

2011 LCD TV Technical Guide

2011-LCD HD/FHD TV

Applies to models:

TC-L42D30
TC-L37DT30
TC-L32DT30
TC-L42E30
TC-L42E3
TC-L37E3
TC-L32E3
TC-L19C30



Panasonic National Training
Panasonic Service and Technology Company

Prepared by
Jean Magloire
Panasonic Service and Technology Company
National Training

"HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC."
Copyright © 2011 by Panasonic Service and Technology Company
All rights reserved. Unauthorized copying and distribution is a violation of law.

 **Warning**

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Table of Contents

Content	Page	Content	Page
Topics	4	Audio Process Circuit	43
New Panel for 2011 - IPS LED LCD	5	SOS Detect (Shutdown)	44
Highlights	6	TC-L37DT30 Power LED Diagnostic Codes	45
2D-3D Conversion	10	TC-L37DT30 Shutdown Circuit Block Diagram	46
2011 Series/Models	11	TC-L42D30 Power LED Diagnostic Codes	47
2011 DT30 Series	12	Protection Circuit (TC-L32/37DT30,TC-L42D30)	48
2011 LCD TV Specifications (1)	13	One Blink of The power LED (TC-L37DT30)	49
2011 LCD TV Specifications (2)	14	Seven Blinks of The power LED (TC-L37DT30)	50
TC-L37DT30 Board Layout	15	Nine Blinks of The Power LED (TC-L37DT30)	51
TC-L37DT30 Connectors	16	10, 13 and 14 Blinks of The Power LED (TC-L37DT30)	52
TC-L37DT30 T-CON & LED Driver	17	Protection Circuit (TC-L42E3)	53
TC-L42D30 Board Layout	18	Protection Circuit (TC-L37E3/L32E3 and TC-L32X30)	54
TC-L42D30 Connectors	19	Protection Circuit (TC-L42E30)	55
TC-L42D30 P Board	20	Nile-T-CON SOS Detection	56
TC-L42D30 A Board	21	Protection Circuit (TC-L42U30)	57
TC-L42D30 LD Board (LED Driver)	22	Protection Circuit (TC-L37U3)	58
TC-L37DT30 Standby Power (1)	23	IC4700 Block Diagram	60
TC-L37DT30 Power On Operation	28	TC-L42D30 Service Mode	61
TC-L37DT30 Voltage Distribution	30	How to Enter the Service Mode's SRV-TOOL	62
TC-L42E3 LED Backlight Control	32	TC-L42D30 How to Enter the Self-check Mode	63
TC-L37E3 LED Backlight Power Circuit	34	Troubleshooting Picture Problem	64
TC-L42D30 LED Backlight Power Circuit	36	Panel Free Run Mode	73
TC-L37DT30 CPU Commands Explanation	38	Data Copy using SD Card	74
TC-L37DT30 Video Input and Process	39	Glossary	78
TC-L37DT30 Eyewear Control Signal	41		

Topics

1. Features
2. Start-up Operation
 - A) Stand by Operation
 - B) Power On Operation
 - C) Voltage Distribution
3. Signal process Circuit
 - A) Video Signal
 - B) Audio Signal
4. SOS Detect
5. Service Notes
 - A) Service Mode
 - B) SRV-TOOL
 - C) Self check
6. Troubleshooting
7. Data Copy Function (SD card)
7. Glossary

New Panel for 2011 - IPS LED LCD

In 2011, IPS Alpha technology is now expanded to the 3D LED LCD line-up with totally new 3D Panel and Drive.

 IPS Alpha Panel

 LED
LCD TV

 3D
FULL HD

New Panel for 2011 - IPS LED LCD

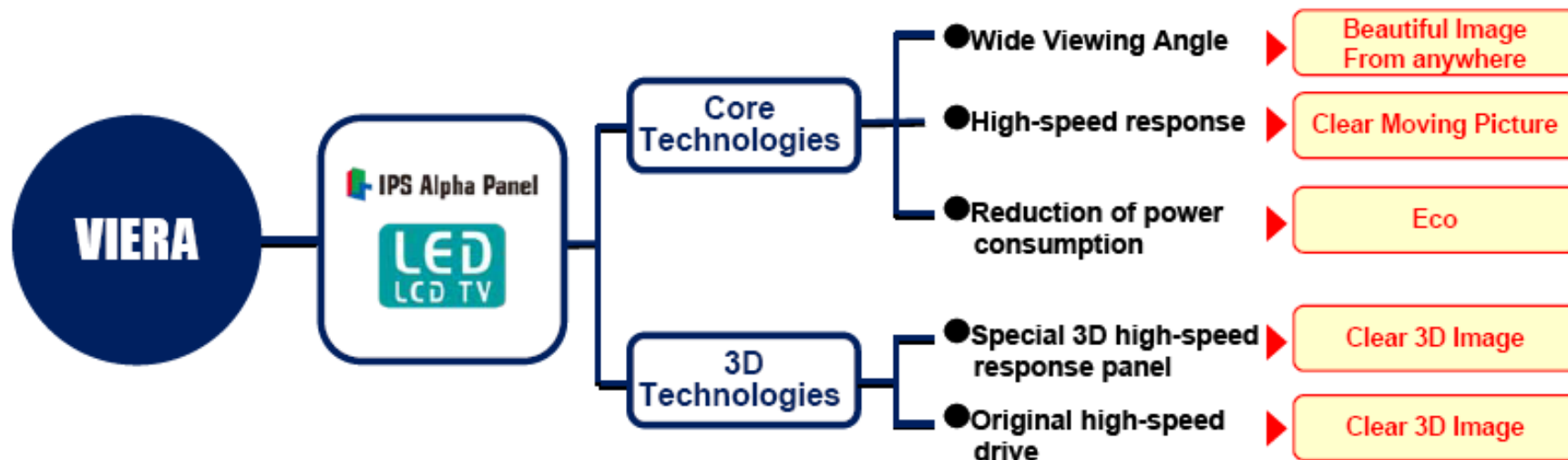
- Superb Motion Reproduction
- Wider Viewing Angle
- Lower Power Consumption
- Fewer Double Images in 3D Pictures

with the newly designed 3D IPS panel and new APD technology



Best 2D Picture
and
Best 3D Picture

Highlights



The New World of Smart VIERA

Smart VIERA Boosts TV Viewing Enjoyment

Smart VIERA lets you enjoy the unlimited growth of newly evolving content and services by taking full advantage of home networking and device linking.

VIERA Connect

VIERA
Connect

TV-based enjoyment of Internet services and content.



VIERA Image Viewer

Easy playback of content you produce yourself via SD cards.



The new world of

Smart VIERA

DLNA



Sharing content by linking devices all through the home.



USB Connecting



Linking and enjoying various devices by USB connection.



VIERA Link



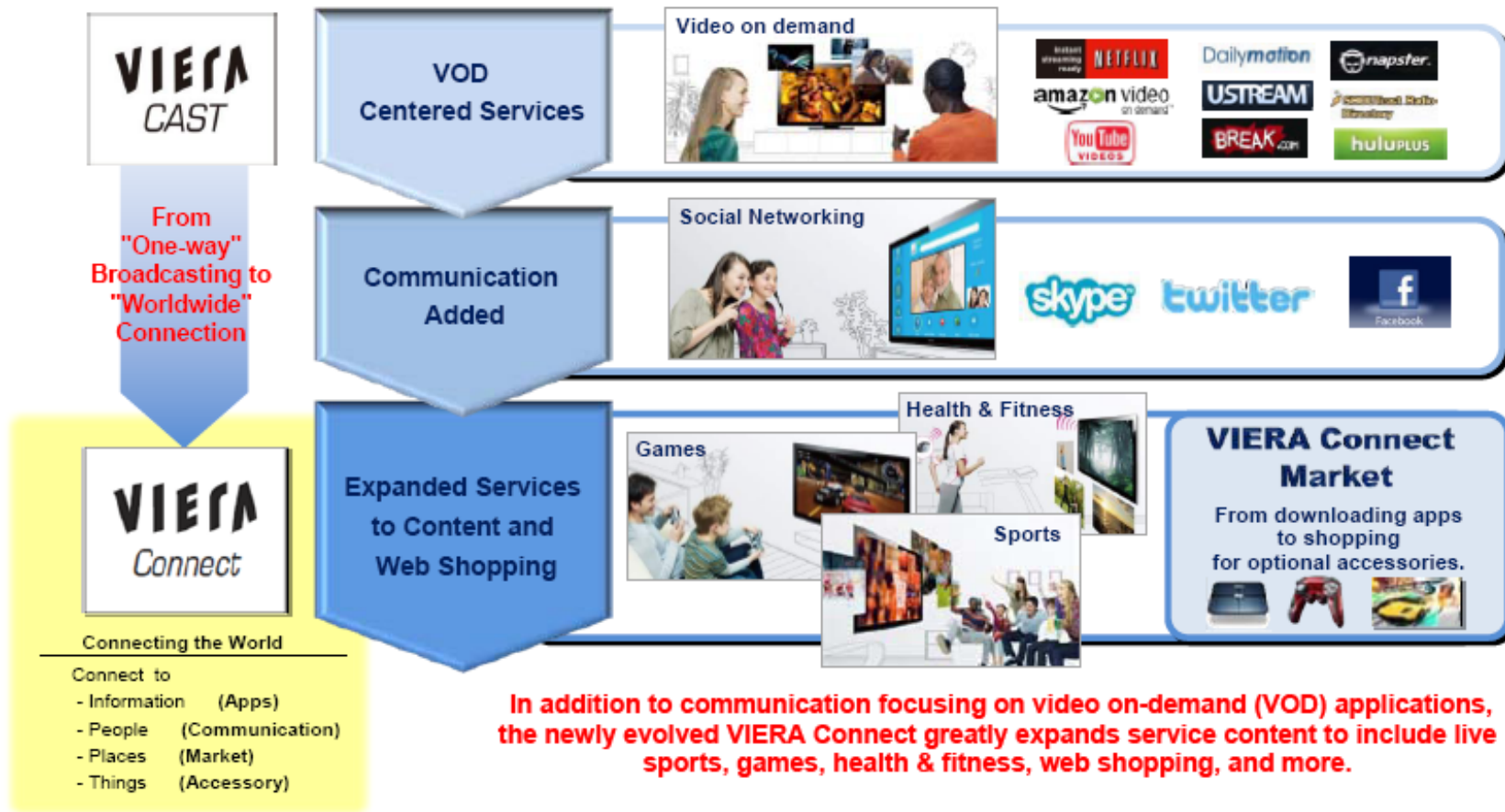
Simple operation of linked devices.



Concept of the IPTV World

VIERA connects you to a new world.

IPTV is a new Internet service that will continue to evolve with an easy-to-use cloud-based Internet service and intuitive operation, centered around the TV. It offers "quality time" for yourself, your friends and your family with a smart, easy worldwide connection.



Evolution of the IPTV World and Its Future Expansion

VIERA Connect evolves through cloud-based Internet services

Easy, comfortable cloud Internet service for the whole family to enjoy.



No need for a PC

You can do everything, from buying apps and accessories to completing credit card transactions, right on the TV screen.



No need for installation

You don't need to install any software into the TV.



Customize your screen

You can group commonly used apps and display them on the screen for even easier use.

Greater entertainment experience



Expanding the availability of content such as VOD, sports events, and health and fitness services, which can be enjoyed with greater dynamism and more fun on a large screen.



Comfortable operation



High-speed start-up, high-speed response and one-click access from the remote control ensure comfortable, easy operation for everyone.



Competitors' products

Simply an extension of content designed for PCs or mobile phones. Keyboard operation is necessary for search function.

Enriching communication with family and others
Establishing new ways to communicate based on TV

2D-3D Conversion



It's easy to watch ordinary 2D images in 3D.

2D-3D Conversion Steps

Easy to view 3D images from 2D image sources such as TV programs, movies, BD/DVD media and accumulated personal photos and videos.

2D Image



Conversion

3D Image



◆ The three 3D conversion levels are Strong, Mid and Weak.



◆ 2D-3D Conversion Technology

Max/Mid

Step 1

The data for the entire screen is picked up in single pixel units, and the optimal depth is set in advance for each scene.



Step 2

Detailed depth information is set with "brightness" and "color."

Brightness:
Bright → Foreground
Dark → Background

Colors:
Yellow, Red → Foreground
Blue → Background



Min

Depth is produced by "curving" the center of the screen.



◆ Types of 3D-convertible content

- Digital TV broadcasts
- Recorded programs
- BD/DVD media
- Video camera images (AVCHD and AVCHD Light only).
- Digital still camera photos (JPEG, DCF compliant).

2011 Series/Models

Series	42"	37"	32"	24"	19"
DT Series FHD-3D		TC-L37DT30	TC-L32DT30		
D Series FHD	TC-L42D30				
E30 Series FHD	TC-L42E30				
E3 Series FHD	TC-L42E3	TC-L37E3	TC-L32E3		
U30 Series FHD	TC-L42U30				
U3 Series FHD		TC-L37U3	TC-L32U3		
X30 Series HD		TC-L32X30			
C30 Series HD					TC-L19C30
C3 Series HD			TC-L32C3	TC-L24C3	

2011 DT30 Series

1 FULL HD 3D Eyewear bundled

2 Flush Design

3 IPS Alpha LED LCD Panel

4 240Hz with Motion Picture Pro5



Wireless LAN Adaptor



One pair of 3D eyewear included

TC-L37DT30
TC-L32DT30



Image

- FULL HD 3D
- IPS Alpha LED LCD Panel
- 240Hz Motion Picture Pro5
- 2D/3D 24p Smooth Film
- Dynamic Contrast 5,000,000:1
- Clear Panel
- ISFccc Calibration Mode¹
- 3D Super Resolution
- Pro Setting

ECO

- Energy Star
- Eco Function

Link

- VIERA Connect with Wi-Fi (Wireless LAN Adaptor Included)
- 3D Image Viewer^{TM2}
- DLNA
- VIERA LinkTM
- 4 HDMI Terminals
- 3 USB Terminals
- Game Mode
- PC Input Terminal

Others

- Flush Design
- Swivel
- 3D Eyewear Included

¹ ISF and IMAGING SCIENCE FOUNDATION are trademarks owned by Imaging Science Foundation, Inc. This function is exclusively for calibrator use. It is not intended for use by ordinary consumers. ² AVCHD / SD-VIDEO / Motion JPEG [Lumix] / MP4 / MKV / JPEG / MPO / MP3 / AAC / LPCM playback.

2011 LCD TV Specifications (1)

Features /Series	DT Series FHD	D Series FHD	E30 Series FHD	E3 Series FHD	U30 Series FHD	U3 Series FHD	X30 Series HD	C30 Series HD	C3 Series HD
Image									
Resolution	3D 1080P	1080P	1080P	1080P	1080P	1080P	720P	720P	720P
IPS Alpha LED LCD Panel	Yes	Yes	Yes	Yes	IPS Alpha Panel	IPS Alpha Panel	IPS Alpha Panel	Yes	IPS Alpha Panel
Motion Picture Pro Technology	240Hz Motion Picture Pro5	120Hz Motion Picture Pro4	120Hz Motion Picture Pro4	-	120Hz Motion Picture Pro4	-	-	-	-
24p Smooth Film	3D/2D 24p Smooth Film	24p Smooth Film	-	-	Yes	-	-	-	-
Dynamic Contrast	5,000,000:1	5,000,000:1	4,000,000:1	3,000,000:1	20000:1	20000:1	20000:1	2000000:1	20000:1
Clear Panel	Yes	Yes	Yes	Fine Black Panel	Fine Black Panel	Fine Black Panel	Fine Black Panel	Fine Black Panel	
Super Resolution	3D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ISFccc Calibration Mode1	Yes	Yes	-	-	-	-	-	-	-
Pro Setting	Yes	-	-	-	-	-	-	-	-

2011 LCD TV Specifications (2)

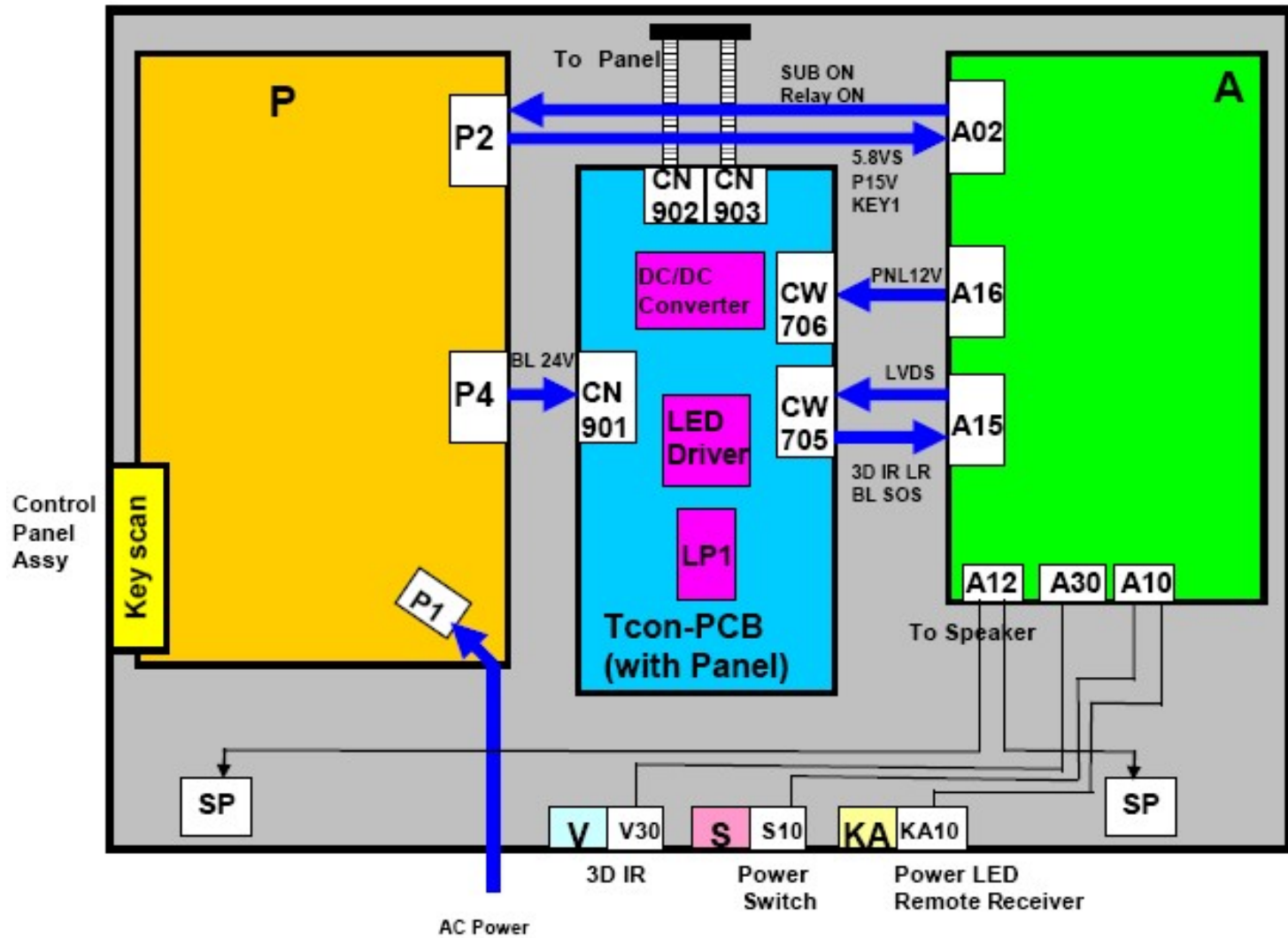
Features/Series	DT Series FHD	D Series FHD	E30 Series FHD	E3 Series FHD	U30 Series FHD	U3 Series FHD	X30 Series HD	C30 Series HD	C3 Series HD
Link									
VIERA Connect	Yes	Yes	-	-	-	-	-	-	-
EASY IPTV™	-	-	Yes	Yes	-	-	Yes	-	-
DLNA	Yes	Yes	Yes	yes	-	-	Yes	Yes	-
Wi-Fi Ready	Yes	Yes	Yes	yes	-	-	Yes	-	-
(Wireless LAN Adaptor Included)	Yes	(Wireless LAN Adaptor Capable)	(Wireless LAN Adaptor Capable)	(Wireless LAN Adaptor Capable)	-	-	(Wireless LAN Adaptor Capable)	-	-
VIERA Link™	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HDMI Terminals	4	4	4	4	3	3	3	3	2 (32C3) 1 (24C3)
USB Terminals	3	3	2	2	-	-	1	1	Yes
Game Mode	Yes	Yes	yes	Yes	Yes	-	Yes	yes	-
PC Input Terminal	Yes	Yes	yes	Yes	Yes	-	Yes	yes	-

TC-L37DT30 Board Layout

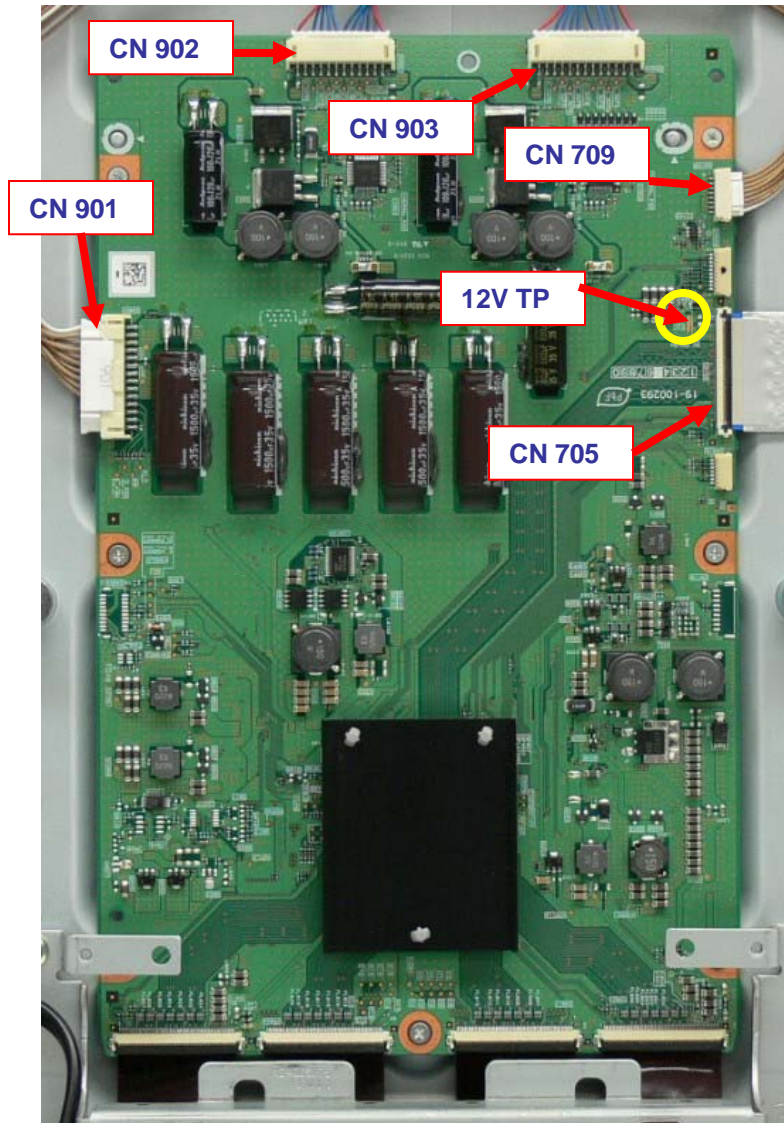


Board Name	Function
A-Board	Main Board - non-serviceable - exchanged for service
KA-Board	Remote Receiver, LED, Cat's eye
P-Board	Power supply - non-serviceable - exchanged for service
S-Board	Power switch
V-Board	3D IR Transmitter

TC-L37DT30 Connectors



TC-L37DT30 T-CON & LED Driver



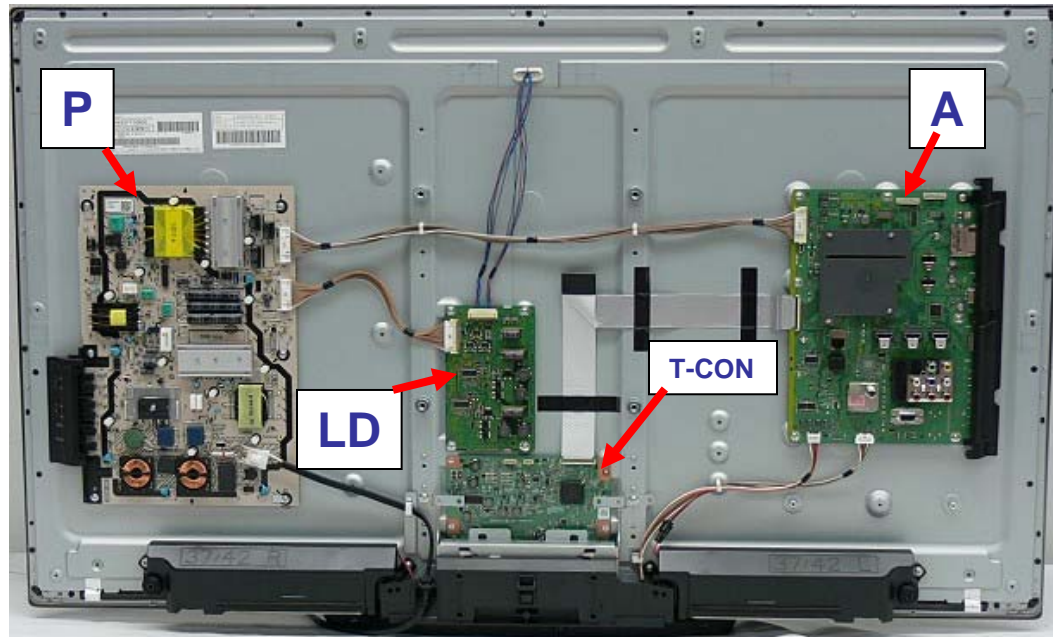
- A disconnected connector CN901 provides 1 blink of the power LED after approximately 24 seconds of power On.
- A disconnected connector CN902, or CN903 provides 1 blink of the power LED after 4 seconds of power On.
- A disconnected connector CN709 provides 10 blink of the power LED after power On.
- A disconnected connector CN705 (LVDS Cable) provides 10 blink of the power LED after power On.

