SONY

Training Manual

Models:
KDS-R50XBR1
KDS-R60XBR1

Diagnostics and Troubleshooting

Course: TVP-21

Table of Contents

Technology

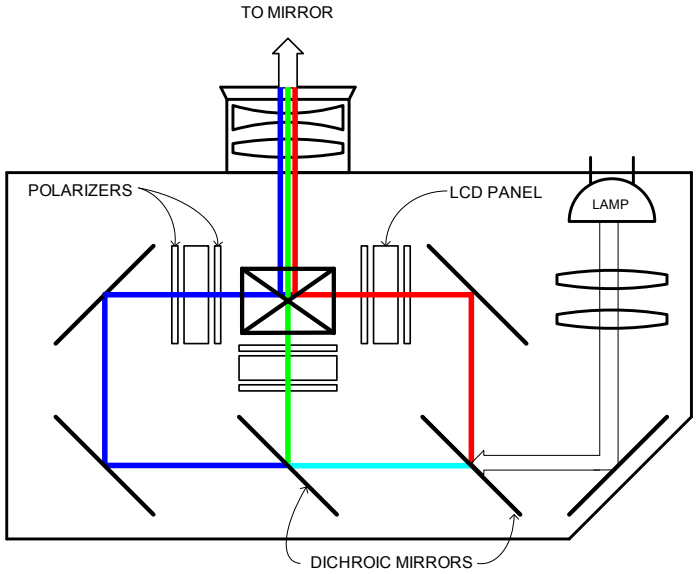
Silicon Crystal Reflective Display (SXRD)

SXRD is Sony's adaptation of Liquid Crystal on Silicon (LCoS) micro-display technology. The SXRD technology is similar to the LCD technology use in previous rear projection and direct TV products in that is uses liquid crystal materials to pass and block light to form the picture you see, however, this is where the similarities stop.

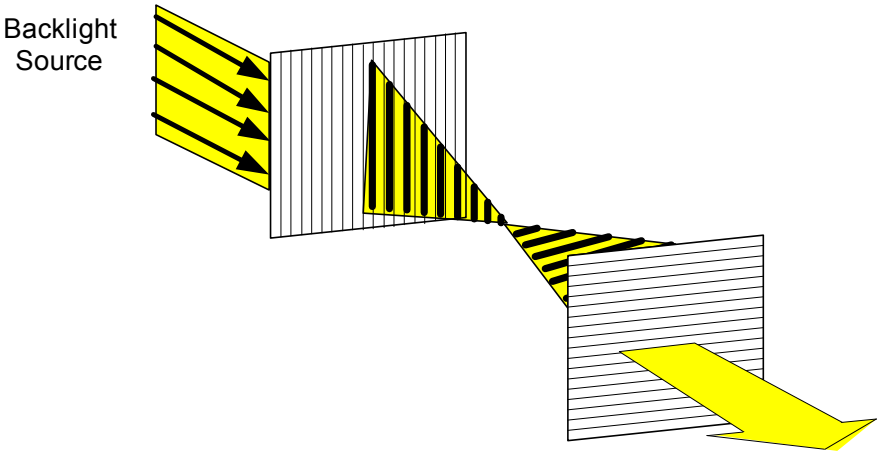
The primary differences between SXRD and the standard LCD technologies are as follows.

LCD Technology

- Is a transmissive device – light is directed into the rear of the panel, the passes through the panel and the liquid crystal material. The light only passes through the liquid crystal material once. The liquid crystals modulate the light as it passes through the panel.
- The liquid crystals when layered from a 90-degree angular orientation after so many layers. Therefore, light is completely passed when no potential is applied to the liquid crystals.
- The Panel depth is thicker then the SXRD technology because the LCD drives and liquid crystal material are place on separate layers in the panel.
- The distance between the pixels is greater than the SXRD technology (causing the screen-door effect) because the matrix wiring and switching elements must be covered with a solid plastic grid structure.

