	OL
	3	0V	12.2V	OL
Gnd	5	0V	0V	Gnd
	7	0V	0V	Gnd
n/c	9	0.47V	3.3V	OL
Video Signal Pins	**11**	0V	1.14V	1.27V
	13	0V	1.14V	1.27V
	15	0V	1.14V	1.27V
	17	0V	1.13V	1.27V
	19	0V	1.14V	1.27V
	21	0V	1.14V	1.27V
Gnd	23	0V	0V	OL
LVDS-SEL	25	0.5V	3.3V	0.66V
Video Signal Pins	**27**	0V	1.4V	1.2V
	29	0V	1.4V	1.2V
	31	0V	1.3V	1.2V
	33	0V	1.2V	1.2V
	35	0V	1.4V	1.2V
	37	0V	1.4V	1.2V
AFLC-EN	39	0V	3.3V	OL

Diode Mode values taken with all Connectors Removed

Main PWB Connector P1000 "Even Pins" Voltage and Resistance

P1000 CONNECTOR "Main" Odd Pins to CN1 "T-CON PWB"

	Pin	SBY	Run	Diode Check
Switched LVDS 12V	2	0V	12.2V	OL
	4	0V	12.2V	OL
Gnd	6	0V	0V	Gnd
	8	0V	0V	OL
n/c	10	0V	3.1V	OL
Video Signal Pins	12	0V	1.1V	1.27V
	14	0V	1.1V	1.27V
	16	0V	1.2V	1.27V
	18	0V	1.3V	1.27V
	20	0V	1.2V	1.27V
	22	0V	1.2V	1.27V
Gnd	24	0V	0V	OL
LVDS-SEL	26	0V	0V	OL
Video Signal Pins	28	0V	1.2V	1.2V
	30	0V	1.1V	1.2V
	32	0V	1.1V	1.2V
	34	0V	1.2V	1.2V
	36	0V	1.1V	1.2V
	38	0V	1.1V	1.2V
AFLC-EN	40	0V	0V	Gnd

Diode Mode values taken with all Connectors Removed

Main PWB Connector P1001 Voltage and Resistance

P1001 "Odd Pins" to CN2 "T-CON PWB"

Pin	SBY	Run	Diode Check
1	0V	1.1V	1.27V
3	0V	1.1V	1.27V
5	0V	1.2V	1.27V
7	0V	1.1V	1.27V
9	0V	1V	1.27V
11	0V	1.1V	1.27V
13	Gnd	Gnd	Gnd
15	0V	1V	1.27V
17	0V	1.1V	1.27V
19	0V	1.1V	1.27V
21	0V	1.3V	1.27V
23	0V	1.1V	1.27V
25	0V	1.1V	1.27V

P1000 "Even Pins" to CN2 "T-CON PWB"

Pin	SBY	Run	Diode Check
2	0V	1.3V	1.27V
4	0V	1.3V	1.27V
6	0V	1.3V	1.27V
8	0V	1.2V	1.27V
10	0V	1.3V	1.27V
12	0V	1.3V	1.27V
14	Gnd	Gnd	Gnd
16	0V	1.3V	1.27V
18	0V	1.3V	1.27V
20	0V	1.3V	1.27V
22	0V	1.3V	1.27V
24	0V	1.3V	1.27V
26	0V	1.3V	1.27V

Pins identified in **Bold** and **Blue** are used to send video content to the T-CON PWB.

Diode Mode values taken with all Connectors Removed

Main PWB Connector P404 Voltage and Resistance

P404 CONNECTOR "MAIN PWB" to "Front PWB Assy"

Pin	Label	STBY	Run	Diode Check
1	EYEQ-SCL	3.3V	3.3V	2.13V
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
8	5V ST	5V	5V	1.48V
9	Ready	0V	0V	OL
10	IR	3.9V	3.9V	1.24V
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

Diode Mode values taken with all Connectors Removed

Main PWB Connector P501 Voltage and Resistance

P501 CONNECTOR "Main" to "Speakers"