CN 901 To P4	
Pin #	Voltage
1	24V
2	24V
3	24V
4	24V
5	24V
6	GND
7	GND
8	GND
9	GND
10	GND
11	BL_SOS
12	BL_ON
13	GND
14	PWM

CN 709 To A16	
Pin #	Voltage
1	PANEL_12V
2	PANEL_12V
3	PANEL_12V
4	PANEL_12V
5	GND
6	GND
7	GND
8	GND

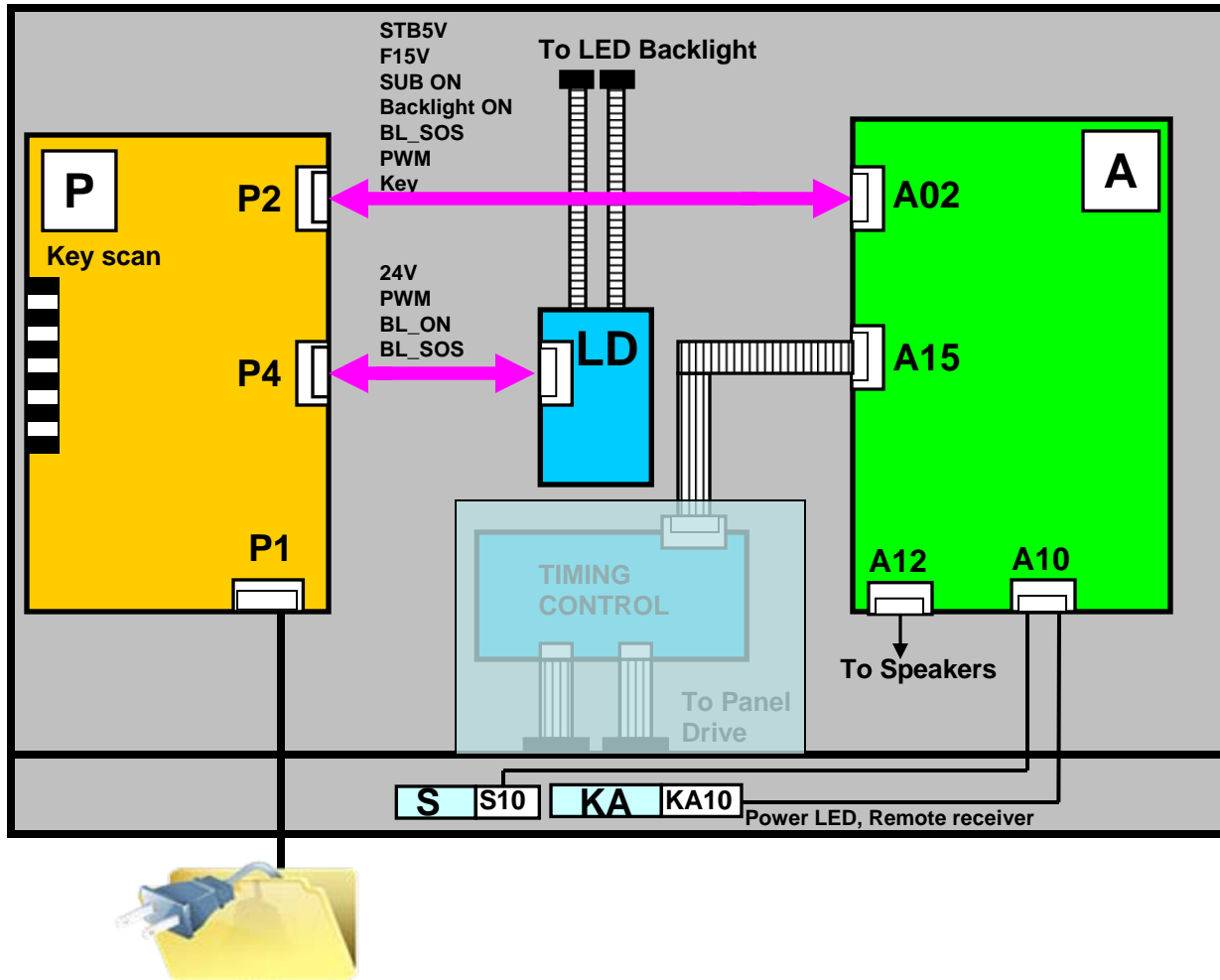
CN 902 or CN903 To PANEL LEDs										
PIN#	1	2	3	4	5	6	7	8	9	10
Volt	67V	NC	10V	9V	8.3V	6.7V	8.3V	10V	NC	67V

TC-L42D30 Board Layout

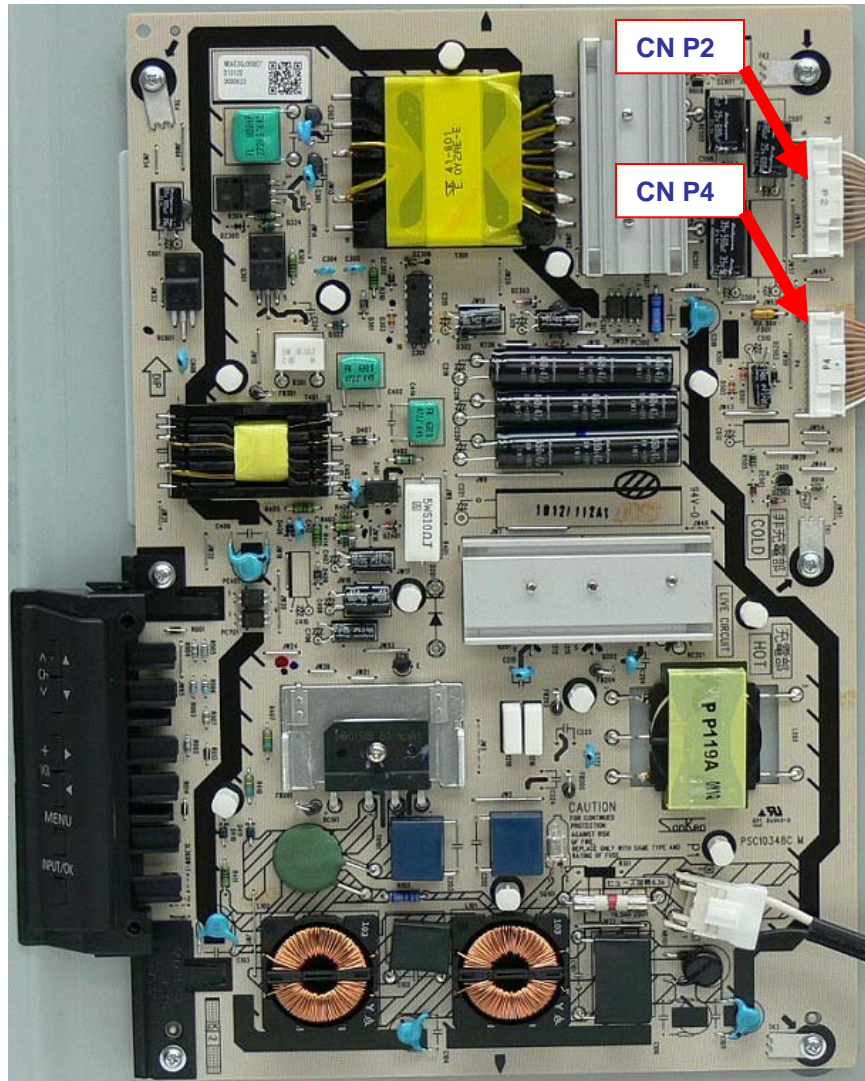


Board Name	Function
A-Board	Main Board - Non-serviceable - Exchanged for service
KA-Board	Remote Receiver, LED, CAT's eye
P-Board	Power Supply - Non-serviceable - Exchanged for service
LD-Board	LED Driver - Non-serviceable - Exchanged for service
S-Board	Power switch

TC-L42D30 Connectors



TC-L42D30 P Board



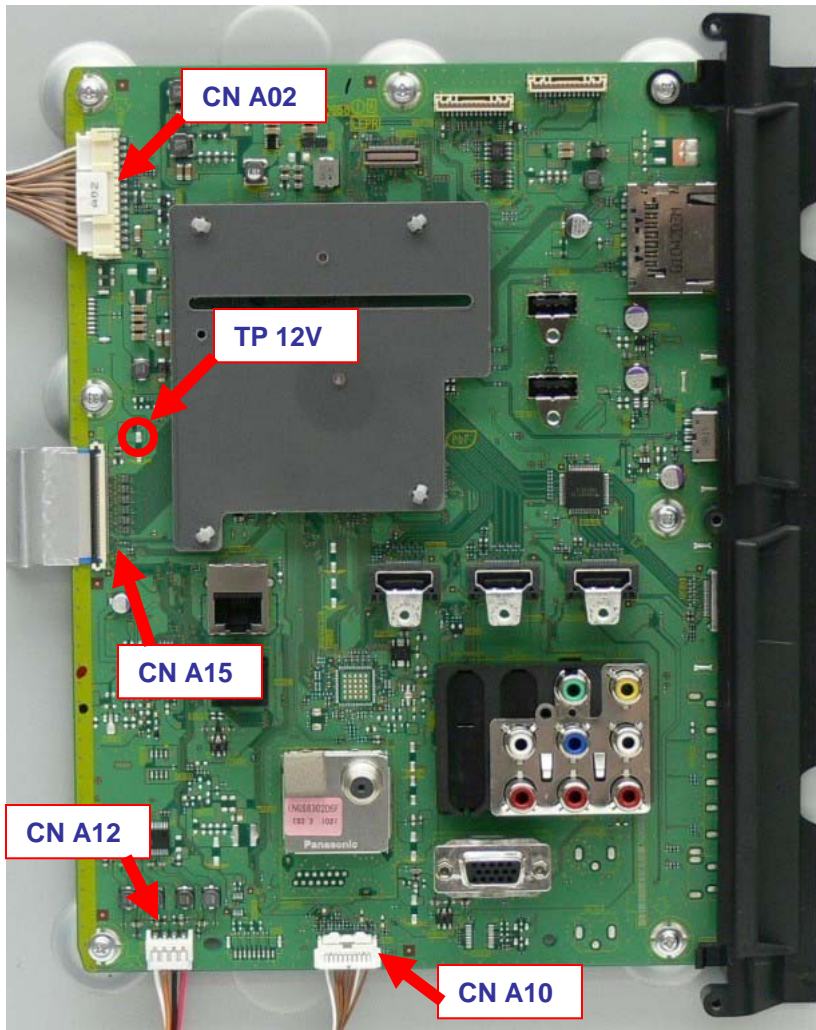
Measure Voltages at the connectors. No test point (TP) needed

CN P2 P-Board	
Pin #	Voltage
1	NC
2	GND
3	PWM
4	BL_ON
5	BL_SOS
6	MAIN_ON
7	KEY
8	RLY
9	SUB_ON
10	GND
11	16V
12	16V
13	16V
14	GND
15	5V

CN P4 P-Board	
Pin #	Voltage
1	PWM
2	GND
3	BL_ON
4	BL_SOS
5	GND
6	GND
7	GND
8	GND
9	GND
10	24V
11	24V
12	24V
13	24V
14	24V

TC-L42D30 A Board

Measure Voltages at the connectors. No test point (TP) needed

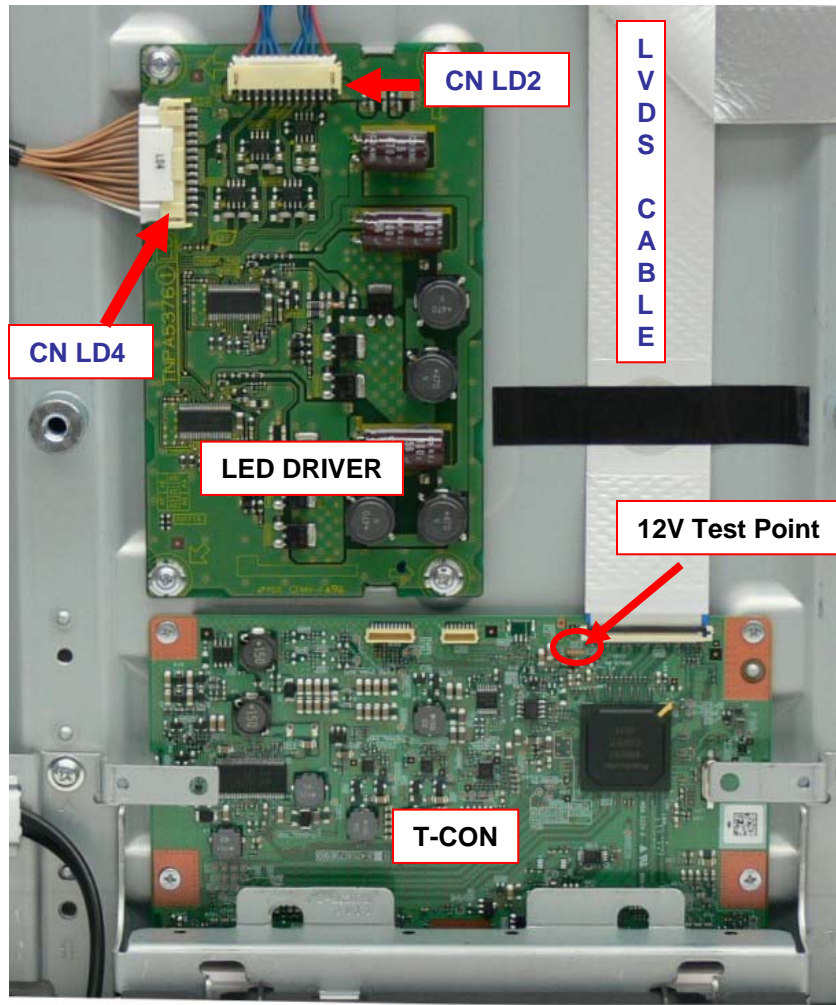


CN A02 A-Board	
Pin #	Voltage
1	5V
2	GND
3	16V
4	16V
5	16V
6	GND
7	SUB_ON
8	RLY
9	KEY1
10	MAIN_ON
11	BL_SOS
12	BL_ON
13	PWM
14	GND
15	NC

CN A10 A-Board	
Pin #	Voltage
1	RED_LED_ON
2	NC
3	STB3.3V
4	AI SENSOR
5	REMOTE
6	-
7	SUB3.3V
8	Key3 (STB5V)
9	NC
10	GND

CN S10 S-Board	
Pin #	Voltage
1	Key
2	GND

TC-L42D30 LD Board (LED Driver)



Measure Voltages at the connectors. No test point (TP) needed

CN LD4 LD-Board	
Pin #	Voltage
1	24V
2	24V
3	24V
4	24V
5	24V
6	GND
7	GND
8	GND
9	GND
10	GND
11	BL_SOS
12	BL_ON
13	GND
14	PWM

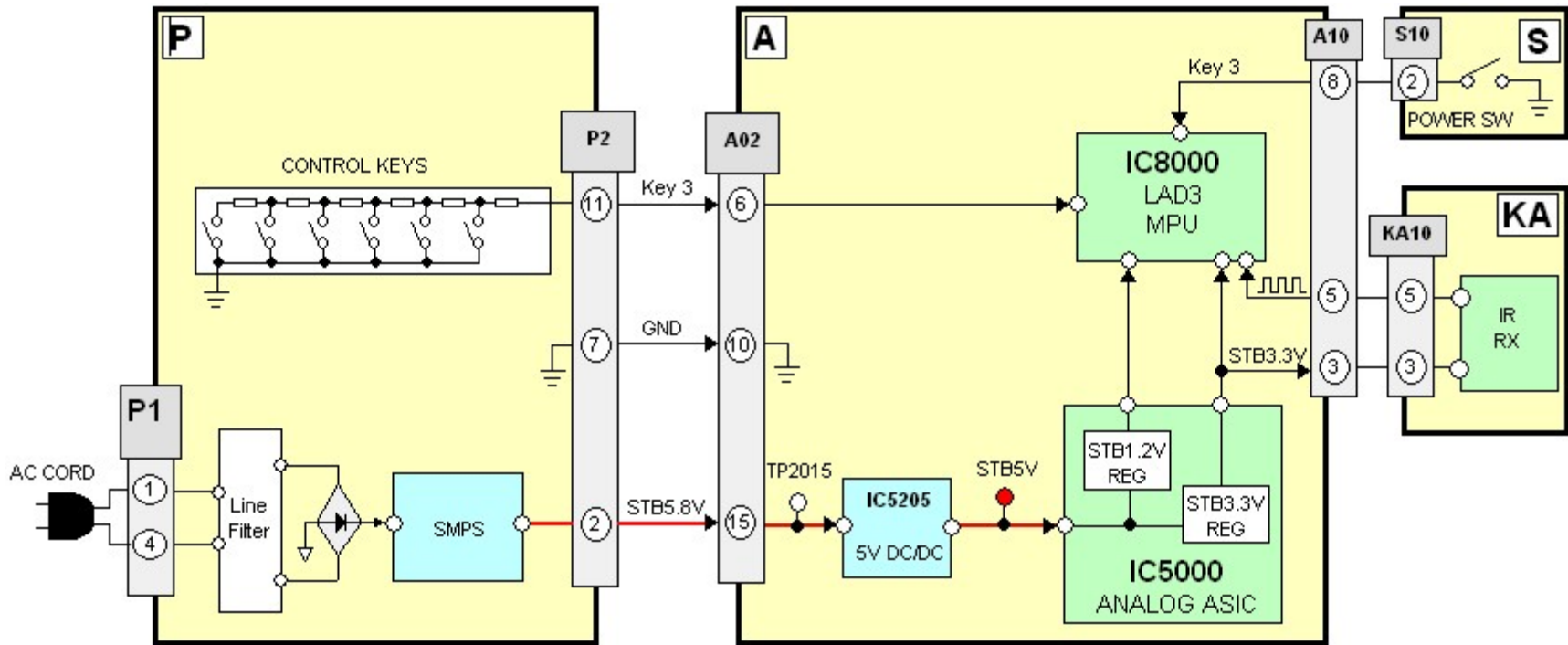
CN LD2 LD-Board	
Pin #	Voltage
1	98.8V
2	NC
3	10.6V
4	10.4V
5	10.6V
6	10.5V
7	10.4V
8	10.8V
9	10.4V
10	10.9
11	NC
12	98.8V

A disconnected connector LD2 provides 1 blink of the power LED after 9 seconds of power On.

A disconnected connector LD4 provides 1 blink of the power LED after 7 seconds of power On.

A disconnected LVDS Connector provides 10 blink of the power LED after 5 seconds of power On.

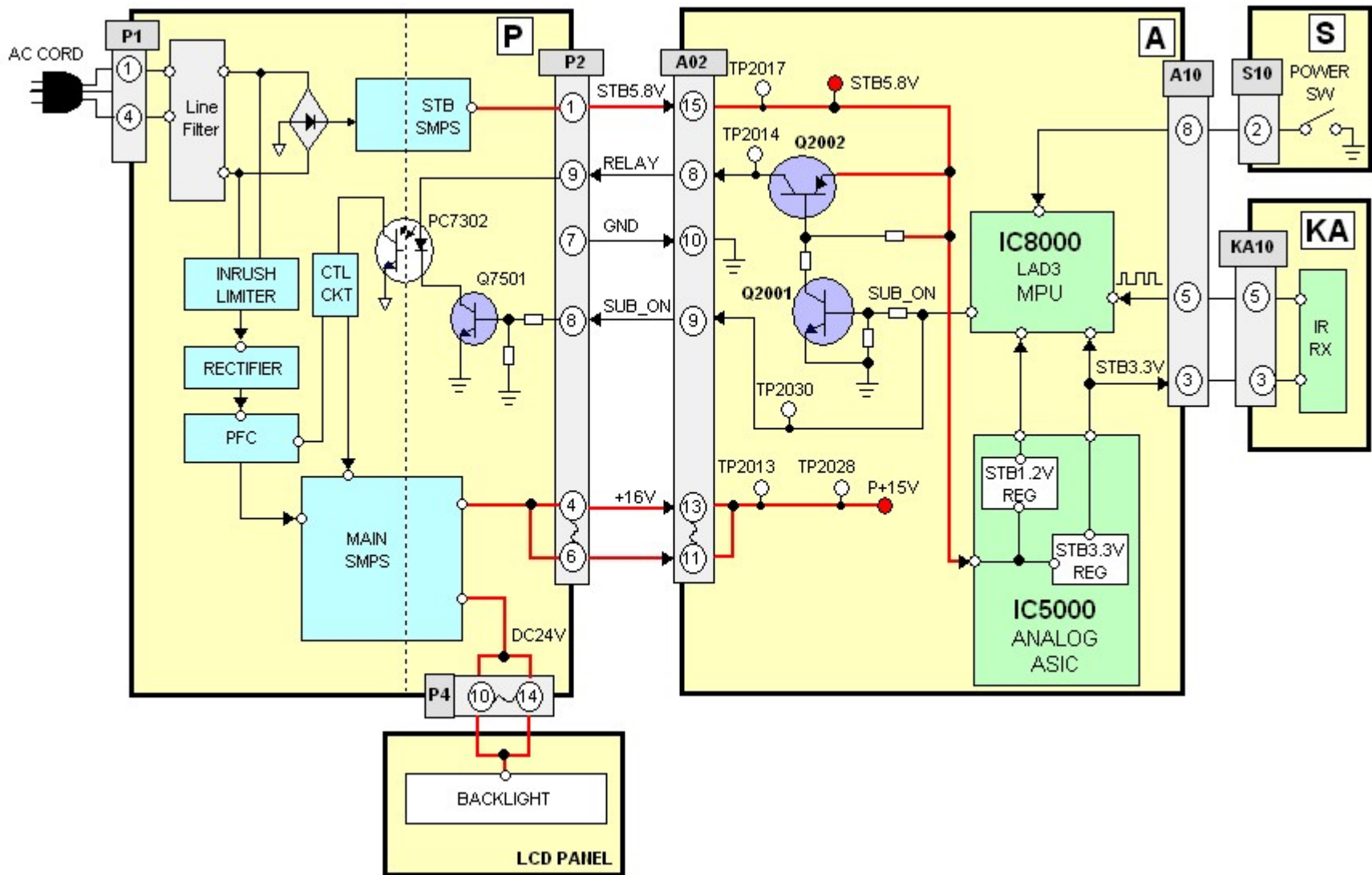
TC-L37DT30 Standby Power (1)



When the TV is plugged in, AC voltage is applied to the standby circuit of the power supply circuit to produce STB5.8V. The STB5.8V is provided to the A board via pin 15 of connector A02. The STB5.8V is regulated to STB5V and applied to the application specific integrated circuit (ASIC), IC5000, for conversion to STB3.3V. The STB3.3V energizes IC8001 to prepare the internal microprocessor for program execution. The 3.3V from the voltage regulator is also applied to the remote control receiver and power LED on the K board through Pin 3 of connector A10/KA10.

