2011 - FHD Plasma TV

Technical Guide & Troubleshooting Flowchart

2011- Plasma FHD TV – (14th Generation)

Applies to models:

TC-PXXST30

Panasonic National Training

Panasonic Service and Technology Company

Prepared by
N. Kuge, J. Mizukami, Chris Meyns, Alfred Draggon, and Cesar Perdomo
Panasonic Service and Technology Company
National Training

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Contents

1.Features

Panasonic Plasma TV Line-up

SERIES	MODELS					
	42”	46”	50”	55”	60"	65"
VT SERIES FHD Premium **3D**				TC-P55VT30		TC-P65VT30
GT SERIES FHD Deluxe **3D**			TC-P50GT30	TC-P55GT30	TC-P60GT30	TC-P65GT30
ST SERIES FHD Core **3D**	TC-P42ST30	TC-P46ST30	TC-P50ST30	TC-P55ST30	TC-P60ST30	TC-P65ST30
S SERIES FHD Leader	TC-P42S30	TC-P46S30	TC-P50S30		TC-P60S30	
X SERIES HD Leader	TC-P42X3	TC-P46X3	TC-P50X3			

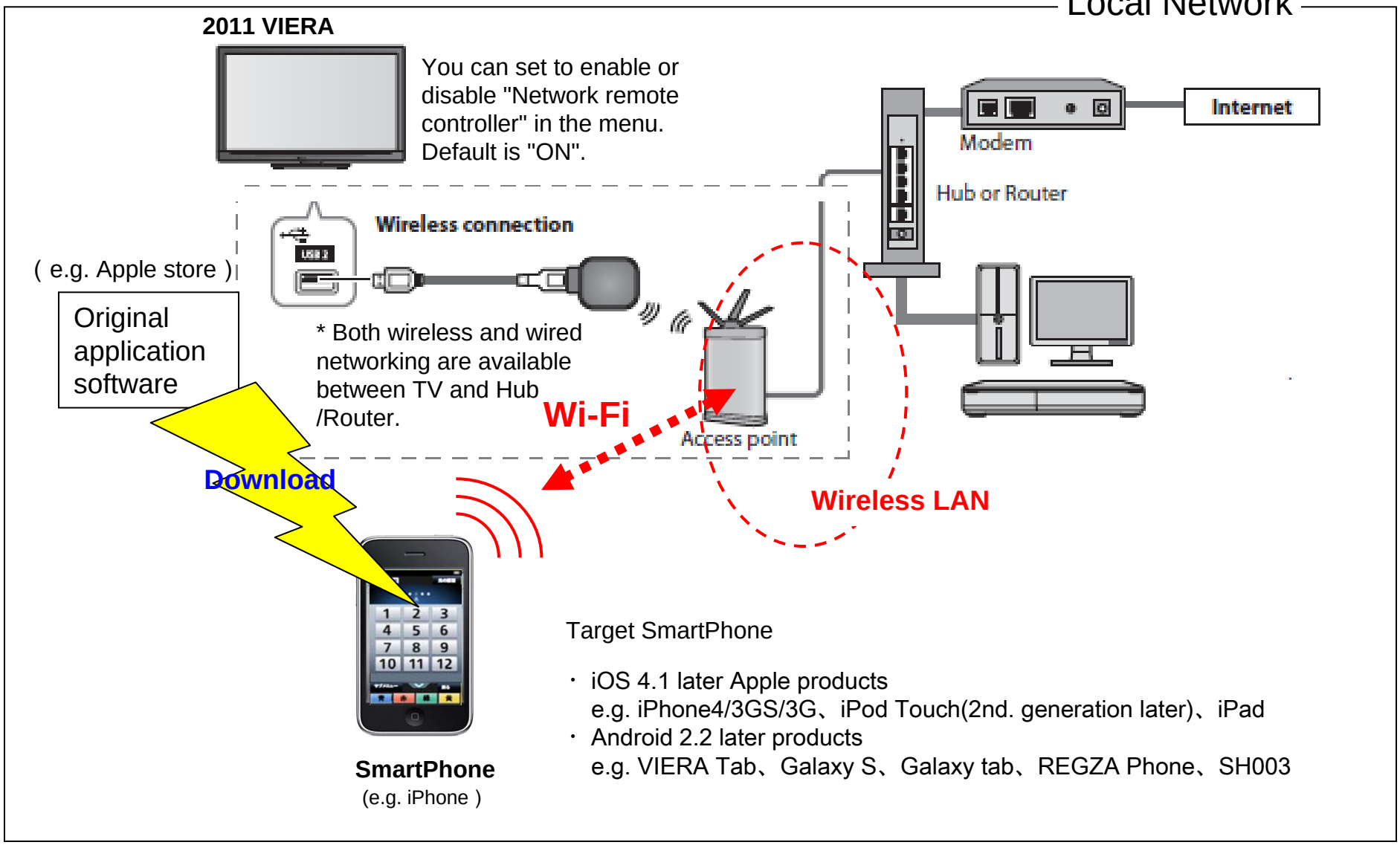
New Features

SmartPhone Remote Controller	**VT**	A selection of Apple (iPhone and iPad) 4.1 and above and Android, 2.2 and above are available.
		Remote Controller application software is provided on the INTERNET.
		SmartPhone links via Wi-Fi.
Game Controller	**GT**	A selection of wired and wireless game controller from Logitech and Guillemot are available.
		Used to handle contents of VIERA Connect.
		USB Connection
Media Player Multi Shot 3D	**ST**	Create 3D picture from the parallax differences of 2 images.
VIERA Connect Banner	**SERIES**	VIERA Connect banner is showed after power on.
		You can enter VIERA Connect by pushing "OK" button on remote controller while banner is showed.

Optional Android, iPhone and iPad.

New Feature (SmartPhone Remote Controller)

SmartPhone remote controller



New Feature (Game Controller)

Game controller

The Game controller is connected to the TV via USB.
- It controls game contents in VIERA Connect.
- It controls basic operation of TV.

Object Game Controller : Refer to CS website http://panasonic.jp/support/global/cs/tv

Logitech

F310
Wired/ low-end

F510
Wired/ middle-range

F710
Wireless/high-end

Guillemot

F1 Wireless Gamepad
Ferrari F60 Limited edition

T-Wireless
3 in 1 Rumble Force

New Feature (Media Player Multi Shot 3D)

Media Player Multi Shot 3D

3D picture can be created from two pictures with parallax differences on Media Player.

Media Player picture list (below is Japanese model screen. This is showed by language of your TV)

Select two picture with parallax differences.
3D picture is generated from them.

New Feature (Viera Connect Banner)

VIERA Connect banner

VIERA Connect banner is showed after the power is turned on.

Power ON

VIERA Connect banner is showed every time the power is turned on. There is no option to disable this banner.

Any key (except "OK" or "INTERNET" keys) or timeout (5-10 sec.)

"OK" or "Internet" key while banner is showed

EXIT

VIERA Connect

Main Differences

3D function	**VT,GT and ST Series have 3D function.**
	New rechargeable 3D glasses with new “Theater Mode” feature.
	The battery can be charged with USB cable connected to TV or PC.
	The 3D glasses can also be used for viewing 3D movies in movie theaters.
	Only one 3D Emitter is installed on the TV.
	2D -> 3D Conversion function is added.
IPTV	**VT, GT and ST Series**
	Name of "VIERA CAST" is changed to "VIERA Connect".
	"VIERA CAST" button on the remote control is changed to "INTERNET" button.
	S and X Series
	Name of "VIERA CAST" is changed to "EASY IPTV".
	To enter "EASY IPTV“, press the "VIERA tools" button on the remote control.
Speaker	Speakers are installed frontwards on VT, GT and ST.
Input / Output Terminal	VT and GT series use thin signal connection terminals.

Differences By Series

Series	Size	3D/ 2D	Panel	Feature	Included
VT30	65 55	3D	FHD	3D VIERA Connect Very thin (Input terminal insert from below) Front Glass, Direct Filter	3D Glasses x 1(Rechargeable) Wi-Fi Adapter x 1 Cable Adapter x 1
GT30	65 60 55 50	3D	FHD	3D VIERA Connect Very thin (Input terminal insert from below) Glassless, Direct filter / Metal cabinet	Wi-Fi Adapter x 1 Cable Adapter x 1
ST30	65 60 55 50 46 42	3D	FHD	3D VIERA Connect Glassless, Direct filter / Metal cabinet	Wi-Fi Adapter x 1
S30	60 50 46 42	2D	FHD	FHD EASY IPTV Front Glass	--
X3	50 46 42	2D	HD	HD EASY IPTV Front Glass	--

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Specifications

		VT SERIES	GT SERIES	ST SERIES	S SERIES	X SERIES
Resolution		FHD (1920X1080)	FHD (1920X1080)	FHD (1920X1080)	FHD (1920X1080)	HD (1024X768)
Size		55/65	50/55/60/65	42/46/50/55/60/65	42/46/50/60	42/46/50
3D	3D Function	Y	Y	Y	N	N
	3D Glasses	Included	Option	Option	-	-
	3D Emitter	1	1	1	-	-
	2D -> 3D Convert	Y	Y	Y	-	-
	3D Effect Adjustment	Y	Y	Y	-	-
Chassis	AC Cable	Direct Connect	Direct Connect	Separate	Separate	Separate
	Panel Scanning	Single Scan	Single Scan	Single Scan	Single Scan	Single Scan
	Front Glass & Filter	Front Glass + Direct Filter	Glassless + Direct Filter	Glassless + Direct Filter	Front Glass	Front Glass
	AR	Y	Y	Y	N	N
	Speaker	Frontward	Frontward	Frontward	Downward	Downward

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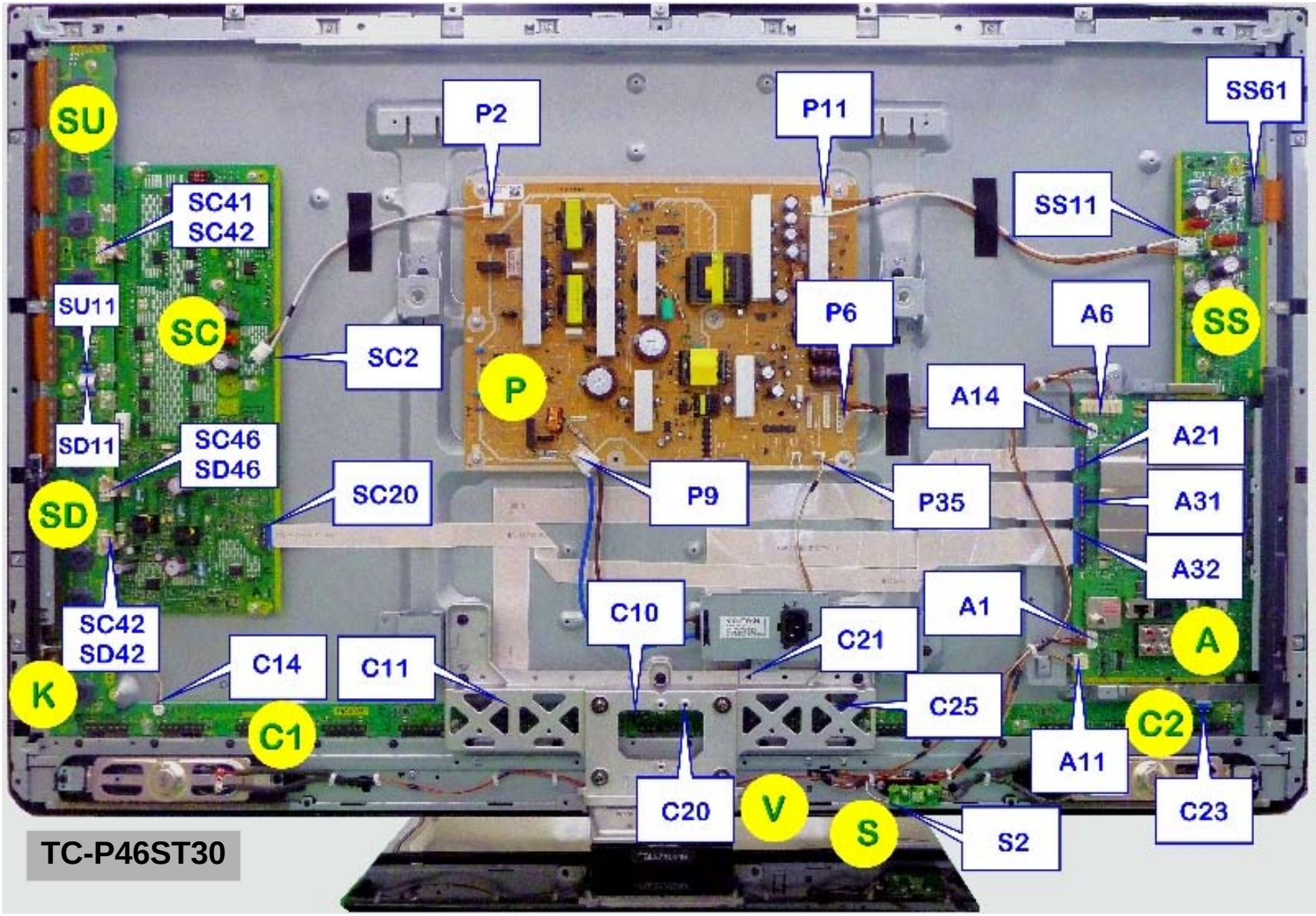
Specifications

		VT SERIES	GT SERIES	ST SERIES	S SERIES	X SERIES
Panel CPU		LP1 x 2	LP1 x 1	LP1 x 1	PD5L	PD5L
Main Processor		Peaks LDA3	Peaks LDA3	Peaks LDA3	Peaks sLD2	Peaks sLD2
Terminal	Thin Input Terminal	Y	Y	N	N	N
	Cable Adapter	Included	Included	-	-	-
	USB	3	3	2	2	2
	HDMI	4	4	3	3	2
	PC Input	Y	Y	N	N	N
	RS-232C	Y	N	N	N	N
Picture	THX	Y	Y	N	N	N
	ISFccc	Y	N	N	N	N
	Cinema Reality	up to 96Hz	N	N	N	N
Network	IPTV	VIERA Connect	VIERA Connect	VIERA Connect	EASY IPTV	EASY IPTV
	Skype	Y	Y	Y	-	-
	DLNA	Y	Y	Y	Y	Y
	Wi-Fi	Y	Y	Y	Y	Y
	Wi-Fi Adapter	Included	Included	Included	Option	Option

2.Technical Changes

Boards Layout And Connectors Location



Boards Description

TC-P46ST30

Board	Description	Board	Description
A	Speaker out, Sound Processor, AV Terminal, AV Switch, DC-DC Converter, Digital Signal Processor, Microcomputer, HDMI Interface, SD card slot, Format-Converter, Plasma AI, Sub-Field Processor, Key Switch	P	Power Supply
C1	Data Drive (Lever Right)	SC	Scan Drive
C2	Data Drive (Lower Center)	SU	Scan Out (Upper)
SS	Sustain Drive	SD	Scan Out (Lower)
K	Remote Receiver, Power LED, C.A.T.S. Sensor	V	3D Eyewear Transmitter

Technical Changes

ST30

Board changes

- 1 V board has been added.

Terminal changes

- 2 USB connectors added

CPU changes

- New Main Processor (Peaks-LDA3) (Integrated Standby-MCU, HDMI x3 inputs, USB x3 inputs, 3D Processing integrated 2010-FPGA function)
- Audio Amp protection circuit has been improved.

SOS changes

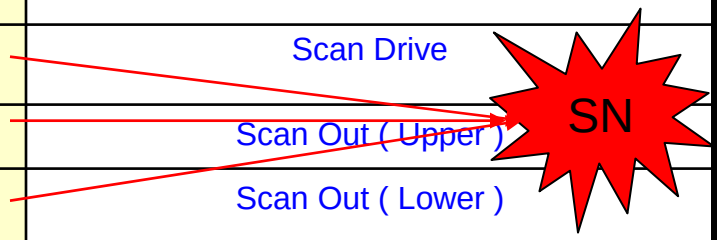
Shutdown but No Blink code - Power LED stays on (Check for Shorted Vsus* / Vda** / P15V).

- 2 – 3 – 5 blinks are not used.
- Changes – 2010 models > SC20 disconnected = 6 blinks .
  2011 models > SC20 disconnected = 8 blinks.
- 13 blinks -> Internal communication error on A board.
- 14 blinks -> Loss of F15V from P bd. P6/pin 10 or A Bd detection.
- Decrease of SOS detect time when SC20 is disconnected (no false det)

Boards Description

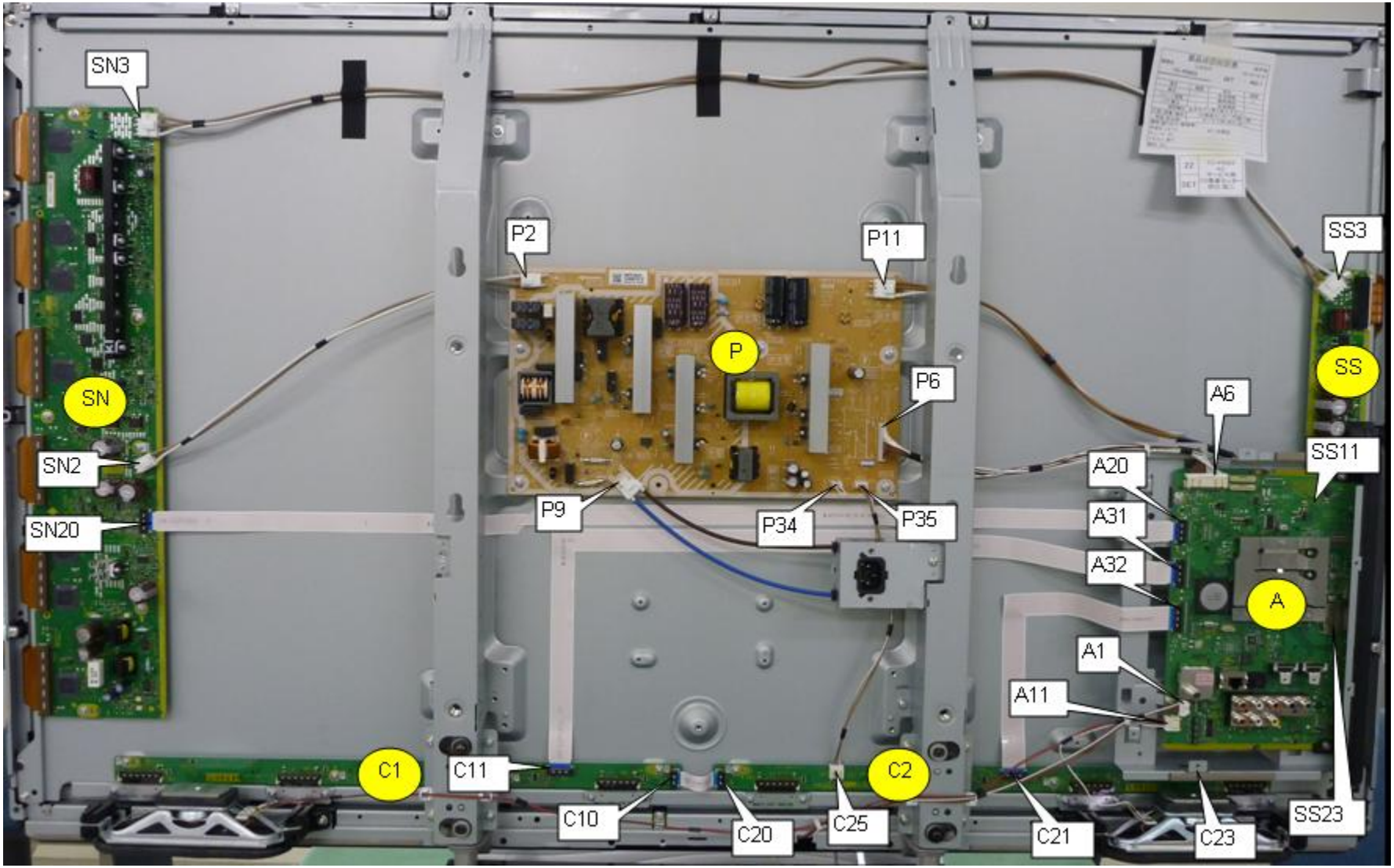
TC-P50X3

Board	Description	Board	Description
A	Speaker out, Sound Processor, AV Terminal, AV Switch, DC-DC Converter, Digital Signal Processor, Microcomputer, HDMI Interface, SD card slot, Format-Converter, Plasma AI, Sub-Field Processor, Key Switch	P	Power Supply
C1	Data Drive (Lower Right)	SC	Scan Drive
C2	Data Drive (Lower Left)	SU	Scan Out (Upper)
K	Remote Receiver, Power LED, C.A.T.S. Sensor	SD	Scan Out (Lower)



Boards and Connectors Location

TC-P50X3



Technical Changes

X3

Board changes

- 42“& 46“ -> SC and SM boards have been potted to SN.
- 50“ -> SC / SU / SD boards have been potted to SN.

Network addition

- Easy IPTV added (Limited services of VIERA Connect).

Terminal changes

- 2 USB connectors added.

CPU changes

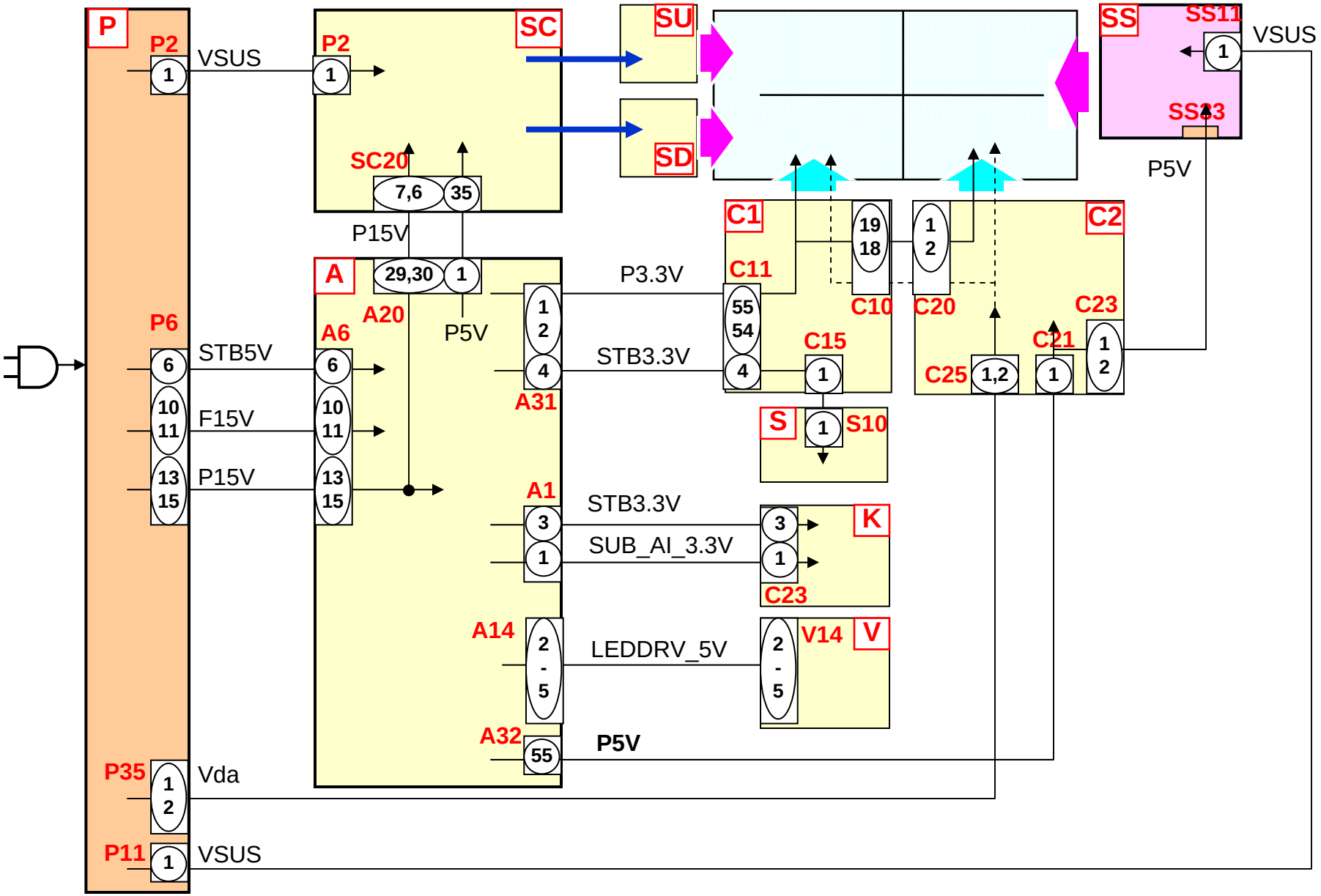
- New Front End Processor (Peaks-sLD2) (Integrated MCU, 3x HDMI inputs, 2x USB inputs) (note: X series has got 2x HDMI inputs, S series has got 3x HDMI inputs).
- Audio Amp protection circuit has been improved.