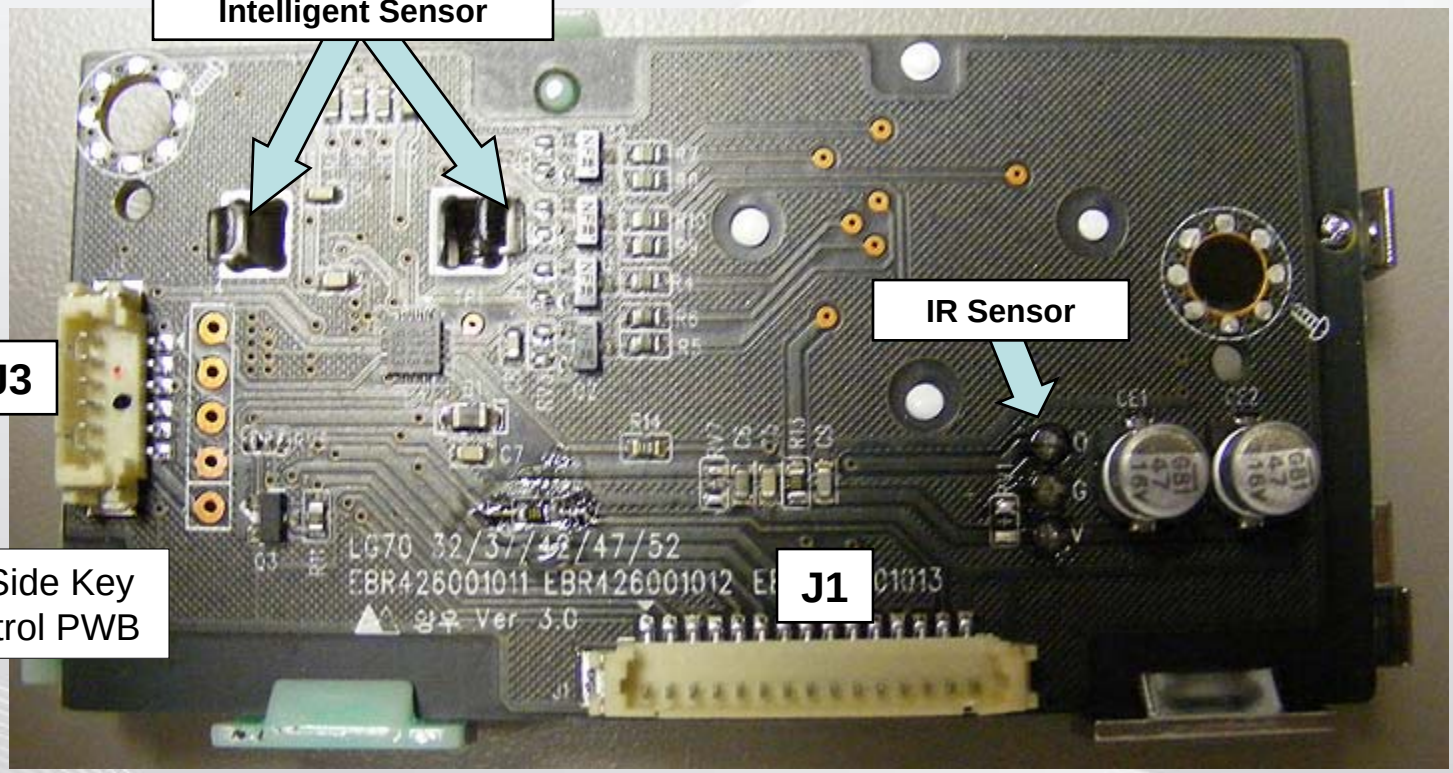
Pin	SBY	Run	Diode Check
1	0V	8V	2.58V
2	0V	8V	2.58V
3	0V	8V	2.58V
4	0V	8V	2.58V