If the STB5.8V is missing, the TV is dead (No power)

TC-L37DT30 Standby Power (2)



TC-L37DT30 Standby Power (2)

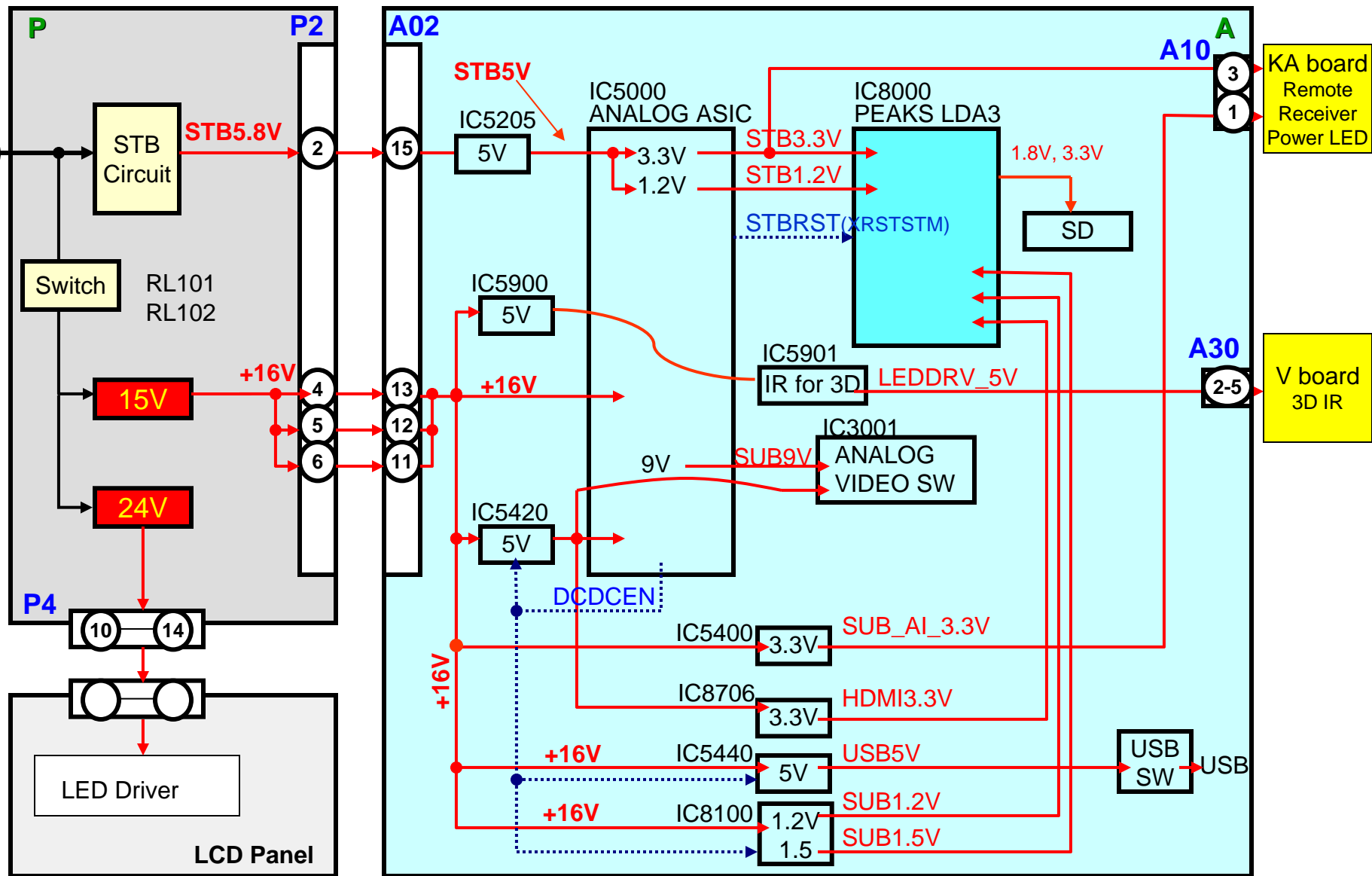
When the power button of the TV or remote control is pressed, The MPU (IC8000) of the A board outputs the TV_SUB_ON command to turn on the transistors Q2001 and Q2002 which provide STB5V to the photo-coupler located on the power supply board. The STB5V enters the power supply board via pin 9 of connector P2. The TV_SUB_ON command is also connected directly to the power supply to turn on a transistor that provides a ground connection to the photo-coupler. When the photo-coupler turns on, the switched mode supply goes in operation to create the +16V or and DC24V supplies.

On the A-Board, the +16V is regulated to numerous voltages to power the A-Board.

The DC24V is applied to the “Tcon/LED drive board” to power the circuit that controls the light output of the backlight LEDs. However the backlight circuit is not yet tuned on because this is only a self-check operation.

Caution: The A and P boards are to be exchanged only. The “Tcon/LED drive board” is part of the LCD panel. If defective, the panel should be replaced.

TC-L37DT30 Standby Power (3)



TC-L37DT30 Standby Power (3)

When the TV is plugged in:

AC is applied to the standby circuit in the power supply to produce STB5V.

The STB5V is provided to the A board via pin 2 of connector P2.

The STB5V from pin 2 of connector P2 is applied to the Analog ASIC (IC5000) to power the Main CPU/PEAKS LDA3 (IC8000) on the A board. The Analog ASIC (IC5000) converts the STB5V to STB3.3V and STB1.2V. These two voltages energize and prepare the microprocessor (CPU) for program execution.

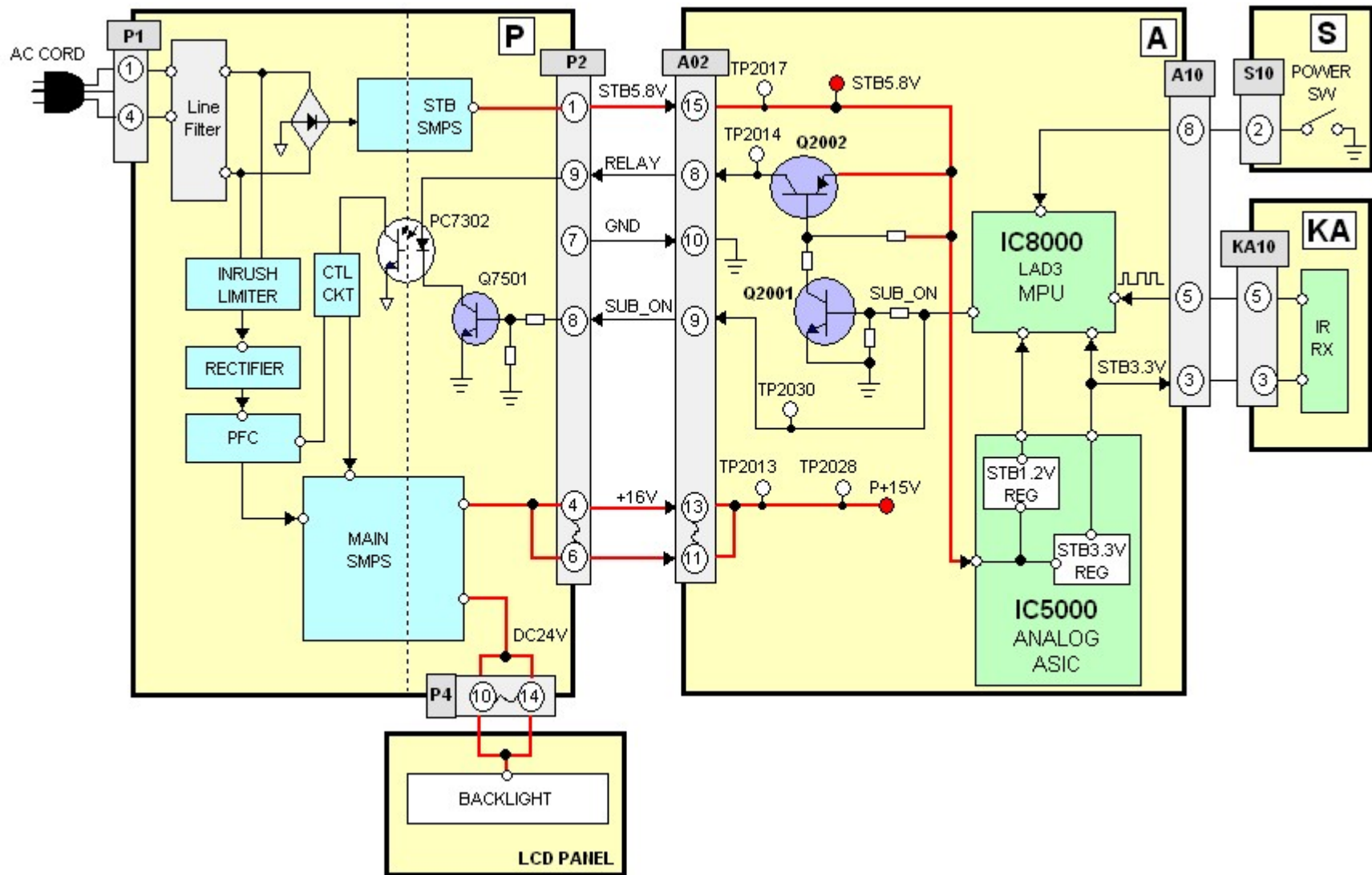
The STB3.3V from the Analog ASIC (IC5000), besides being applied to the CPU, is also applied to the remote control receiver and the power LED on the K board through connector A1/K1 (pin 3).

When the CPU receives 3.3V and 1.2V, it outputs the SUB-ON command that is provided to the P board. This command triggers the switches on the P board and only lasts approximately 15 seconds. The function of this command is to turn on the circuit that generates the "F15V" on the P board.

The +16V from the P board is applied to the A board through connector P2 (pins 4 through 6). This voltage is applied to several voltage regulators to generate the SUB voltages used by the A board for a self-check operation.

If the STB5V is missing, the TV is dead (No power)

TC-L37DT30 Power On Operation



TC-L37DT30 Power On Operation

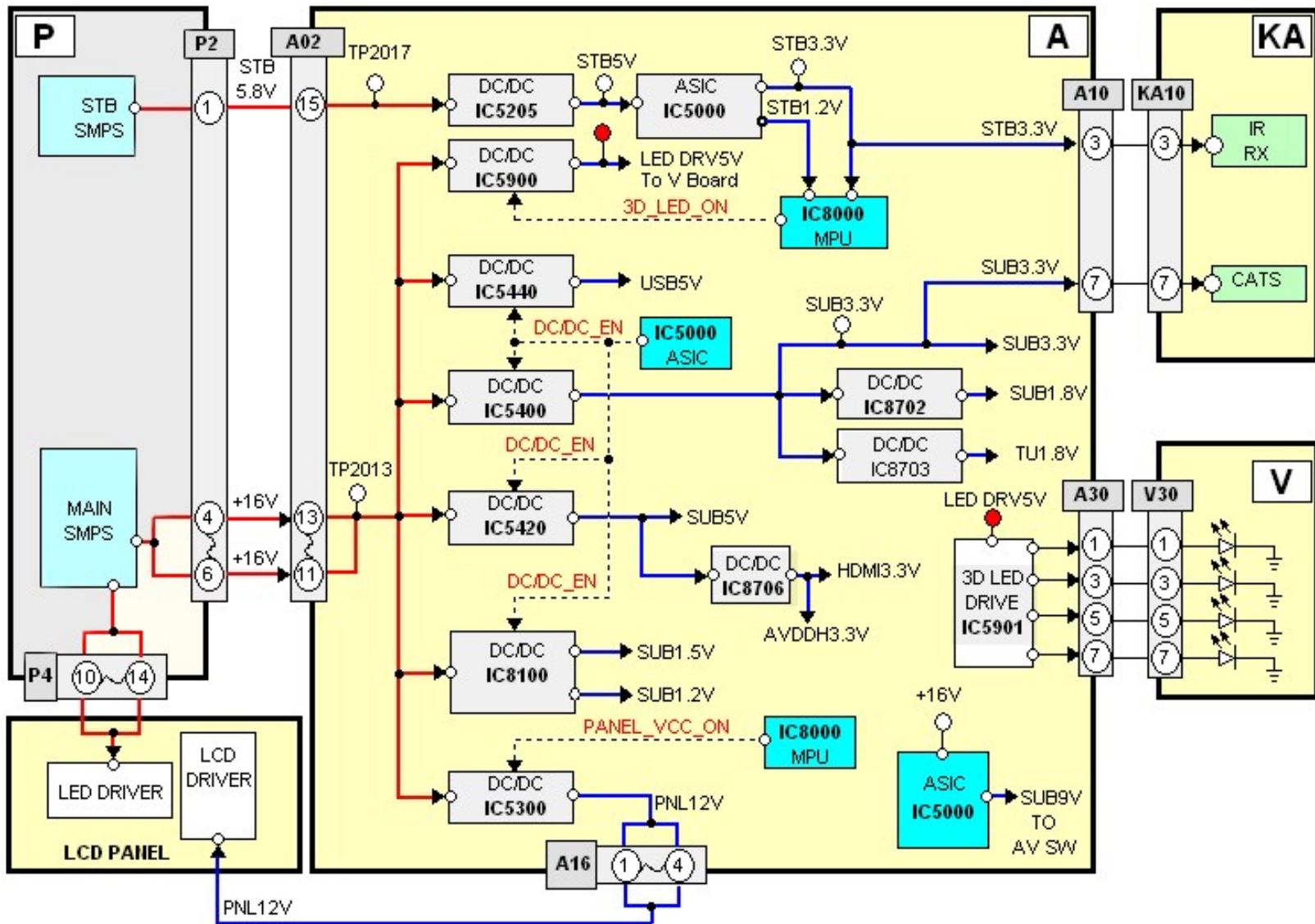
When the power button of the TV or remote control is pressed, The MPU (IC8000) of the A board outputs the TV_SUB_ON command to turn on the transistors Q2001 and Q2002 which provide STB5V to the photo-coupler located on the power supply board. The STB5V enters the power supply board via pin 9 of connector P2. The TV_SUB_ON command is also connected directly to the power supply to turn on a transistor that provides a ground connection to the photo-coupler. When the photo-coupler turns on, the switched mode supply goes in operation to create the +16V or and DC24V supplies.

On the A-Board, the +16V is regulated to numerous voltages to power the A-Board, LCD Panel, and T-CON board.

The DC24V is applied to the LD-Board to power the circuit that controls the light output of the backlight LEDs.

Caution: The A and P boards in the unit are to be exchanged only. The “Tcon/LED drive board” is part of the LCD panel. If defective, the panel should be replaced.

TC-L37DT30 Voltage Distribution



TC-L37DT30 Voltage Distribution Explanation

The TV SUB On command of IC8000 triggered the P-Board into supplying +16V to the A board.

The +16V source, also known as the P15V, is supplied to numerous DC/DC converters to produce SUB and MAIN voltages.

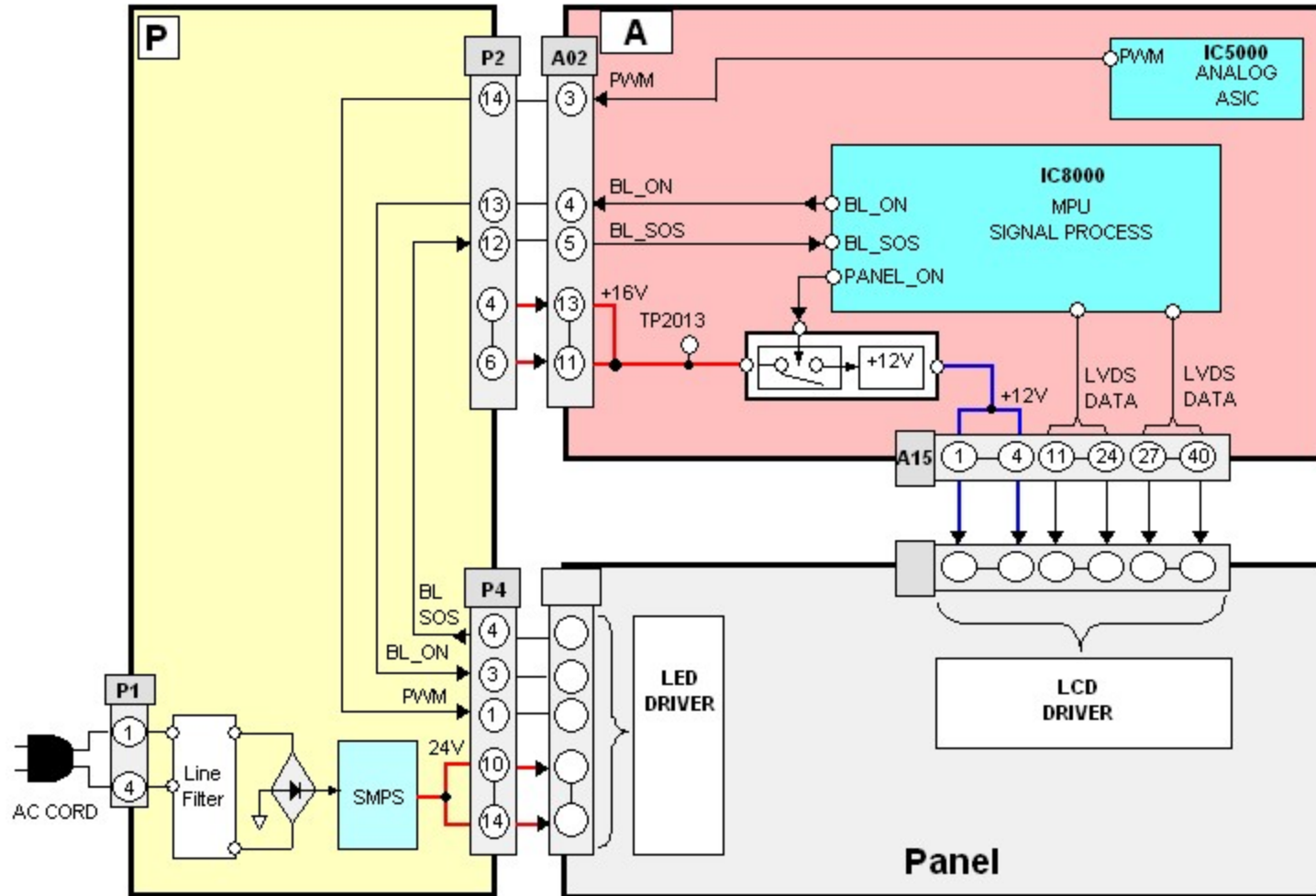
On the other hand, the DC/DC_EN command from IC5000 triggers several DC/DC converters to produce SUB5V, USB5V, SUB3.3V, SUB1.5V and SUB1.2V for the operation of the A-Board, KA-Board, and S-board. Some of these voltages are monitored by IC5000 and IC8000 for their presence. If one of the monitored voltages is missing, a shutdown is triggered and a blink code generated.

The 3D_LED_ON command of IC8000 turns on the LED_DRV5V DC/DC converter to power the 3D IR Transmitter used to synchronize the 3D glasses.

A SUB9V source is also created by a DC/DC converter located inside IC5000. This voltage is applied to the AV Switch IC.

Provided by IC8000, the panel VCC-ON command turns on the Panel 12V DC/DC converter to produce 12V for the operation of the T-CON circuit.

TC-L42E3 LED Backlight Control



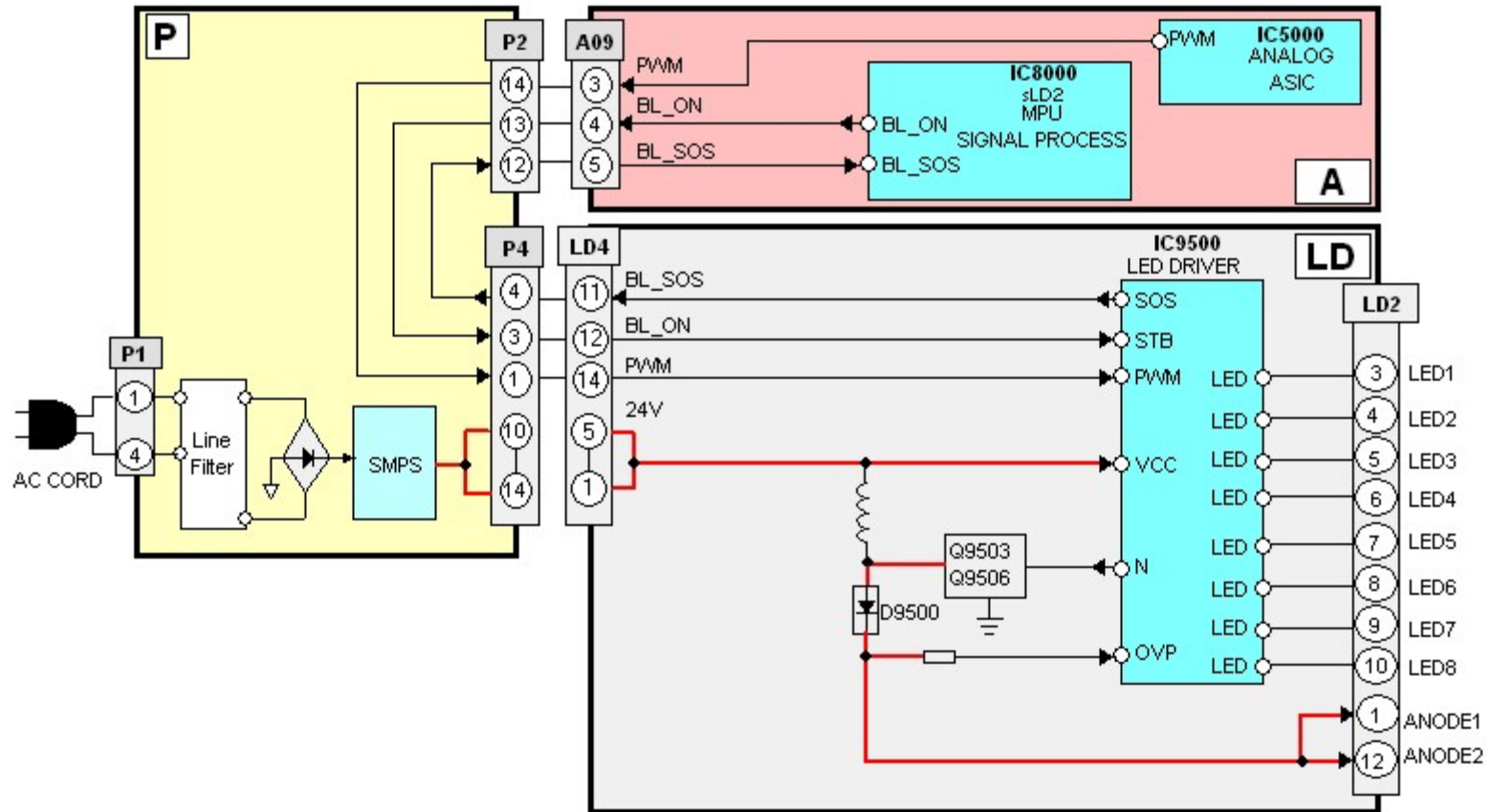
TC-L42E3 LED Backlight Control Explanation

The LED Drive circuit receives 24V from the SMPS.