SOS changes

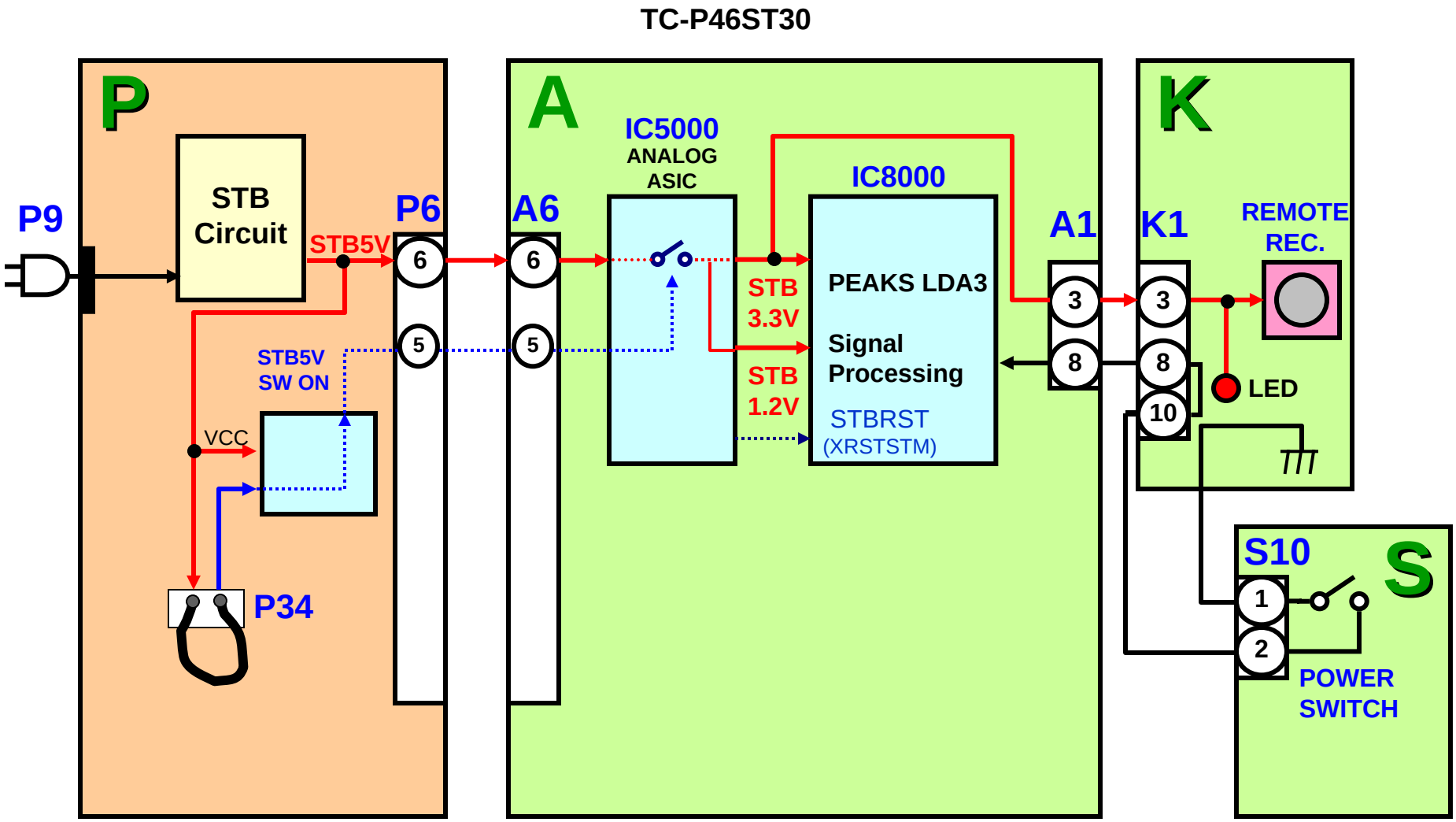
- Shutdown but No Blink code – Power LED stays on (Check for Shorted Vsus* / Vda** / P15).
- 2 – 3 – 5 blinks are not used.
- Changes – 2010 models > SC20 disconnected = 6 blinks .
  2011 models > SC20 disconnected = 8 blinks.
- 13 blinks -> Internal communication error on A board.
- 14 blinks -> Loss of F15V from P bd. P6/pin 10 or A Bd detection.
- Decrease of SOS detect time when SC20 is disconnected (no false det)

3.Start-up Operation

Voltage Distribution

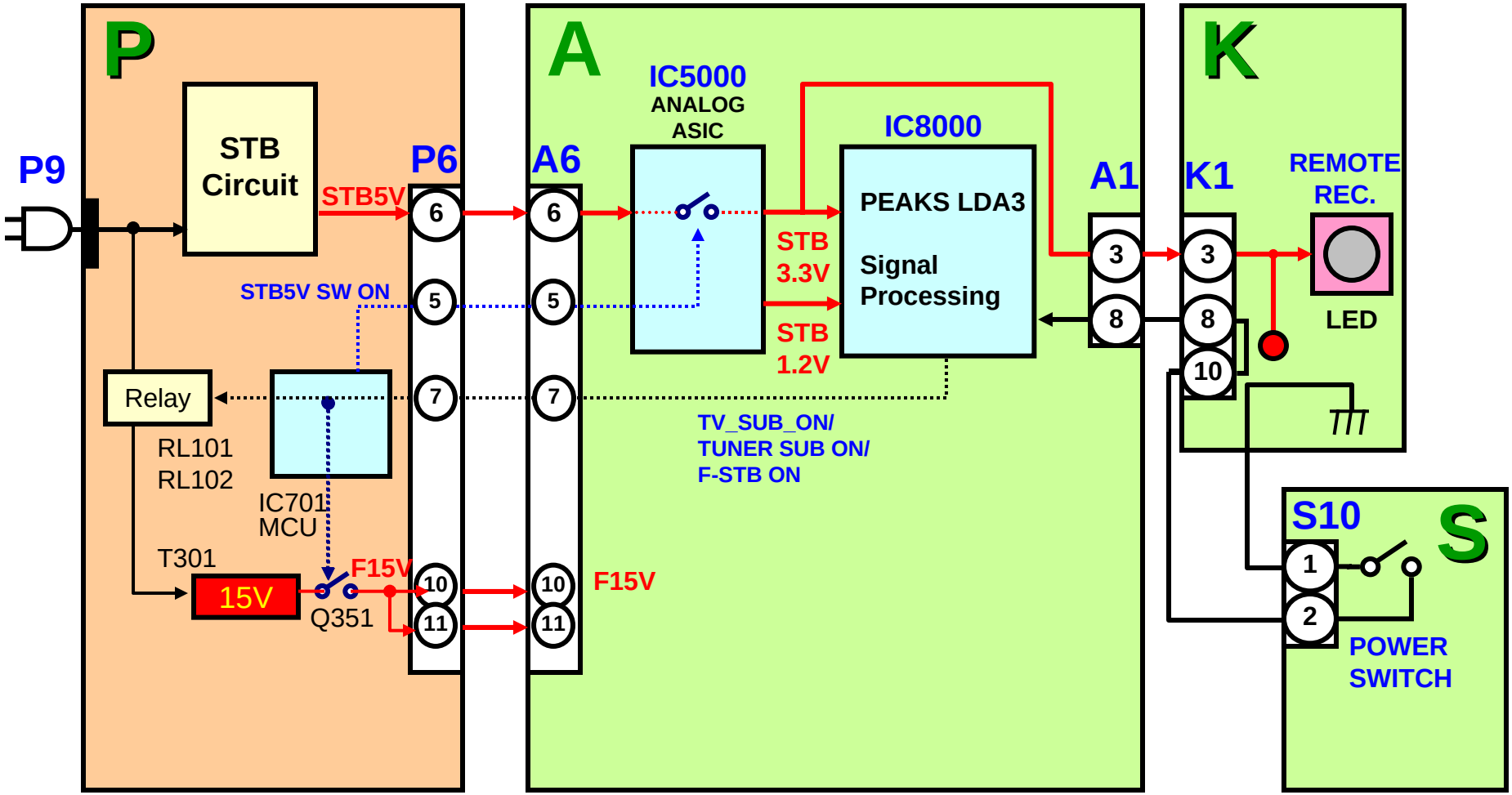


2-2. Standby Operation (1 of 3)

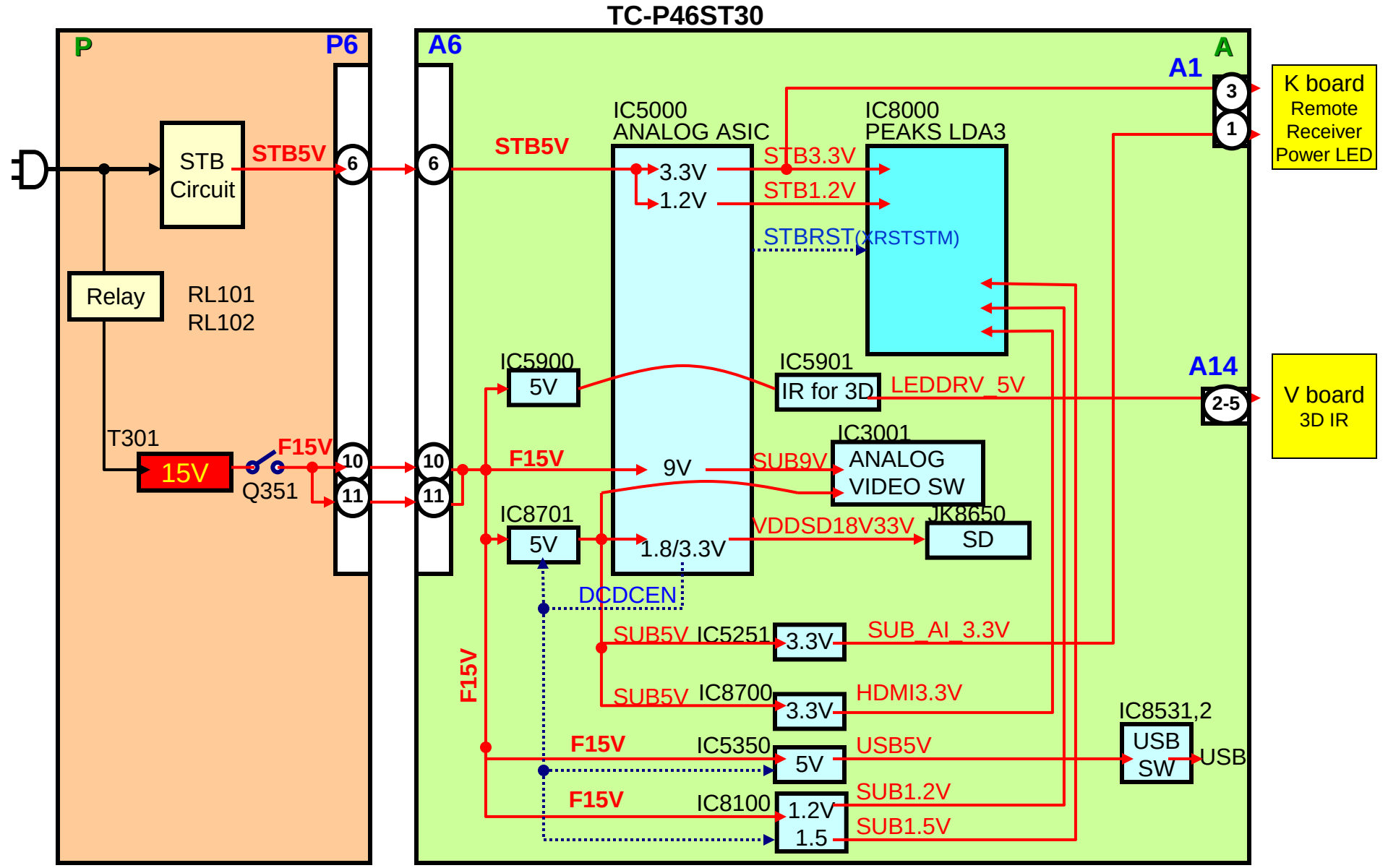


2-2. Standby Operation (2 of 3)

TC-P46ST30



2-2. Standby Operation (3 of 3)



Standby Operation

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 connectors P6 (pin6).

The STB5V from pin6 of connector P6 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 2 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).

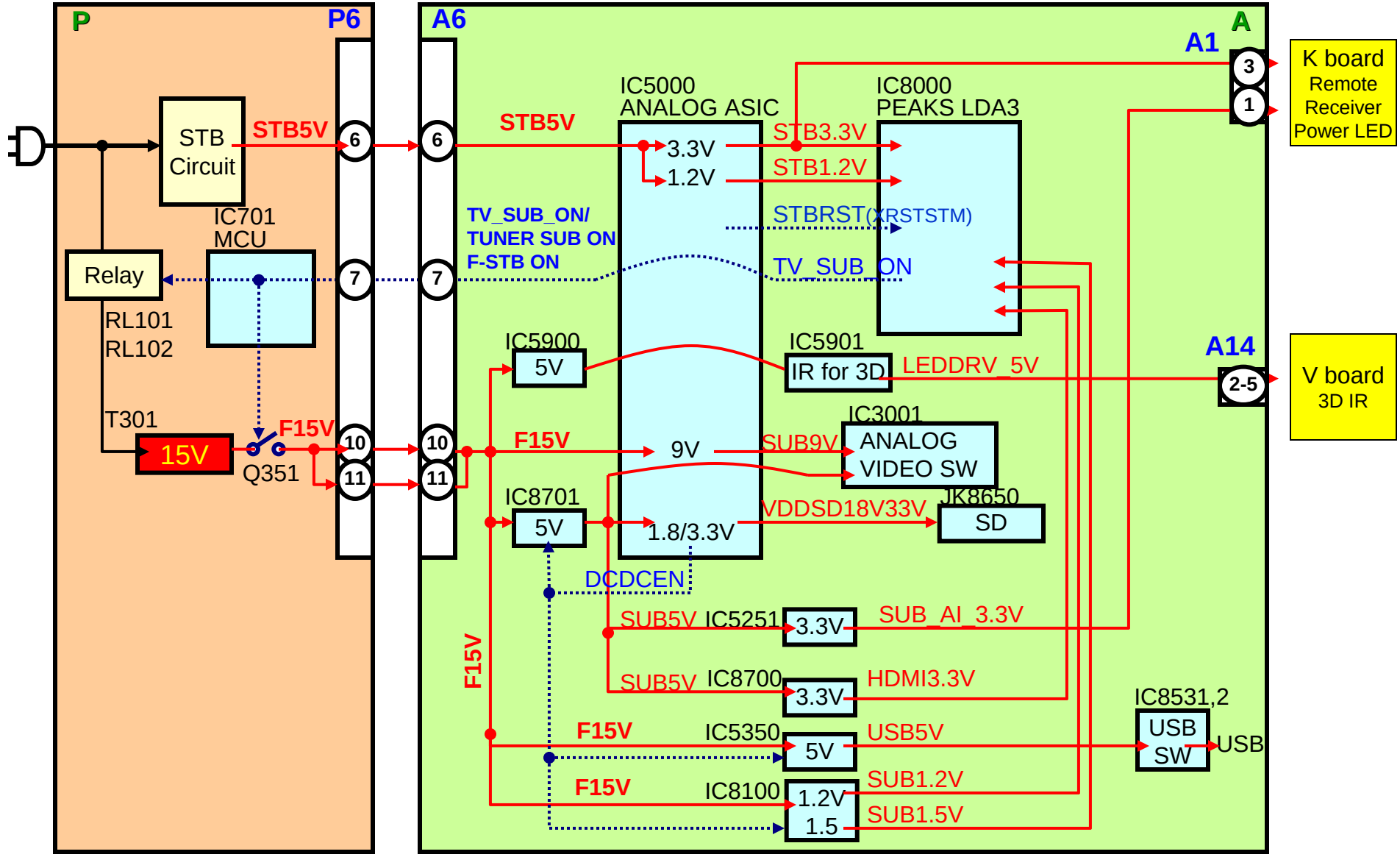
When the CPU receives 3.3V and 1.2V, it outputs a command that is provided to the P board. This command triggers the AC relays on the P board and only lasts approximately 15 seconds. The command applied to the P board is called different names, “F-STB-ON,TV-SUB-ON, or TUNER-SUB-ON”. The function of this command is to turn on the circuit that generates the “F15V” in the P board.
The F15V from the P board is applied to the A board through connector A6 (pins 10 and 11). This voltage is applied to several voltage regulators to generates the SUB voltages used by the A board.

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

Power On Operation

Standby - F15V -> SUB Voltage

TC-P46ST30



Power On Operation

Standby - F15V -> SUB Voltage

AC is applied to the standby circuit in the power supply to produce STB5V when the TV is plugged in. The STB5V is provided to the A board via connectors P6 (Pin 1).

1. The STB5V from pin 6 of connector P6 is applied to the voltage regulator (IC5000). IC5000 outputs 3.3V and 1.2V to power the Main CPU/PEAKS LDA3 (IC8000) on the A board. This energizes and prepare the microprocessor (PEAKS IC8000) for program execution.

2. The 3.3V from the ANALOG ASIC (IC5000), besides being applied to the Main CPU/PEAKS LDA3 (IC8000), is also applied to the remote control receiver and the power LED on the K board through connector A1/K1 (pin 3).

3. The reset pulse "STBRST" from the IC5000 is applied to IC8000 for program execution.

4. The power command from the power switch or the remote control receiver (Not shown on the schematic) is provided to IC8000 PEAKS LDA3.

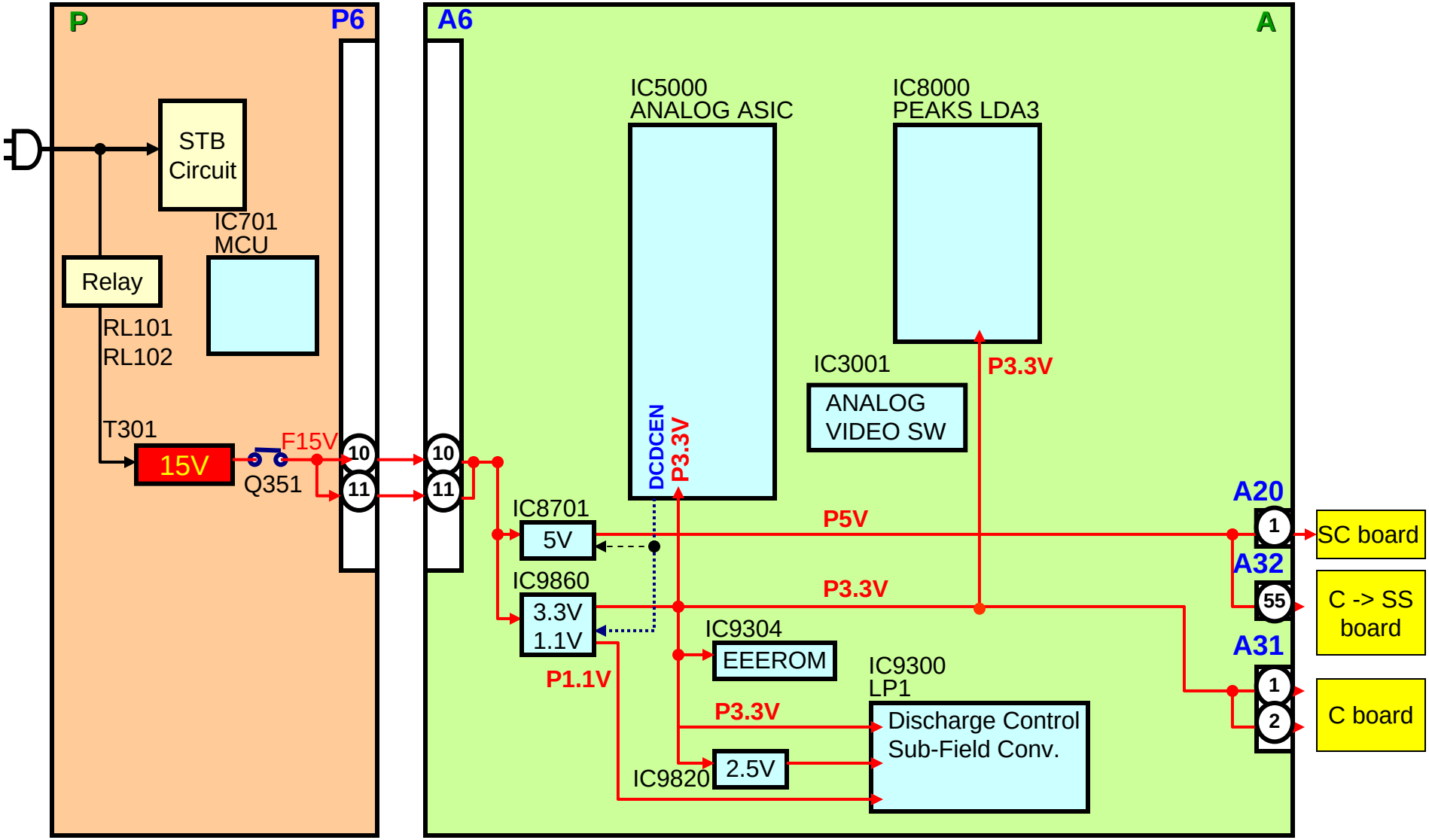
5. IC8000 on the A board outputs the “TV_SUB_ON” command. The “TV_SUB_ON” command is provided to pin 5 of connector P6 of the power supply to develop the F15V. At this time, the relays on the power supply are triggered and a click” sound can be heard.

6. The F15V from the P board is applied to IC5000, IC5900, and IC8701 (Voltage regulators) on the A board. IC5000 outputs the "DCDCEN(ENABLE)" command to the voltage regulators to output several voltages respectively.

Power On Operation

F15V -> P5V, P3.3V, P1.1V

TC-P46ST30

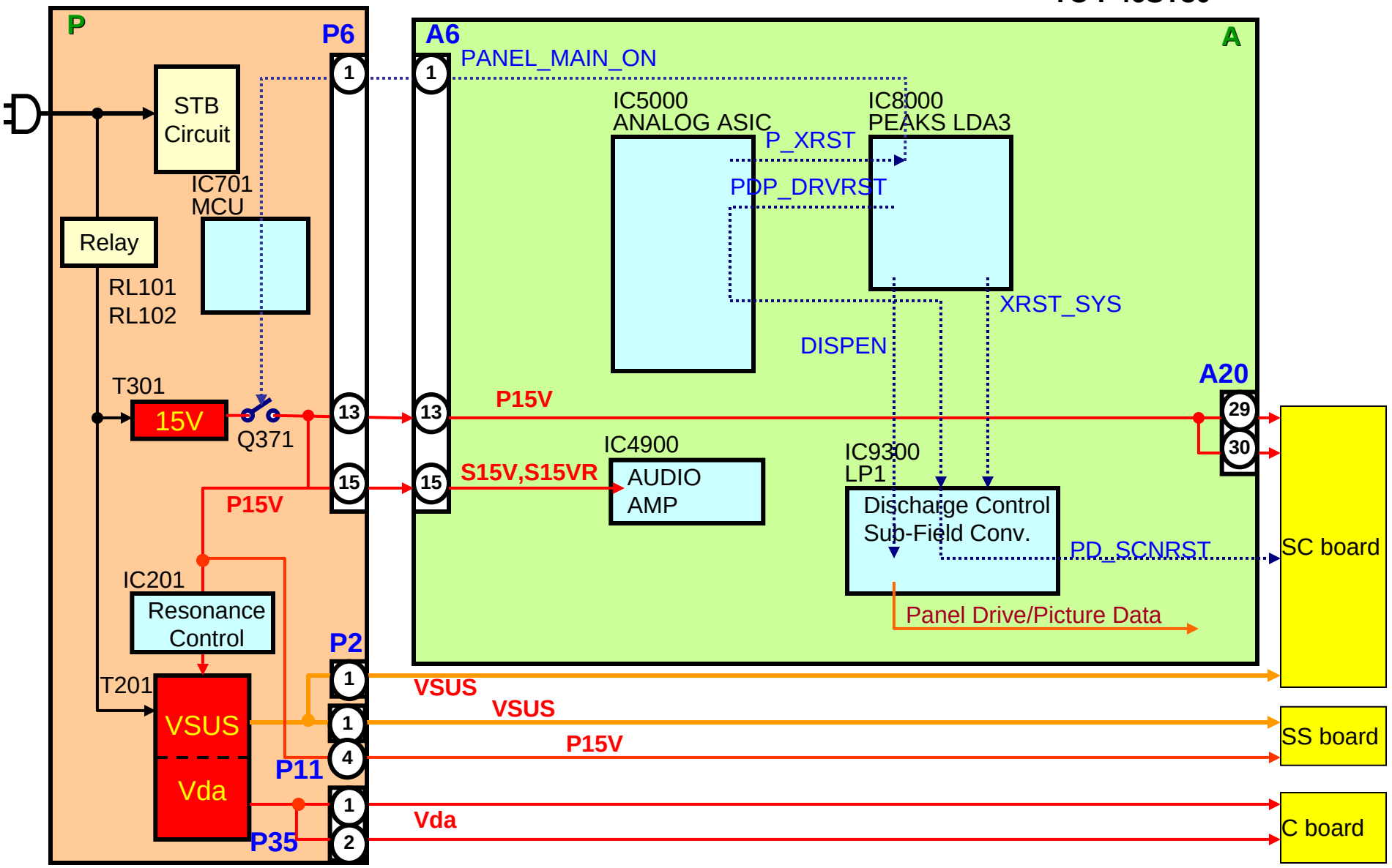


7. The F15V from the P board is applied to the voltage regulator ICs (IC8701 and IC9860) on the A board. The 3.3V, and 1.1V, output from IC9860 are used by IC9300 on the A board and. The P5V are output to the SC and SS boards

Power On Operation

P15V, VSUS, Vda

TC-P46ST30



Power On Operation

P15V, VSUS, Vda

8. When the output of the Sub-voltages is confirmed by the IC5000 ANALOG ASIC, It outputs the “P_XRST” command to IC8000 PEAKS LDA3..

9. When the “P_XRST” command are applied to IC8000 PEAKS LDA3, the "PANEL MAIN ON" command is output to the power supply.

10. P15V is output from the power supply when it receives the "PANEL MAIN ON" command. VSUS and Vda are also output at this point.

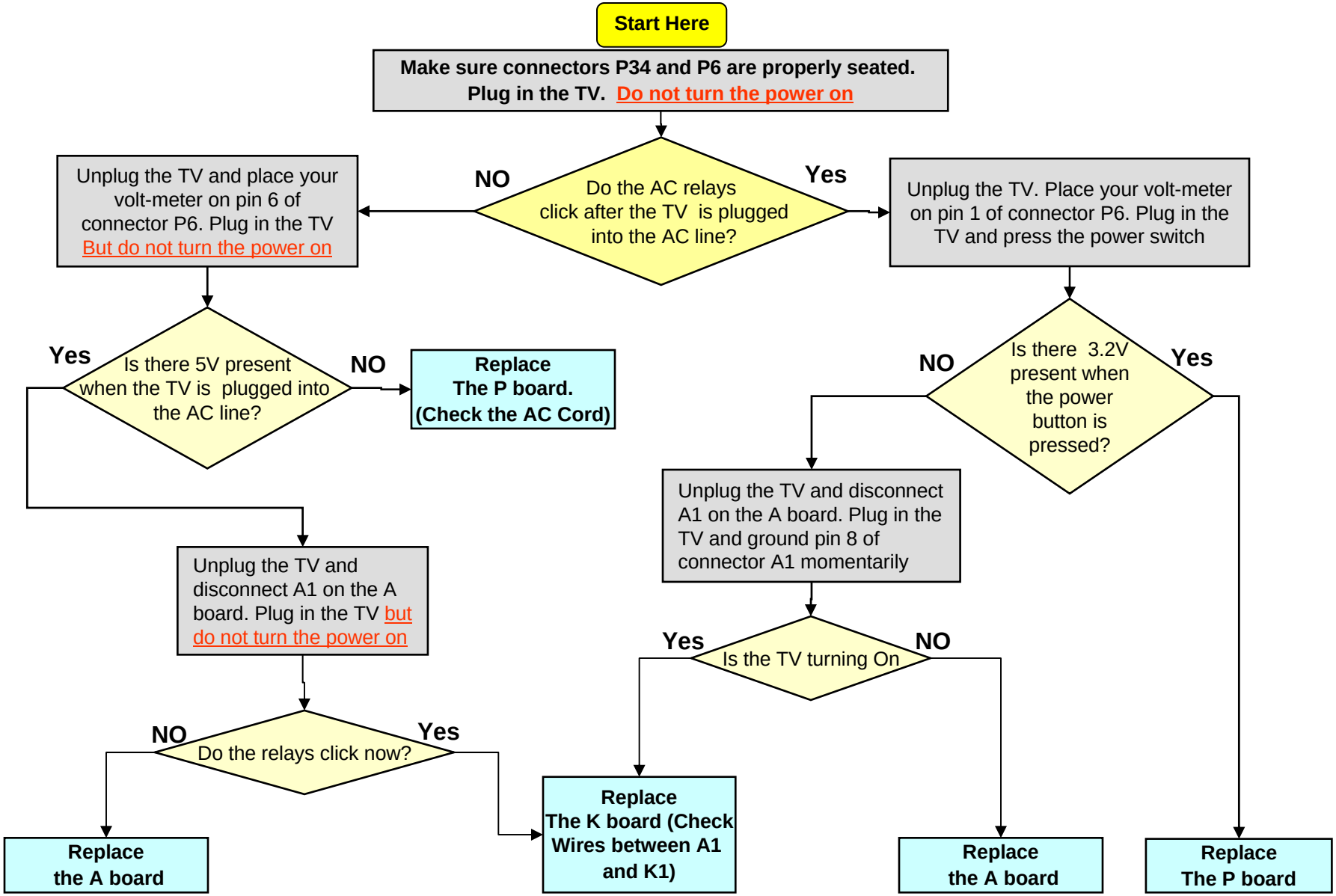
11. IC8000 PEAKS LDA3 outputs the "XRST_SYS" command to IC9300 LP1.

12. IC8000 PEAKS LDA3 also outputs the "PDP_DRVRST" command to reset the drive section of IC9300 LP1 and begin panel drive operation.

13. IC8000 PEAKS LDA3 also outputs the "PD_SCNRST" command to reset the IC on the SC board.

14. At the last, IC8000 PEAKS LDA3 outputs the "DISPEN" command (Display Enable) to IC9300 LP1 to begin panel drive and picture drive operation.