Use speaker out to test for defective Audio Amp IC501

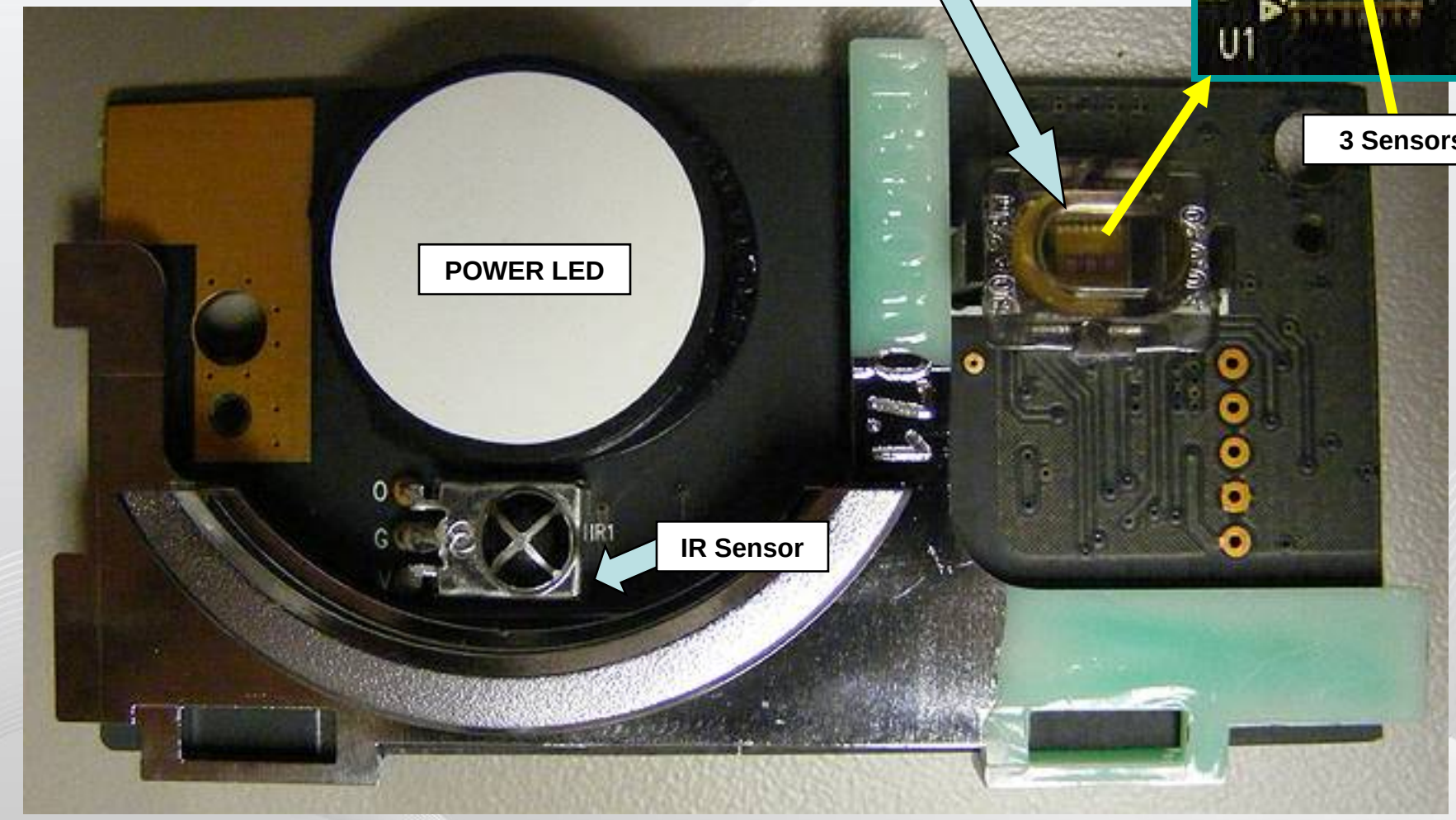
Diode Mode values taken with all Connectors Removed

Front PWB Assembly Layout

The Touch Sensitive Power Switch, Intelligent Sensor and IR Sensor are located on the front of this PWB



Front PWB Assembly (Front View) Layout



Front Control Connector J1 and J3 Voltage and Resistance

J1 CONNECTOR "Front Keys" to "MAIN PWB" P404

Pin	STBY	Run	Diode Check
1	3.25V	3.25V	OL
2	3.25V	3.25V	OL
3	0V	0V	OL
4	0V	0V	OL
5	3.3V	3.3V	OL
6	3.3V	3.3V	OL
7	0V	3.3V	OL
8	5V	5V	1.8V
9	0V	0V	OL
10	3.92V	3.92V	OL
11	0V	0V	OL
12	0V	0V	Gnd
13	0V	0V	OL
14	0V	0V	OL
15	0V	0V	Gnd

J3 from Ft Control to Side Key P100

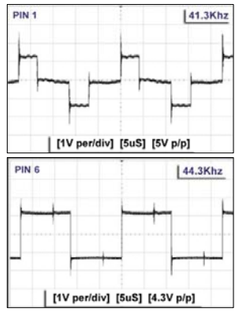
Pin	STBY	Run
1	3.3V	3.3V
2	0V	0V
3	3.3V	3.3V
4	0V	0V
5	0.1V	0.1V
6	5.1V	5.1V