When IC8000 is satisfied of the presence of all the monitored sub-voltages, it provides the Backlight_On command to turn on the LED drive circuit. This command enters the P-Board via pin 13 of connector P2 and travels to the LCD panel to turn on the LED drive circuit. The backlight control signal, PWM, is delivered to the LED drive circuit via pin 1 of connector P4 to control the brightness of the LEDs. The PWM signal is dependent on user settings and picture content. An artificial intelligence circuit is used to manipulate the PWM signal for picture quality and reduced power consumption. The LED drive circuit is responsible for controlling the amount of current that passes through the LEDs.

To avoid catastrophic failures, when the LED backlight control circuit is defective, the BACKLIGHT_SOS command is output to IC8000 to trigger the shutdown of the TV. The power LED blinks one time.

TC-L37E3 LED Backlight Power Circuit



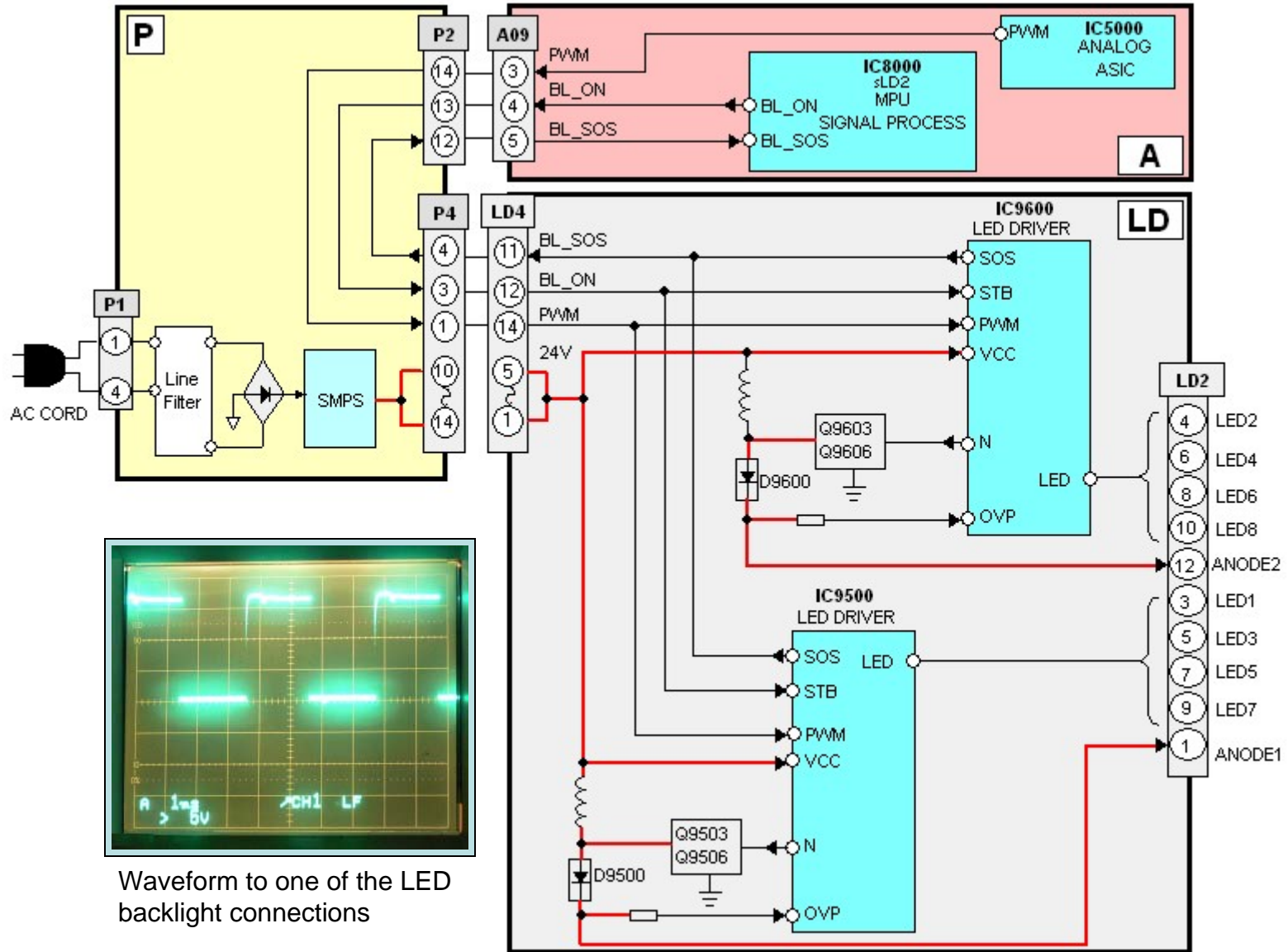
TC-L37E3 LED Backlight Power Circuit

This circuit diagram on the previous page is an example of the type of LED drive circuit that exists inside the LCD panel

The LED Drive circuit receives 24V from the SMPS. IC8000 provides the Backlight_On command to turn on the LED drive circuit. This command enters the P-Board via pin 13 of connector P2 and travels to the LD board to turn on the LED drive circuit. The backlight control signal, PWM, is delivered to the LED drive circuit via pin 1 of connector P4 to control the brightness of the LEDs. The PWM signal is dependent on user settings and picture content. An artificial intelligence circuit, located inside IC8000, is used to manipulate the PWM signal for picture quality and reduced power consumption. IC9500 is a boost regulator. Using the PWM signal, it controls the amount of voltage and current applied to the upper and lower Panel's backlight LEDs.

To avoid catastrophic failures, when the LED backlight control circuit is defective, the BACKLIGHT_SOS command is output to IC8000 to trigger the shutdown of the TV. The power LED blinks one time.

TC-L42D30 LED Backlight Power Circuit



TC-L42D30 LED Backlight Power Circuit

This circuit diagram on the previous page is an example of the type of LED drive circuit that exists inside the LCD panel

The LED Drive circuit receives 24V from the SMPS. IC8000 provides the Backlight_On command to turn on the LED drive circuit. This command enters the P-Board via pin 13 of connector P2 and travels to the LD board to turn on the LED drive circuit. The backlight control signal, PWM, is delivered to the LED drive circuit via pin 1 of connector P4 to control the brightness of the LEDs. The PWM signal is dependent on user settings and picture content. An artificial intelligence circuit, located inside IC8000, is used to manipulate the PWM signal for picture quality and reduced power consumption. IC9500 and 9600 are boost regulators. Using the PWM signal, they control the amount of voltage and current applied to the upper and lower backlight LEDs of the panel.

To avoid catastrophic failures, when the LED backlight control circuit is defective, the BACKLIGHT_SOS command is output to IC8000 to trigger the shutdown of the TV. The power LED blinks one time.

TC-L37DT30 CPU Commands Explanation

TV SUB ON ①

The SYSTEM MPU on the A board outputs the “TV SUB ON” command (3.2V) when the power is turned on. This command is used to turn on the circuit in the power supply that generates +16V or P15V and DC24V.

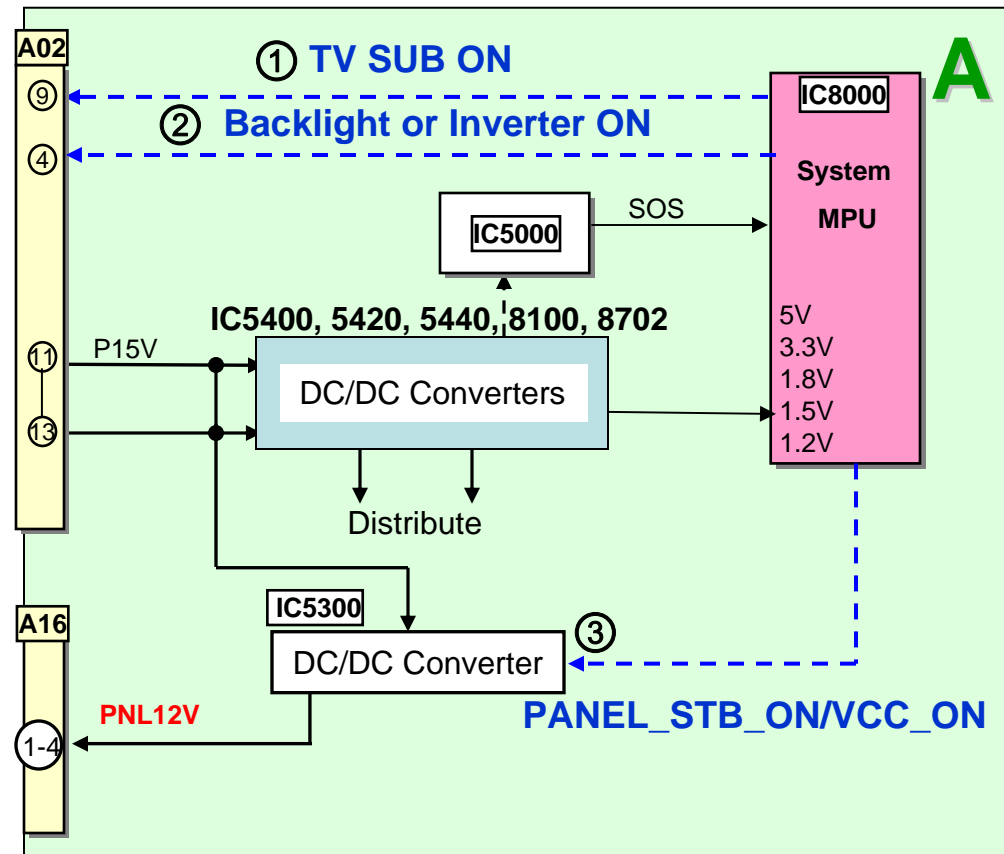
P15V is provided to the A board to generate the sub-voltages used by the signal process circuit. The sub-voltages are confirmed by ASIC IC5000.

Backlight ON ②

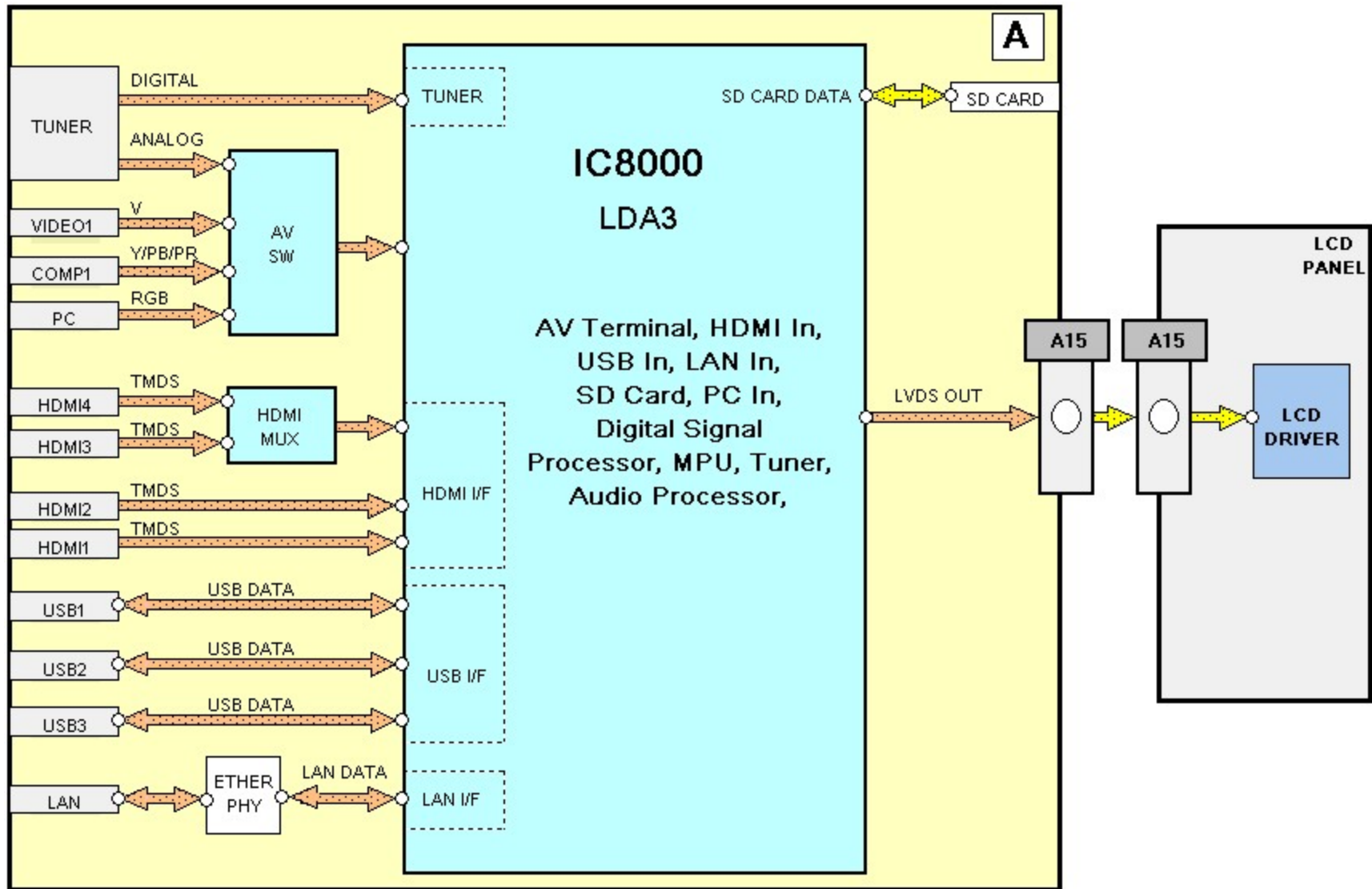
After confirming the presence of the sub-voltages, the “Backlight ON” command is applied to the P board and subsequently the LCD panel to turn on the circuit that controls the backlight.

Panel STB ON / VCC ON ③

On the other hand, IC8000 provides the Panel_STB_ON command to trigger the DC/DC converter IC5300 into supplying 12V to the LCD Panel or T-CON board.



TC-L37DT30 Video Input and Process



Signal Process Circuit Explanation

The main function of the A board is to select and process one of the incoming video signals. All analog video inputs, including Composite Video, Component Video, PC, and the composite video output of the tuner are all connected to a video switch for selection and output to IC8000 for further selection. Digital output signal of the tuner, LAN, HDMI inputs 1 and 2, JPEG data from the SD card slot and USB inputs are connected to IC8000 for selection. HDMI 2 and 4 enter a HDMI switch for selection and output to IC8000 for further selection. The video input signals enter IC8000 in their original formats.

All analog signals that enter IC8000 undergo digital to analog conversion. When the signal source signal is composite, a comb filter separates the video signal into Y and C (luminance and chrominance) signals. S-Video, which is already Y/C separated, simply passes through the comb filter. The signal is then converted to RGB data.

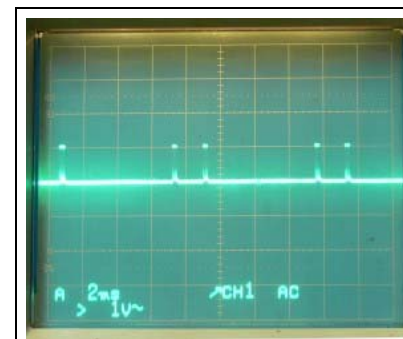
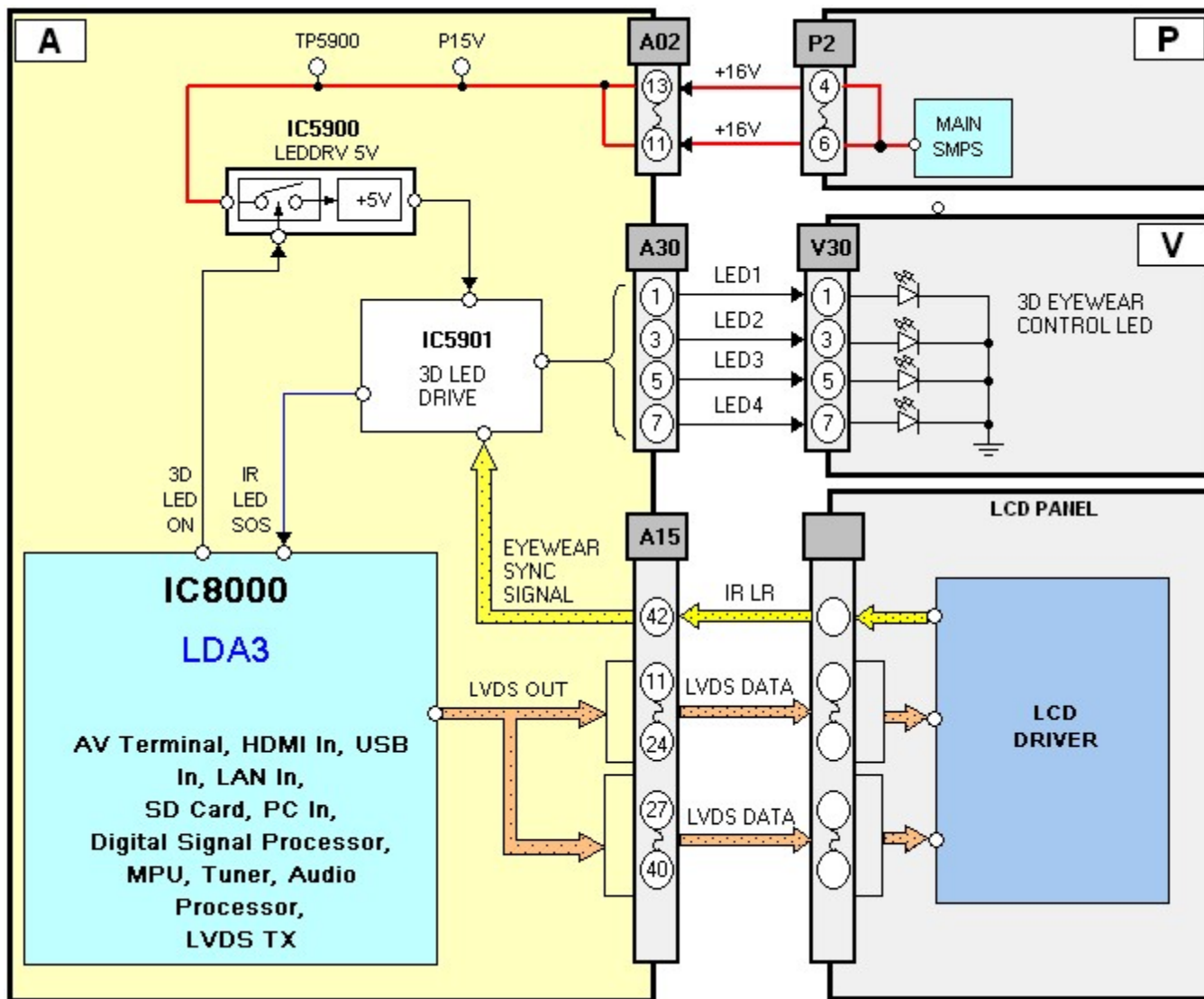
At the completion of this process, the format of the composite or S-Video signal is now the same as a digital 480i component signal. If the incoming video is in the 480p, 720P, 1080i, or 1080p format, the Y, Pb, and Pr signals undergo A/D (analog to digital) conversion only.

Digital television reception of the tuner is output in the form of an IF (Intermediate Frequency) signal, also known as the transport stream. The transport stream from the tuner enters the VSB I/F (Interface) section of IC8000 where the video signal is extracted and converted to digital RGB. The JPEG data of the SD card, HDMI, USB, LAN inputs of IC8000 are also converted into RGB data. The video input interface of IC8000 outputs the selected picture data to the video process circuit.

The Video Process section of the IC performs all picture control operations such as brightness, contrast, color, tint, etc. On Screen Display data such as channel numbers, Digital TV closed caption, and picture adjustments are mixed with the video data. The RGB data is then converted to dual 12 bit LVDS (Low Voltage Differential Signaling) and output to the LCD panel.

IC8000 handles all video applications. It serves as the controller that monitors all operations of the TV.

TC-L37DT30 Eyewear Control Signal



Output waveform to IR Transmitter (V Board)
3D Mode Only

Connector A30	
Pin 1	2.30Vdc
Pin 3	2.30Vdc
Pin 5	2.30Vdc
Pin 7	2.30Vdc

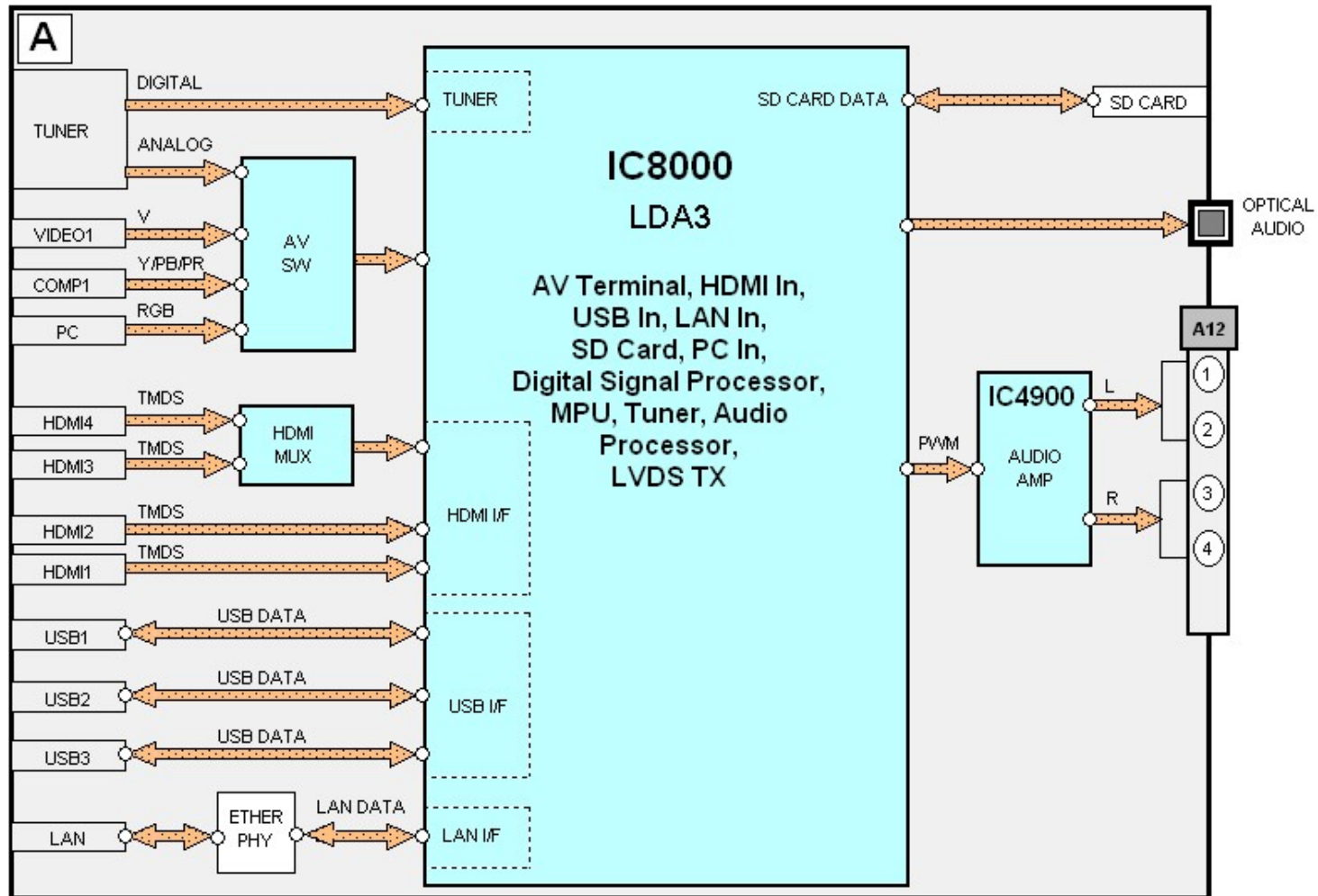
Voltages are always present, 2D or 3D mode.