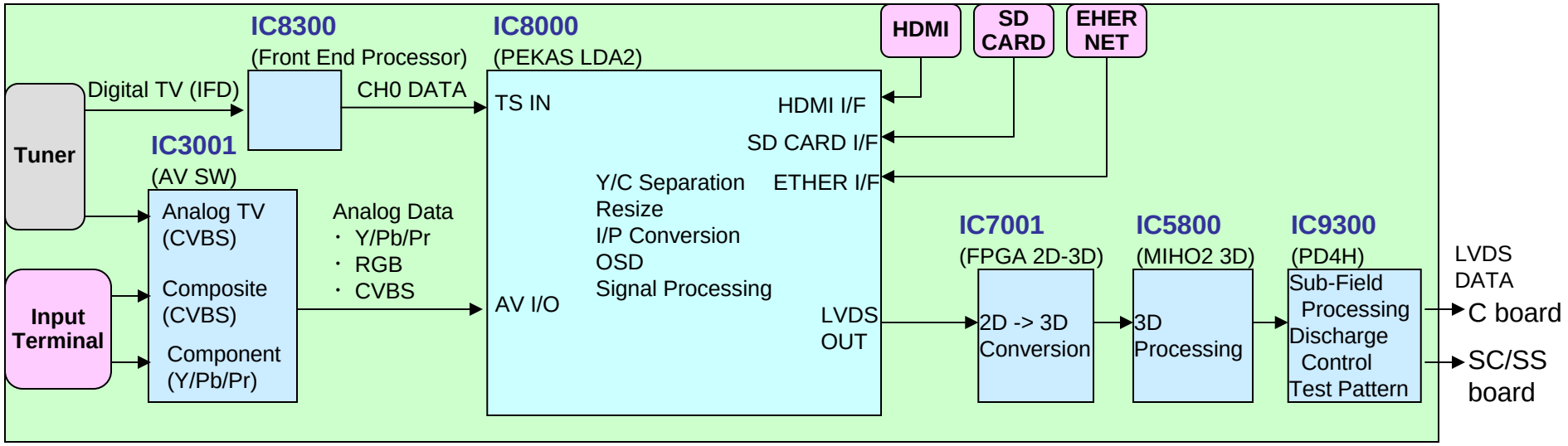
Troubleshooting No Power/Dead Symptom (Power LED is Off)



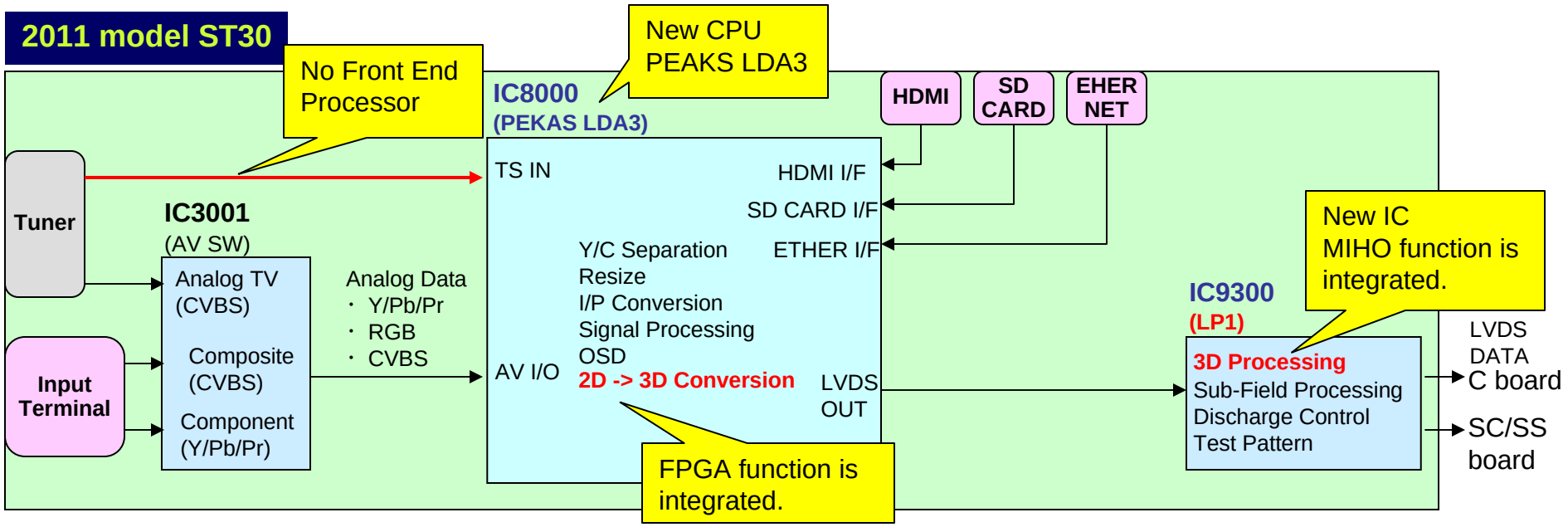
4.Signal Processing

Video Signal Process Circuit

2010 model GT25



2011 model ST30



Video Signal Process Circuit

The main function of the A board is to select and process one of the incoming video signals. All analog video data are inputted to IC3001 AV SW. One of analog video data is choosen by IC3001 and inputted to IC8000 Main CPU. Video input, Component Video Input, HDMI input and the composite video output of the tuner are all connected to IC8000 for selection. The video input signal can be two formats: Video, or Y, Pb, Pr.
A comb filter inside IC8000 converts the composite video signal of the main picture to Y and C (luminance and chrominance) signals. The signal is then converted to RGB.
At the completion of this process, the format of the composite signal is now the same as a digital 1080i component signal. If the incoming video is in the 480p, 720p, 1080i, and 1080p format, the Y, Pb, and Pr signals undergo A/D (analog to digital) conversion only. Finally all picture signals are converted to 1080p.

Digital television reception of the tuner is output in the form of an IF (Intermediate Frequency) signal .
The transport stream from the tuner enters the VSB I/F (Interface) section of IC8000 where the video signal is extracted and converted to YUV data. The output is provided to the Video Input I/F for selection. The JPEG data of the SD card enters the JPEG I/F section of IC8000 for conversion into YUV data and output to the Video Input I/F circuit. The video input interface outputs the selected picture data to the video process circuit.

This 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. LVDS (Low Voltage Differential Signaling) is output to IC9300 (Plasma AI, Sub-field Processor and Discharge Control).
The Plasma AI (Adaptive brightness Intensifier) circuit analyzes the video program level for the distribution of dark and bright components. This circuit is also used to speed up the scanning process and control the number of sustain periods. This increases the brightness and improves the contrast ratio.
The data drive signals are output to the C board. The C board drives the panel.

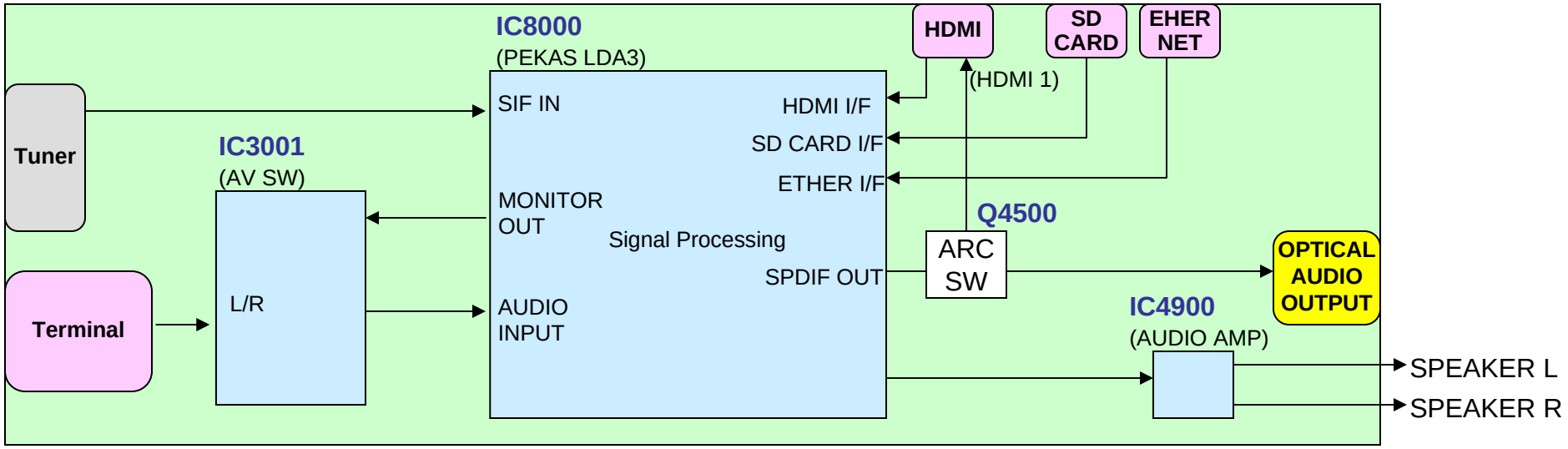
IC9300 also provides the scan, sustain and data drive signals.
The scan pulses are output to the SC board. The sustain pulses are output to the SS board.

New feature of 2011 model ST30 are:
Front End Processor is integrated in Main CPU (IC8000 PEAKS LDA3).
FPGA function (2D -> 3D Conversion) is integrated in Main CPU (IC8000 PEAKS LDA3).
MIHO function (3D Processing) is integrated in PDP processor IC (IC9300 LP1).

Audio Signal Process Circuit

Audio Signal Process doesn't change from 2010 model, except part number.

2011 model ST30



5.SOS Detect (Shut down)

When an abnormality occurs in the unit, the “SOS Detect” circuit is triggered and the TV shuts down. The power LED on the front panel will flash a pattern indicating the circuit that has failed.
Note: A “NO BLINK” error code can also occur with the 2011 models. When this happens, the TV shuts down and the power LED stays on.

Cautions:

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

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

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

Warning: The Vsus line has large capacitors that hold the charge for some time even after the TV has been turned off and unplugged. When disconnecting P2/SC2 or P11/SS1, bleed the remaining charge of the Vsus before reconnecting the cable.

Use a 500 ohms/ 5W (At least) resistor to discharge the Vsus line before reconnecting P2/SC2 or P11/SS11.

New Technical Features

2 new technical features have been added to the 2011 models to assist the service technicians speed up the repair process.

- **The ability of the power LED to match the number of blinks of the first and last SOS blinking codes detected by the TV as listed on the "SELF Check" menu.**
- **The delaying of the power LED blinking reaction by 10 seconds when the SC/SN board is isolated.**

The power LED can be forced to duplicate the number of blinks of the first and last SOS conditions detected by the TV. This can be done while the power LED is blinking after a shutdown condition has occurred.

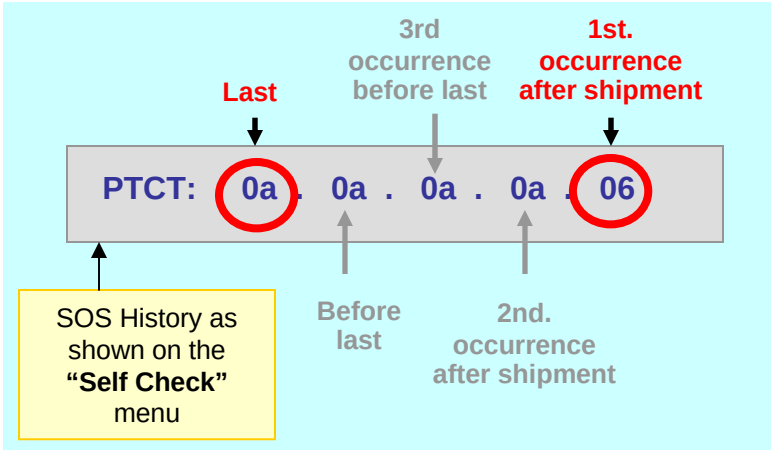
Procedure:

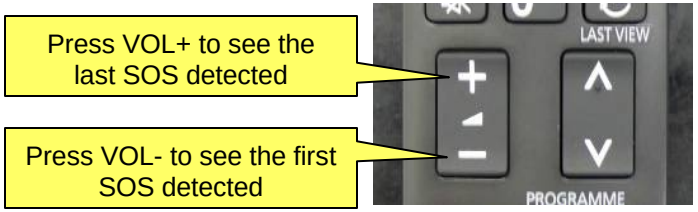
To duplicate the number of blinks of the last SOS detected.

While the power LED is blinking, press the "VOL+" on the remote control once to make the power LED blink the same number of times as the last blinking code detected by the TV.

To duplicated the number of blinks of the first SOS detected.

Press the "VOL-" once to make the power LED match the number of blinks of the first SOS blinking code detected.





This can help in determining if the symptom shown by the TV when it first failed (Most likely during operation), has changed to another blinking code when checked by the service technician.

Power LED Error Code Definition (1 of 2)

POWER LED ERROR CODE	CIRCUIT MONITORED	CONDITIONS TRIGGERING THE SHUTDOWN	LIST OF BOARDS POSSIBLY CASUSING THE FAILURE			
			MOST COMMON	2ND	OCCASIONALLY	RARELY
NO BLINLK SOLID RED	LSI Error	Shorted Vsus Shorted Vda Shorted P15V	SC - SS	**P**	**A**	**Panel**
1 BLINLK	Panel Information SOS PD5 Start-up SOS	Communication problem between the System CPU (IC8001) and the Panel CPU (IC9003)	A	¤	¤	¤
4 BLINKS	Power Supply output voltages	Regulation issues with any of the voltages output from the power supply. Wrong diagnostic by the A board	P	A	¤	¤
6 BLINKS	SC Energy Recovery Circuit	An increase or reduction of the Energy Recovery Circuit output (MID). Open connection of the P15V line between the P and A board. Open connection between any of the ribbon cables on the C boards and the A board. Open connection between the ribbon cable/cables interconnecting the C boards. Wrong diagnostic by the A board.	SC	A	¤	C
7 BLINKS	Scan Drive Circuit and Connection between the SC board and the SM(SU/SD) board.	Missing Vsus. Abnormality of the scan circuit output, the 15V_F, the scn_pro, and Vscn circuit. Loose or open Connection between the SC board and the SM(SU/SD) board (SC41, SC42, SC46). Open or loose connection between connectors SC2/P2 Wrong diagnostic by the A board Defective Panel	SC	SU-SD	Panel	A
8 BLINKS	Sustain Drive Circuit and Connection between the SS board and the Panel.	Abnormality of the Sustain drive circuit. Open or loose connection between the SS board and FPCs from the panel (SS61, SS64, SS21, SS24, and SS58). Open or loose connection between connectors C10/C20 Open or loose connection between A20 and SC20. Wrong diagnostic by the A board	SS	Panel	A	C2

Note: When connector SC20/A20 is disconnected on the 2011 models, the TV shuts down with 8 blinks. When this is done on the 2009 and 2010 models, the TV shuts down with 6 blinks.

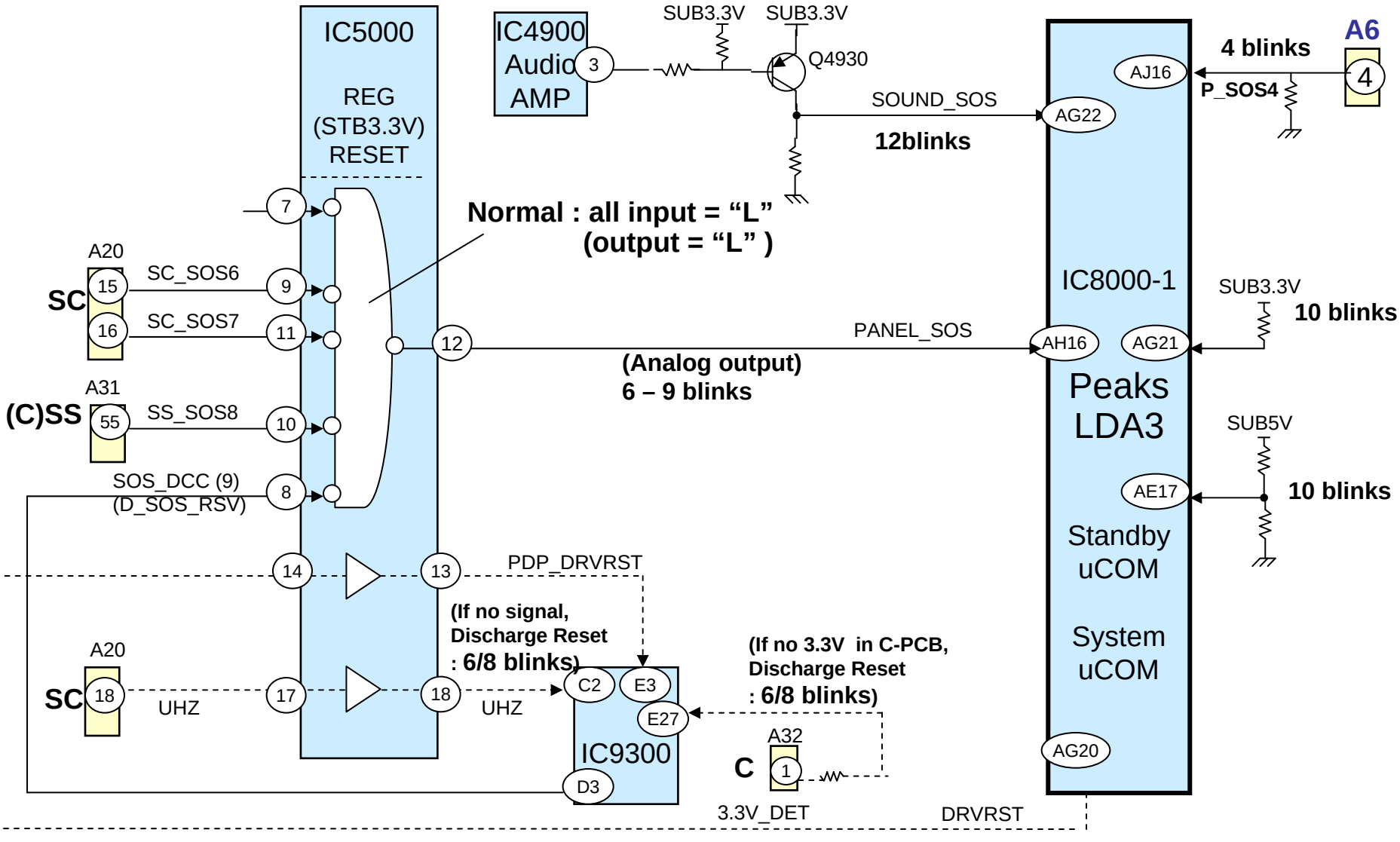
Power LED Error Code Definition (2 of 2)

POWER LED ERROR CODE	CIRCUIT MONITORED	CONDITIONS TRIGGERING THE SHUTDOWN	LIST OF BOARDS POSSIBLY CASUSING THE FAILURE			
			MOST COMMON	2ND	OCASSIONALLY	RAREALLY
9 BLINKS	DCC Discharge Control Circuit	Failure of PD4 IC9300 (Discharge control)	A			
10 BLINKS	SUB5V – SUB3.3 – F15V Tuner Power Down	Abnormalities of the F+15V and derivate Sub-voltages. • Reasons: • The P board is not generating the F+15V • SUB Voltages are affected by the K board or by metal object present in the SD card slot.. Wrong diagnostic by the A board.	P	A		
12 BLINKS	AUDIO AMP	Abnormalities of the Audio AMP Pinched speaker wire. Wrong diagnostic by the A board.	A	¤	¤	¤
13 BLINKS	Communication error between Stby section and Main processor within the Peaks SLD/LDA IC	Abnormal operation of the Peaks SLD/LDA IC Wrong diagnostic by the A board.	A			
14 BLINKS	This code is triggered if there are abnormalities during data exchange with the standby CPU ROM.	No F15V connected to the A board at plug-in (Open connection of both pins 10 & 11 between P6 and A6) Shorted F15V developed after the TV is up and running. Holding the power switch for over 5 seconds after the unit has gone into shut down and it's in lock mode with the power LED solid red (Note: the LED stays on if the power button is momentarily pressed).	A- P			

Protection circuit block diagram

The A board is always a suspect for any blinking failure

TC-P46ST30



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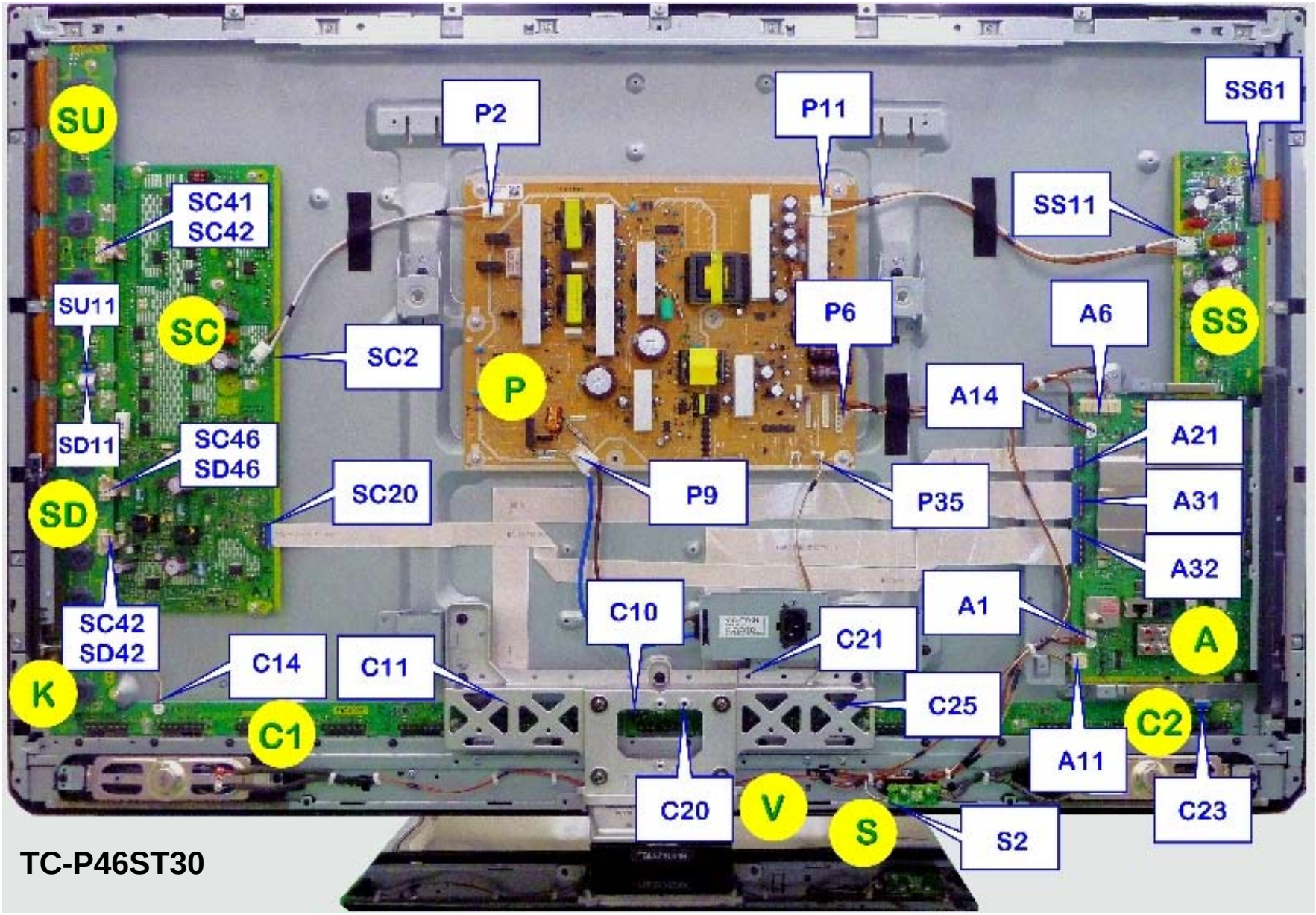
Boards Layout And Connectors Location



TC-P46ST30

SOS Detect Circuit (1 of 4)

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. If the TV has fans, the shutdown circuit is triggered when they draw more current than normal.
The PEAKS-LDA3 (IC8000) of the A board detects when a shutdown condition has been triggered.
When an abnormality has occurred, the unit's protection circuit operates and the TV is reset to the standby mode. At this time, the defective block can be identified by the number of blinks of the POWER LED on the front of the unit.
The number of times that the POWER LED blinks indicates the areas where a problem is suspected.

New

Red Solid LED (No Blink): LSI error. This condition is triggered when the power supply SOS-detect-signal is triggered during the startup process.

1 Blink SOS: PDP start-up SOS and Panel information SOS.

New

Note: The 2 blinks, 3 blinks, and 5 blinks error codes have been eliminated from the 2011 models.

4 Blinks SOS: When abnormalities on any of the lines from the power supply occurs, pin 4 of connector P6 goes high. This high is provided to Peaks LDA3 IC on the A board triggering the "POWER SOS" circuit. When this happens, the TV shuts down and the power LED blinks 4 times. Primarily the P board causes 4 blinks, followed by the A board.

SOS Detect Circuit (2 of 4)

6 Blinks SOS: Pin 9 of the Application Specific IC – ASIC (IC5000) monitors the status of the SC board's energy recovery circuit. During normal operation, a low is output to pin 9 of IC5000 from connector SC20 on the SC board. If an abnormality is detected on the energy recovery circuit, pin 9 of IC5000 goes. This change of input, causes the voltage output a pin 12 to change. This change of voltage is provided to the Peaks-Lda3 IC (IC8000). As a result, the unit shuts down and the power LED blinks 6 times.
The **TC-P**X3** series besides having the SC energy recovery circuit, also has the sustain energy recovery circuit in the SN boards. This circuit monitors the scan board output and the sustain board output. Any abnormality on this circuit will trigger the 6 blinks code. If SC20 is disconnected or is not seated properly, the TV shuts down with 8 blinks.

7 Blinks SOS: Pin 11 of the Application Specific IC – ASIC (IC5000) monitors the status of the SC board's control pulses circuit. During normal operation, a low is output to pin 11 of IC5000 from connector SC20 on the SC board. If an abnormality is detected on the switching circuit, pin 11 of IC5000 goes high. This change of input, causes the voltage output a pin 12 to change. This change of voltage is provided to the Peaks-Lda3 IC (IC8000). As a result, the unit shuts down and the power LED blinks 7 times.

8 Blinks SOS: Pin 10 of the Application Specific IC – ASIC (IC5000) monitors the status of the SS board. During normal operation, a low from the SS board (SS33) is output to pin 10 of IC5000 from connector A3. If an abnormality is detected on the energy recovery circuit, pin 10 of IC5000 goes high. This change of input, causes the voltage output a pin 12 to change. This change of voltage is provided to the Peaks-Lda3 IC (IC8000). As a result, the unit shuts down and the power LED blinks 8 times.
8 Blinks condition is also caused when the connections between the panel's flex-cables and the sustain board are broken or the connector are not properly seated.

9 Blinks SOS: Failure of the Discharge Control Circuit – DCC (IC9300)

SOS Detect Circuit (3 of 4)

10 Blinks SOS: The F15V and its derivates sub-voltages are monitored by the Peaks – LDA3 IC (IC8000). Any abnormality on these voltages, triggers the shutdown circuit. The MPU shuts down the unit. The power LED blinks 10 times.

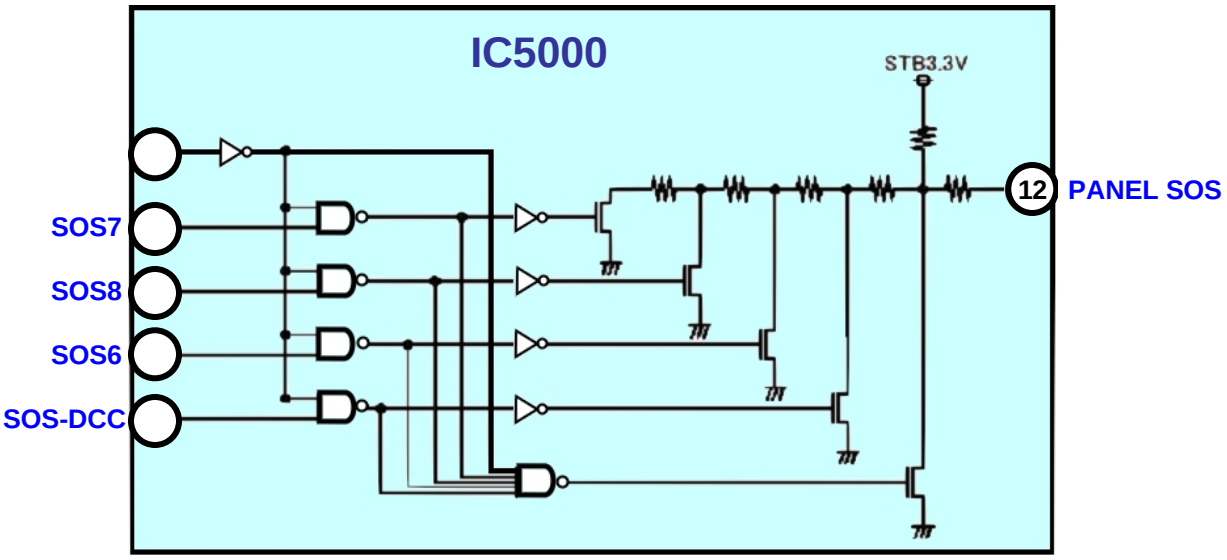
12 Blinks SOS:

The transistor Q4930 monitors the speaker amplifier IC (IC4900). Pin 3 is normally high. If IC4900 or one of the speakers develops a short circuit, pin 3 goes low causing Q4930 to go into conduction and output a high to pin AG22 of the System CPU (IC8000) on the A board.
When this happens, the TV shuts down and the power LED blinks 12 times.