Diode Mode values taken with all Connectors Removed

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

42LG70 INTERCONNECT DIAGRAM

Any Transformer on Ballast

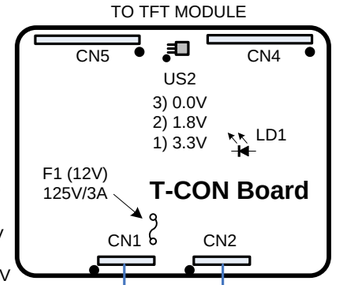


P204 "SMPS" to MCN1 "Ballast PWB"

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

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"

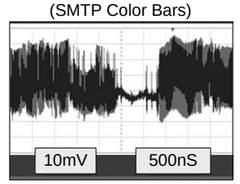
Pin	Label	STBY	Run	Diode Check
2	16.5V	0V	16.2V	0.49V
4	Gnd	Gnd	Gnd	Gnd
6	12V	0V	12.3V	1.6V
8	Gnd	Gnd	Gnd	Gnd
10	5V	5.1V	5.1V	1.27V
12	5V	5.1V	5.1V	1.27V
14	Gnd	Gnd	Gnd	Gnd
16	Gnd	Gnd	Gnd	Gnd
18	ACD	5V	5V	2.1V
20	INV-On/Off	0V	3.2V	0V
22	*PWM-DIM	0V	1.4V	0V
24	N/C	0V	0V	0V

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

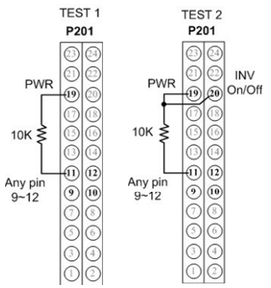
Power Supply

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

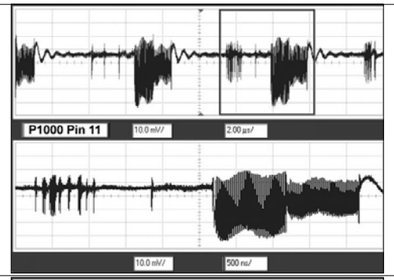
IC1004	STBY	RUN
Pin 1	0V	10V
Pin 2	0.78V	0V
Pin 3	0.7V	0V
Pin 4	0V	1.24V
Pin 5	0V	0V
Pin 6	0V	0V
Pin 7	0V	12V
Pin 8	0V	1.3V

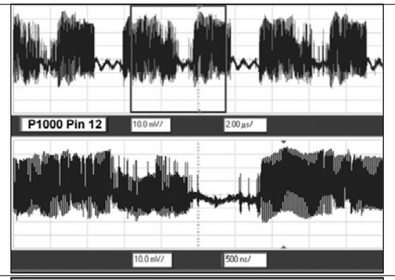
IC1005	STBY	RUN
Pin 1	0V	0V
Pin 2	0V	3.4V
Pin 3	0V	0V
Pin 4	0V	1.4V
Pin 5	0V	1.2V

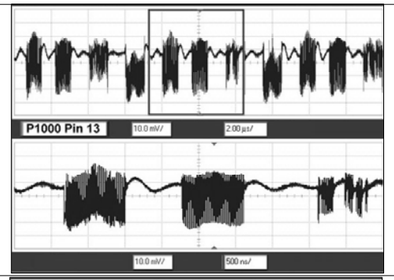
IC1006	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	1.8V
Pin 5	0V	0V

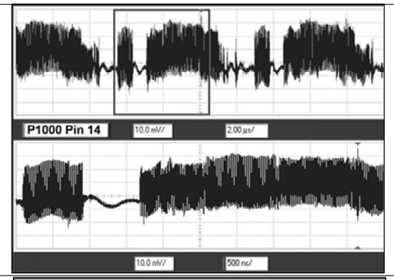
IC1007	STBY	RUN
Pin 1	0V	3.3V
Pin 2	0V	3.3V
Pin 3	0V	0V
Pin 4	0V	0V
Pin 5	0V	2.5V