TC-L37DT30 Eyewear Control Signal

The circuit that handles 3D processing of the LCD TV is located inside the LCD panel. Neither a block diagram nor a schematic diagram is available for the basic understanding of the 3D operation. The one thing that is known is that the eyewear sync signal, developed inside the LCD panel, is output to the A board via pin 42 of the LVDS connector (A15). On the A-Board, it enters IC5901 where it is used as a reference to create the signal needed to synchronize the 3D glasses. The output signal of IC5901 is provided to the LEDs of the V-Board for infrared transmission to the eyewear.

To turn on the IR transmitter, IC8000 outputs the 3D_LED_ON command to trigger the DC/DC converter IC5900 into outputting LED_DVR5V.

Audio Process Circuit



All the audio signals' selection and processing are performed by the Main CPU/Signal Processor IC (IC8000). The digital audio signal from IC8000 is output to the optical audio output jack as PCM/Dolby Digital.

Serial data is output to the audio amplifier IC (IC4900). The output of IC4900 is connected to the speakers.

SOS Detect (Shutdown)

TC-L37DT30 Power LED Diagnostic Codes

When an abnormality is detected, the protection circuit resets the unit to the standby mode. The (A) board microprocessor causes the power LED to blink a number of times. The number of blinks points to the circuit where the abnormality is detected.

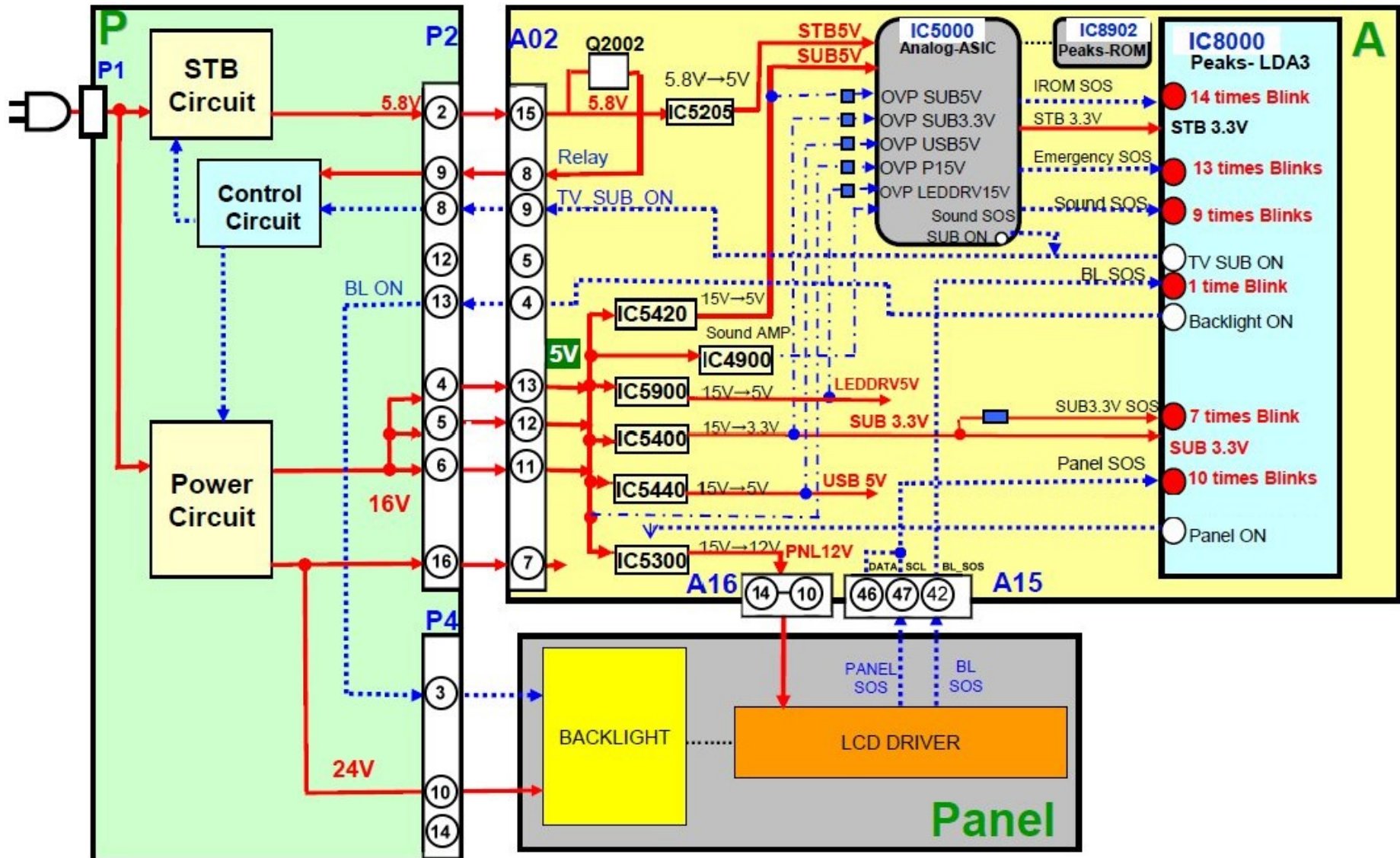
Blinking times	Contents	Check Point
1	BACKLIGHT_SOS	P BOARD LCD Panel
7	SUB 3.3V SOS	A-BOARD
9	SOUND SOS	A-BOARD SPEAKER
10	LP1 SOS	LCD PANEL
13	EMERGENCY SOS	A-BOARD
14	IROM SOS	A-BOARD

Protection circuits are incorporated in the unit to prevent the failure of a single circuit or component from creating catastrophic damage. A shutdown condition occurs when there is an over voltage, a short or a drop in any of the voltage lines.

Example of the power LED blinking 3 times



TC-L37DT30 Shutdown Circuit Block Diagram



TC-L42D30 Power LED Diagnostic Codes

When an abnormality is detected, the protection circuit resets the unit to the standby mode. The (A) board microprocessor causes the power LED to blink a number of times. The number of blinks points to the circuit where the abnormality is detected.

Blinking times	Contents	Board
1	BACK LIGHT_SOS	P BOARD LCD PANEL
3	Tuner SOS	(Not Used)
4	P15V SOS	A/P-BOARD
7	SUB 3.3V_SOS	A-BOARD
9	SOUND SOS	A Board SPEAKER
10	ZWEI2 SOS	LCD PANEL
13	EMERGENCY_SOS	A BOARD

Example of the power LED blinking 3 times

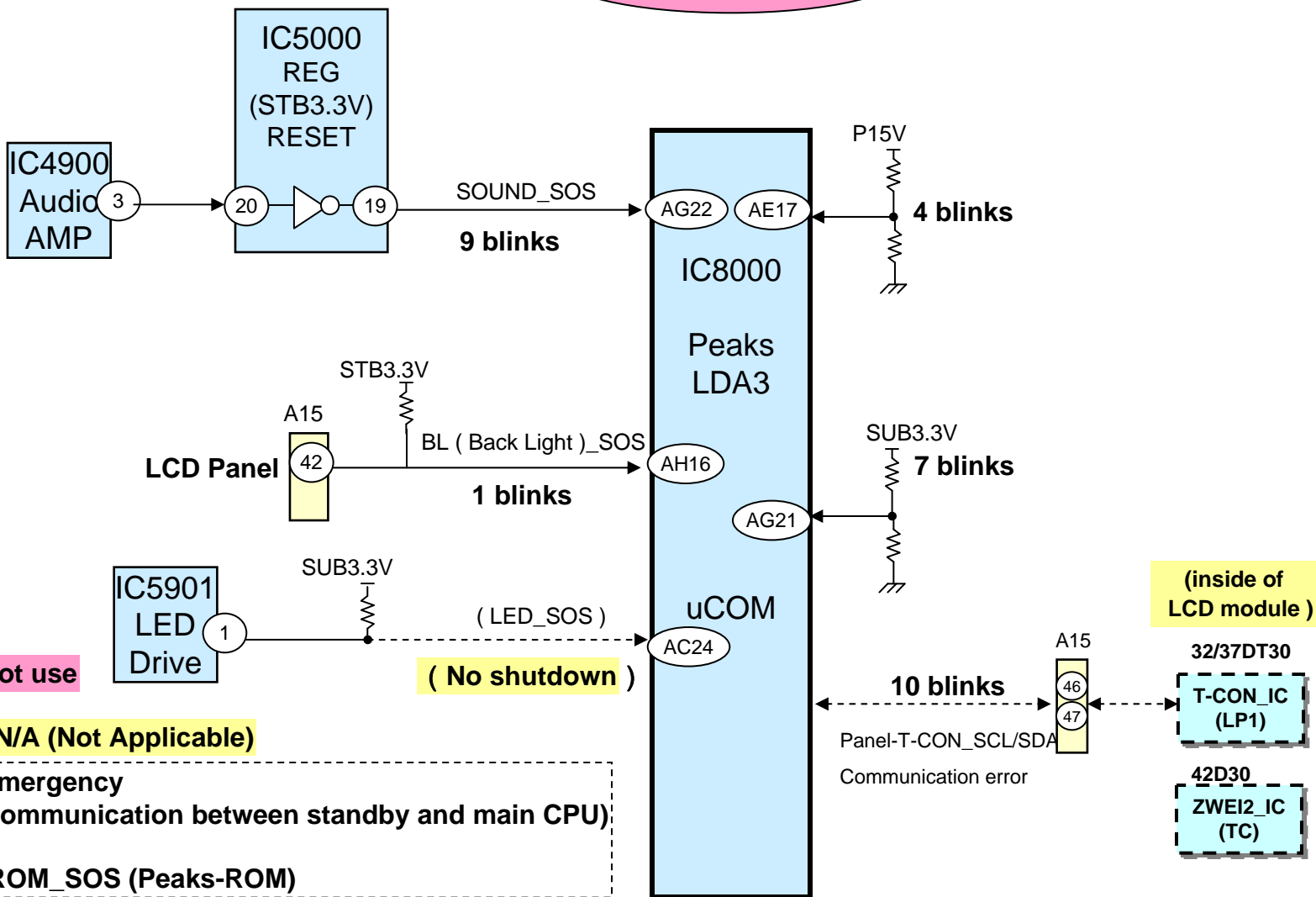


Protection Circuit (TC-L32/37DT30,TC-L42D30)

A Board (TNPH0958)

< SOS signal >

Peaks LDA3



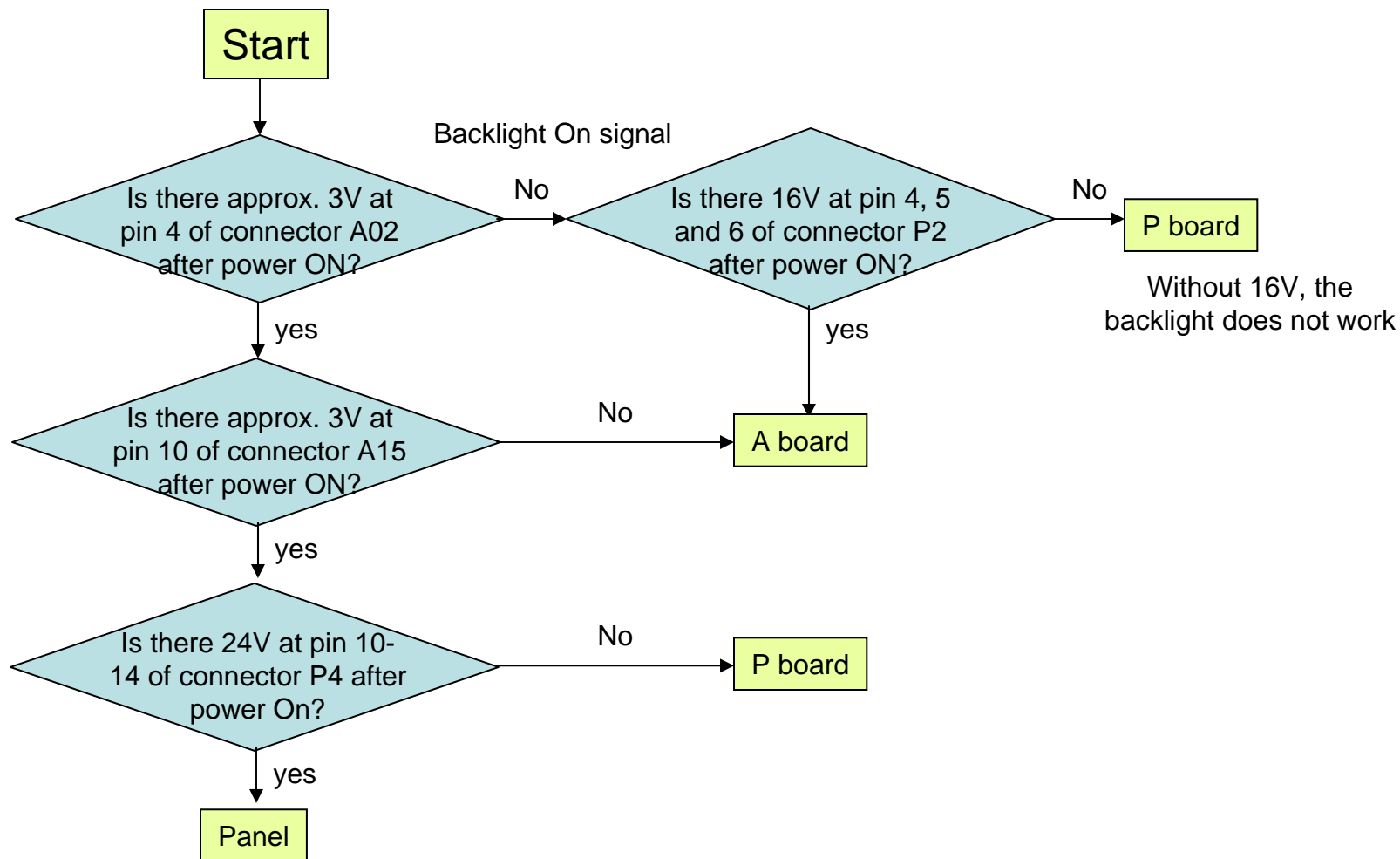
3 blinks : Not use

12 blinks : N/A (Not Applicable)

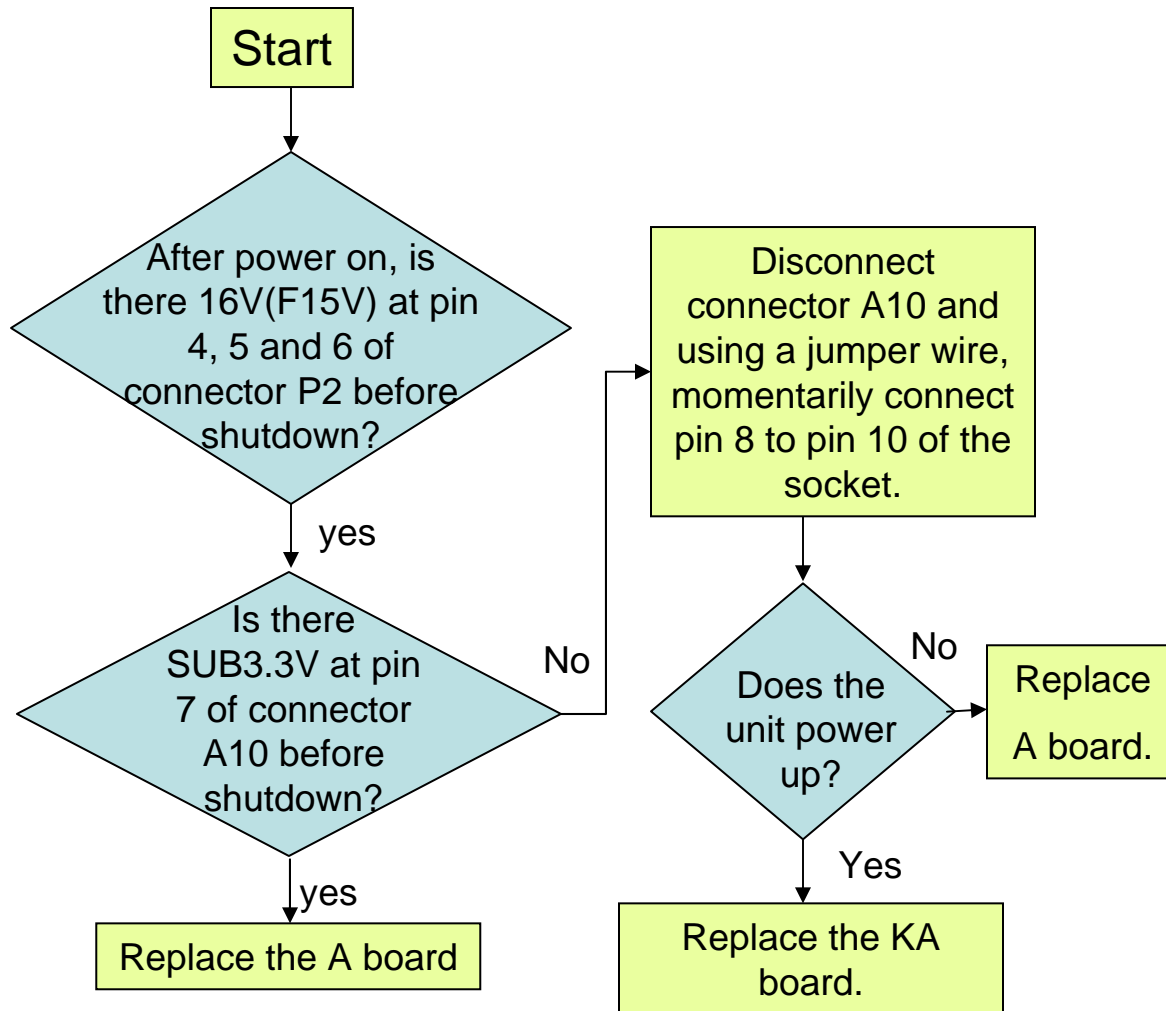
13 blinks: Emergency
(communication between standby and main CPU)

14 blinks: IROM_SOS (Peaks-ROM)

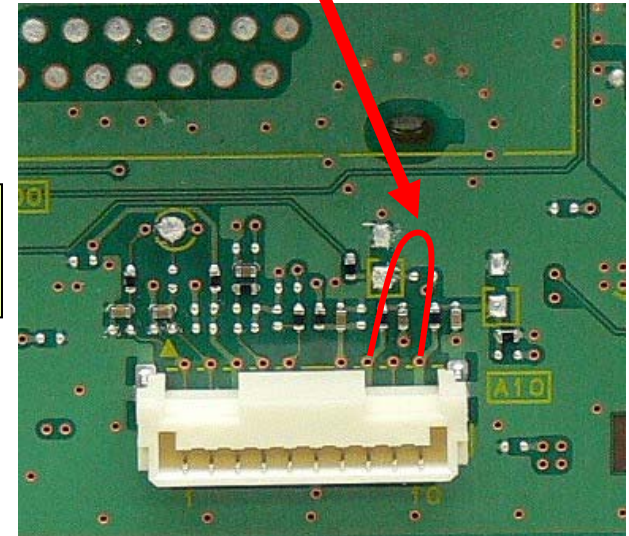
One Blink of the power LED (TC-L37DT30)



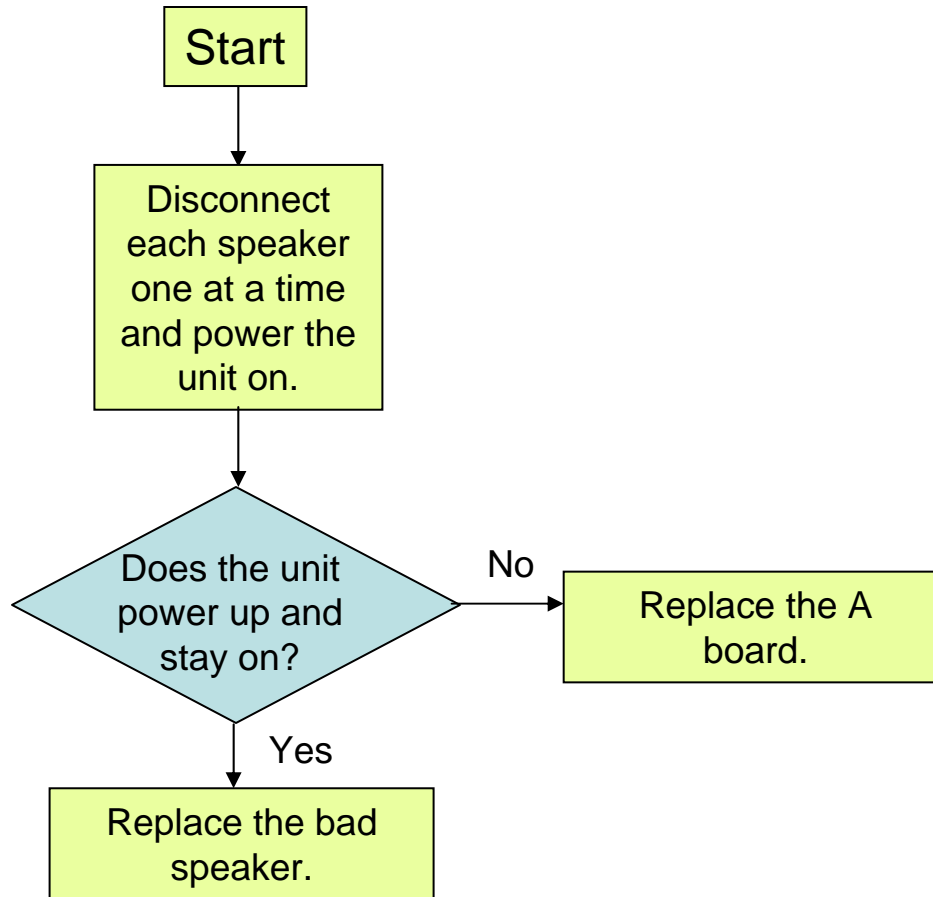
Seven Blinks of the power LED (TC-L37DT30)



Jumper across pins 8 and 10 to simulate the power switch when connector A10 is disconnected



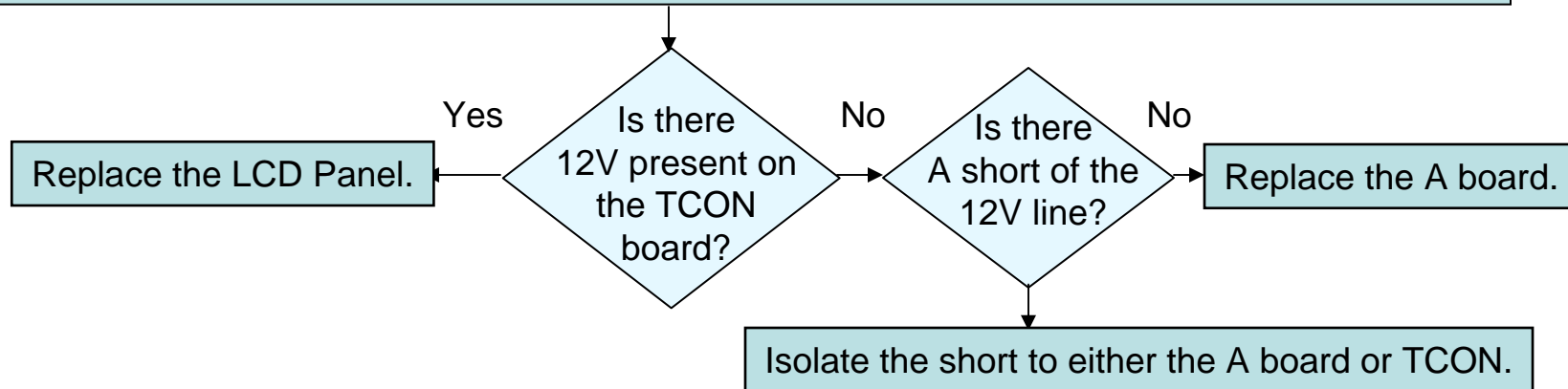
Nine Blinks of the Power LED (TC-L37DT30)



10, 13 and 14 Blinks of the Power LED (TC-L37DT30)

10 Blinks

Communication problem between the TCON board (LCD panel) and system control



13 Blinks

Communication problem between IC 8000(Peaks LDA3) and IC5000 (STB micom)

Replace the A board.