13 Blinks: This condition can happen when the internal communication of the Main processor and the Standby microprocessor within the PEAKS-LDA3 IC is interrupted for more than 3 minutes.

14 Blinks: This code is triggered if there are abnormalities during data exchange with the standby CPU ROM.

SOS Detect Circuit (4 of 4)



INPUT				OUTPUT	
SOS7 – SC2	SOS8 - SS	SOS6 – SC1	SOS - DCC	Panel SOS	
Pin 11	Pin10	Pin 9	Pin 8	Pin 12	
L	L	L	L	0.3V	Normal
L	H	L	L	2.55V	8 Blinks
L	X	H	L	1.95V	6 Blinks
L	X	X	H	1.35V	9 Blinks
H	X	X	X	3.0V	7 Blinks

Quick Procedure To Check For Short or Low Resistance Condition of the Vsus, Vda, and P15V Lines

Quick Procedure To Check For Short or Low Resistance of the Vsus, Vda, and P15V Lines

Note: Vsus is generated by the Power supply and is only used by the SS and SC boards
Vda is generated by the Power supply and is only used by the Panel (Panel Drive ICs)
P15V is generated by the Power supply and is used by the A, SS, and SC boards

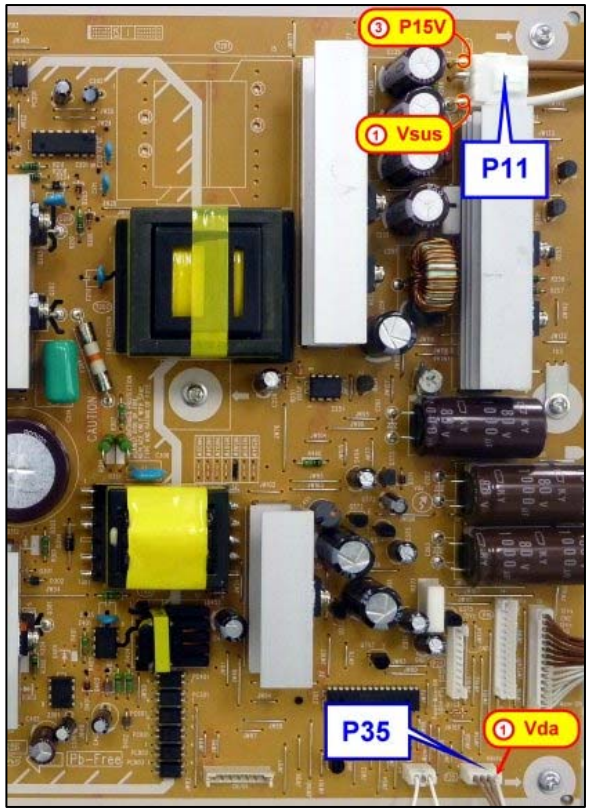
Test points for the Vsus, Vda, and P15V can be easily found on the P board. To check for short circuit or low resistance on these lines, follow this procedure:

Preparation

1. Make sure the TV is disconnected.
2. Remove any residual charge from the Vsus and Vda lines by momentarily grounding them through a 500 ohms resistor (At least 5Watts).
3. Measure the resistance between chassis ground and the pins indicated on the table below. A dead short or a reading lower than 1K indicates a shorted or partially shorted line.

Voltage Test Points		
Connector/ Wire Color	Pin Number	Voltage
P11/White	1	Vsus
P11/Brown	4	P15V
P35/White	1	Vda

Note: For a quick procedure to determine the cause of the problem when a short or low resistance reading is found, see the next page.



TC-P46ST30

Quick Procedure To Determine the Cause of the Problem if a short or Low Resistance Reading is Found

Quick Procedure To Determine the Cause of the Problem if a short or Low Resistance Reading is Found

Shorted Vsus

Note: Vsus is generated by the Power supply and is only used by the SS and SC boards

If a short is found on the Vsus line, remove connectors P2/SC2 and P11/SS11 one at a time to determine if the SC board or the SS board is defective.

Shorted Vda

Vda is generated by the Power supply and is only used by the Panel (Panel Drive ICs)

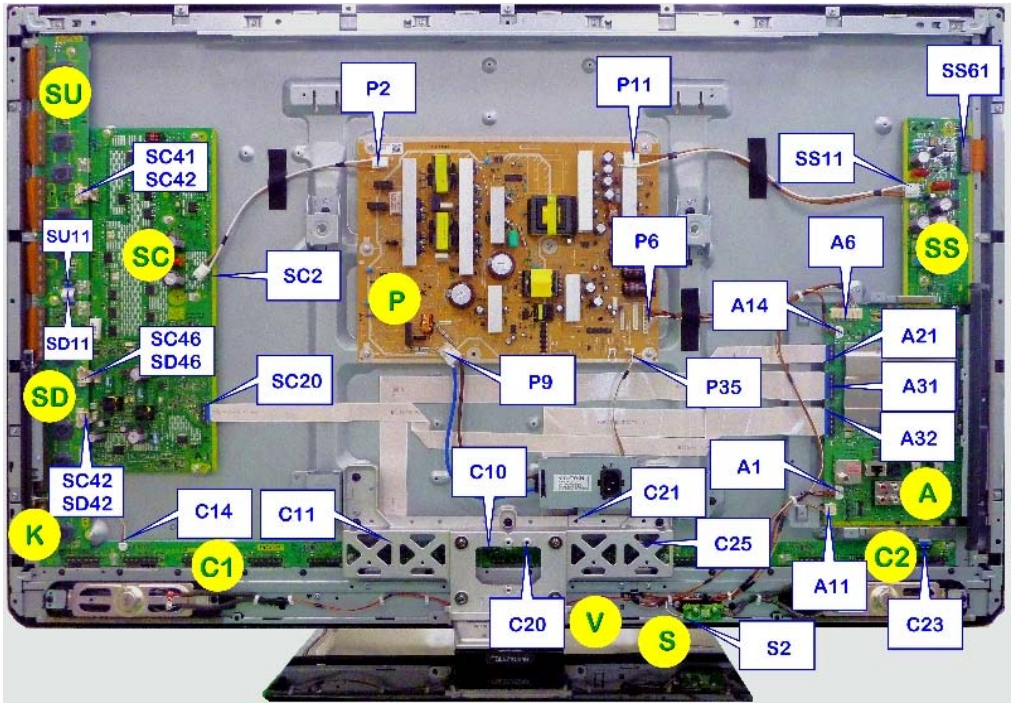
If a short is found on the Vda line, is likely that the panel or one of the C boards is defective. To determine which is defective, remove connector C10 between the C1 and C2 boards and the panel's flex-cables connected to the C boards one at a time.

Shorted P15V

P15V is generated by the Power supply and is used by the A, SS, and SC boards

If a short is found on the P15V line, remove connectors P6, P11, and SC20 one at a time to determine which board is defective. A shorted P15 is primarily caused by the following boards in the order presented; SC, P, A, and SS boards.

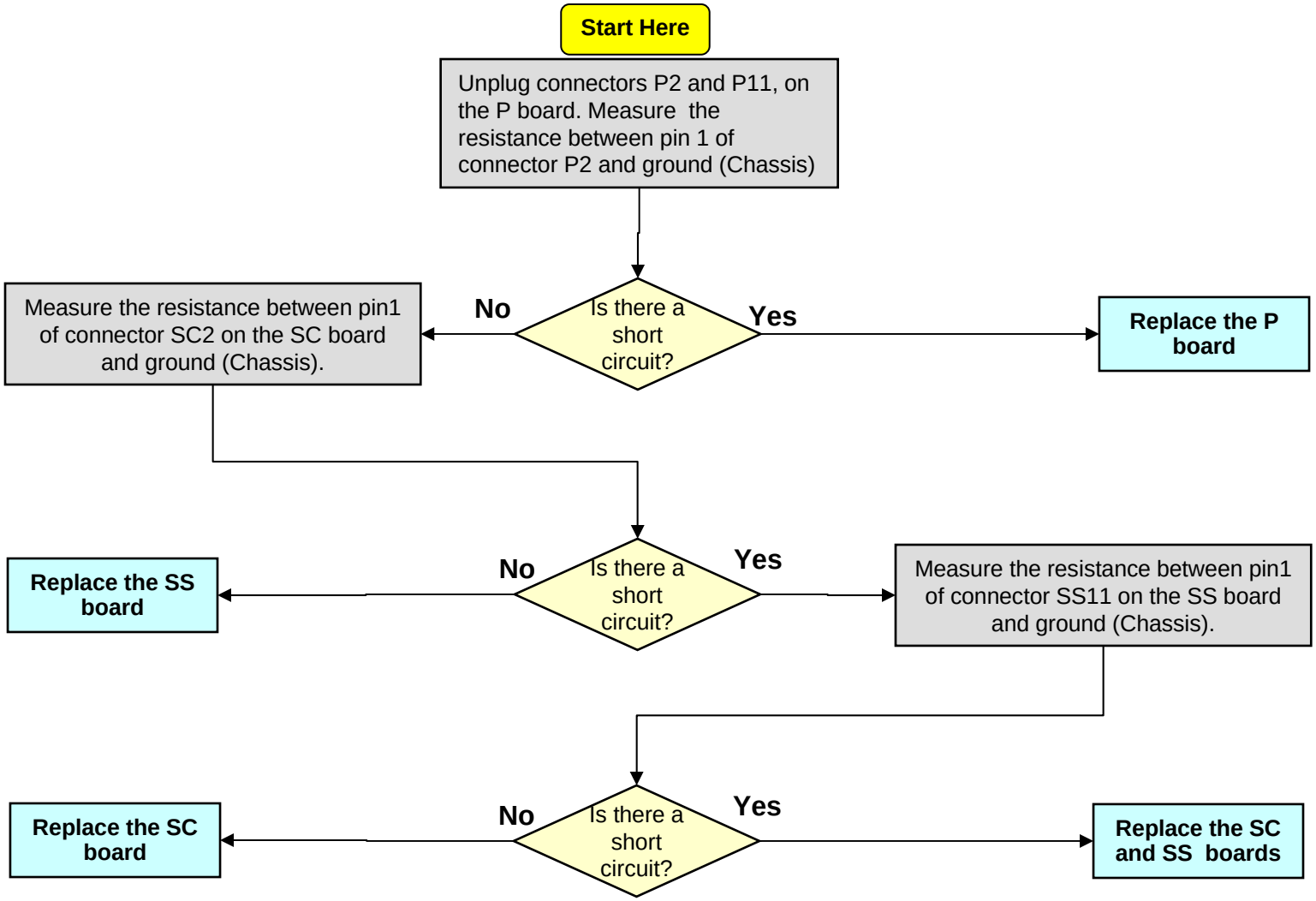
Note: Even though is not common, the P board can also cause a shorted Vsus, Vda, or P15V.



Connectors location

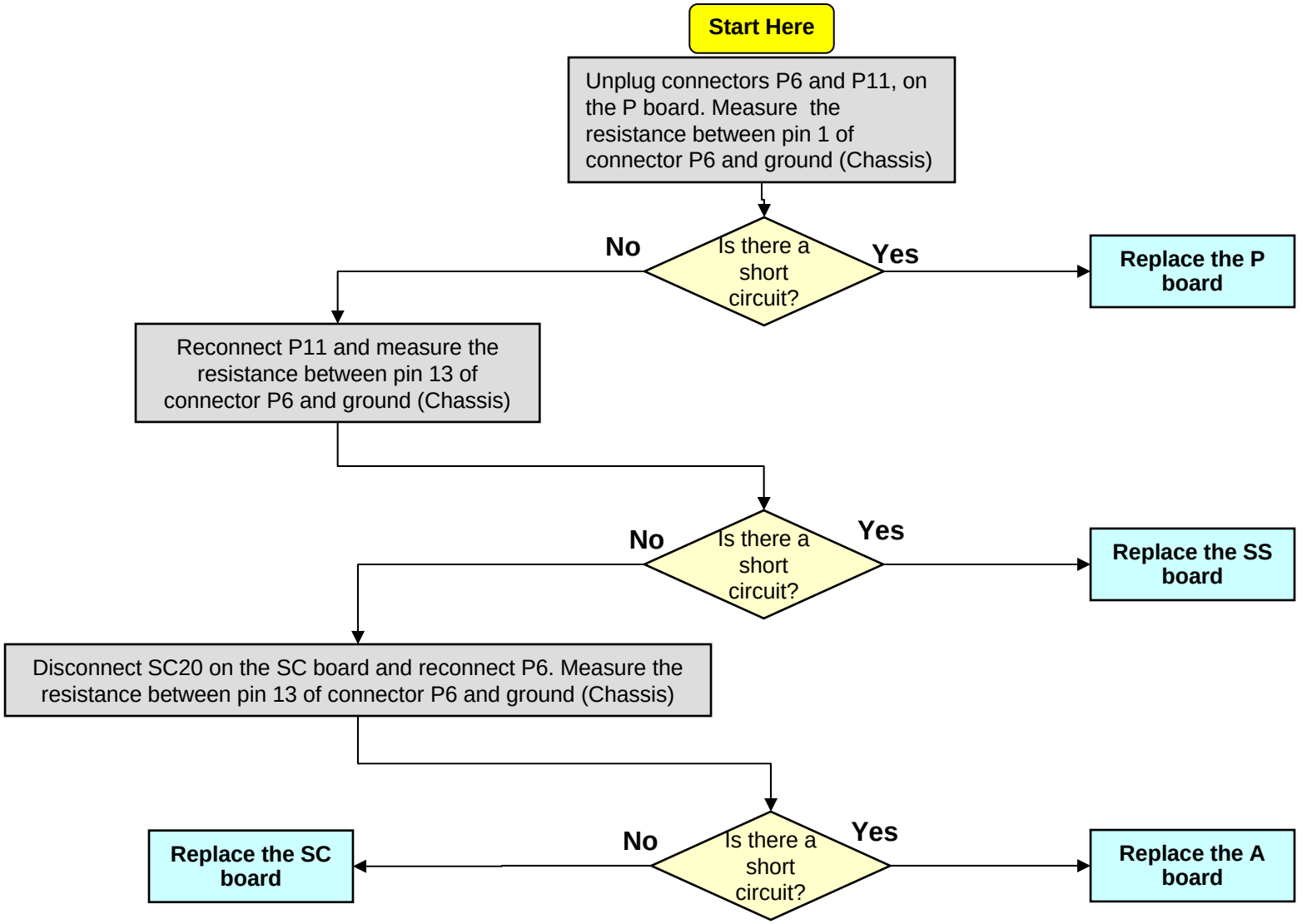
Detailed Troubleshooting Procedure for Shorted Vsus

Detailed Troubleshooting Procedure for Shorted Vsus



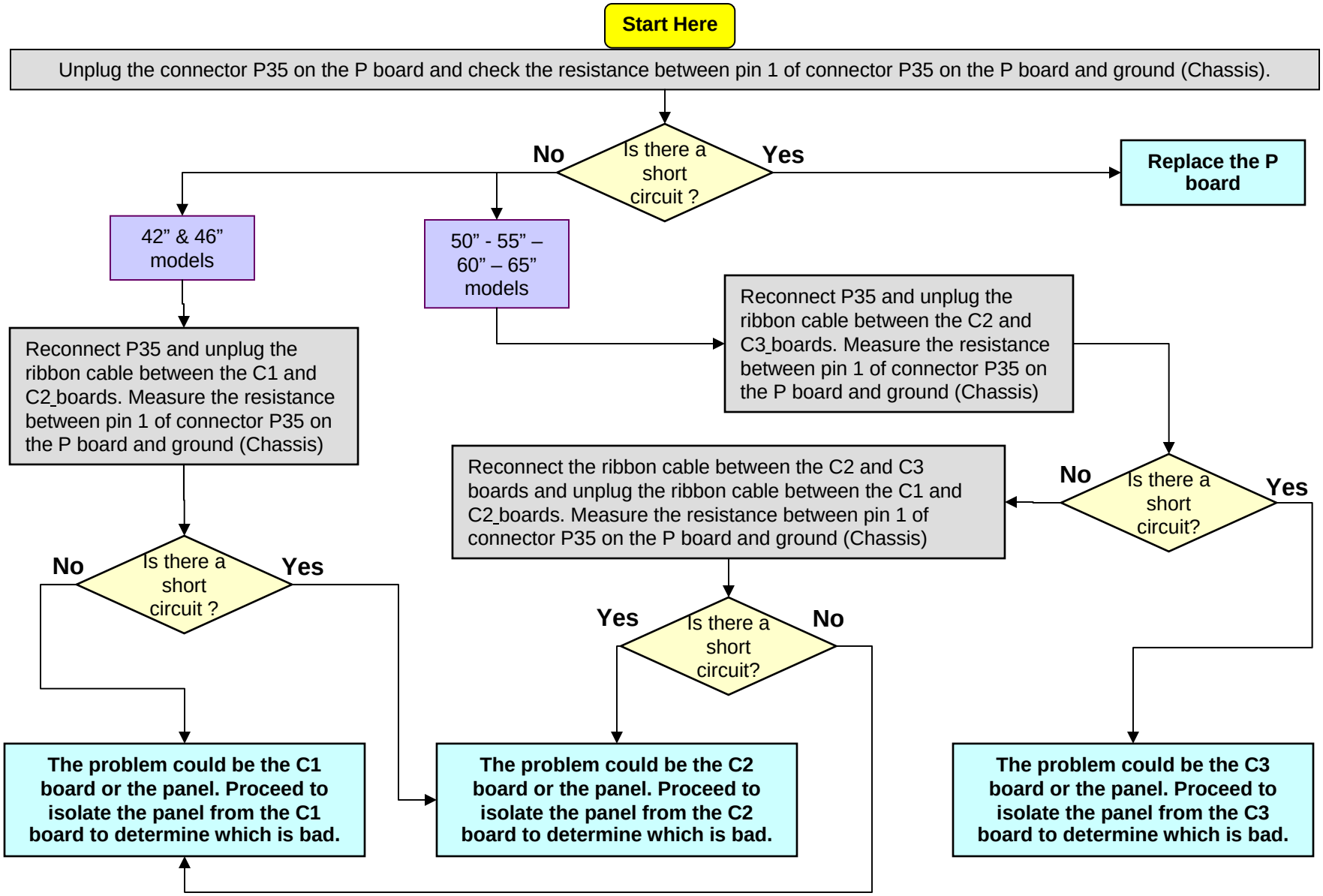
Detailed Troubleshooting Procedure for Shorted P15

Detailed Troubleshooting Procedure for Shorted P15V



Detailed Troubleshooting Procedure for Shorted Vda

Detailed Troubleshooting Procedure for Shorted Vda



SOS Blinking Codes Troubleshooting Flowcharts

Solid Red LED error Code (SOS4 At Start-Up)

New

These conditions can cause the TV to shutdown while the power LED stays on (Solid red)

1. **Over current condition detected by the power supply during start-up process.**
   - ❑ Shorted Vsus.
   - ❑ Shorted Vda.
   - ❑ Shorted P15V.
2. **Wrong diagnostic by the A board**

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

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

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

Troubleshooting Solid Red LED Failure (Locked Mode)

To confirm that the TV is on Locked Mode, 1st, press the power switch to turn on the TV, then when the LED turns on, press the power switch to turn the TV off. If the LED stays on, the TV is on Locked Mode but if the LED goes off, then the symptom is different (Like no video or black screen).

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
Solid Red	**SC**	**P**	**SS**	**A**	**Panel**		

New

Start Here

Unplug the TV and disconnect SC2/P2, SC20/A20, SS11/P11. Reconnect the TV and press the power switch. Note: Do not let the TV run for more than 30 seconds.

Is the Power LED blinking or is it solid red?

- Blinking any other number of times besides 6. → **Replace the A board and check Vsus and P15V for short circuit.**
- Blinking 6 times after approx. 10 sec. → Unplug the TV and reconnect P11/SS11. Turn the power on.
  - Is the Power LED blinking or is it solid red?
    - Blinking 8 times after approx. 10 sec. → **Replace the SC board**
    - Solid red → **Replace the SS board.**
- Solid red → Unplug the TV. Disconnect P35 on the P board. Turn the TV on.
  - Is the Power LED solid red or is it blinking?
    - Blinking 6 times → **Replace the Panel (Check the C boards for shorted Vda first).**
    - Solid red → **Replace the P board.**

Troubleshooting 1 Blink Failure

(PD4 Startup SOS/Panel Information SOS)

Start Here

If the TV shuts down and the power LED blinks 1 time, replace the A

4 Blinks Error Code (Abnormality of Power Supply Output)

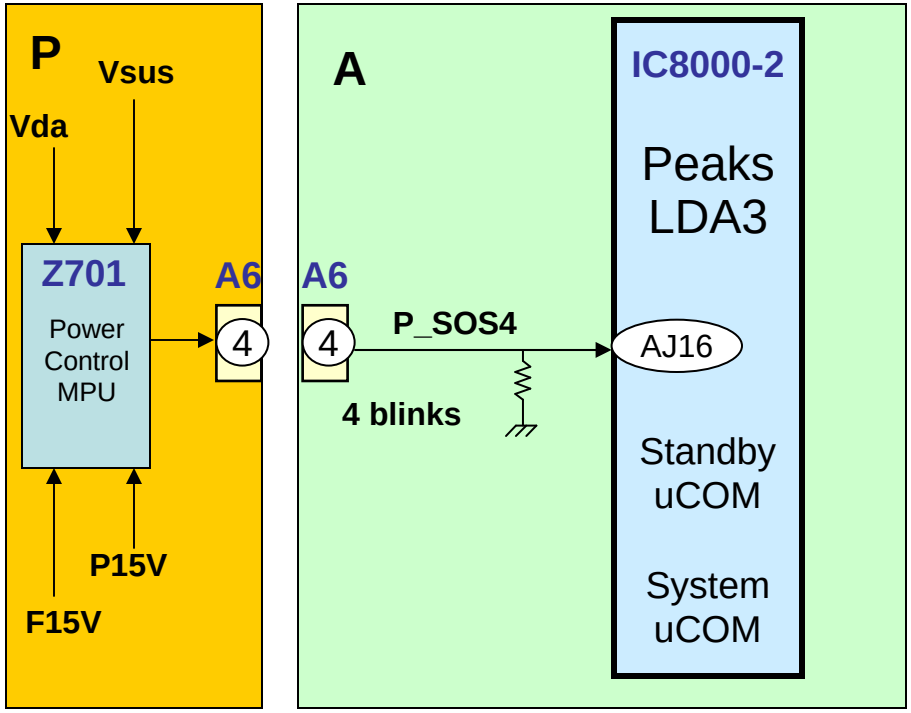
These conditions can cause the TV to shutdown and the power LED to blink 4 times

1. **Regulation issues with any of the voltages from the power supply.**
   - ❑ If PFC goes over 470V (±50V) or below 165V (±20V)
   - ❑ If Vsus goes over 240V (±10V)
   - ❑ If Vda goes above 67V (±4V) or below 28V (±4V)
   - ❑ If there's an over current condition at the P15V line
2. **Wrong diagnostic by the A board**

The power supply outputs STB5V, F+15V, Vsus, Vda, and P15V. These voltages are necessary to drive the different circuits in the TV.

In order to provide protection to the TV, these voltages are monitored. If any abnormality is detected, the power supply outputs a shutdown voltage (SOS4_PS) to the System CPU to disable the Unit.

A 4 blinks condition is normally caused by the P board or the A board.



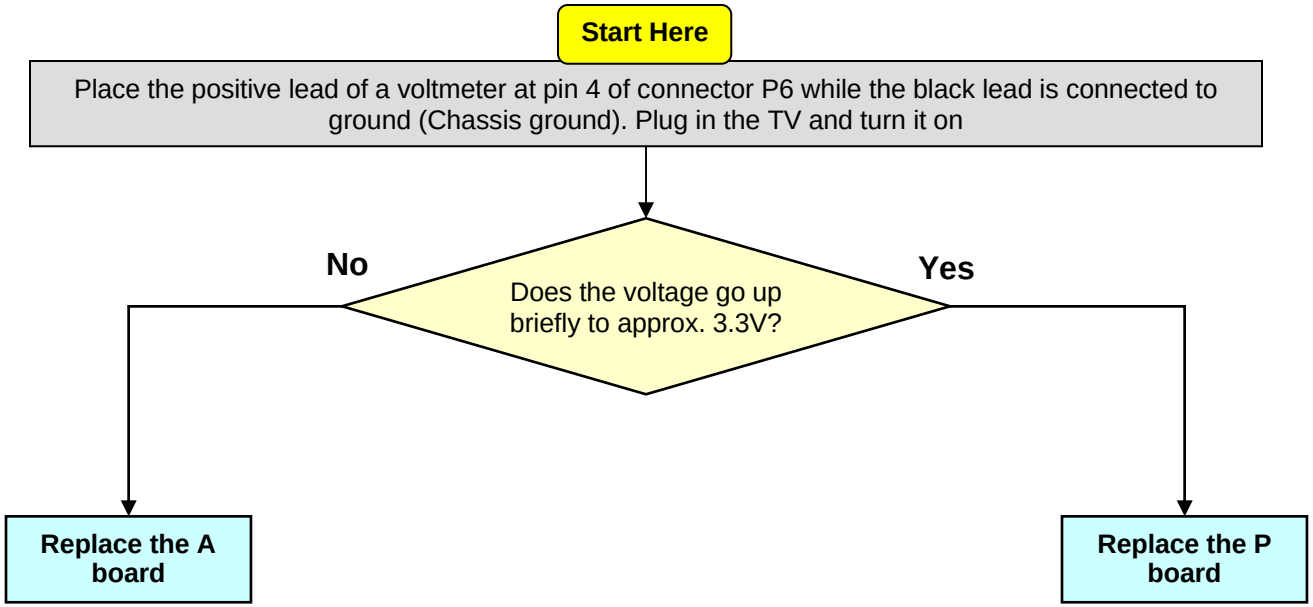
Troubleshooting 4 Blinks Failure

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
4 Blinks	**P**	**A**					

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

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



6 Blinks Error Code Circuit Explanation

6 Blinks SOS

Energy Recovery/Vscan

The energy recovery circuit and Vscan are monitored in the SC board. Failure of any these 2 circuits triggers the SOS6 line causing the unit to shut down and the power LED to blink 6 times.
Under normal operation, the output voltage (MID) of the “Energy Recovery” circuit ranges between 68V and 138V. If the voltage drops below 67V or increases above 139V, the error detect circuit (IC16581) is triggered. This causes a high to be output to pin 15 of connector SC20.
Pin 15 of SC20 (SOS6-SC1) also goes high, if the Vscan generating circuit fails.

The voltage from SC20 is connected to the Peaks – LDA3 (IC8000) on the A board via the DC level shifter section of the ASIC (Application Specific) IC (IC5000)
If this voltage goes high, the TV shuts down and the power LED blinks 6 times.

This condition is normally caused by a defective SC, A, or P board. (SC>A>P).
6 blinks can also be caused by open connection between the C boards and open connection between any of the C board and the A board.

6 Blinks Error Code (SC Energy Recovery Circuit Abnormality)

These 5 conditions can cause the TV to shutdown and the power LED to blink 6 times

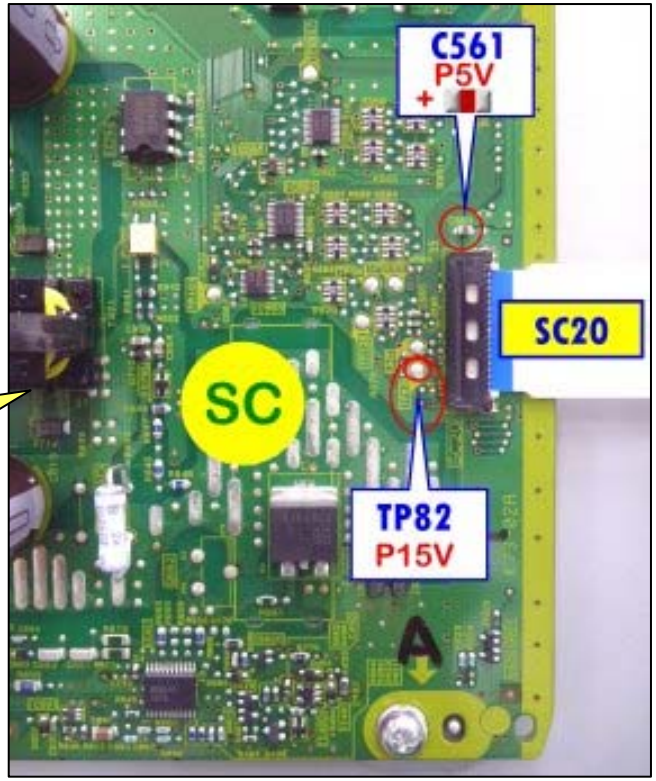
1. **An increase or reduction of the Energy Recovery Circuit output (MID).**
2. **No P15V connection to the A board (Open P15V (Pin 13 of connector P6/A6) between P board and A board).**
3. **Open connection between any of the ribbon cables on the C boards and the A board.**
4. **Open connection between the ribbon cable/cables interconnecting the C boards.**
5. **Wrong diagnostic by the A board**

New

Note: Disconnecting SC20/A20 on the 2011 models causes the TV to shut down with 8 blinks instead of 6 blinks like it was the case of the 2009 and 2010 models.