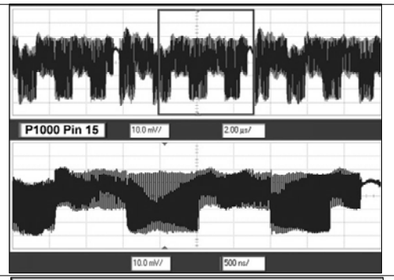
42LG70 LVDS P1000 WAVEFORMS

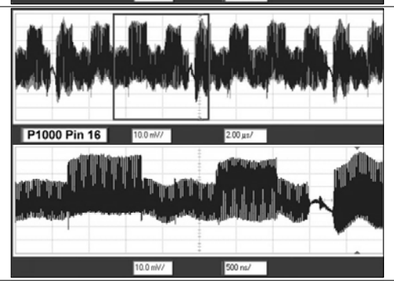


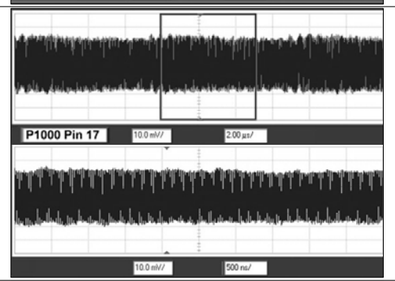


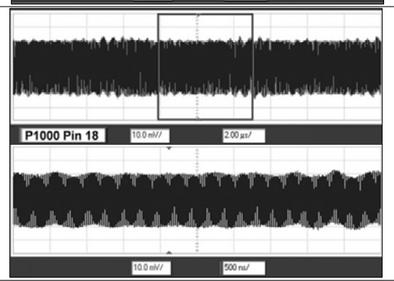


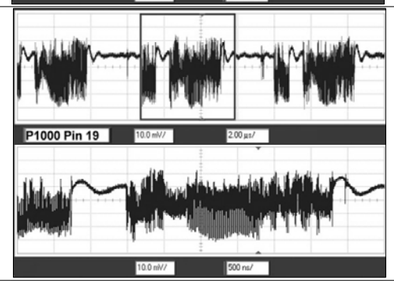


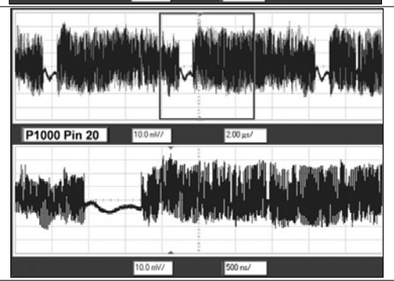


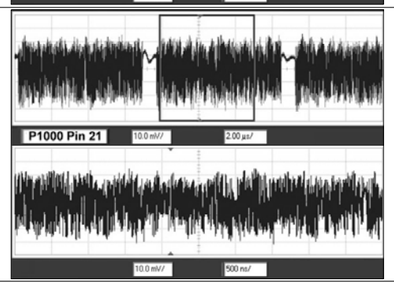


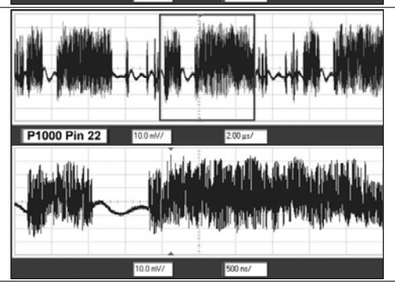


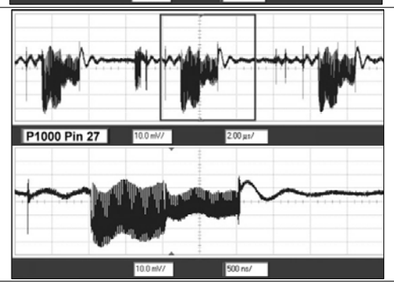


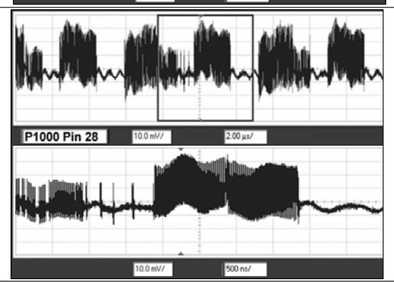


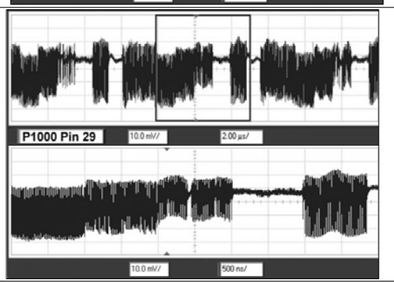


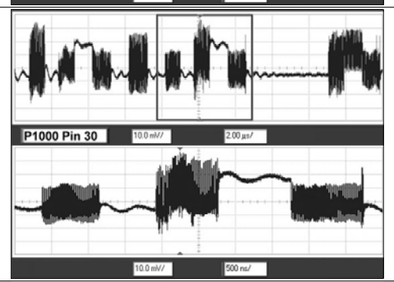