14 Blinks

IC8000(Peaks LDA3) and IC8902 (Peaks EEPROM) read error

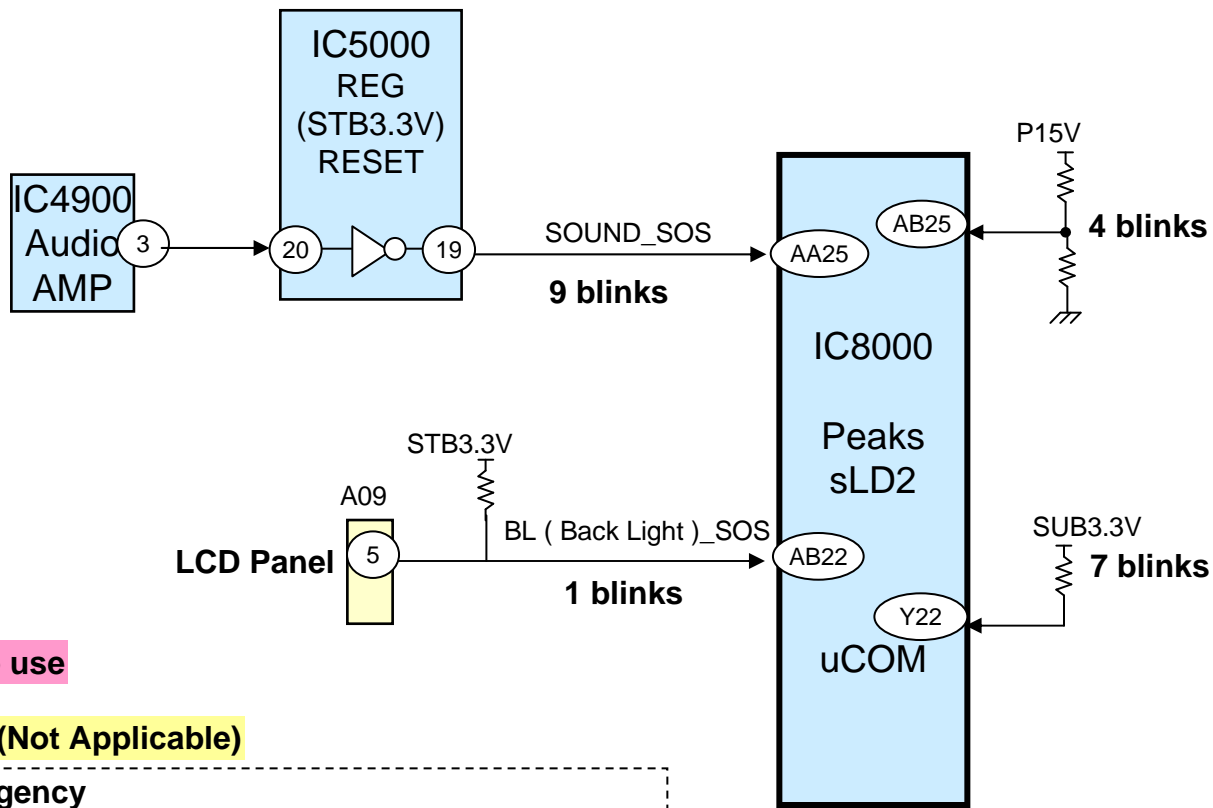
Replace the A board.

Protection Circuit (TC-L42E3)

A Board (TNP0926)

< SOS signal >

Peaks sLD2



3,10 blinks : No use

12 blinks : N/A (Not Applicable)

13 blinks: Emergency
(communication between standby and main CPU)

14 blinks: IROM_SOS (Peaks-ROM)

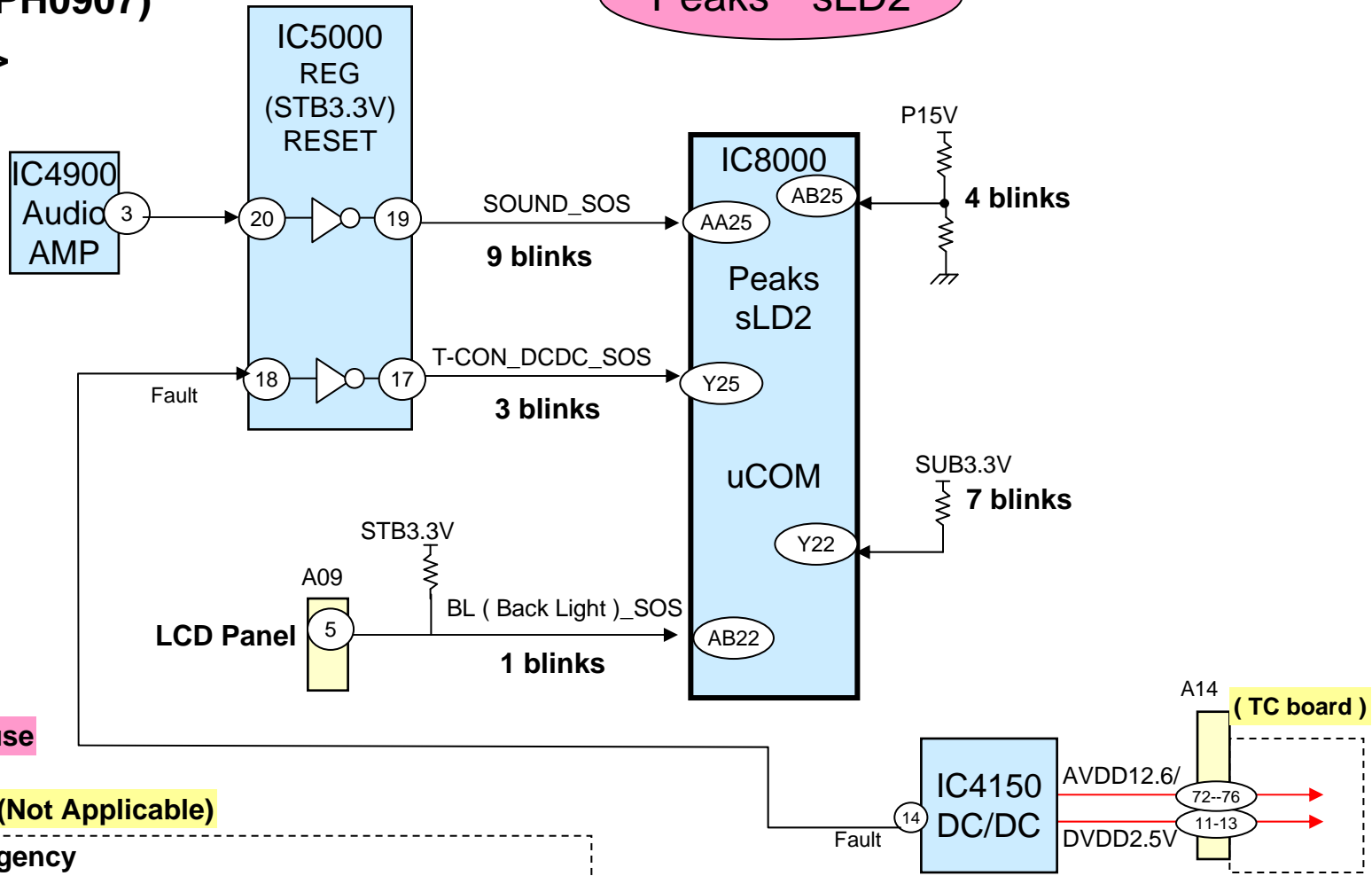
Protection Circuit (TC-L37E3/L32E3 and TC-L32X30)

A Board (TNPH0906)

A Board (TNPH0907)

< SOS signal >

Peaks sLD2



10 blinks : No use

12 blinks : N/A (Not Applicable)

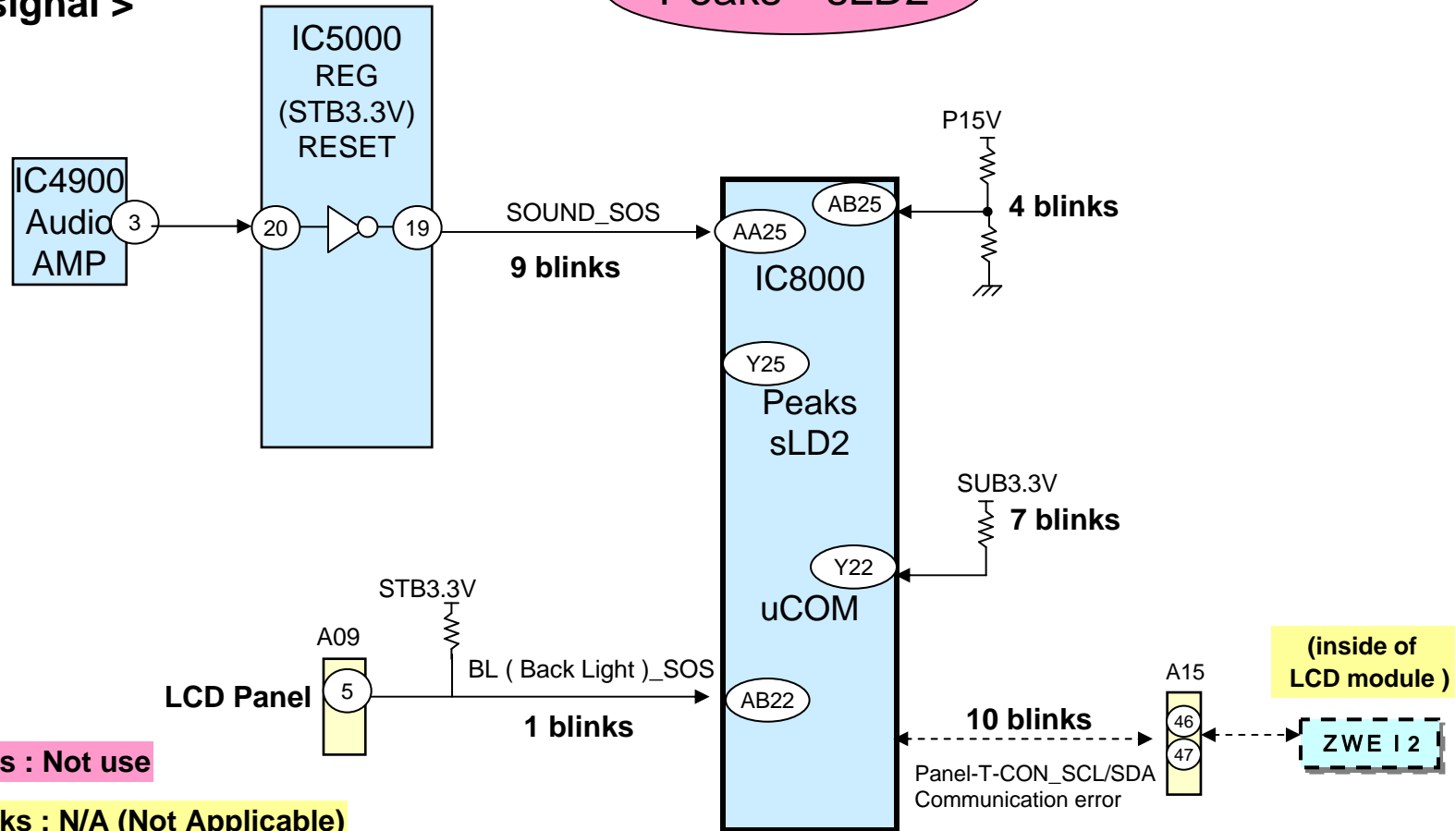
13 blinks: Emergency
(communication between standby and main CPU)

14 blinks: IROM_SOS (Peaks-ROM)

Protection Circuit (TC-L42E30)

A Board (TNP0906)

< SOS signal >



3 blinks : Not use

12 blinks : N/A (Not Applicable)

13 blinks: Emergency
(communication between standby and main CPU)

14 blinks: IROM_SOS (Peaks-ROM)

Nile-T-CON SOS Detection

blinks	SOS	content
1	BL_SOS	Back light problem
2	SUB1.8V_SOS	Abnormal SUB1.8V
3	SUB1.2V_SOS	Abnormal SUB1.2V
4	POWER_SOS	Power for PANEL abnormal(AVDD12.6V,DVDD2.5V)
9	T-CON_SOS	Communication error with T-CON-IC (Double-speed type)
10	SUB3.3V_SENSE	Abnormal SUB3.3V
11	T-CON-DCDC_SOS	T-CON-DCDC error
12	SOUND_SOS	Audio-AMP error

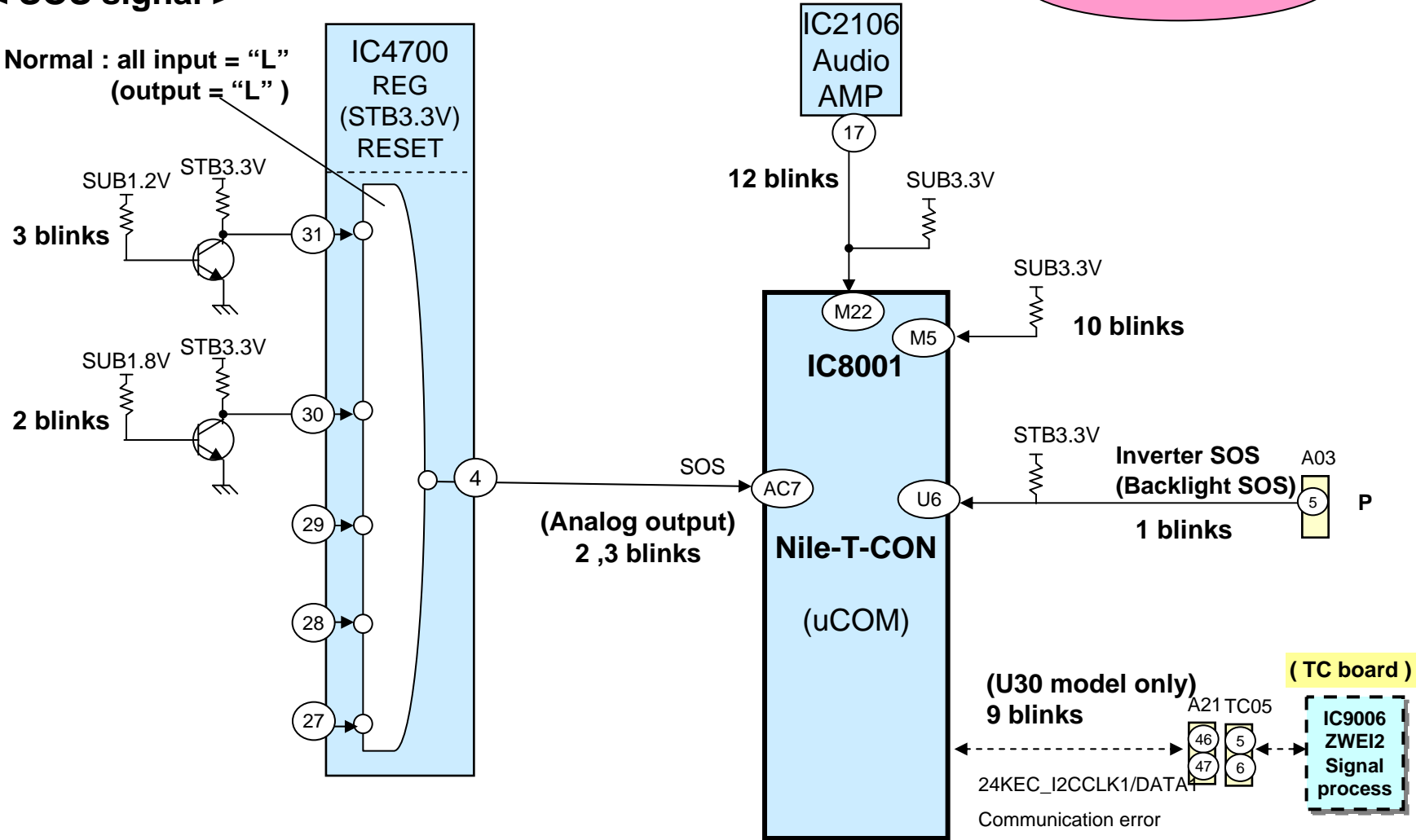
blinks	SOS	19C30	24C3	3232C	32LX34	32C3	32U3	37U3	42U30
1	BL_SOS	○	○	○	○	○	○	○	○
2	SUB1.8V_SOS	×	×	×	×	×	○	○	○
3	SUB1.2V_SOS	×	×	×	×	×	○	○	○
4	POWER_SOS	○	×	○	○	○	○	○	×
9	T-CON_SOS	×	×	×	×	×	×	×	○
10	SUB3.3V_SENSE	○	○	○	○	○	○	○	○
11	T-CON-DCDC_SOS	○	×	○	○	○	○	○	×
12	AOUND_SOS	○	○	○	○	○	○	○	○

Protection Circuit (TC-L42U30)

A Board (TNP0904**)

< SOS signal >

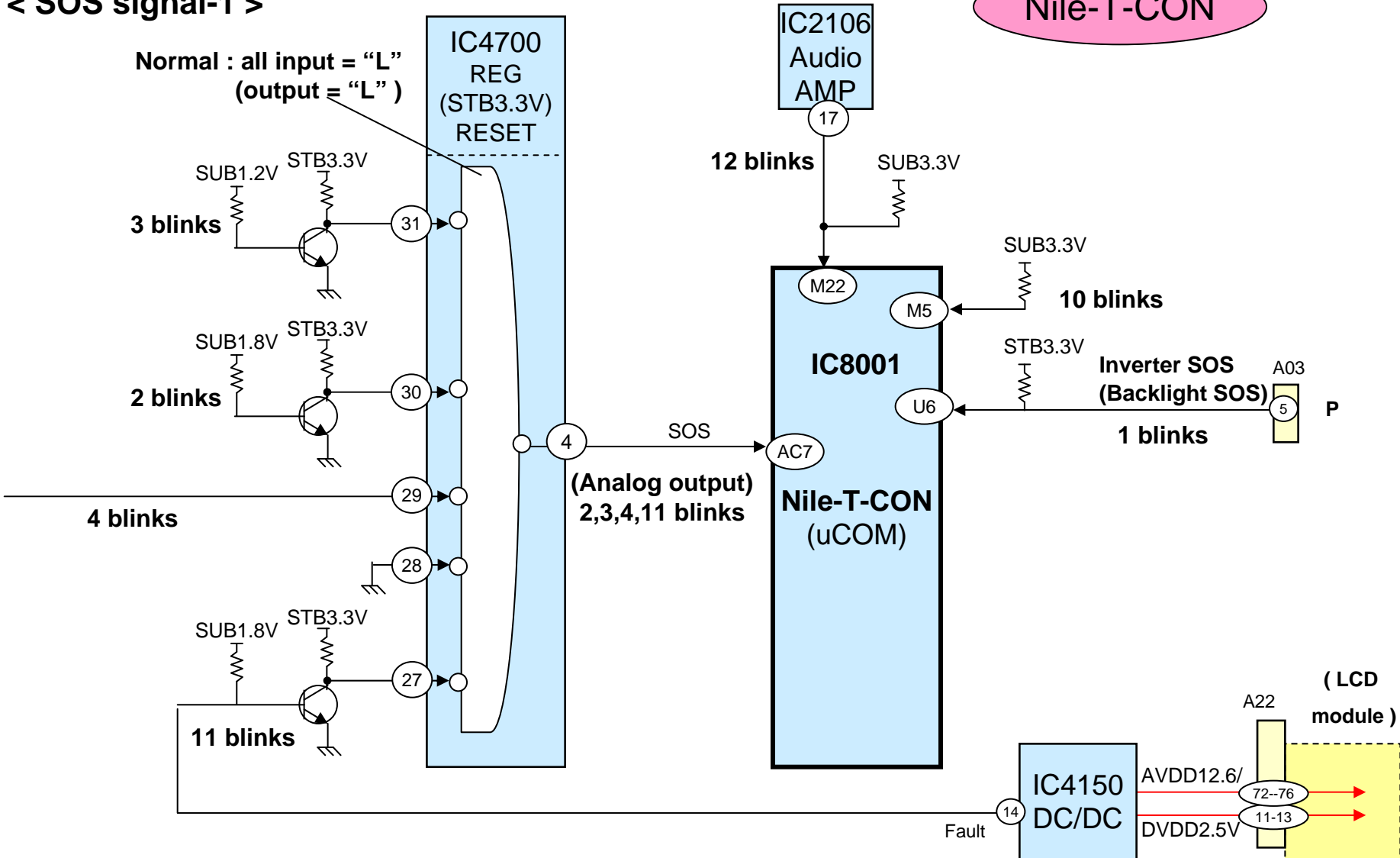
Normal : all input = "L"
(output = "L")



Nile-T-CON

Protection Circuit (TC-L37U3)