P5V and P15V test points location

P5V can be measured on the positive side of capacitor C561 on the SC board.
P15V can be measured on TP82 on the SC board.



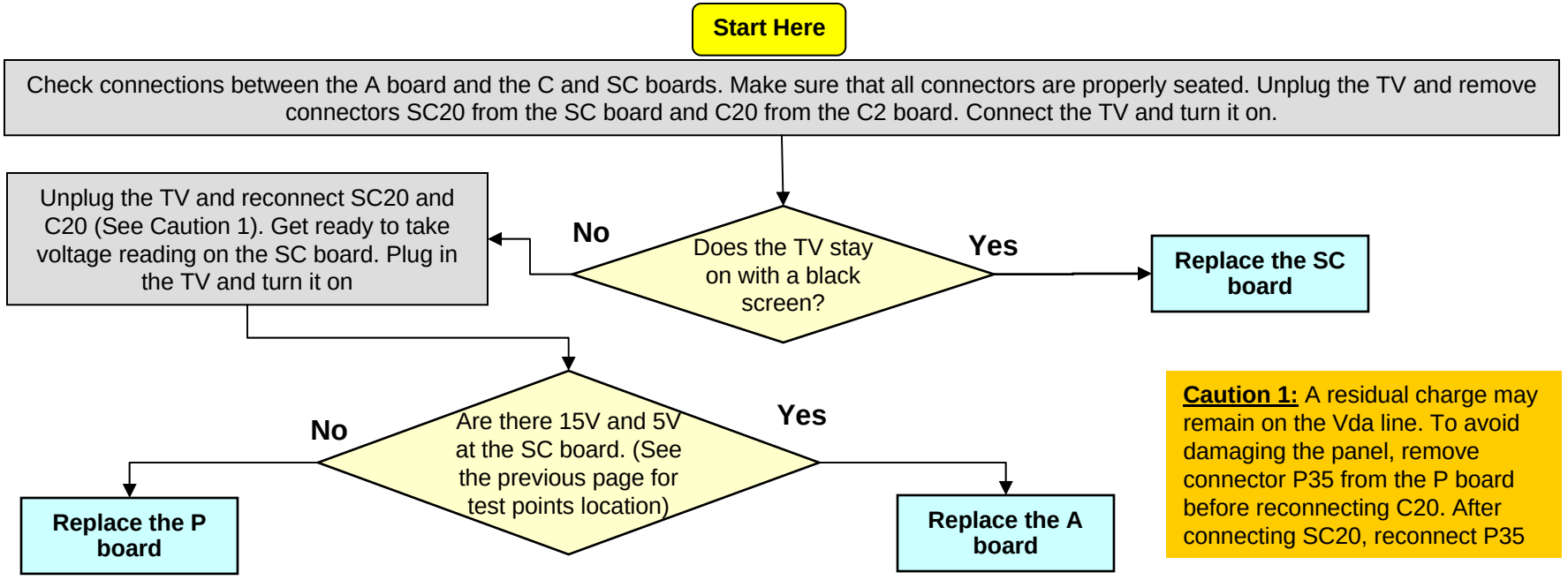
Troubleshooting 6 Blinks Failure

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
6 Blinks	**SC**	**A**	**P**				

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

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



Caution 1: A residual charge may remain on the Vda line. To avoid damaging the panel, remove connector P35 from the P board before reconnecting C20. After connecting SC20, reconnect P35

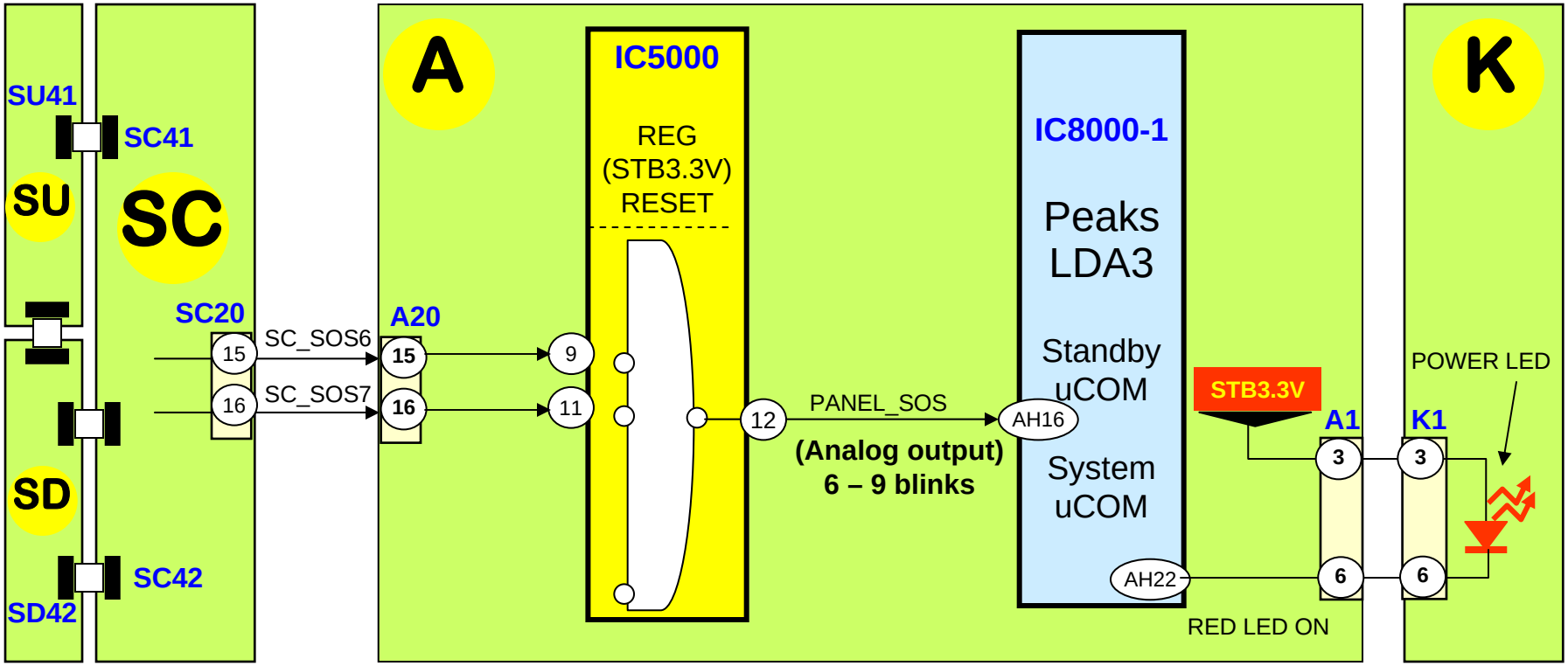
7 Blinks Error Detect Circuit

These 5 conditions can cause the TV to shut down and the power LED to blink 7 times

1. **Missing Vsus.**
2. **Abnormality of the scan circuit output, the 15V_F, the scn_pro, and Vscn circuit.**
3. **Defective Panel.**
4. **Loose or open Connection between the SC board and the SU/SD boards.**
5. **Wrong diagnostic by the A board**

The SOS7 circuit monitors the panel, the scan circuit output, the 15V_F, the scan_pro, Vscan, and the physical connection between the SC board and the SU and SD boards (CHA).

If any abnormality occurs on any of these lines or Vsus is missing, the TV shuts down and the power LED blinks 7 times. If any of the connectors between the SC and the SU or SD board is open, the TV also shuts down and the power LED blinks 7 times.



Troubleshooting 7 Blinks Failure

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

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

Preparation:

Disconnect AC Power prior to making any disconnection or connection.
Wait at least 2 minutes before the removal of any connector.
Remove the front cabinet and expose the panel to a bright light for a thorough visual inspection.
Check for cracks and blown pixels or any other abnormalities.
Check for burnt panel driver ICs on the SU and SD boards.
If the panel is defective, the SU, SD, and/or the SC board may also be defective.

Warning: The Vsus line has large capacitors that hold the charge for some time even after the TV has been turned off and unplugged. When disconnecting P2/SC2 or P11/SS1, bleed the remaining charge of the Vsus before reconnecting the cable.

Use a 500 ohms/ 5W (At least) resistor to discharge the Vsus line before reconnecting P2/SC2 or P11/SS11.

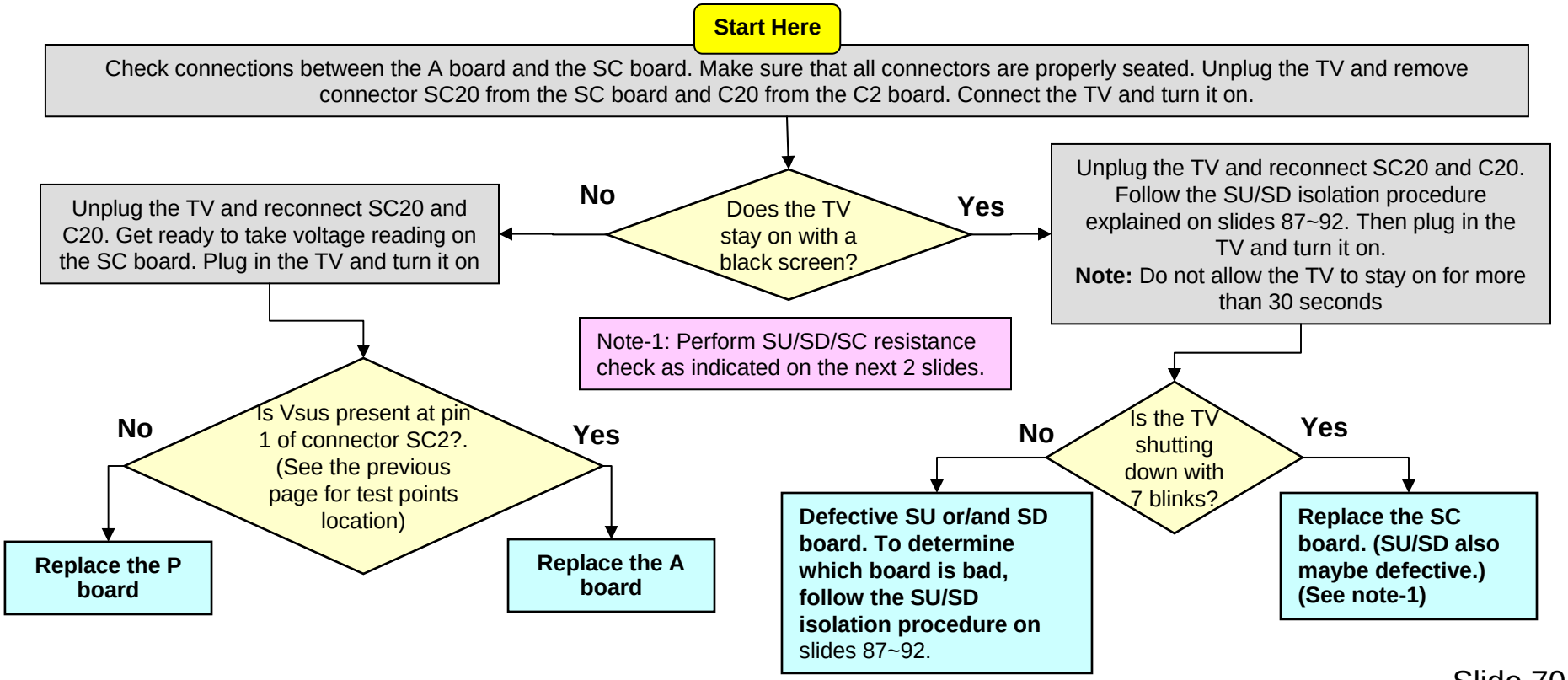
Troubleshooting 7 Blinks Failure

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
7 Blinks	**SC**	**P**	**A**				

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

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



SU/SD/SC Short Circuit/Low Resistance Test

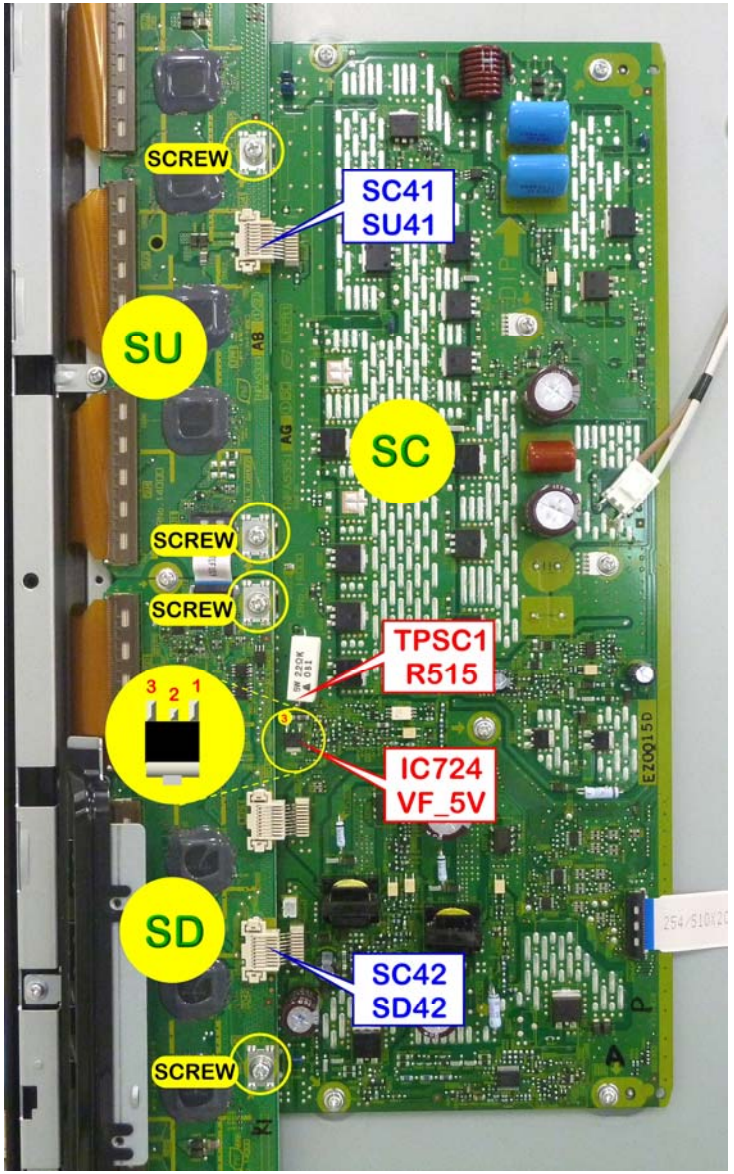
This test can be used to quickly determine if either the SC, SU, or/and the SD board are bad. **Note:** even though a short circuit is a clear indication of a defective board, a no-short-circuit condition does not necessarily means that the boards are good. Follow the isolation procedure to determine if these boards are good or bad.

Preparation:

Disconnect AC prior to making any disconnection or connection.

Wait at least 2 minutes before removal of any connector.

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



Resistance Test

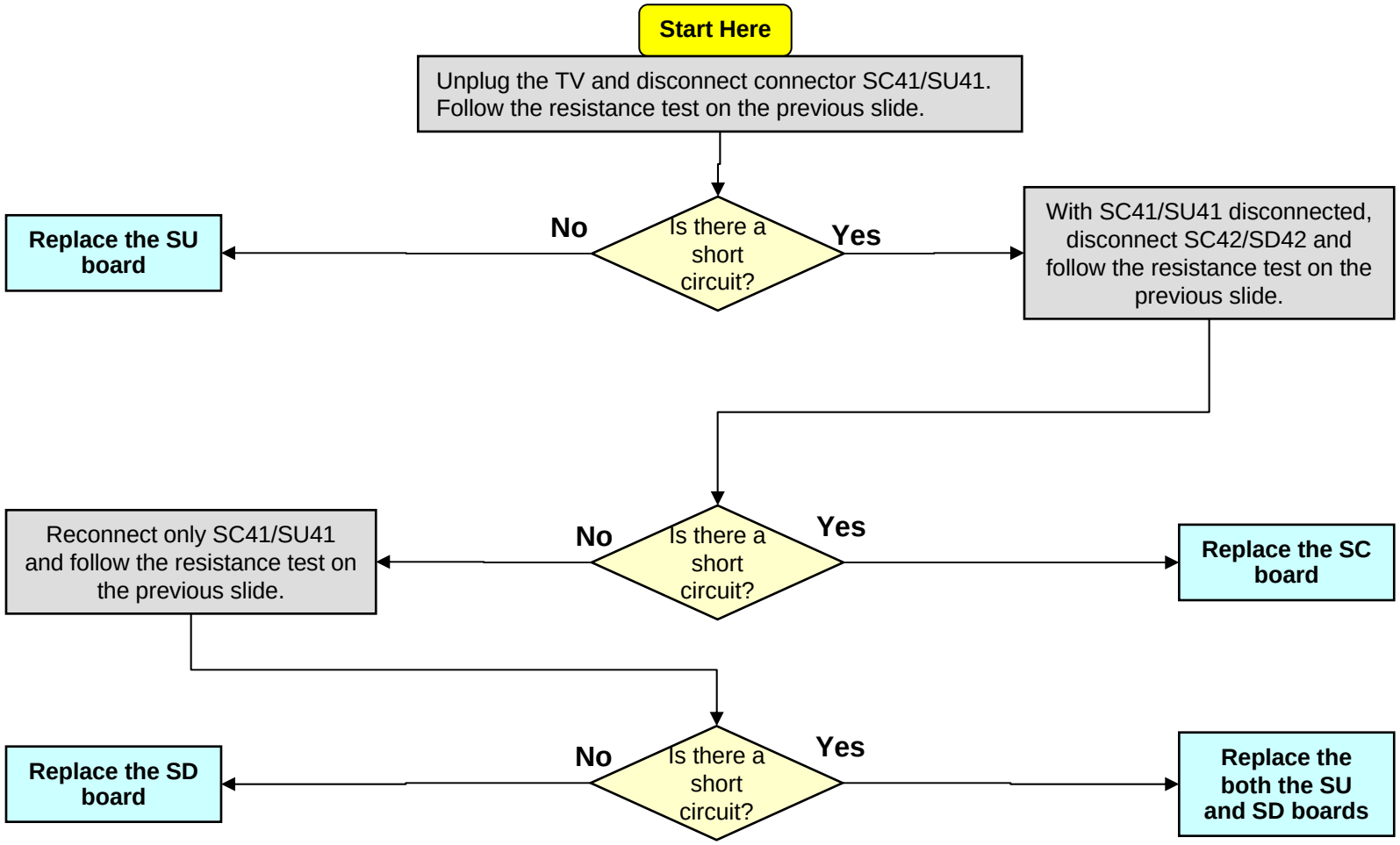
Procedure to determine if there is a short circuit or low resistance reading of the TPSC1 or VF_5V.

Using VFG (Floating ground screws) as ground, measure the resistance of:

- TPSC1 (R515)
- VF-5V (Pine 3 of IC724)

If there is short circuit or low resistance reading, continue with the procedure on the next slide.

If a Short Circuit or Low Resistance is Found, Follow This Procedure



8 Blinks Error Code

These 5 conditions can cause the TV to shut down and the power LED to blink 8 times

1. **Abnormality of the Sustain drive circuit.**
2. **Open or loose connection between the SS board and FPCs from the panel.**
3. **When SS61 or SS66 are disconnected.**
4. **Missing F15V while the TV is On.**
5. **Wrong diagnostic by the A board**

The SOS Detect circuit in the Sustain board monitors:

- ❑ Physical connection between the panel and the SS board.
- ❑ The output of the sustain drive circuit.

Under normal condition, Q16280 is on. When Q16280 is on, a low is provided to the anode of D16255 D255).

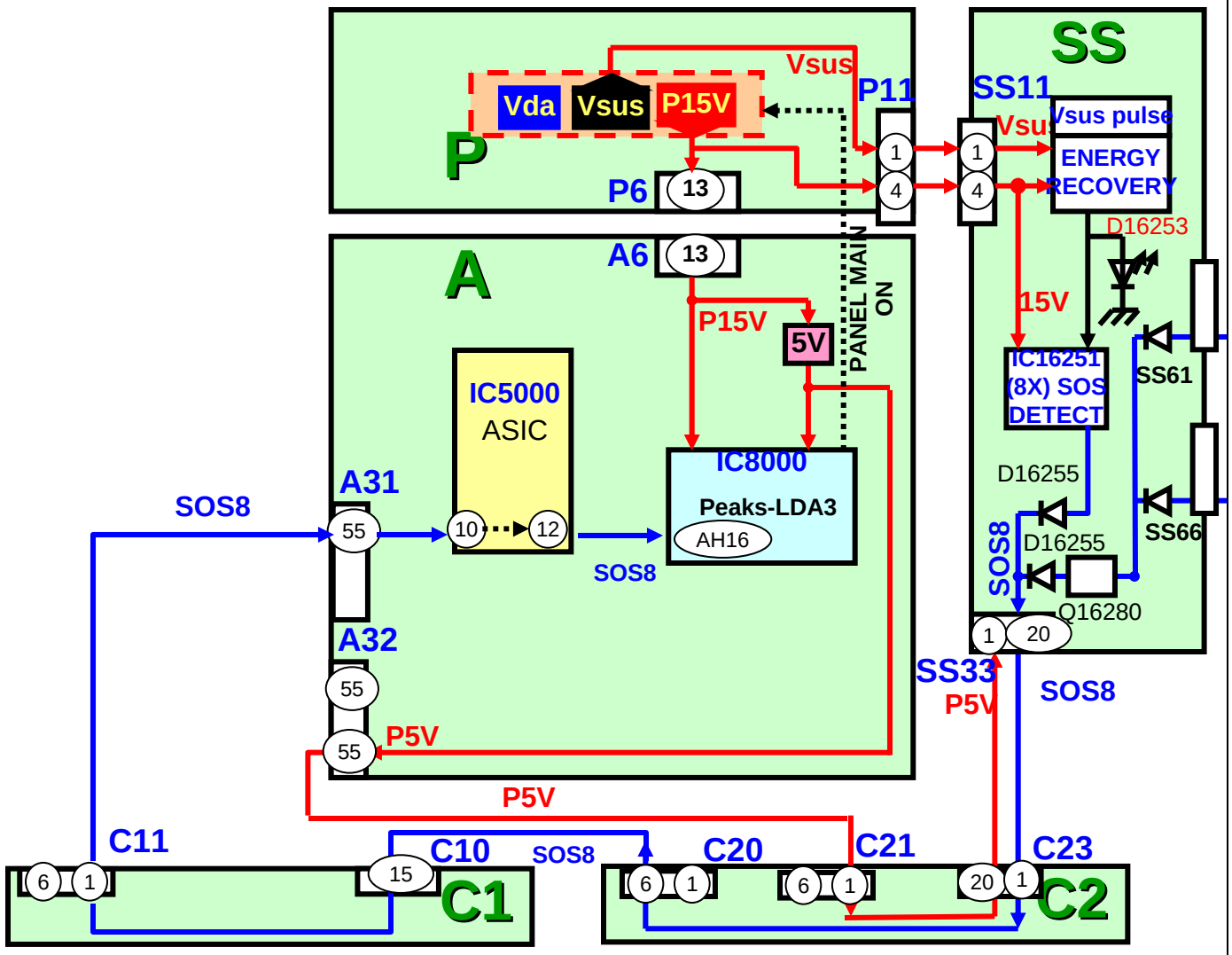
If any abnormality occurs on the sustain drive circuit or one of the FPC cables (SS61 or SS66) is open, Q16255 turns off and a high is provided to the anode of D16255 (D255).

This high is provided to pin 10 of IC5000 on the A board. When this happens, the TV shuts down and the power LED blinks 8 times.

To determine if the 8 blinks is caused by the A board, SS board, or the Panel:

- Isolate the SS board and check if the TV stays on when it's turned on.
- If the TV does not stay on after disconnecting the SS board, the A board is defective.
- If the TV stays on, then the SS or the Panel is defective.
- Check continuity between pins 1 and 2 of connectors SS61 and SS666. If open, the Panel might be defective. (Check for loose connection between the flex-cables and the SS board).
- If continuity is OK, the SS board is defective.