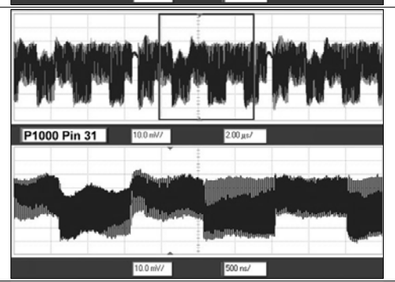


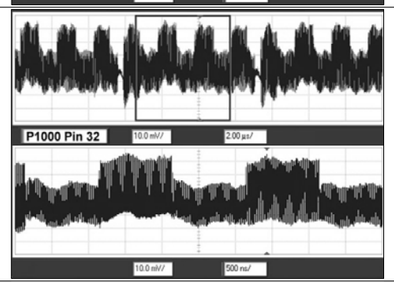


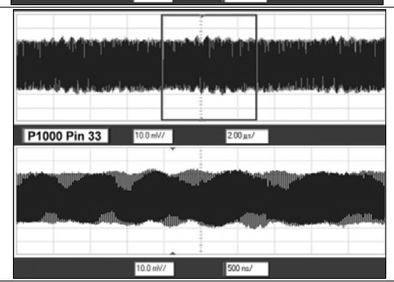


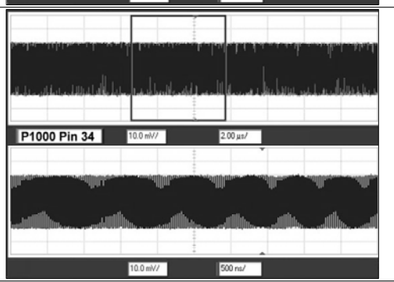


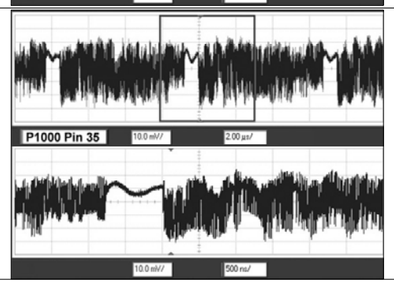


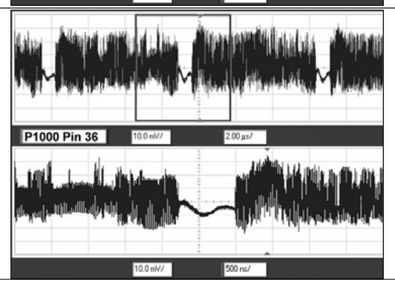


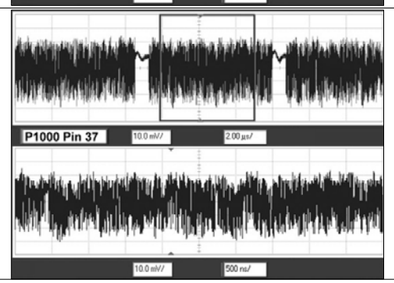


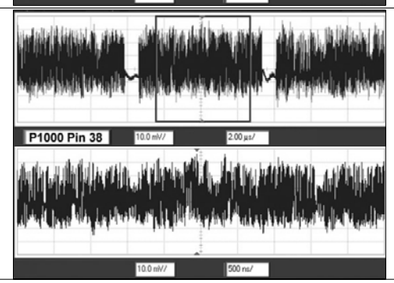






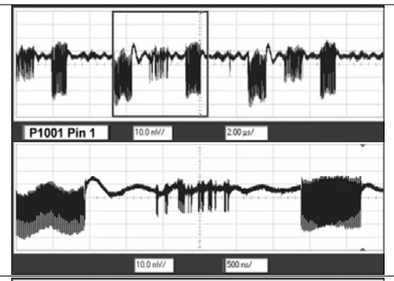


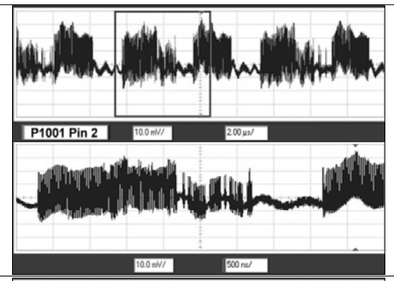


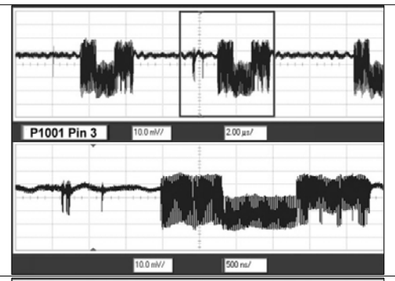


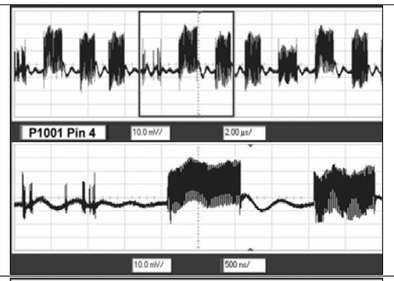
42LG70 P1000 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