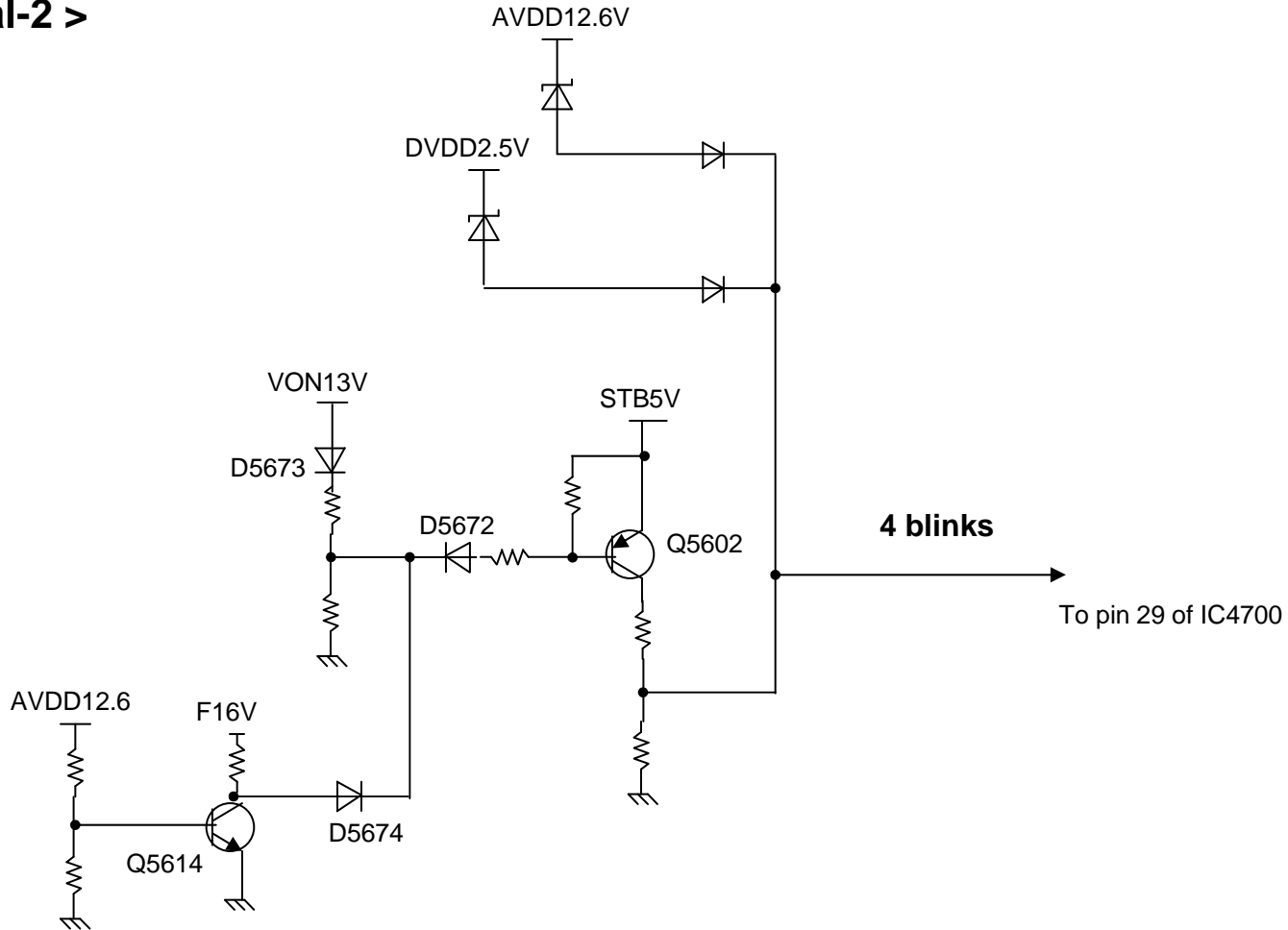
A Board (TNP0904**)
 < SOS signal-1 >



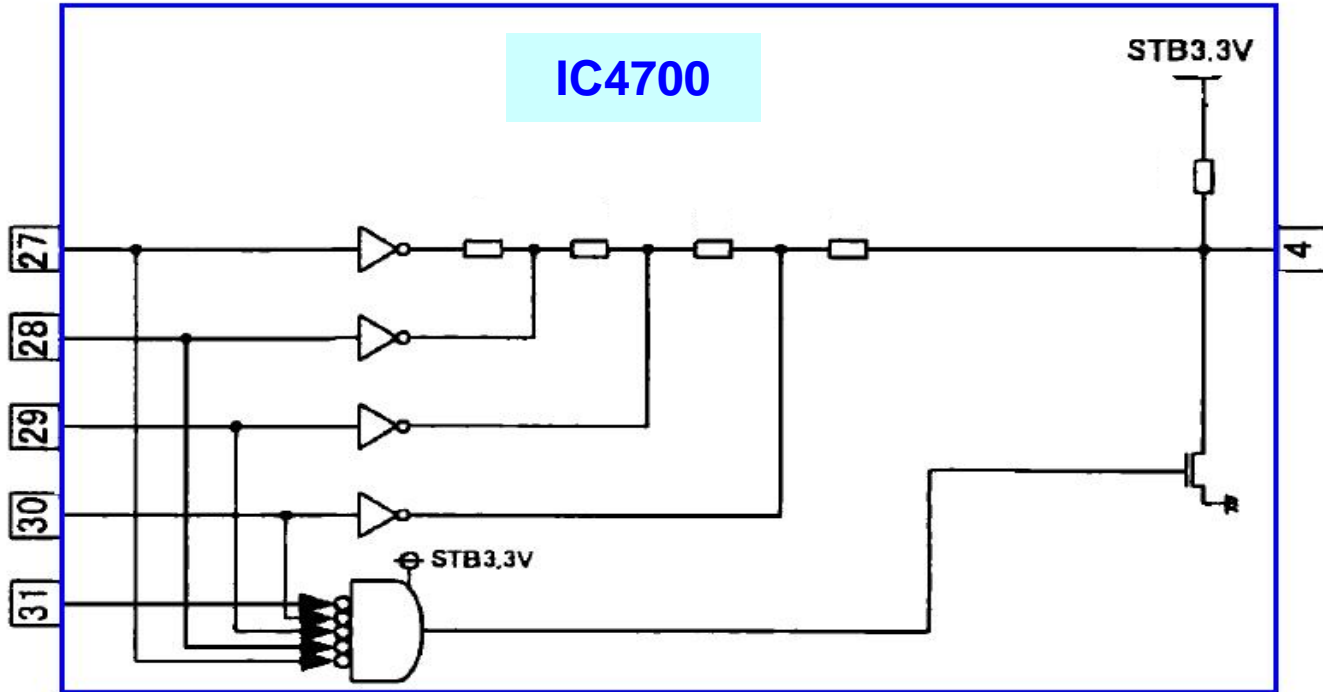
Protection Circuit TC-L37U3

A Board (TNP0904**)

< SOS signal-2 >



IC4700 Block Diagram



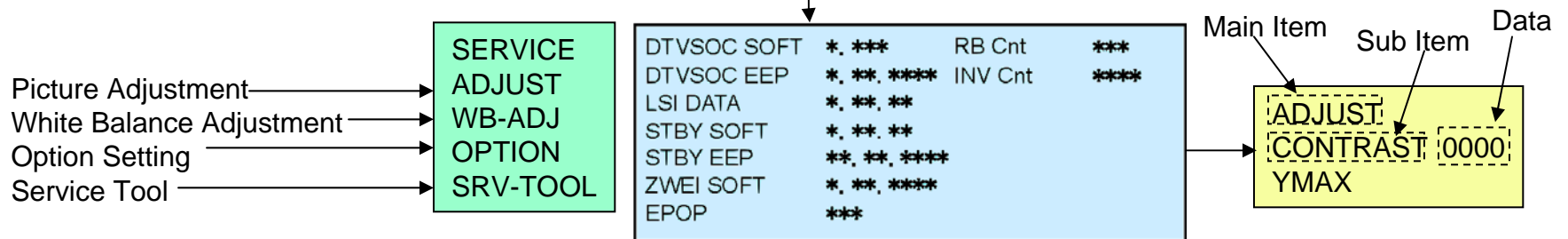
INPUT					OUTPUT
Pin31	Pin27	Pin28	Pin29	Pin30	Pin4
L	L	L	L	L	0.1V
H	L	L	L	L	3.3V
X	H	L	L	L	2.55V
X	X	H	L	L	1.95V
X	X	X	H	L	1.35V
X	X	X	X	H	0.75V

TC-L42D30 Service Mode

How to enter the Service Mode

While pressing [VOLUME (-)] button of the main unit, press [INFO] button of the remote control three times within 2 seconds.

Software Version



Key command

[1] button...Main items Selection in forward direction

[2] button...Main items Selection in reverse direction

[3] button...Sub items Selection in forward direction

[4] button...Sub items Selection in reverse direction

[VOL] button...Value of sub items change in forward direction (+), in reverse direction (-)

How to exit

Turn the television off with the [POWER] button on the main unit or the [POWER] button on the remote control.

How to Enter the Service Mode's SRV-TOOL

How to access

1. Select [SRV-TOOL] in Service Mode.
2. Press [OK] button on the remote control.

S
O
S

H
I
S
T
O
R
Y

SRV-TOOL	
TD2Microcode:0200b105	
Flash ROM : AD - DA	
PTCT : 00 . 00 . 00 . 00 . 00	Time 000040:40 Count 0000049

Display of SOS (Shutdown) History

SOS History (Number of LED blinks) indication.

From the left side; Last SOS, before Last, two occurrences before last, 2nd occurrence after shipment, 1st occurrence after shipment.

This indication except the 2nd and 1st occurrence after shipment will be cleared by reset.

To exit

Disconnect the AC cord from the wall outlet.

TC-L42D30 How to Enter the Self-check Mode

How to access:

1. Self-check display only:

While in TV reception mode, press the [VOLUME (-)] button on the main unit and simultaneously press the [OK] button on the remote control for 3 seconds or more.

2. Self-check display and forced to factory shipment setting:

While in TV reception mode, press the [VOLUME (-)] button on the main unit and simultaneously press the [MENU] button on the remote control for 3 seconds or more.

Self Check Screen

Self Check ---.XXXXXX - XXXXXX

PEAKS	OK
TUN	OK
AVSW	OK
STBY	Ok
MEM1	OK
MEM2	OK
ZWEI	OK
iPOD-CP	NG
ID	OK
HDMI-SW	OK

ROM CHECK: *****

Copyright Panasonic Corporation 2011

Panasonic

DISPLAY	Check Ref. No.	Description	Check Point
PEAKS	IC8000	PEAKS	A-Board
TUN	TU4801C	TUNER	A-Board
AVSW	IC3001	AV SWITCH	A-Board
STBY	IC8000	PEAKS (STM)	A-Board
MEM1	IC8902	EEPROM (PEAKS)	A-Board
MEM2	IC8901	EEPROM (STM)	A-Board
ZWEI		ZWEI2	LCD PANEL
iPOD-CP	IC3900	iPod-CP	A-Board
ID		ID	
HDMI-SW	IC4700	HDMI-SW	A-Board

NG_ Indicates a defective part.

When NG is displayed, replace the (A) board.

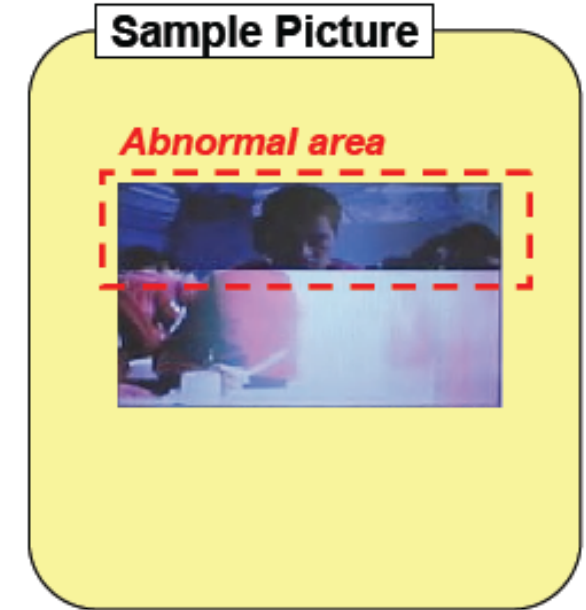
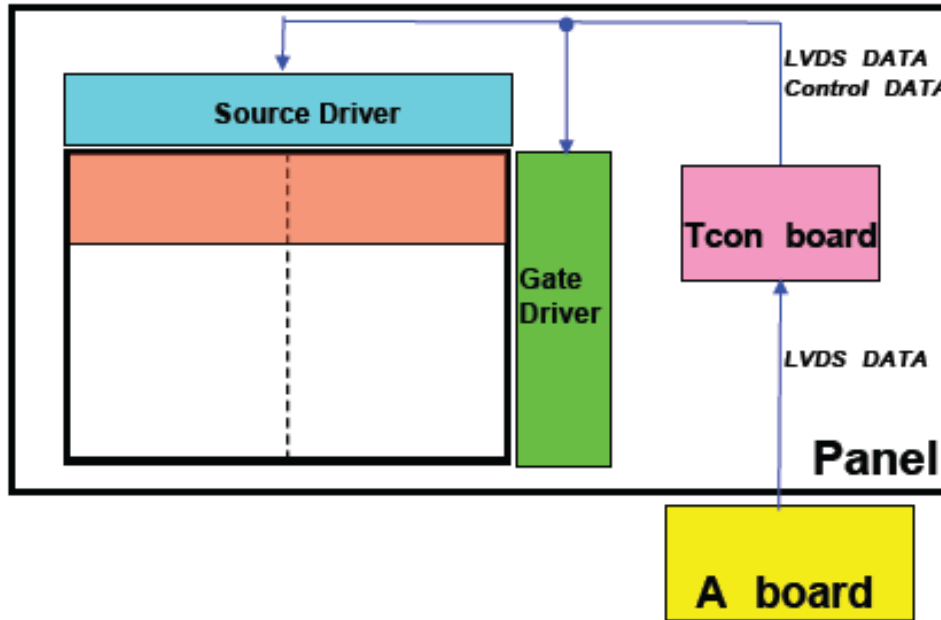
How to Exit

Disconnect the AC cord from wall outlet.

Troubleshooting Picture Problem

Horizontal Area Picture Problem

Horizontal area picture problem



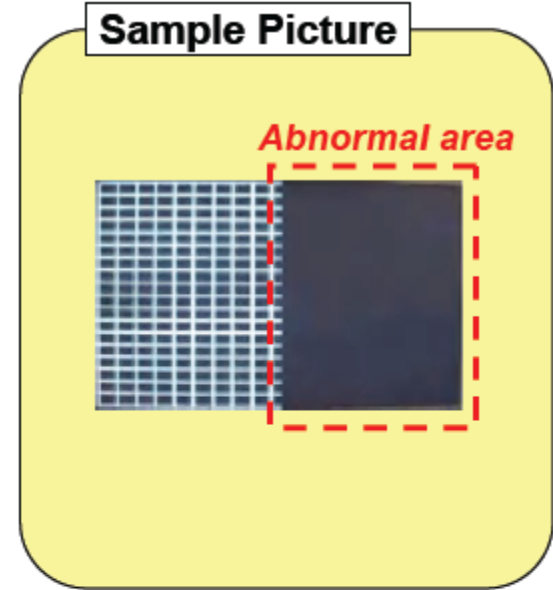
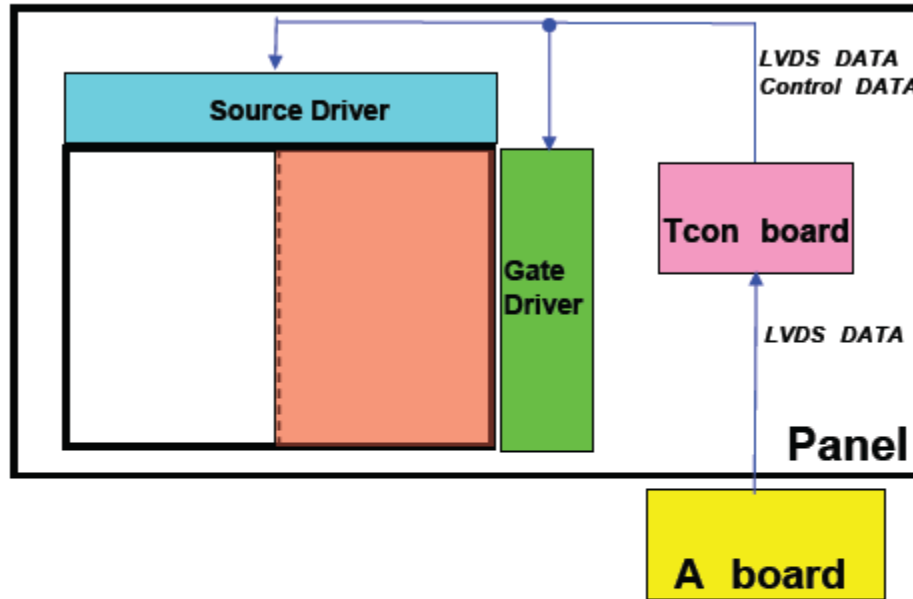
Action: Exchange the Panel.

Diagnosis

*The Gate driver is defective.
It is impossible to exchange the gate driver.
So, exchange the LCD panel.*

Vertical Area Picture Problem

Vertical area picture problem



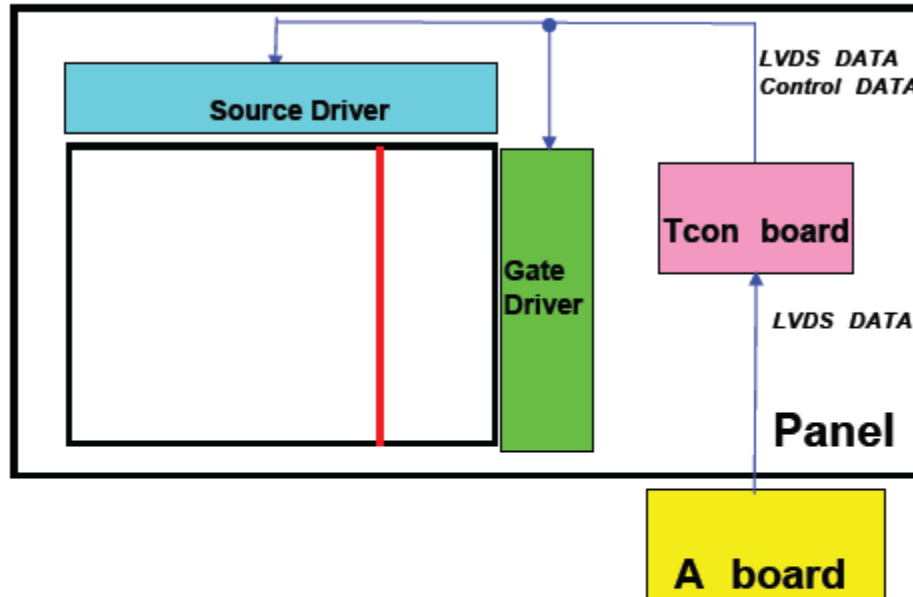
Action: Exchange the Panel.

Diagnosis

*In this case, the right half of the screen has trouble.
So, half of the source driver is defective.
It is impossible to exchange only the source driver.
So, exchange the LCD panel.*

Vertical Line/Bar Problem

Vertical line/bar problem

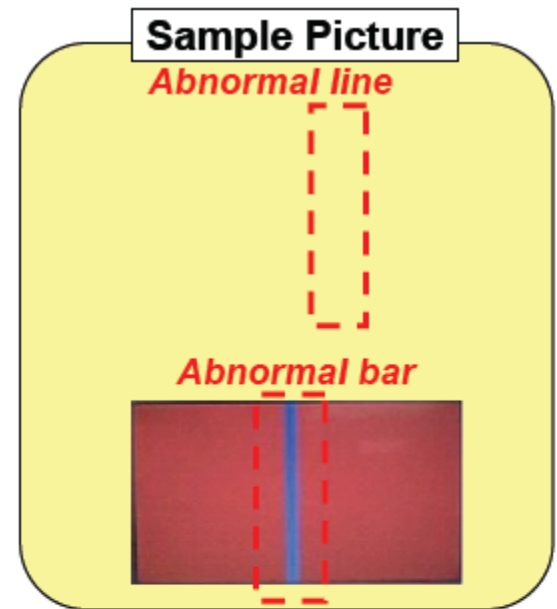


Action: Exchange Panel.

Diagnosis

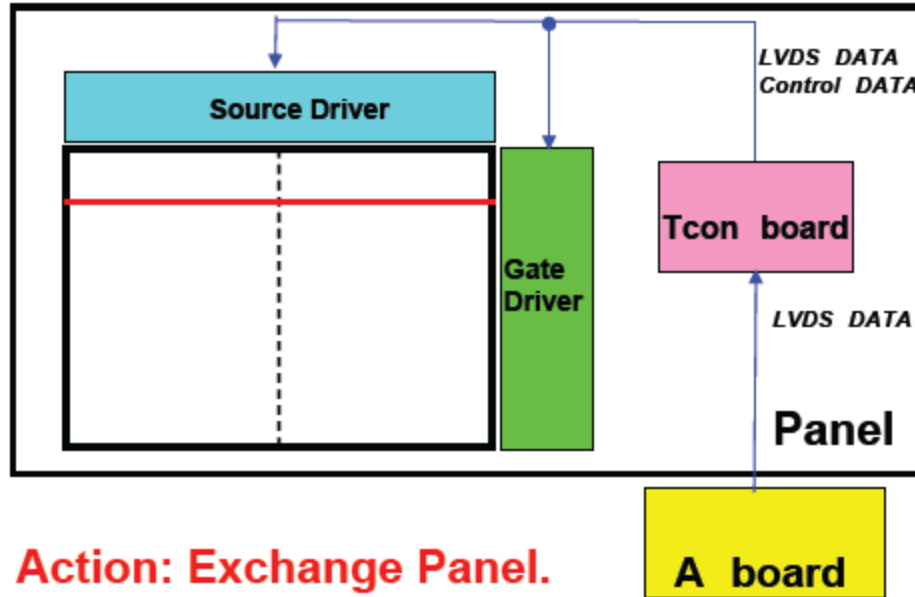
Thin vertical line problem is caused by a LCD panel defect.

If IC8000 (Peaks LDA3) on the A board is defective, many vertical lines would appear all over screen.



Horizontal Line Picture Problem

Horizontal line picture problem



Action: Exchange Panel.

A board

Sample Picture

Abnormal lines



Abnormal line



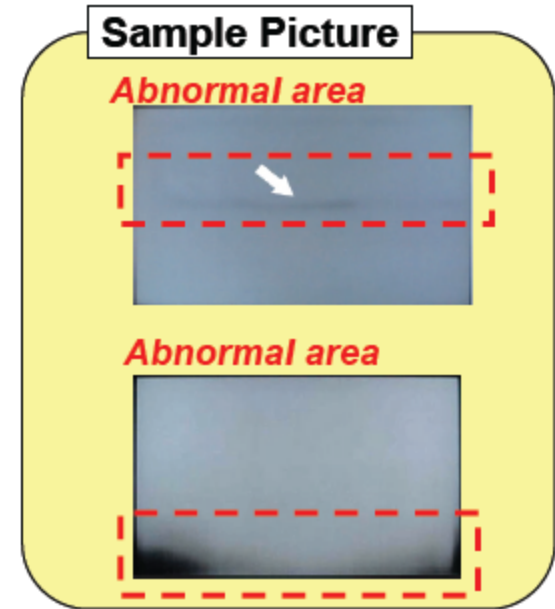
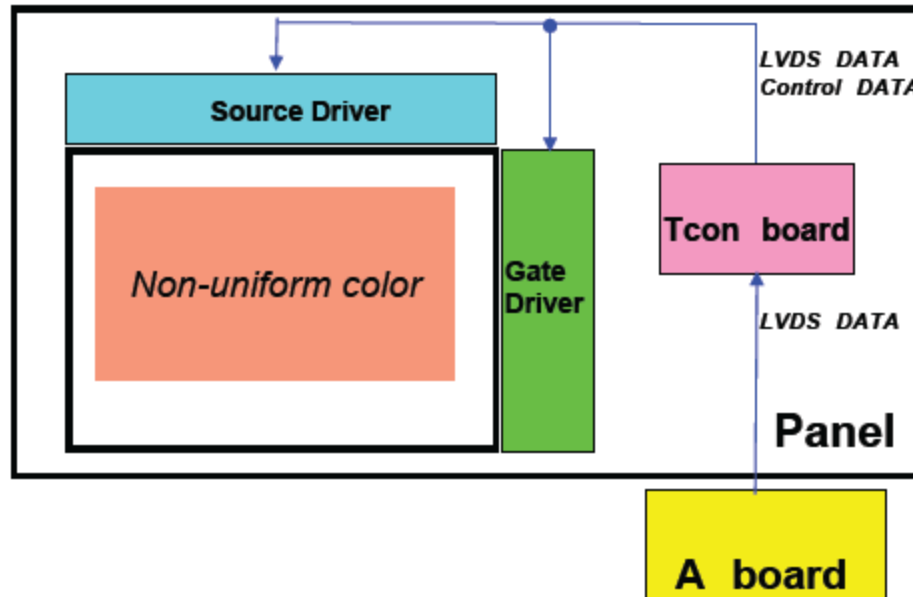
Diagnosis

Thin horizontal line problem is caused by a LCD panel defect.

If IC8000 (Peaks LDA3) in the A board is defective, many horizontal lines would appear all over screen.

Non-uniform Color Picture Problem

Non-uniform color picture problem



Action: Exchange Panel.