8 Blinks Error Detect Circuit



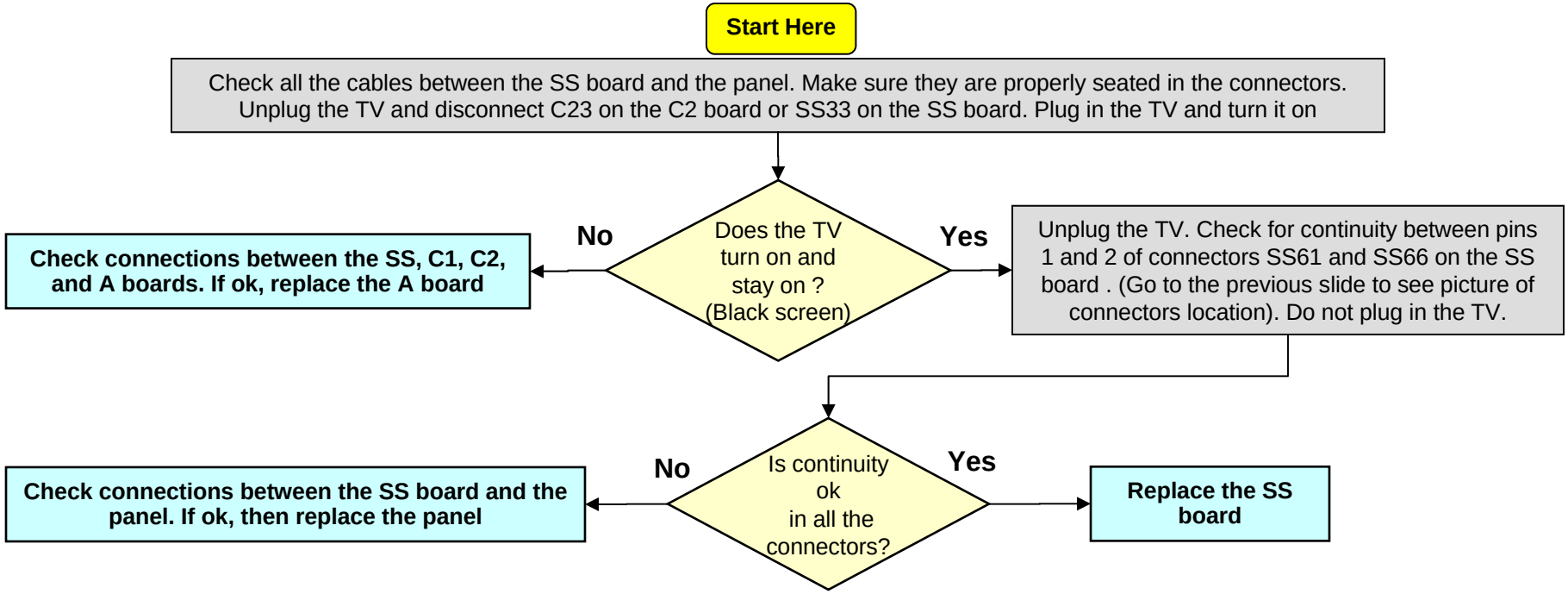
Troubleshooting 8 Blinks Failure

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
8	**SS**	**A**	**Panel**	**C2 Connections**			

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

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

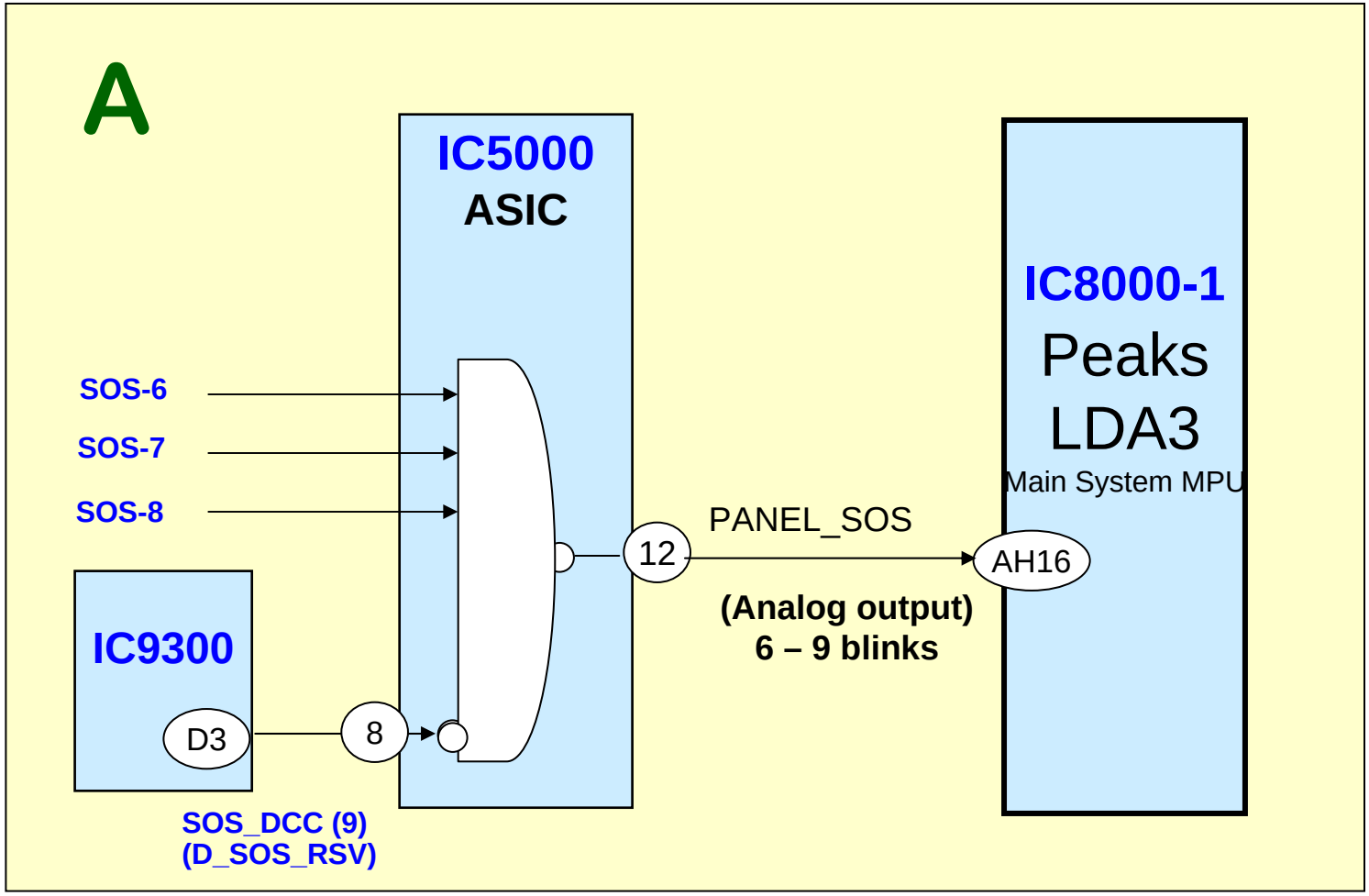


9 Blinks Error Code

This condition can cause the TV to shutdown and the power LED to blink 9 time

1. Failure of PD4 IC9300 (Discharge control)

9 blinks can be caused by failure of IC9300, IC5000, or IC8000. Since all these ICs are located on the A board, only the A board should be replaced when a blinks condition is detected.



Troubleshooting 9 Blinks Failure

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
9	**A**						

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

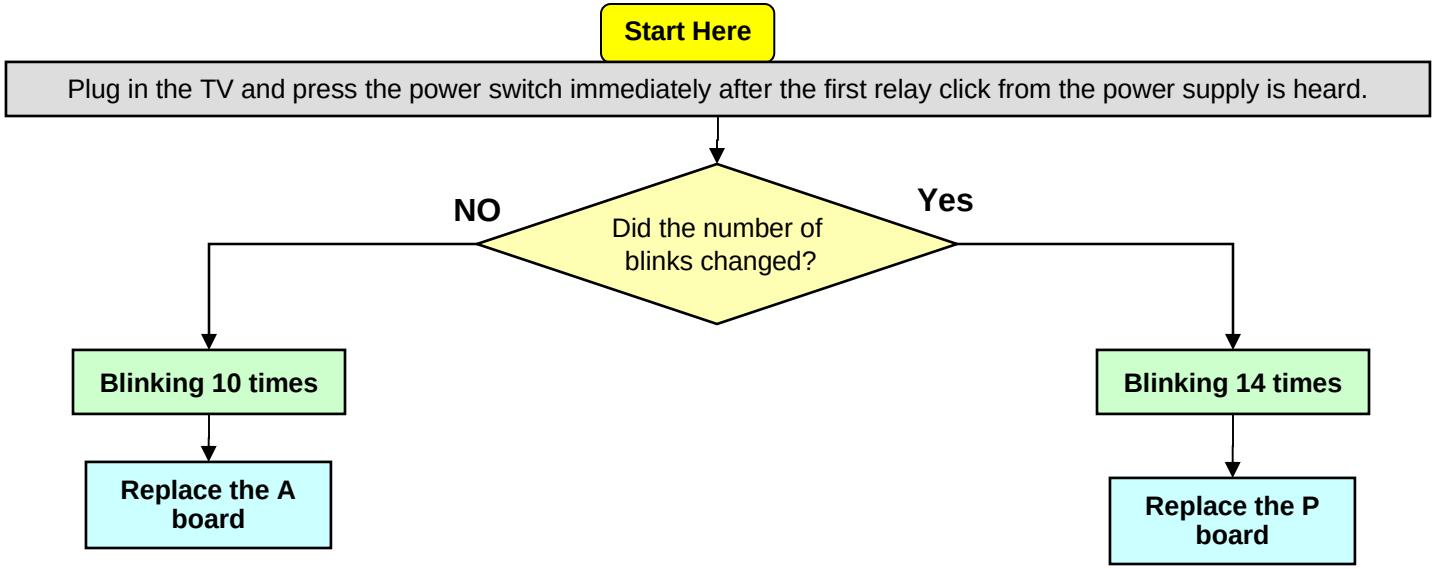
Start Here

Replace the A board

Troubleshooting 10 Blinks Failure

Troubleshooting 10 Blinks Failure

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
10	P	A					

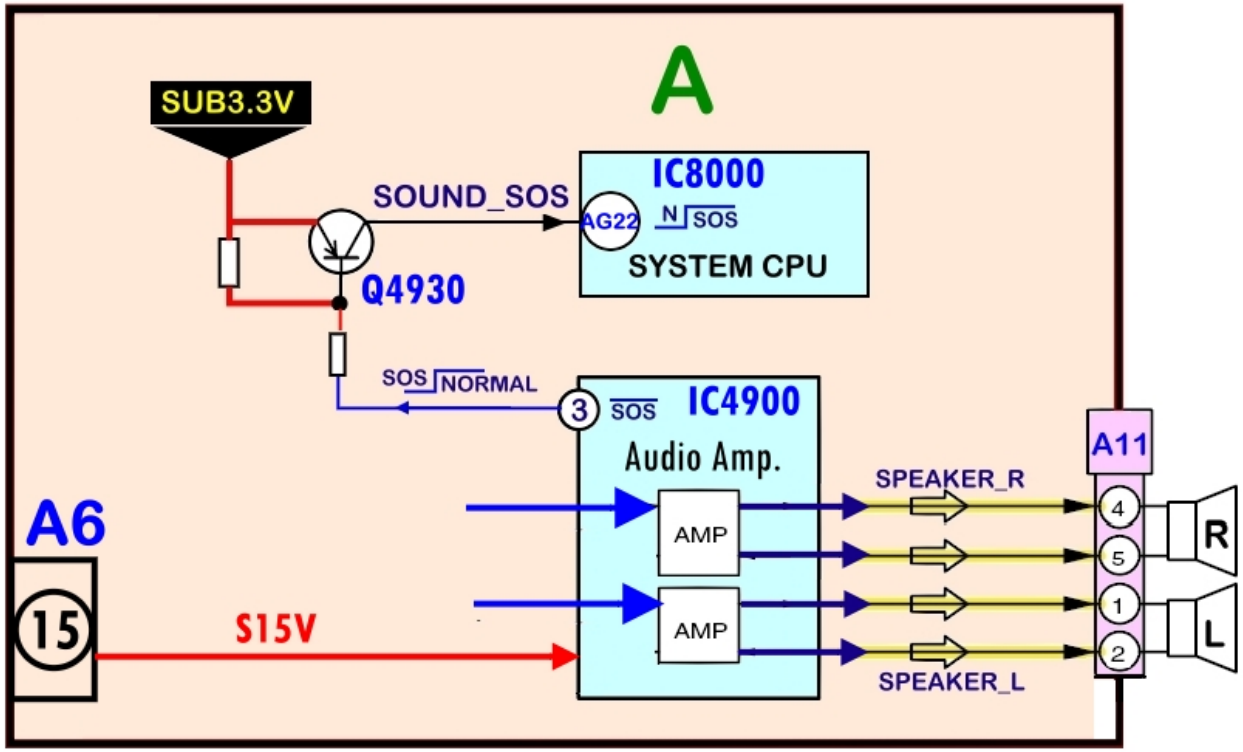


12 Blinks Error Code

These 3 conditions can cause the TV to shut down and the power LED to blink 12 times

1. **A Board.**
2. **Pinched speaker wire.**
3. **Speakers**

The transistor Q4930 monitors the speaker amplifier IC (IC4900). Pin 3 is normally high. If IC4900 or one of the speakers develops a short circuit, pin 3 goes low causing Q4930 to go into conduction and output a high to pin AG22 of the System CPU (IC8000) on the A board.
When this happens, the TV shuts down and the power LED blinks 12 times.



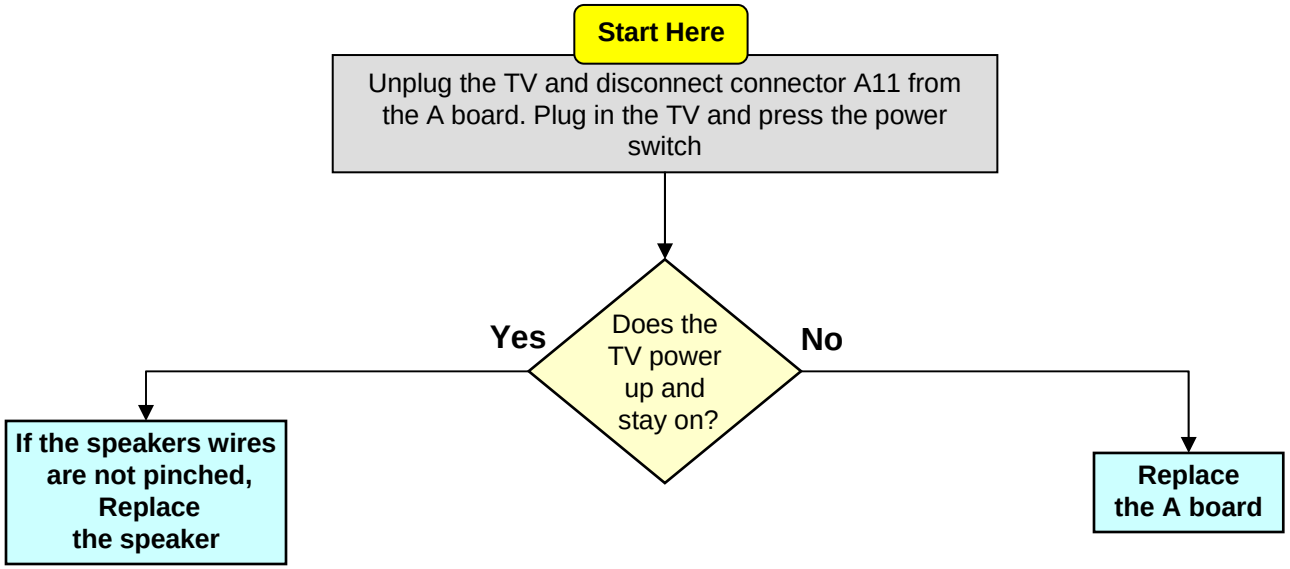
Troubleshooting 12 Blinks Failure

Blink Code	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
12	A	Speaker					

Cautions: Disconnect the AC Power prior to making any disconnection or connection.

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

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



13 Blinks Error Code

This condition can happen when the internal communication of the Main processor and the Standby microprocessor within the PEAKS-LDA3 IC is interrupted for more than 3 minutes.

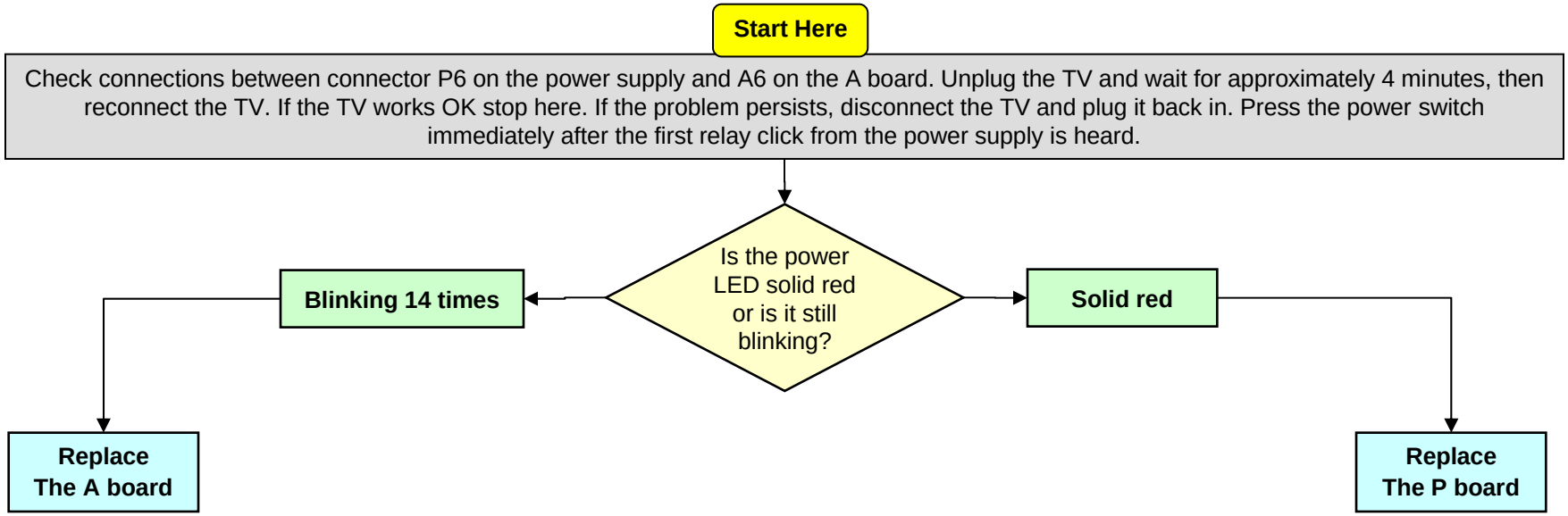
Start Here

Replace the A board

14 Blinks Error Code

These conditions can cause the TV to shutdown and the power LED to blink 14 times

1. No F15V connected to the A board at plug-in (Open connection of both pins 10 & 11 between P6 and A6)
2. Shorted F15V developed after the TV is up and running.
3. Holding the power switch for over 5 seconds after the unit has gone into shut down and it's in lock mode with the power LED solid red (Note: the LED stays on if the power button is momentarily pressed).



Troubleshooting No Power/Dead Unit

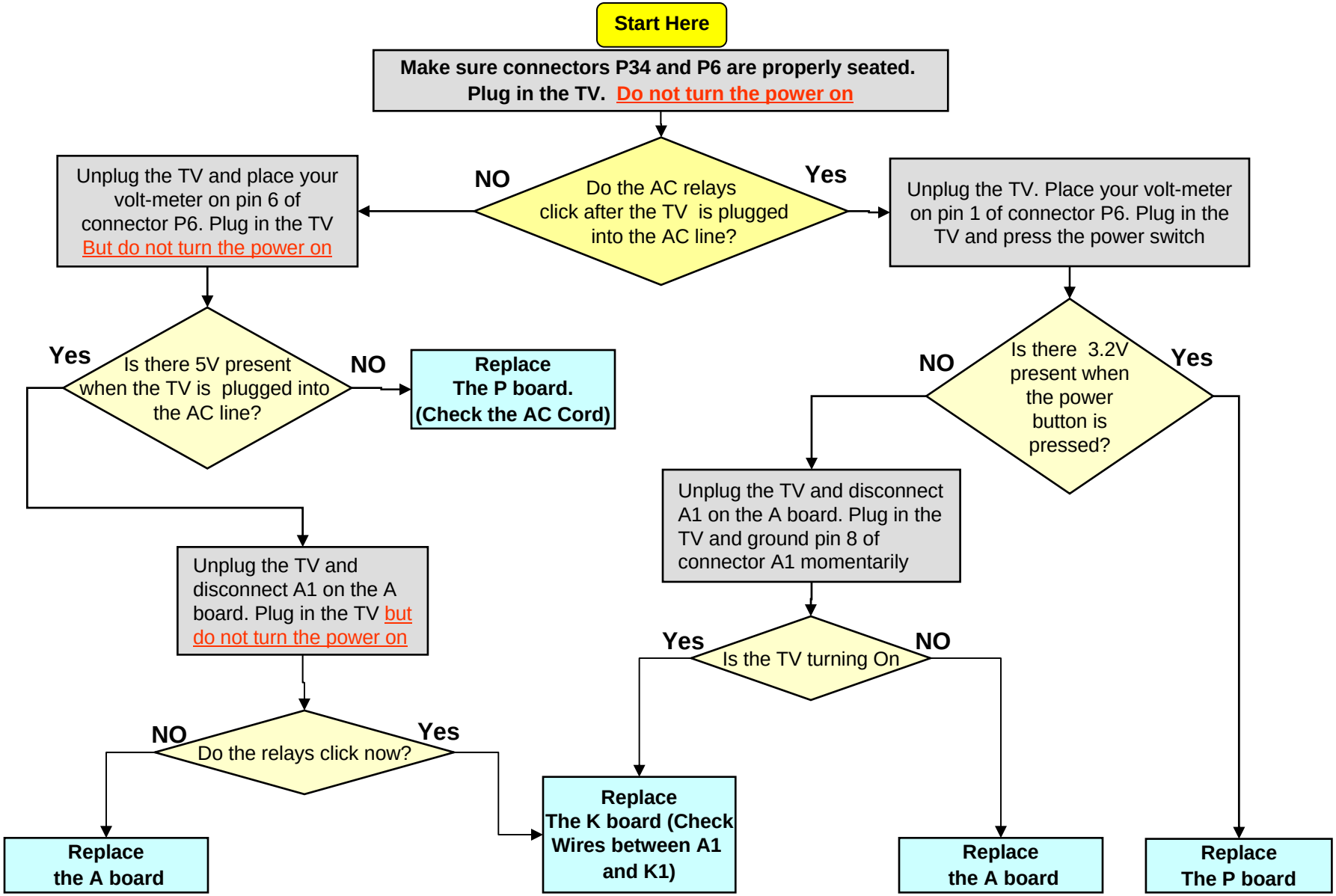
These 3 conditions can cause the TV to be dead with no power.

1. **A Board.**
2. **P Board.**
3. **K Board**

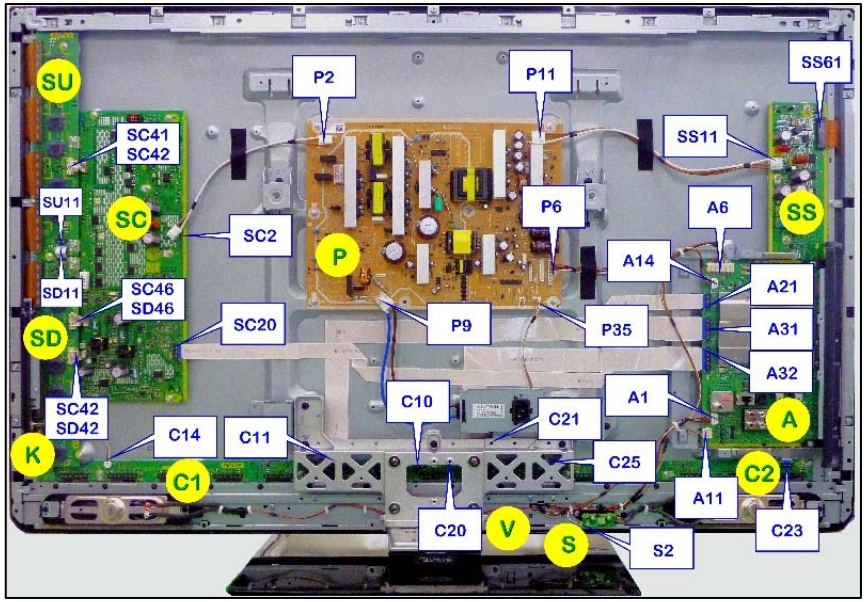
Condition	List of boards likely to cause this symptom.						
	Main Suspect	2nd	3rd	4th	5th	6th	7th
Dead	**P**	**A**	**K**				

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

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



TV's Behavior After Connectors Removal



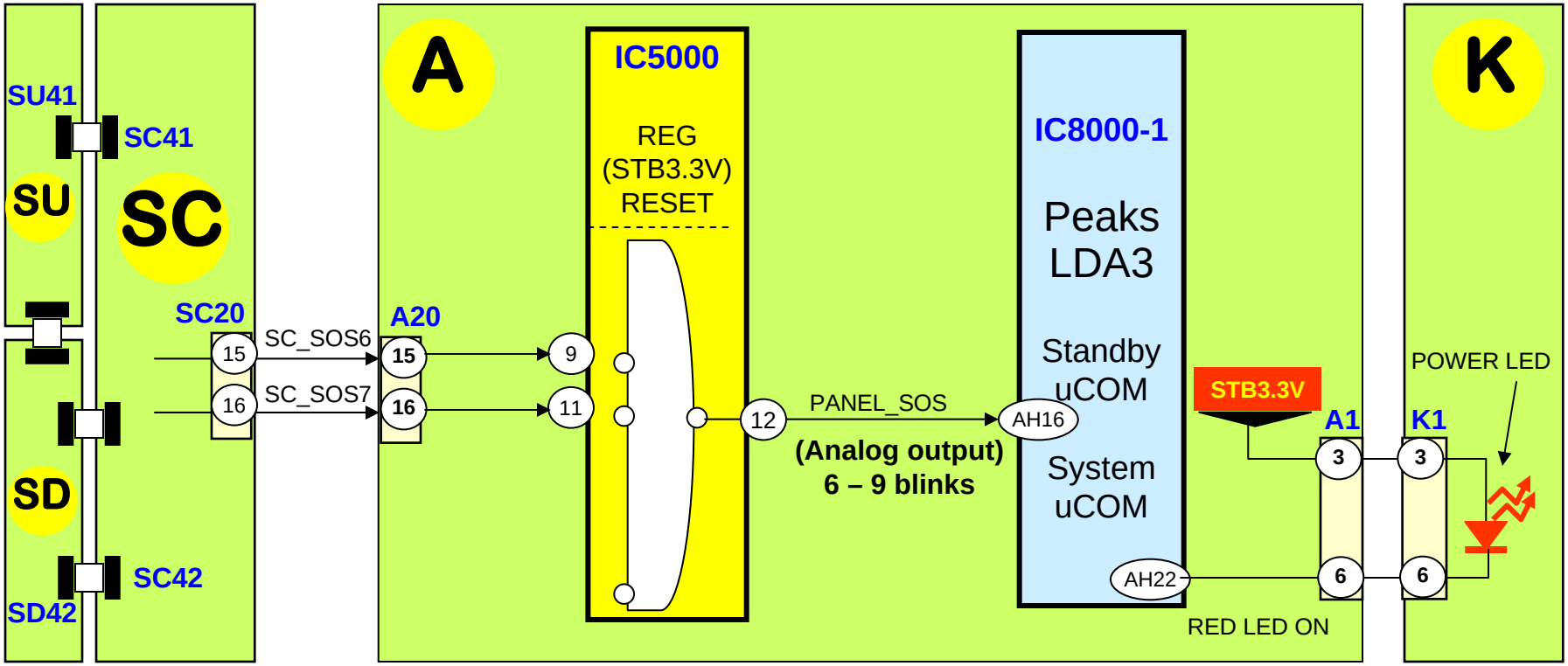
MODEL N0. TC-P46ST30 (Connectors Removal on the SS + combination of connectors on the SS board and SC board)				
Connector	Connector	Connector on SC Board	Connector on SC Board	Result
SS11				TV Stays On
	SS33/C23			TV Stays On
SS11	SS33/C23			TV Stays On
SS11		SC2		SOS 7 Blinks
	SS33/C23	SC2		SOS 7 Blinks
SS11	SS33/C23	SC2		SOS 7 Blinks
SS11			SC20	SOS 8 Blinks
SS11		SC2	SC20	SOS 6 Blinks
	SS33/C23		SC20	SOS 6 Blinks after 20sec
	SS33/C23	SC2	SC20	SOS 6 Blinks
SS11	SS33/C23	SC2	SC20	SOS 6 Blinks

MODEL N0. TC-P46ST30 (Connectors Removal on the SC Board)			
Connector	Connector	Connector on C1 Board	Result
SC2			SOS 7 Blinks
	SC20		SOS 8 Blinks
SC2	SC20		SOS 8 Blinks
SC2		C10	SOS 6 Blinks
	SC20	C10	TV Stays On
SC2	SC20	C10	TV Stays On

MODEL N0. TC-P46ST30 (Connectors Removal on the A Board)			
Connector	Connector	Connector	Result
A20			SOS 8 Blinks
	A31		SOS 6 Blinks
		A32	SOS 6 Blinks
A20	A31		TV Stays ON with Black Screen
A20		A32	SOS 8 Blinks
	A31	A32	SOS 6 Blinks
A20	A31	A32	TV Stays ON with Black Screen

SU/SD Board Isolation Procedure (1 of 3)

This TV is designed to shutdown if the SU or/and SD board is/are disconnected.
Disconnecting this board causes the unit to shutdown and the power LED to blink 7 times.
Unplugging any of the connectors SC41/SU41, SC42/SD42, opens the interlocked connection between VF_GND on the SC board. This floats point “CHA” triggering the SOS7 detect circuit. A high is output to the A board through pin 16 of connector SC20 triggering the shutdown circuit.



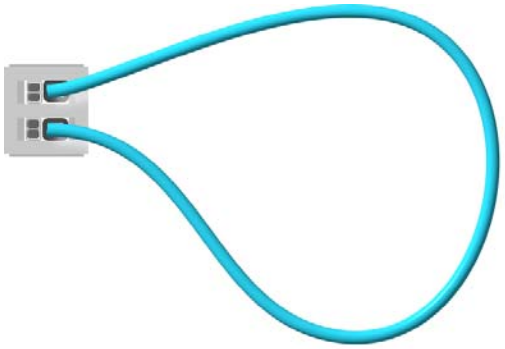
SU/SD Board Isolation Procedure (2 of 3)

This procedure is useful when troubleshooting 7 blinks problems.

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

To isolate the SU and SD boards is not necessary to remove any boards

- ❑ Remove the 4 VF_GND screws from the SU and SD boards.
- ❑ Unplug connectors SC41, SC46, and SC42 on the SC board.
- ❑ Place the SC jig cable **(TZSC09187)** between pins 1 and 2 of connector SC50 on the SC board.