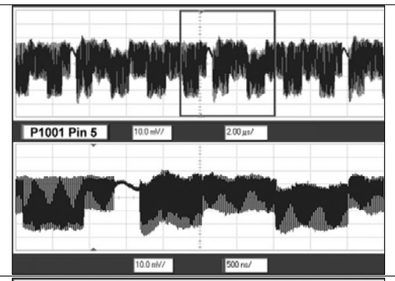
42LG70 LVDS P1001 WAVEFORMS

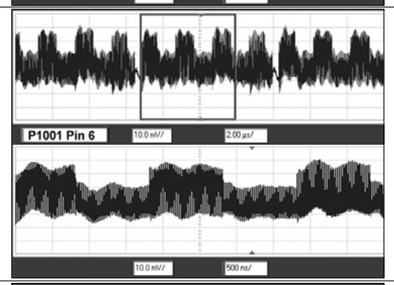


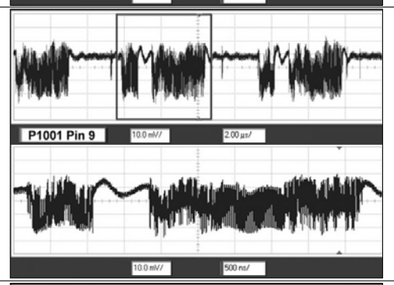


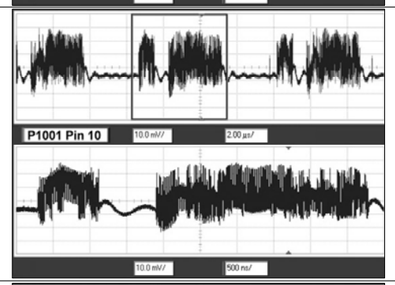


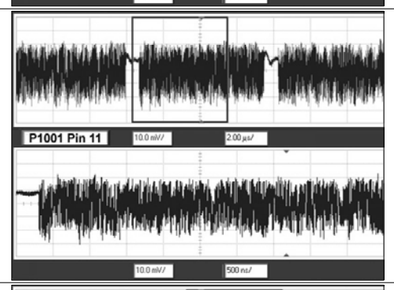


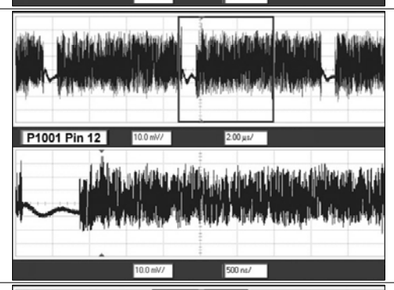


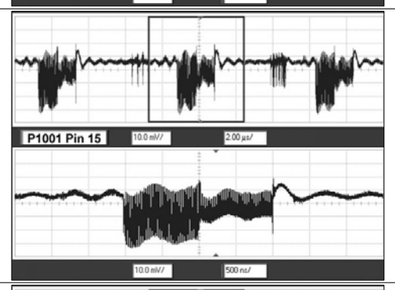


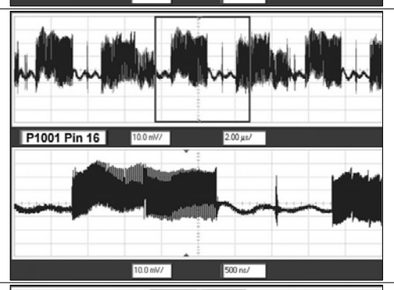


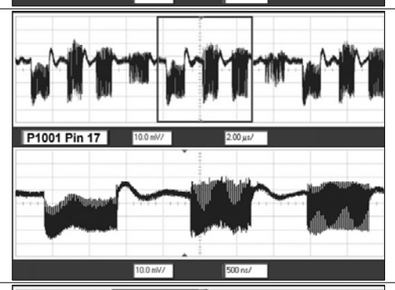


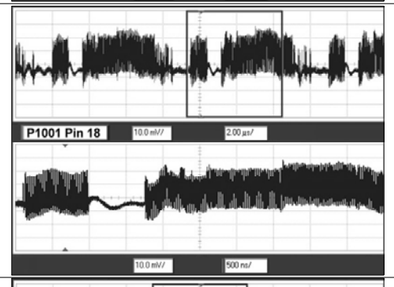


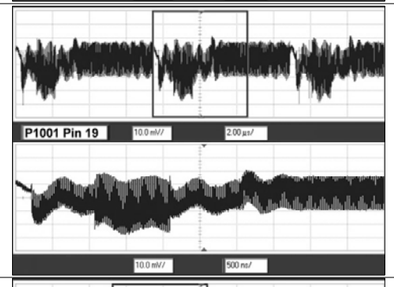


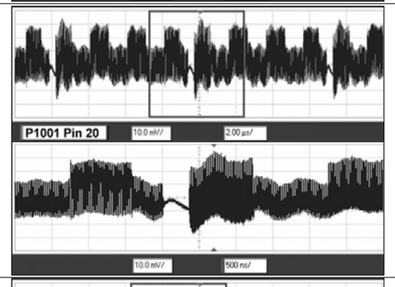


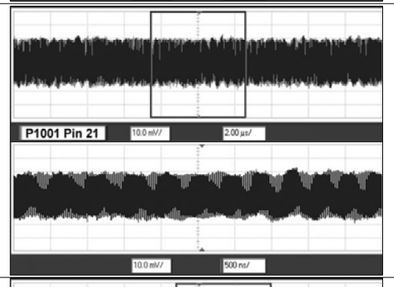