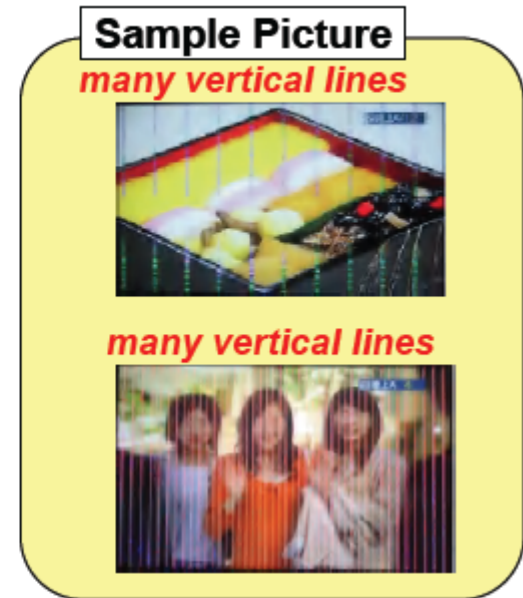
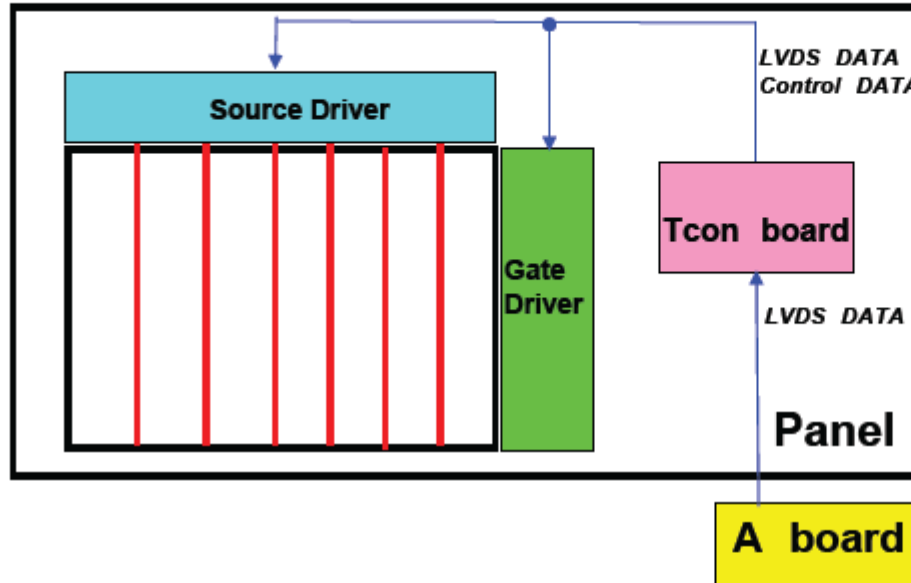
Diagnosis

The picture has non-uniform color.

The LCD panel is transformed by stress or a shock that may have come from a drop or the use of the wrong screw. For such trouble, we have to exchange the LCD panel.

Many Vertical Lines Picture Problem

Many vertical lines picture problem



Action: A board or Panel is defective.

This model has a panel check mode that exists in the TCon. So, activate it.

If the same symptom appears. → Panel is defective.

If the displayed pattern is normal. → A board is defective.

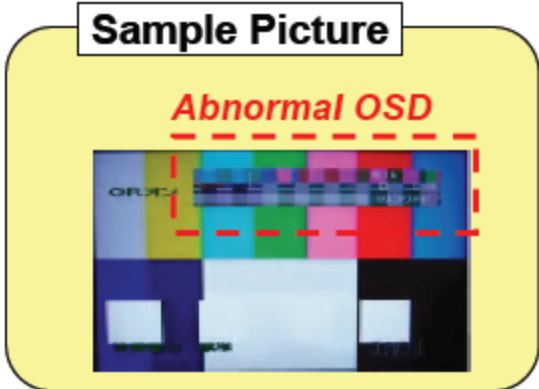
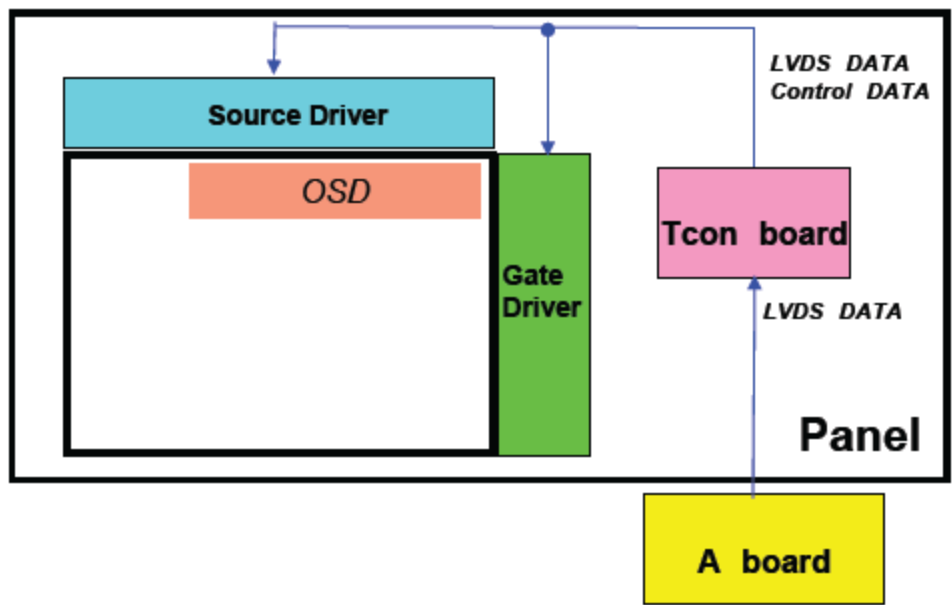
Diagnosis

Many vertical lines all over screen are caused by the A board or a Panel defect.

If it is one thin line (right photo), panel is defective.

OSD Problem

OSD problem



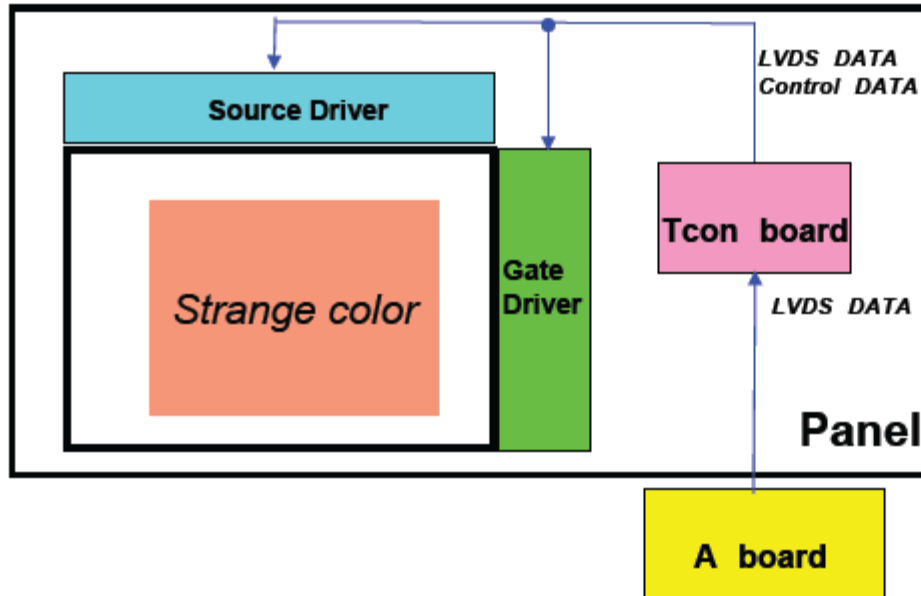
Action: Exchange A board.

Diagnosis

OSD (On Screen Display) is generated by IC8000 (Peaks LDA3) in the A board. So, the A board is defective.

Strange Color Problem

Strange color problem



Sample Picture

Strange color



Strange color part



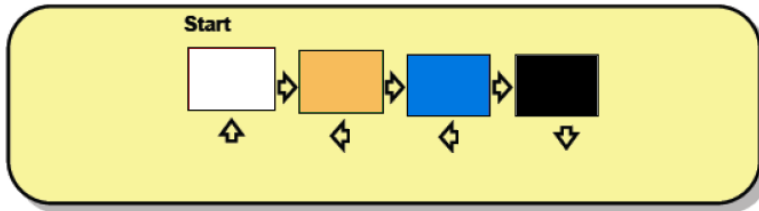
Action: Exchange A board

Diagnosis

Strange color or discolor is caused by an A board defect, mainly IC8000 Peaks-LDA3. So, exchange the A board.

Panel Free Run Mode

When a picture problem is encountered, the internal test pattern generator may be used to determine whether the symptom is the result of a defective A board or panel. The test pattern is displayed as follows:



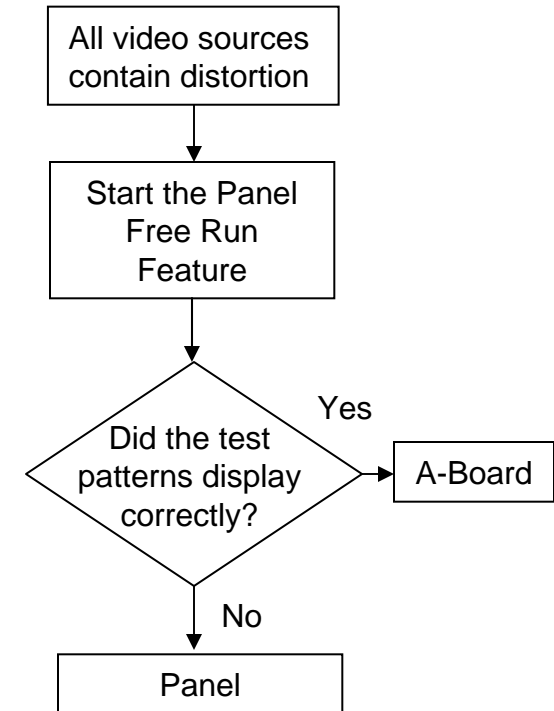
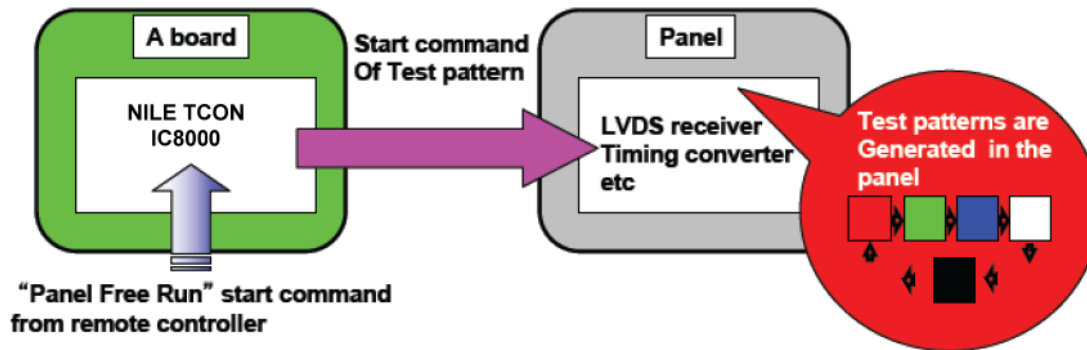
How to enter "Panel Free Run" mode

Same time { Press "VOL-" button on TV unit
Press "SUB MENU" button 3 times on remote controller

Use the main Power Switch to exit

"Panel Free Run" operation

Test Patterns are generated by the panel



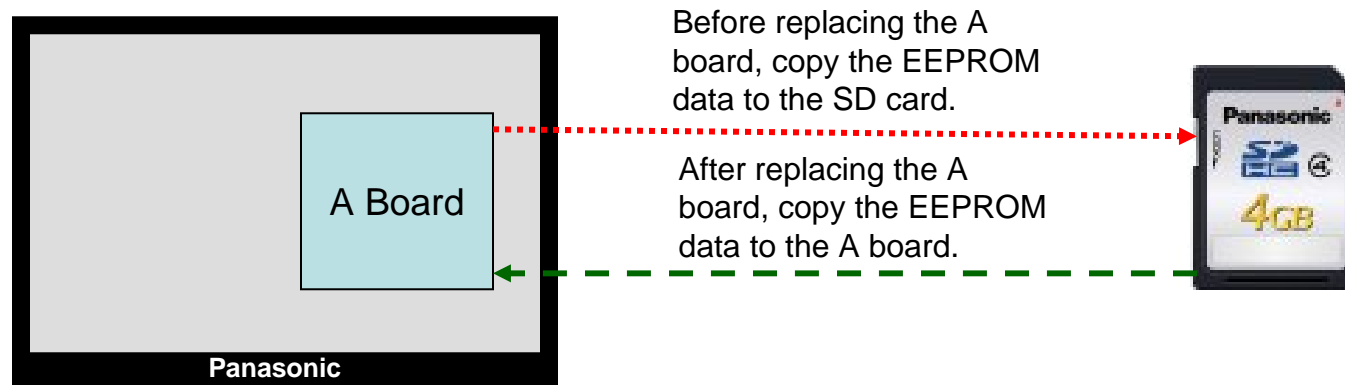
Data Copy by SD Card

Purpose

User settings data, including hotel mode settings data such as channel scan, adjustment data and factory preset data can be copied to and from an SD card.

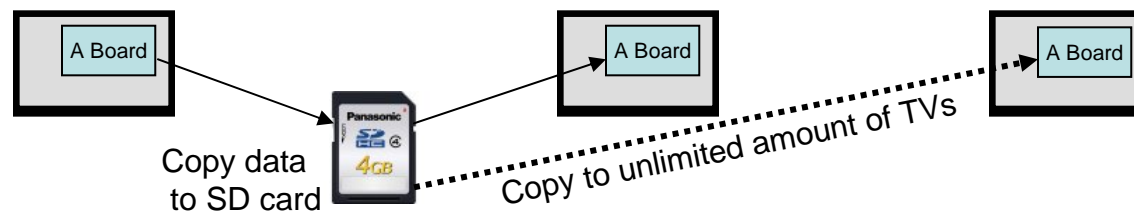
A) Board replacement (Copy the data when exchanging A-board):

When exchanging A-board, the data in original A-board can be copied to SD card and then copy to new A-board.



B) Hotel (Copy the data when installing a number of units in hotel or any facility):

When installing a number of units in a hotel or any facility, the data in the master TV can be copied to a SD card and then copied to other TVs.



Data Copy Preparation

The SD card requires a startup text file with a “.pwd” extension for copying to the SD card when replacing the A board or installing a number of units in a hotel.

1. Insert an empty SD card to your PC.
2. Right-click a blank area in the SD card window, point to New, and then click text document. A new file is created by default (New Text Document.txt).
3. Right-click the new text document that you’ve just created and select “Rename”.
4. Change the name and extension of the file to the following file name for copying to the SD card and press ENTER.

File name:

(a) For Board replacement : boardreplace.pwd

(b) For Hotel : hotel.pwd

Note:

Please make only one file to prevent operational error.

Do not have any other file on the SD card.

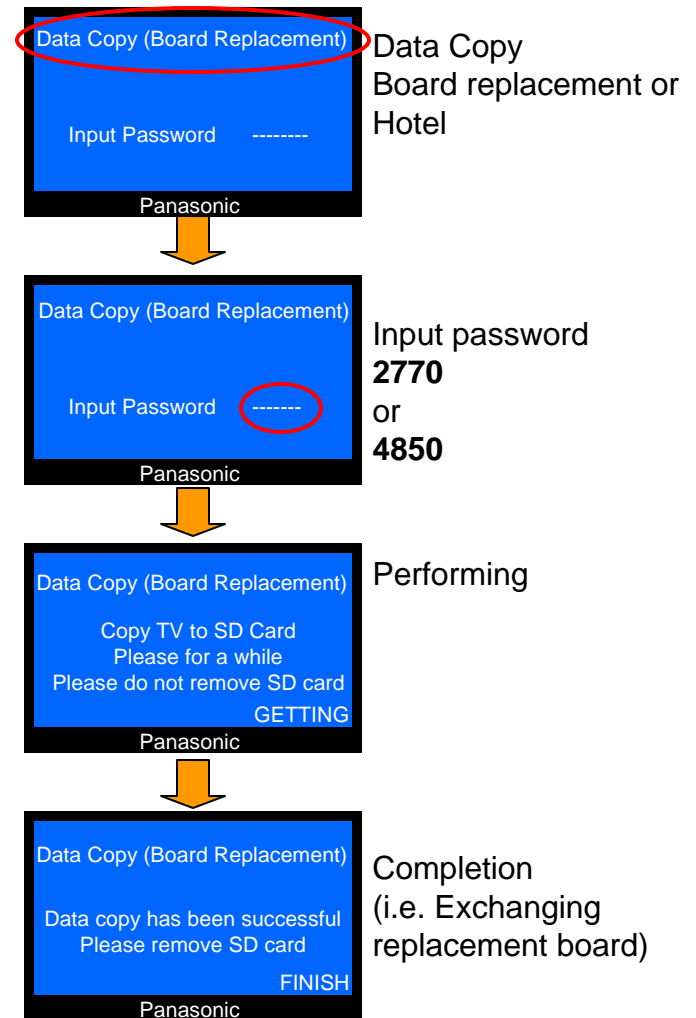
Data Copy From the TV to SD Card

1. Turn on the TV set.
2. Insert the SD card that contains the startup file (pwd file) in the SD card slot.
An On-screen display associated with the startup file will appear automatically.
3. Input the following password for (a) or (b) by using the remote control.
(a) For Board replacement : 2770
(b) For Hotel : 4850
Data will be copied from the TV set to the SD card.
It takes around 2 to 6 minutes maximum for copying.
4. After the completion of copying to the SD card, remove the SD card from the TV.
5. Turn off the TV.

Note:

The following new folder will be created in the SD card from the TV.

- (a) For Board replacement : user_setup
- (b) For Hotel : hotel



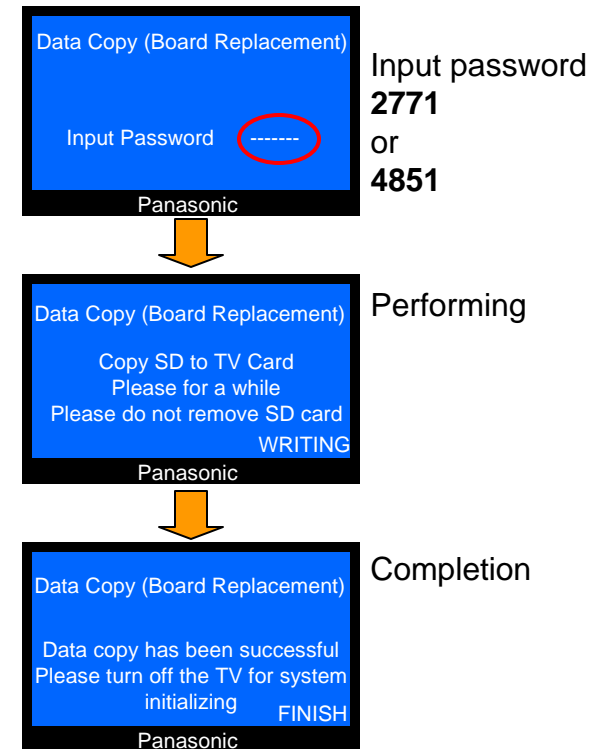
Data Copy From the SD Card to TV

1. Turn on the TV.
2. Insert the SD card with Data in the SD card slot.
An On-screen display associated with the startup file will appear automatically.
3. Input the following password for (a) or (b) by using the remote control.
 - (a) For Board replacement : 2771
 - (b) For Hotel : 4851Data will be copied from the SD card to the TV.
4. After the completion of copying to SD card, remove SD card from the TV set.
 - (a) For Board replacement : The data will be deleted after copying (Limited one copy).
 - (b) For Hotel : The data will not be deleted and can be used for other TVs.
5. Turn off the TV.

Note:

1. Depending on the failure of the A board, the data copy function for board replacement may not work.
2. This function can be effective among the same model numbers.

(i.e. Exchanging replacement board)



Glossary (1)

120Hz Motion Picture Pro4

Even fast-moving scenes are displayed sharply and clearly. With a 60Hz video signal input, 120Hz Motion Picture Pro4 makes 120 frames/second from 60 frames/second. This increases the frame count to allow natural frame-to-frame transitions, for smooth motion images with high resolution. Motion Focus Technology also reduces flicker and effectively suppresses blurring and afterimages.

24P Smooth Film

Enjoy naturally flowing 24p films and familiar TV-like quality. This mode optimizes the number of frames of 24p images recorded from film media such as a Blu-ray Disc™. Advanced source analysis and frame generation produce smooth images that are faithful to the original.

Dynamic Contrast Ratio 2000000:1

Both high contrast and energy-saving efficiency have been achieved in the IPS LED LCD TV by combining the IPS panel, which is known for its wide viewing angle, with a bright, energy-efficient LED backlight. Even dark scenes like night skies are naturally rendered with delicate shades of black. The Intelligent Scene Controller further boosts the image quality.

Energy Saving Mode

The entire 2011 VIERA line-up meets the Energy Star 4.0 requirements. VIERA TVs satisfy the new criteria for the Energy Star program of the U.S. Environment Protection Agency (EPA). This testifies to their top-level energy-saving performance.

Game Mode

In Game Mode, quicker image response increases the enjoyment of video games when a game console is connected to the TV. What's more, VIERA produces the dark images in video games more clearly. This mode works with the anti-image retention (wobbling) function, too.

Glossary (2)

IPS Liquid Crystal Panel

IPS liquid crystal is an abbreviated expression for In-Plane-Switching type TFT crystal, and is a high quality crystal mode that "is beautiful even when viewed at an angle." With IPS, the liquid crystal molecules rotate on a plane parallel to the TFT board by a horizontal electrical field, and therefore in principle, it offers superior viewing angle, color reproduction, and halftone response speed, has little variation in color tone according to the viewing direction and is capable of displaying a natural image.

Motion Focus Technology

The VIERA LCD TV detects areas with motion and activates backlight blinking for only those areas, greatly enhancing resolution.

VIERA Image Viewer™

It's easy to view full-HD images with the SD card slot. Watch and show your photos right after you take them. Simply insert an SD card into VIERA to display photos on the large screen. You can also choose the background music and display effects. It's much more fun when you can view them on a large-screen HDTV with family and friends in 1920 x 1080-pixel high definition and a wide 16:9 aspect ratio.

VIERA Link™

VIERA Link™ allows the interlinked operation of various AV devices using only the VIERA remote control, by simply **connecting the devices to each other by an HDMI cable.**

VIERA Tools

The VIERA Tools user interface makes it easy to use access key functions by pressing a single button. Functions are easier to use, and there's no complicated operation. The explanation is displayed when you press the function's button. Just keep pressing the button to use the function immediately.

- VIERA Tools screen design image is subject to change without notice.

** The screen display varies depending on the model.

Glossary (3)

Wide Viewing Angle

The wide 178° viewing angle ensures clear images even when viewed from an angle. The backlight's wide transmission aperture enhances the contrast between light and dark, and improves motion-image response.

HDMI ARC

The HDMI Audio Return Channel (ARC) allows the TV to receive picture and audio signals over the HDMI cable, and then send the same audio out over the same HDMI cable. ARC is part of the HDMI 1.4 specification.

DLNA

DLNA (Digital Living Network Alliance) is a standard that makes it easy for DLNA-certified equipment to share multimedia content within a home network. A DLNA-certified media server such as a Windows 7 personal computer with Windows Media Player 12 is required.

Media content that can be played back using DLNA, SD card or USB memory

Certain JPEG, SD-Video, AVCHD, MP4 files, MKV files, MPEG-2 files, MP3 files, AAC files and LPCM files can be shared using the DLNA feature. Please see the Owner's Manual for the additional requirements.

USB Port

You can connect flash memory, wireless LAN adapter, keyboard, or mass storage devices to the USB ports on the TV. Ports are USB 2.0, providing maximum 500mA per port.

Easy IPTV

Easy IPTV provides Internet functionality that allows your TV to access popular movie, music and social networking sites such as Netflix, Amazon VOD, Napster, Pandora, CinemaNow and Facebook. In order to use Easy IPTV services, the TV needs to be connected to your home network. Not all IPTV services are available depending on your country or region. IPTV services are subject to change without notice.