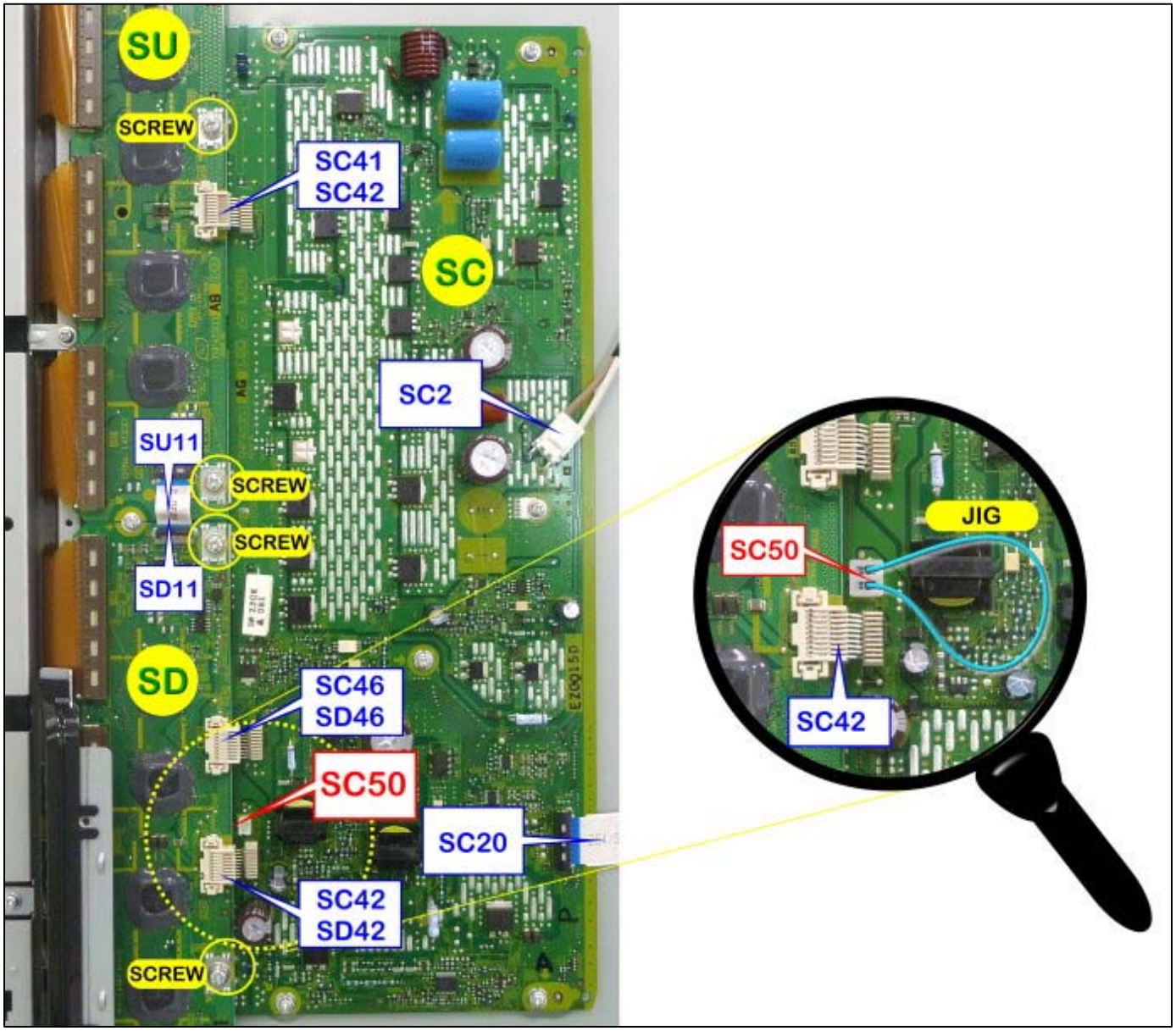


Actual SC50 Jig

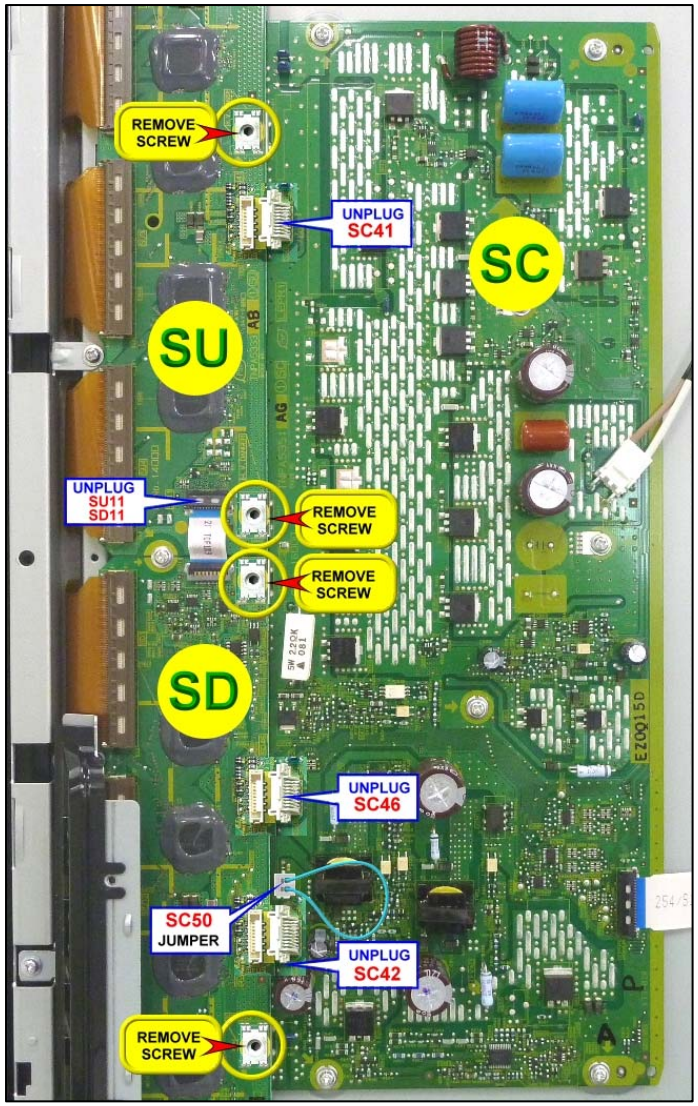
The SC test fixture (Jig) can be used when the SM board is isolated. The jig is a small connector with a jumper between pin 1 and pin 2. The part number is **TZSC09187.**
It plugs into connector SC50 on the SC board.

Note: If the SC jig is not available, install a jumper between pins 1 and 2 of connector SC50 on the SC board. (Remove the jig or the jumper after completing the isolation procedure). When this is done, the display is completely black (No picture)

SU/SD Board Isolation Procedure (3 of 3)



SU-SD boards (Together) Isolation Procedure



Preparation:

Disconnect AC Power prior to making any disconnection or connection.

Wait at least 2 minutes before the removal of any connector.

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

Procedure:

1. Remove the 4 VFG screws from the SU and SD boards. (See picture on the left side.)

2. Remove SC41, SC42, and SC46 from the SC board. Also remove the ribbon cable between the SU and SD boards (SU11/SD11).

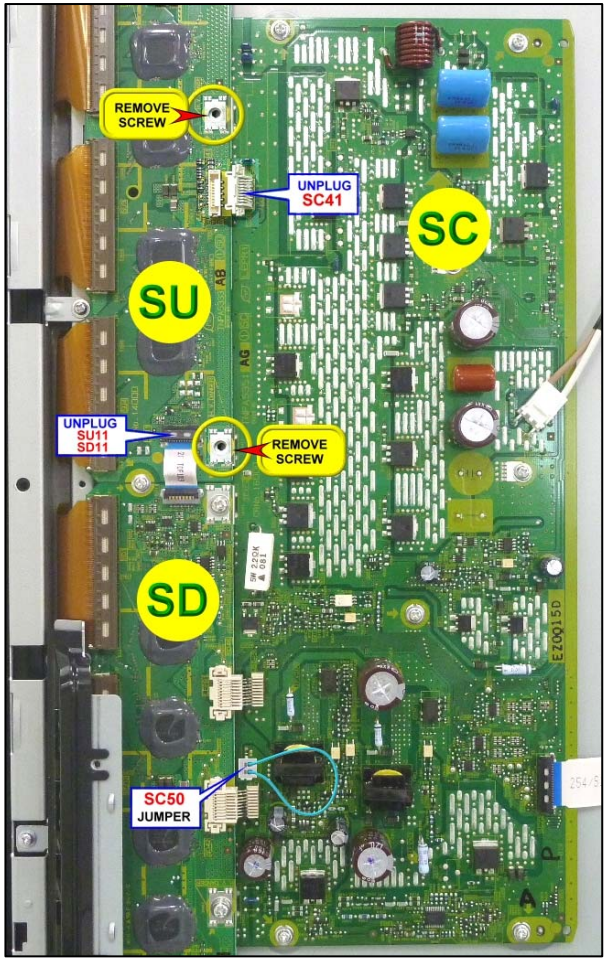
3. Install the SC50 Jig or just jump pins 1 and 2 of connector SC50 on the SC board.

Actual SC50 Jig

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

SU Board Isolation Procedure

To isolate either the SU or the SD board individually, all the connectors, (Except the panel flex-cables) and the VF-GND screws on the board have to be removed. (See the picture below)



Preparation:

Disconnect AC Power prior to making any disconnection or connection.

Wait at least 2 minutes before the removal of any connector.

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

SU board Isolation Procedure

1. Remove the 2 VFG screws from the SU board.
   Note: The 2 screws on the SD board should be installed.

2. Remove SC41/SU41 and the ribbon cable between the SU and SD boards (SU11/SD11).
   Note: SC46 and SC42 should be connected

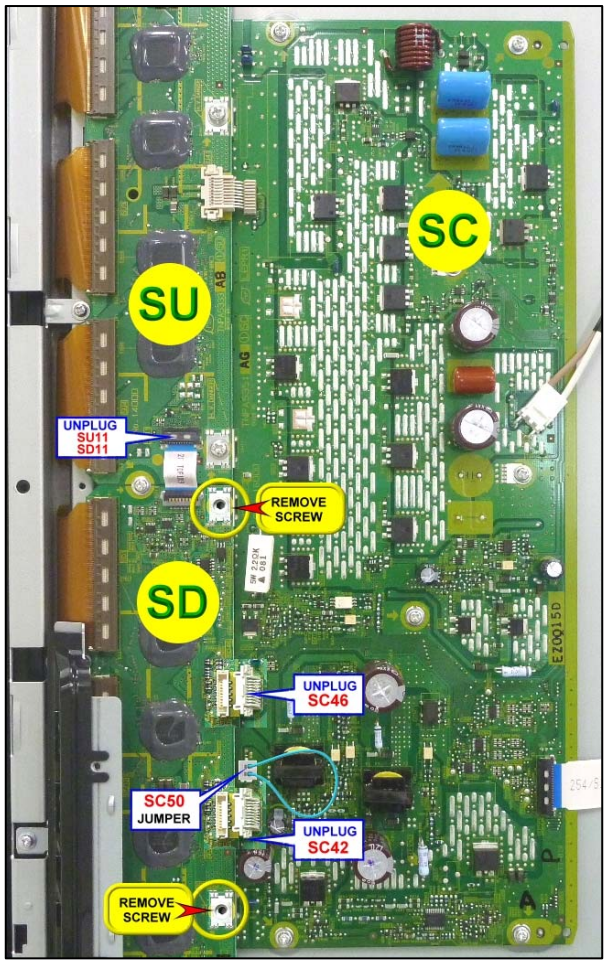
3. Install the SC50 Jig or just jump pins 1 and 2 of connector SC50 on the SC board.

Actual SC50 Jig

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

SD Board Isolation Procedure

To isolate either the SU or the SD board individually, all the connectors, (Except the panel flex-cables) and the VF-GND screws on the board have to be removed. (See the picture below)



Preparation:

Disconnect AC Power prior to making any disconnection or connection.

Wait at least 2 minutes before the removal of any connector.

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

SU board Isolation Procedure

1. Remove the 2 VFG screws from the SD board. **Note:** The 2 screws on the SU board should be installed.

2. Remove SC46/SD46 and SC42/SD42 and the ribbon cable between the SU and SD boards (SU11/SD11). **Note:** Make sure SC41/SU41is connected.

3. Install the SC50 Jig or just jump pins 1 and 2 of connector SC50 on the SC board.

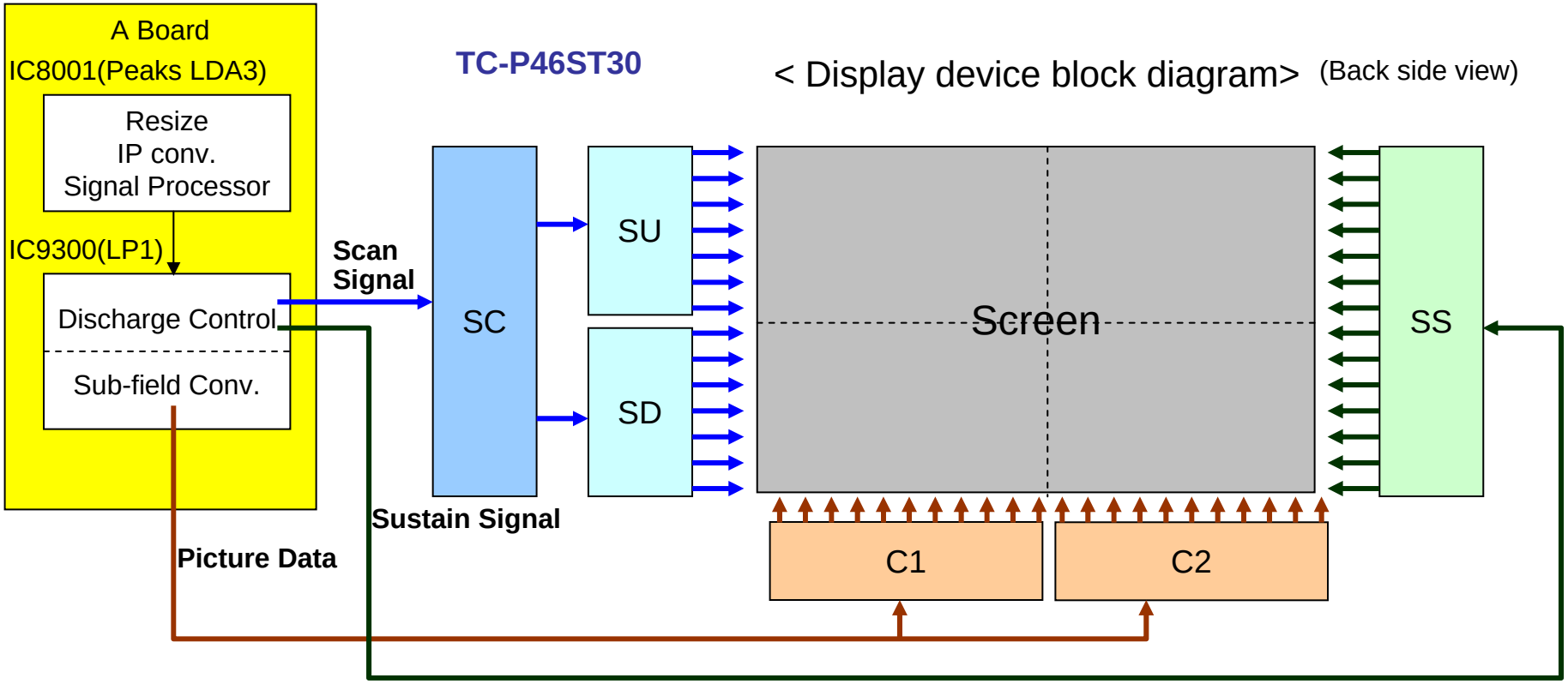
Actual SC50 Jig

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

6.Picture Trouble

Relation of Boards and Display Area

The cause of the symptom can be diagnose by analyzing the affected area



Relation of Boards and Display Area

Input signal (e.g. Digital television reception, Video input from terminal) is processed by IC8001 (Peaks LDA3). Then it transmitted to IC9300 (LP1).

IC9300 (LP1) has "Discharge Control" function and "Sub-field Convert" function.

"Discharge Control" function of IC9300 (LP1) provides "Scan Signal" to SC board. SC board also provides "Scan Signal" to SU and SD boards. SU board provides "Scan Signal" to upper side of the screen. SD boards provides to lower side.

"Discharge Control" function of IC9300 (LP1) provides "Sustain Signal" to SS board. SS board provides "Sustain Signal" to entire screen.

"Sub-field Convert" function of IC9300 (LP1) provides "Picture Data" to C1 and C2 boards. C1 board provides "Picture Data" to left side of the screen. C2 board provides to right side of the screen. (Rear side view)

Possible defective board according to the area affected.

Only upper side picture trouble	-> SU board is defective.
Only lower side picture trouble	-> SD board is defective.
Only right side picture trouble (front side view)	-> C1 board is defective.
Only left side picture trouble (front side view)	-> C2 board is defective.
Entire screen picture trouble	-> SC or SS board is defective.

Troubleshooting for Picture Trouble (some part)

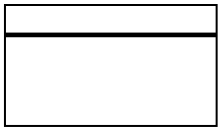
Picture trouble (some part of screen)

Where is abnormal picture displayed ?

Upper or lower area

→ SU/SD board

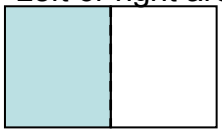
Horizontal line



→ SU/SD board or PDP panel

In case of horizontal line problem, first, check the connection of FPC between SU/SD board and the panel.

Left or right area



→ C1/C2 board

Vertical area (Width is same as FPC)

→ C1/C2 or A board

Vertical line (width is narrower than FPC)

→ PDP panel

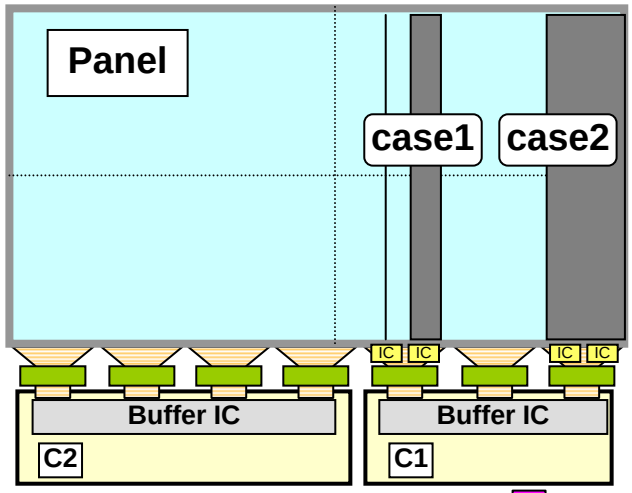
In case of vertical picture problem, first, check the connection of FPC between A board and C board.

Regularly defect

→ A board

Vertical Line Problem Explanation

Symptoms caused by the C board or the Panel.



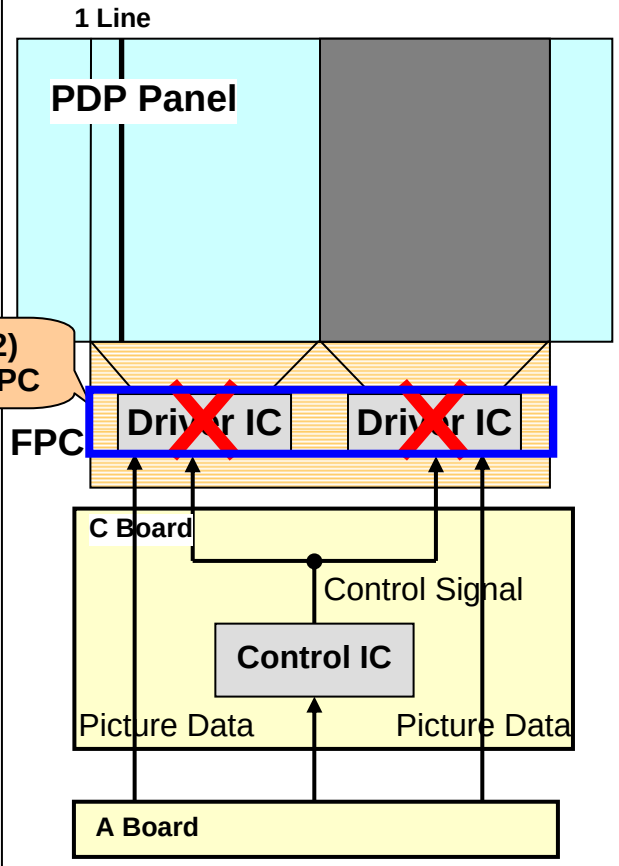
Drive IC(2) inside in FPC

If the symptom's width is smaller than the FPC, then the driver IC built-in the FPC is defective. Therefore the panel is bad (FPC is bonded to the panel directly).
If the size of the symptom matches the FPC's size, the control IC on the C board or the A board is defective.

Driver IC NG = PDP panel NG

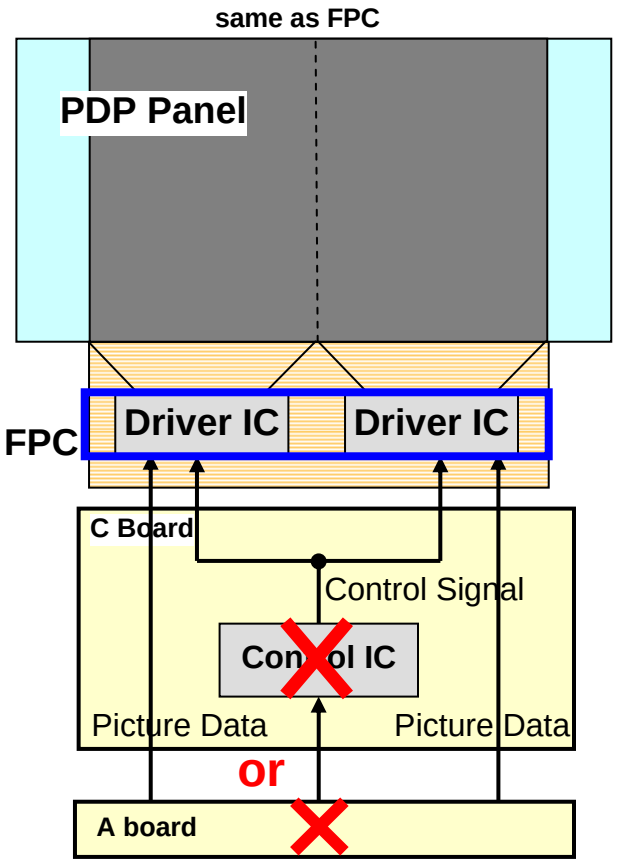
case1 Thin vertical line or 1 block no lighting

PDP panel (Drive IC) NG

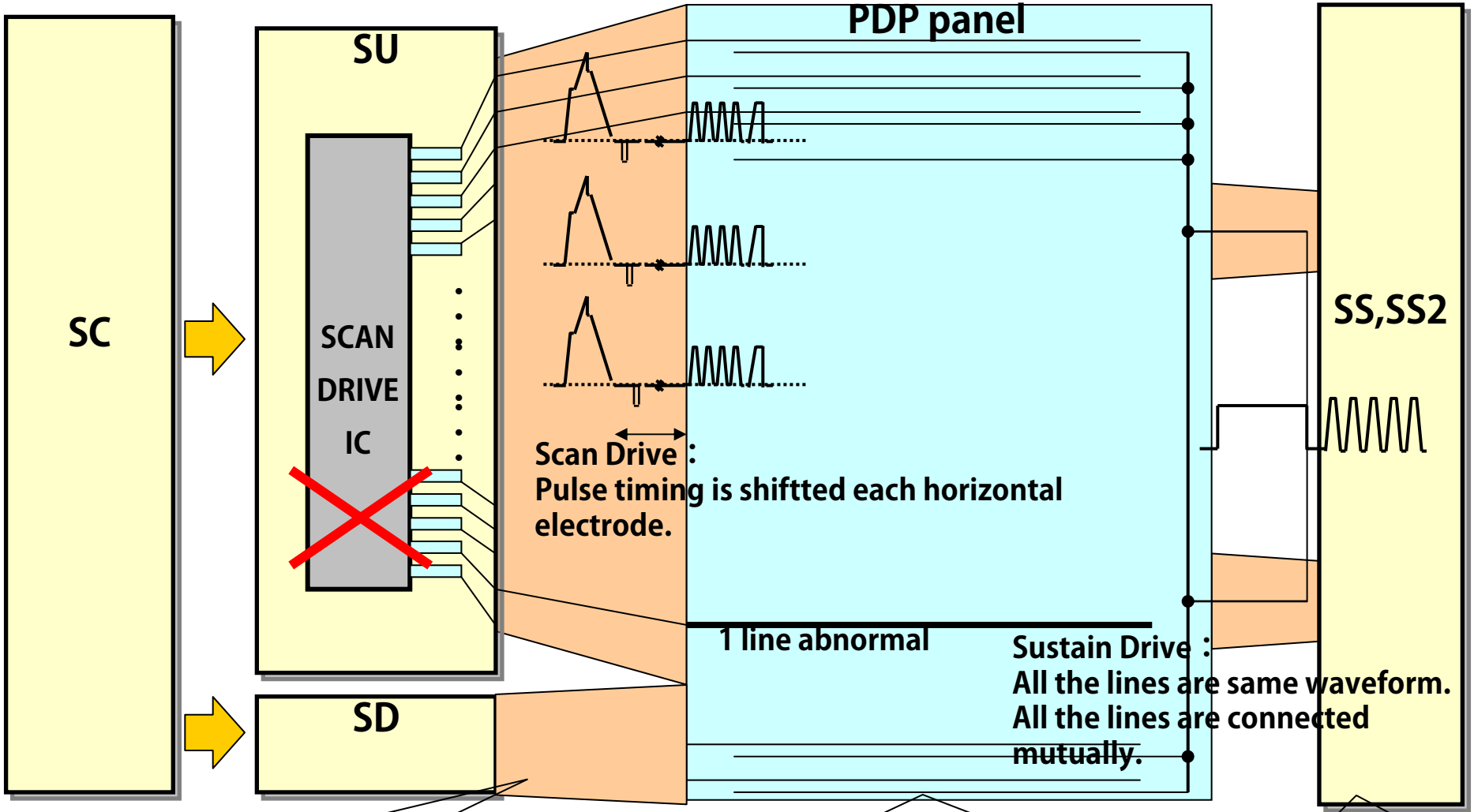


case2 Black area

A board or C board NG



Horizontal Line Problem Explanation



When FFC is damaged, it is needed to replace the panel
The FFC is bonded to the panel directly.

If horizontal line is showed, it is possible that defect of one pin of scan drive IC or failure of connection to the panel or damage of electrode on the panel

SS board doesn't cause horizontal lines problems. All the electrodes on SS board are common

Troubleshooting for Picture Trouble (Entire)

Picture trouble (entire screen)

Regular pattern problem or block noise

e.g. Regular vertical line

→ A

If the entire screen is affected, then it's a signal processing circuit failure.

Certain color (R or G or B) is not displayed. Color problem.

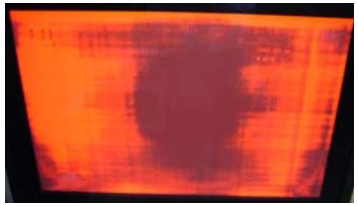
e.g. Yellowish picture

e.g. Redish picture

→ A

abnormal color is normally caused by signal processing circuit failure.

Luminescence error. Mottled color, dark picture, remaining previous picture.



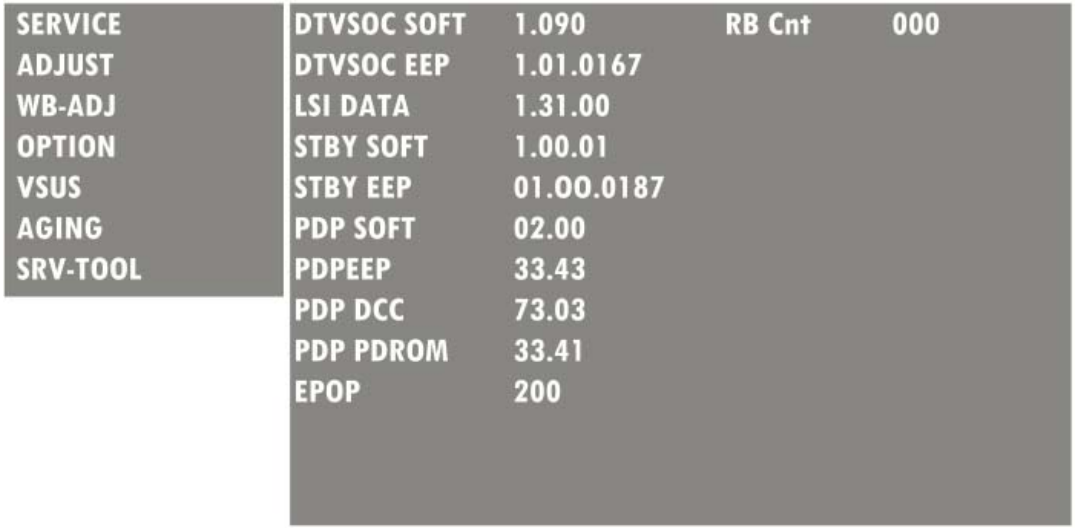
→ Check adjustable voltages on the SC and SS boards

Mottled or image retention is caused by discharge voltage failure.