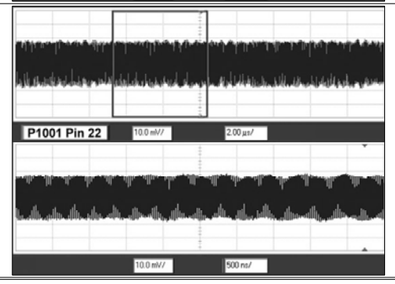


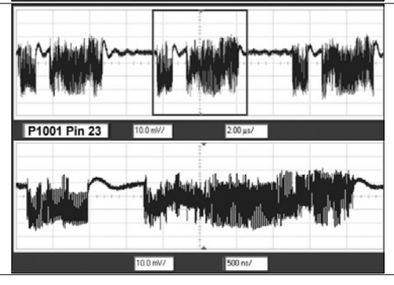


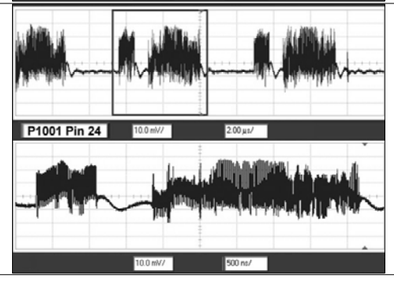


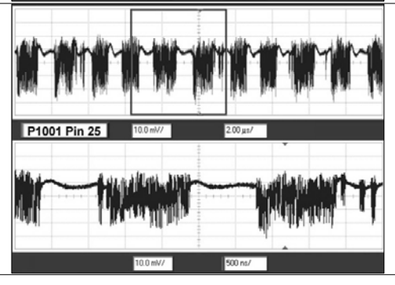


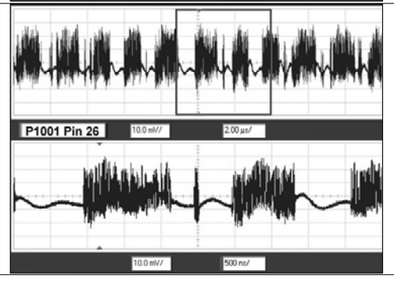












42LG70 P1001 LVDS CABLE WAVEFORMS:
Waveforms taken using SMTP Color Bar input.
All readings give the Scale 10mV and Time Base related to scope settings.
Top waveform in each image gives a slower rate, 2us per division. Outlined area is shown in the bottom waveform at 500ns per division time base.

LG TRAINING CENTER

42LG70

Direct View LCD

This concludes the 42LG70 training session.

LG

Life's Good