7.Service Notes

Service Mode

While pressing the “VOLUME -” button of the main unit, press the “INFO” button of the remote control three times within 2 seconds.



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:
Switch off the power with the “POWER” button on the main unit or the “POWER” button on the remote control.

Service Tool Function

How to Access Service tool Function

Enter Service mode function

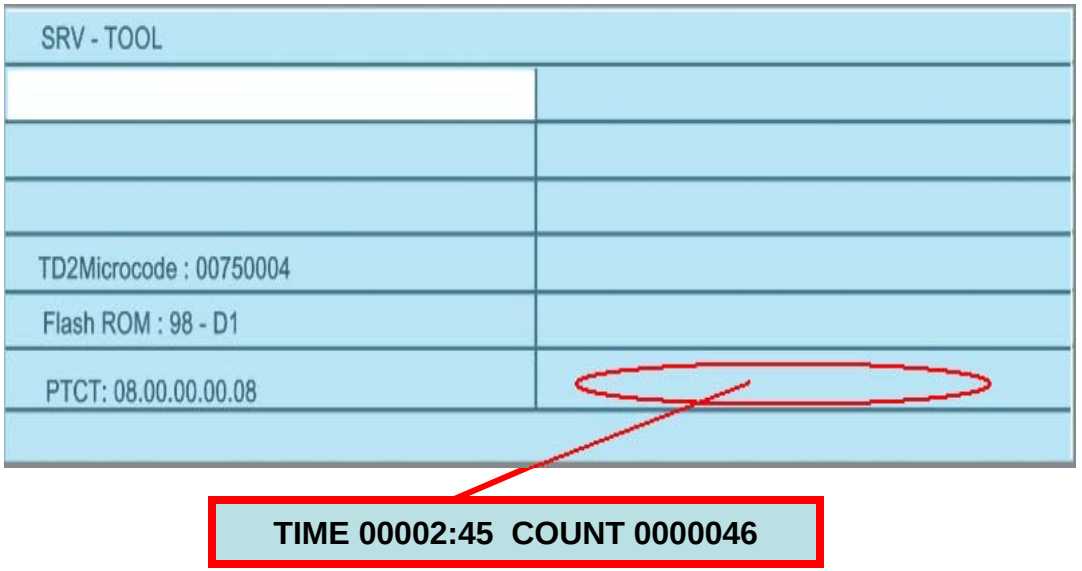
Select SRV-Tool

Press OK button on the Remote Control

Display of TD2 Microcode version →

Display of flash Rom Maker Code →

Display of SOS History →



Power ON Time/ Count Press (Mute) button (3 Sec) In area shown above

Display of SOS History

SOS History (Displays the Number LED Blinks) The indications from the left of the PTCT display shows the LAST reported SOS Blink error displayed.

From the Right side of the PTCT display shows the 1st occurrence after shipment this followed by 2nd occurrence,

Power on Time/Count

Note: To display Time/count menu highlight position

Note: Cumulative power on time indication hours minutes by decimal

Count: Number of On times by decimal

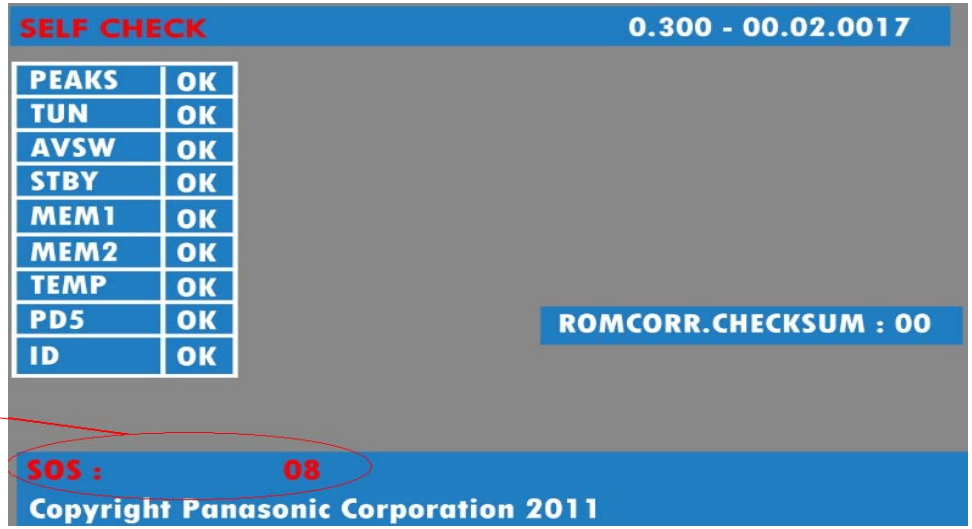
Note: The indication will not be cleared by either of the (SELF CHECK) or any other command.

Self Check

To Access the Self-Check Mode Turn the TV on and while pressing “VOLUME (-)” button on the main unit, press the “OK” button on the remote control for more than 3 seconds.

1. Checks the communication IIC bus lines
2. Provides a SOS History

Last Error code displayed in Self Check Log



- **TV volume down & OK on remote only does a basic IC self check. It does NOT clear any unit settings.**
- It does not clear channel programmed settings, picture settings, channel labels, LOCK mode settings, or password.
- Using this method, it shows the unit firmware version and it checks IC communications ONLY.
- This is more useful to identify the firmware version without having to decode the info in the setup menu About/Version screen.

To Exit the Self-Check Mode, Press and hold the Power button on the TV for 5 seconds or disconnect the AC cord from the wall outlet.

Reset Procedure

Reset forces the TV to factory shipment setting.

Note: All customer programmed parameters will be erased.

To Reset the TV, Press and hold the “VOLUME (-)”button on the TV and press the “MENU” button on the remote control for more than 3 seconds.

To Exit, Disconnect the AC cord from wall outlet.

Mirror Function

This feature allows the picture to be rotated 180° horizontally or 180° vertically.

When servicing plasma TVs with horizontal lines, this feature can help to determine if the A board is causing the problem or not. Also, for vertical lines problems, this feature can help to determine if the A board or the panel. The rear cover does not need to be removed to do this service

operation.

If the position of the line/lines changes when performing this function, the A board is possibly defective.

If the line/lines do not move:

- For horizontal lines check between the panel and the SU/SD and SM boards dependent on Model.
- For vertical lines, change the panel.

How to enter the Mirror Function.

From the **Service Mode Menu**, select **"OPTION".**

Press **3** or **4** to select **"MIRROR".**

Press the **VOLUME up** or down button to change the Mirror's data.

Data = 00 is the default data (Mirror feature is off)

Data = 01 The picture is flipped **180° horizontally**.

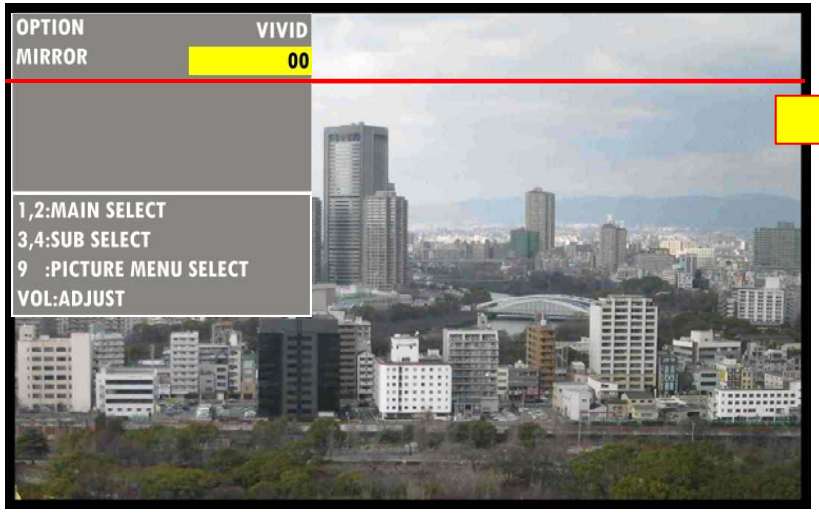
Data = 02 The picture is flipped **180° vertically**

Mirror Function

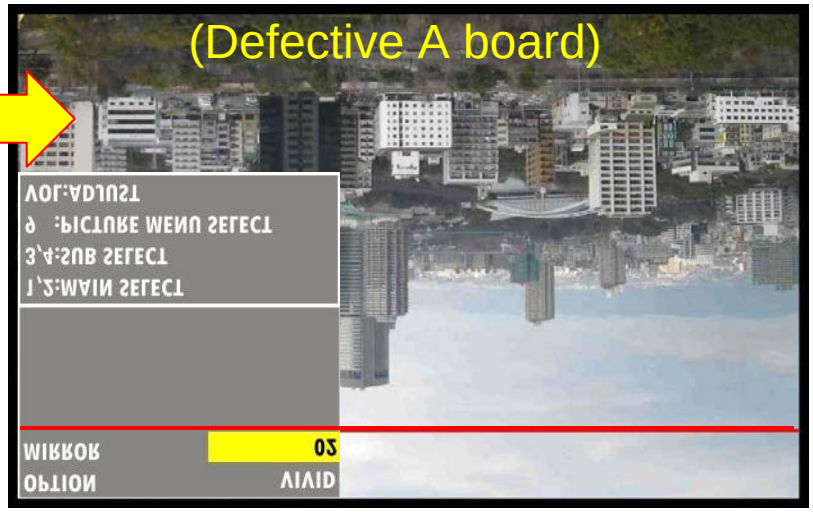
Normal View

Picture flipped Horizontally
(Defective A board)

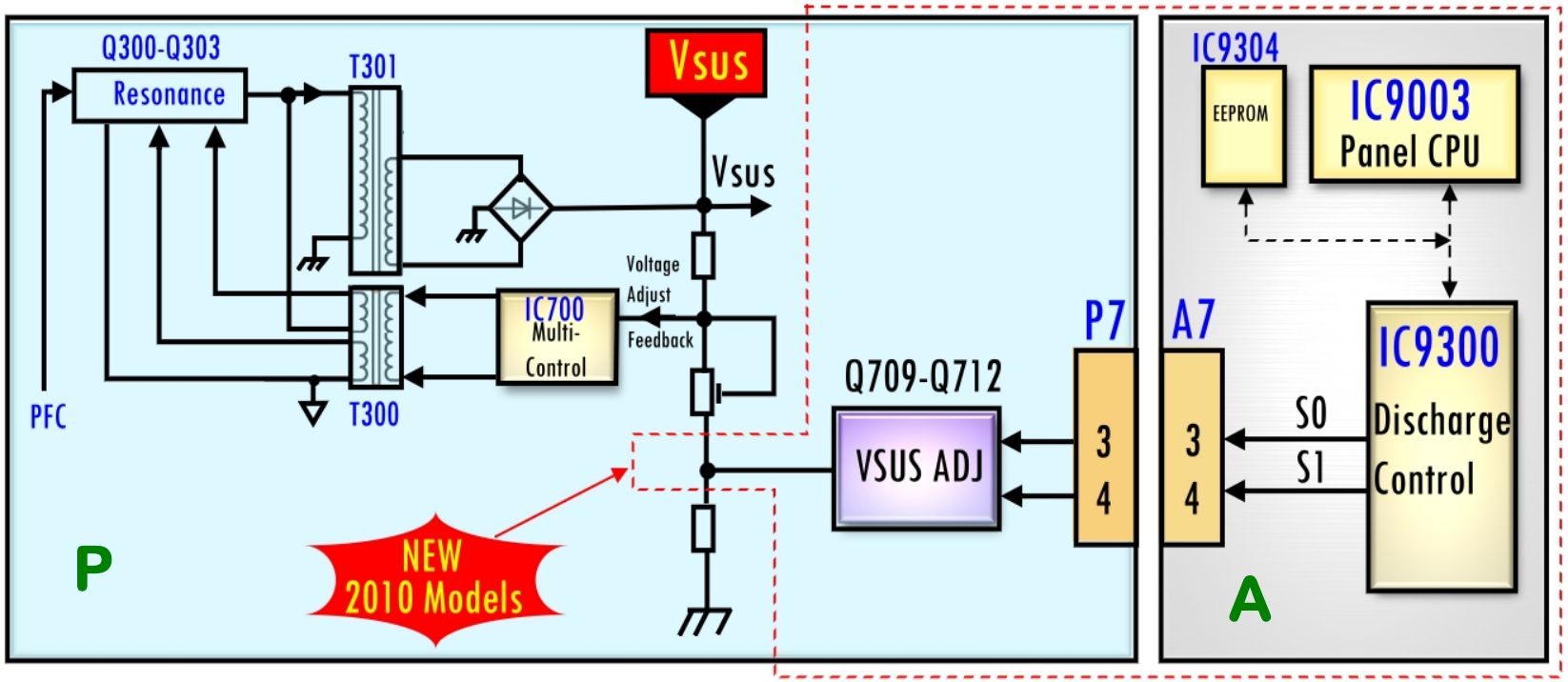
Normal View



Picture flipped Vertically



VSUS Adjustment With Remote Control

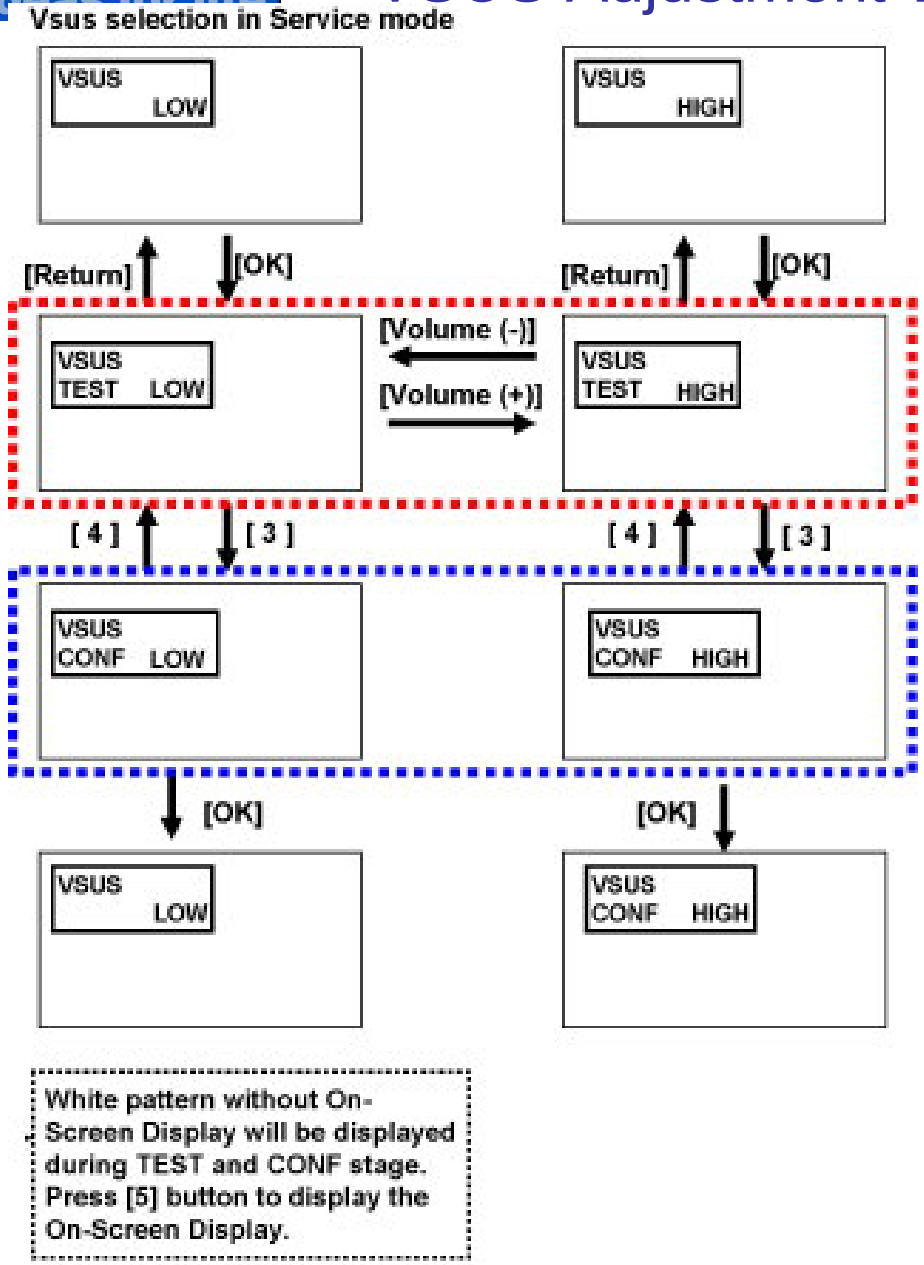


The 2010 later Plasma TV models do not require Vsus adjustment using the control in the power supply. The Vsus can now be adjusted to 2 different levels (high or Low) using the remote control from within the service mode menu. Perform this adjustment when the A board or the panel is replaced and to correct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

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

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

VSUS Adjustment With Remote Control



Press 1 or 2 on the remote control to select Vsus from the main Items menu on the Service mode. LOW or HIGH will be displayed.

Press [OK] button to go to TEST stage.

White pattern without On-Screen Display will be displayed during TEST and CONF stage. Press [5] button to display the On-Screen Display.

Press [VOL (-)] button to set to LOW.

In LOW setting

If no several dead pixel is visible remarkably in white pattern, press [3] button to go to CONF stage.

If the several dead pixels are visible remarkably in white pattern, Set to HIGH by press [VOL (+)] button. Press [3] button to go to CONF stage if the symptom is improved.

Press [OK] button in CONF stage to store LOW or HIGH.

Exit Service Mode by pressing [Power] button.

VSUS Adjustment With Remote Control

To adjust Vsus:

Enter the service mode.

Press 1 or 2 on the remote control to select Vsus from the main Items menu.

The Vsus menu appears showing whether is low or high. (Default setting is “LOW”)

At this point, the settings can not be changed.

To perform the adjustment, press the “OK” button on the remote control to change the menu to Vsus **“TEST”** mode. **Note:** the data can now be changed (Low or High). Press the Vol 1 or Vol+ button on the remote control to change to “Low or High”. The data’s color changes to red when adjusted.

Note: The data can only be changed while in the “Vsus Test” mode.

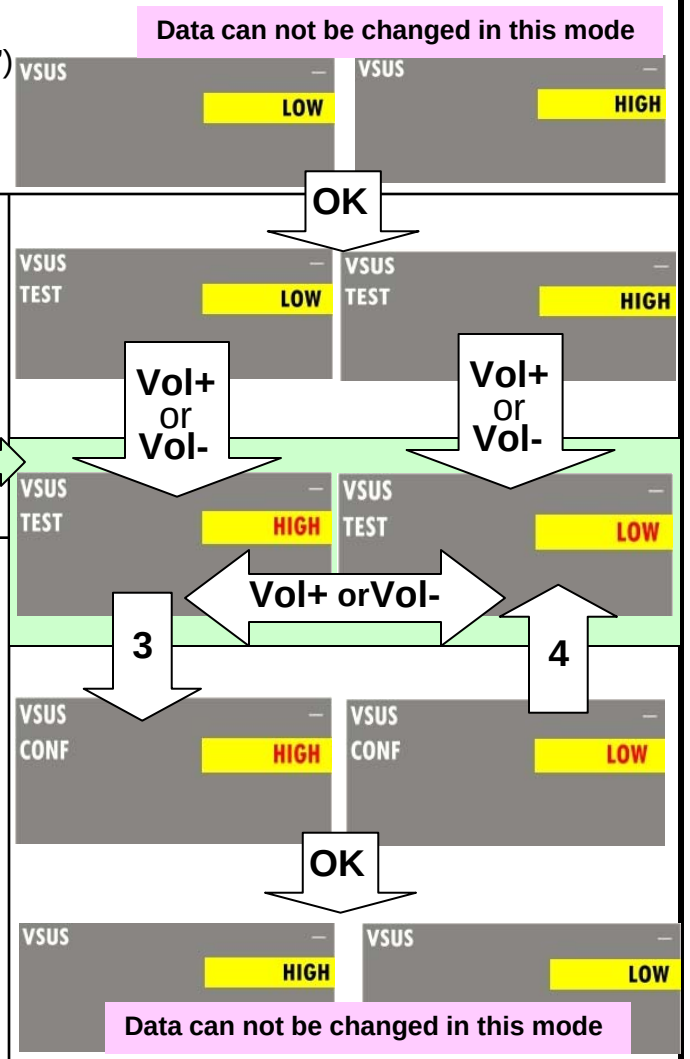
If result of adjustment is satisfactory at this point, proceed to save the data by pressing the number 3 on the remote control. This will change from the “Test” menu to the “CONF” menu. **Note:** the Data is still red, indicating that it has not been saved yet.

If no improvement is noticed, set the adjustment to “LOW”.

To return to the Vsus “TEST” mode after entering the Vsus “CONF” mode, press the number 4 on the remote control.

After changing the settings, make sure to save the data.

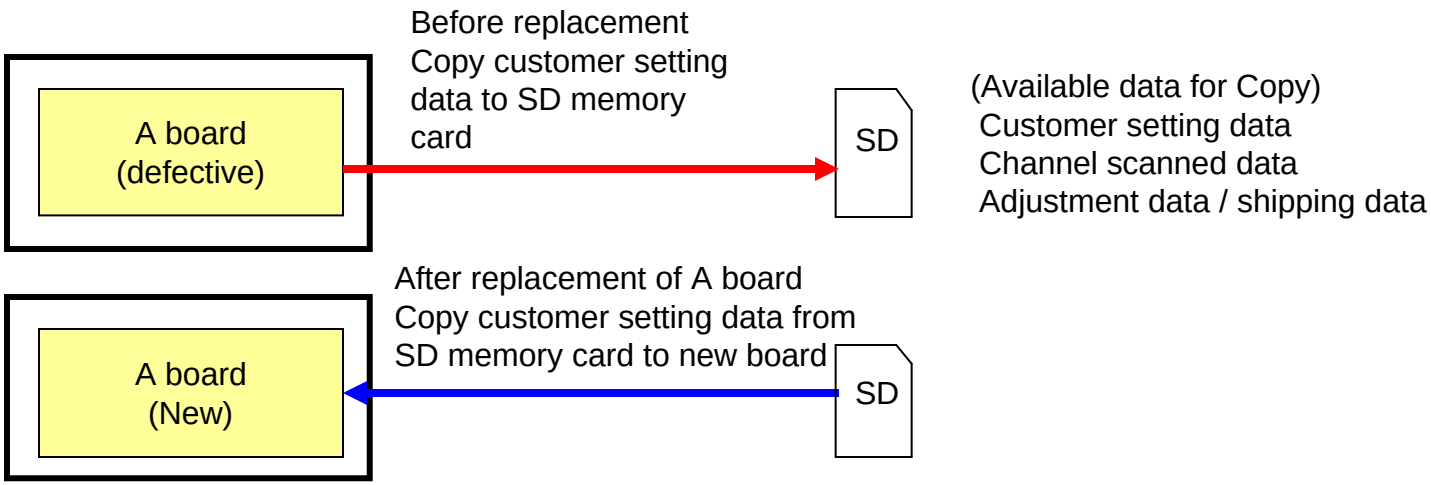
To save the data, while in the “CONF” menu, press the “OK” button on the remote control. The data changes from red to black and the Vsus menu goes back to normal mode. The adjustment is now completed.



Copy Customer Setting Data to SD Memory Card

This function provides the engineer the ability to Save the Customers Setting Data Copy to SD Memory Card.

When a replacement of the A board is require, the customer setting data can be copied from the defective A board to the new A board by the use of this function. This now allows the engineer to return the television as before the fault occurred.



Preparation

Make new (empty) text file in SD memory card, and change file name to "boardreplace.pwd".

Action

Power On TV set. > Insert SD card. > Input pass word.

1.From TV set to SD memory card. Password is "2770".

2.From SD memory card to TV set. Password is "2771"

8. Glossary

Glossary

Resolution

Resolution is a combination of values that express the quality of displayed images. A display's resolution is indicated by the number of dots in the horizontal and vertical directions of the screen, such as 1024 x 768 dots. Higher values indicate clearer, sharper image reproduction. The larger the screen size, the higher the required
resolution.

HD (high-definition) panel

The HD panel has a resolution of 1,366 x 768 pixels and an aspect ratio of 16:9. It is designed for displaying the beautiful images of digital, high-definition broadcasts.

Full HD (high-definition) panel

The term "full-HD panel" refers to 1,920 x 1,080-pixel panels that display progressive images of full-specification HDTV signals without the use of up sampling.

Number of pixels

The number of pixels indicates the resolution of the Image. The number of pixels of a digital image is expressed by the product of the number of pixels (dots) in the horizontal direction and the number of pixels (dots) in the vertical direction. The higher the number of pixels, the better the image quality. For plasma TVs and LCD TVs, the number of pixels is sometimes expressed by the following equation: number of pixels in horizontal direction x number of pixels in vertical direction x 3 (R, G, B).

Pixel

A pixel is a tiny dot that forms the smallest basic unit of a displayed image. Digital images are composed of pixels, with all of the text and images displayed on the screen consisting of dots. Digital images are usually rendered by square pixels arranged vertically and horizontally in an orderly manner.

Plasma panel

A key component of the plasma display. A plasma panel is a collection of millions of tiny fluorescent lights. By firing these lights on and off at a rapid rate, the plasma panel produces images.

Glossary

THX

THX is a trade name of a high-fidelity sound reproduction standard for movie theaters, screening rooms, home theaters, computer speakers, gaming consoles, and car audio systems. THX stands for **T**omlinson **H**olman's e**X**periment.
The THX system is not a recording technology, and it does not specify a sound recording format: all sound formats, whether digital (Dolby Digital, SDDS) or analog (Dolby Stereo, Ultra-Stereo), can be "shown in THX." THX is mainly a quality assurance system.
THX-certified theaters provide a high-quality, predictable playback environment to ensure that any film soundtrack mixed in THX will sound as near as possible to the intentions of the mixing engineer.

AVCHD

Advanced **V**ideo **C**odec **H**igh **D**efinition is a high-definition and standard-definition recording format for use in digital tape-less camcorders and digital cameras. It is based on the H.264/MPEG-4 AVC video compression standard. Audio is stored in compressed form (Dolby AC-3). The container format for the audio and video is MPEG transport stream.

H.264

H.264 is a standard for video compression, and is equivalent to **MPEG-4 Part 10**, or **MPEG-4 AVC** (for **Advanced Video Coding**). As of 2008, it is the latest block-oriented motion-compensation-based codec standard. The final drafting work on the first version of the standard was completed in May 2003.
The intent of the H.264/AVC project was to create a standard capable of providing good video quality at substantially lower bit rates than previous standards (e.g. half or less the bit rate of MPEG-2, H.263, or MPEG-4 Part 2), without increasing the complexity of design so much that it would be impractical or excessively expensive to implement.

YUV

YUV is used for a specific analog encoding of color information in television systems
Y' stands for the luma component (the brightness) and U and V are the chrominance (color) components.

Glossary

YUV

Is The color encoding system used for analog television worldwide (NTSC, PAL and SECAM). The YUV color space differs from RGB, which is what the camera captures and what humans view.

Composite Video and S-video

The original TV standard combined luma (Y) and both color signals (B-Y, R-Y) into one channel, which uses one cable and is known as "composite video." An option known as "S-video" or "Y/C video" keeps the luma separate from the color signals, using one cable, but with separate wires internally. S-video is a bit sharper than composite video.

Component Video

When luma and each of the color signals (B-Y and R-Y) are maintained in separate channels, it is called "component video," designated as YPbPr when in the analog domain and YCbCr when it is digital.

ASIC

An Application-Specific Integrated Circuit (ASIC) is an integrated circuit (IC) customized for a particular use, rather than intended for general-purpose use.