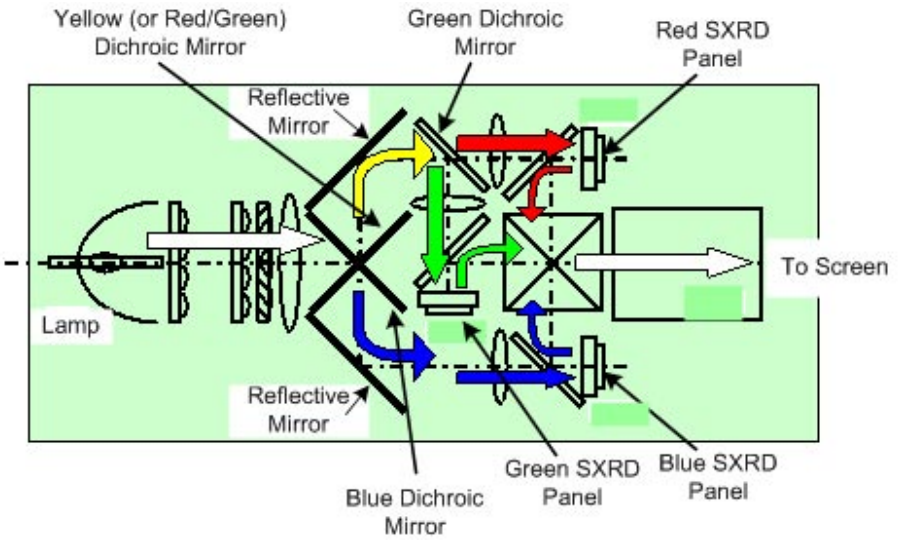


LCD Optics Block

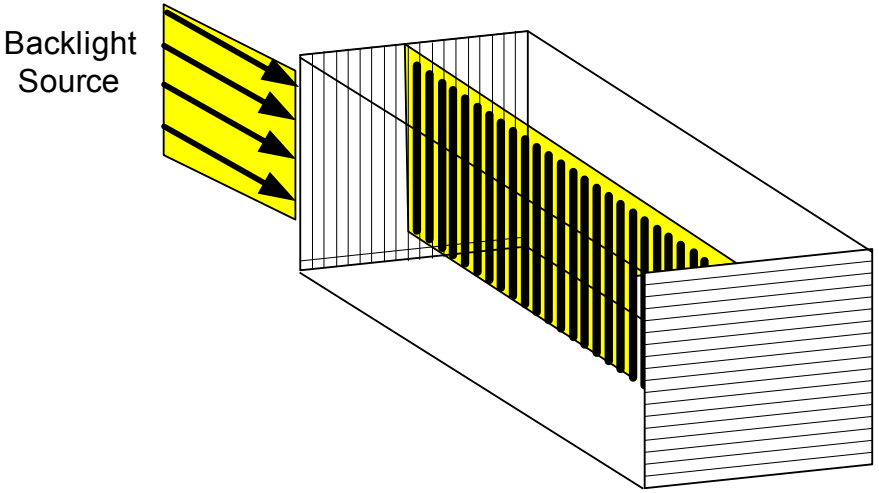


LCD Natural Layering Light Effect

- SXRD Technology
    - Is a reflective device – light is directed into the panel from the front, the light passes through the liquid crystal material, and is then reflected back out through the same liquid crystal material by tan aluminized substrate. The light passes through the liquid crystal twice. The liquid crystals modulate the light with the picture information on the way back out of the panel.
    - The liquid crystals when layered maintain the same angular orientation between layers. Therefore, light is blocked when no potential is applied to the liquid crystals.
    - Panel depth is greatly decreased due to the LCD drivers and the liquid crystal materials are jointly sealed directly to the silicon chip substrate
    - The distance between pixels is greatly diminished (no screen-door effect) due to the fact that all the matrix wiring and switching elements a placed behind the reflective substrate.



SXRD Optics Block

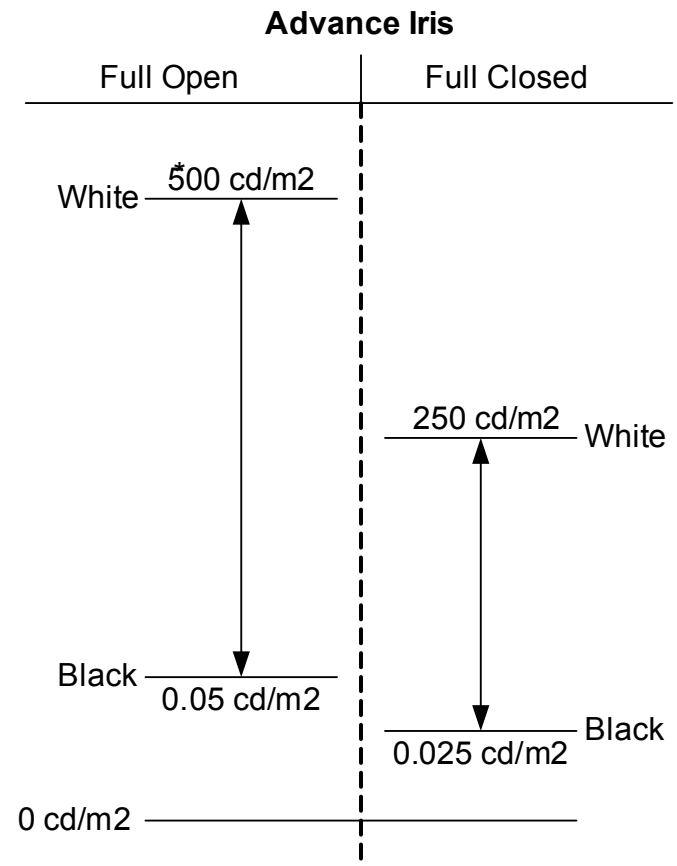


SXRD Natural Layering Light Effect

Features

Advanced Iris

The Average Picture Level (APL) drives the Advanced Iris operation. **APL** is defined in video systems, as the average level of the picture signal during active scanning time integrated over a frame period; defined as a percentage of the range between blanking and reference white level. Basically, the video scene is measure for overall brightness level and the iris's aperture opening is increased of decreased to either increase the whites in the brighter scenes, or decrease the blacks in the darker scenes. Subsequently, achieving a contrast ratio for the SXRD models approaching10,000:1.



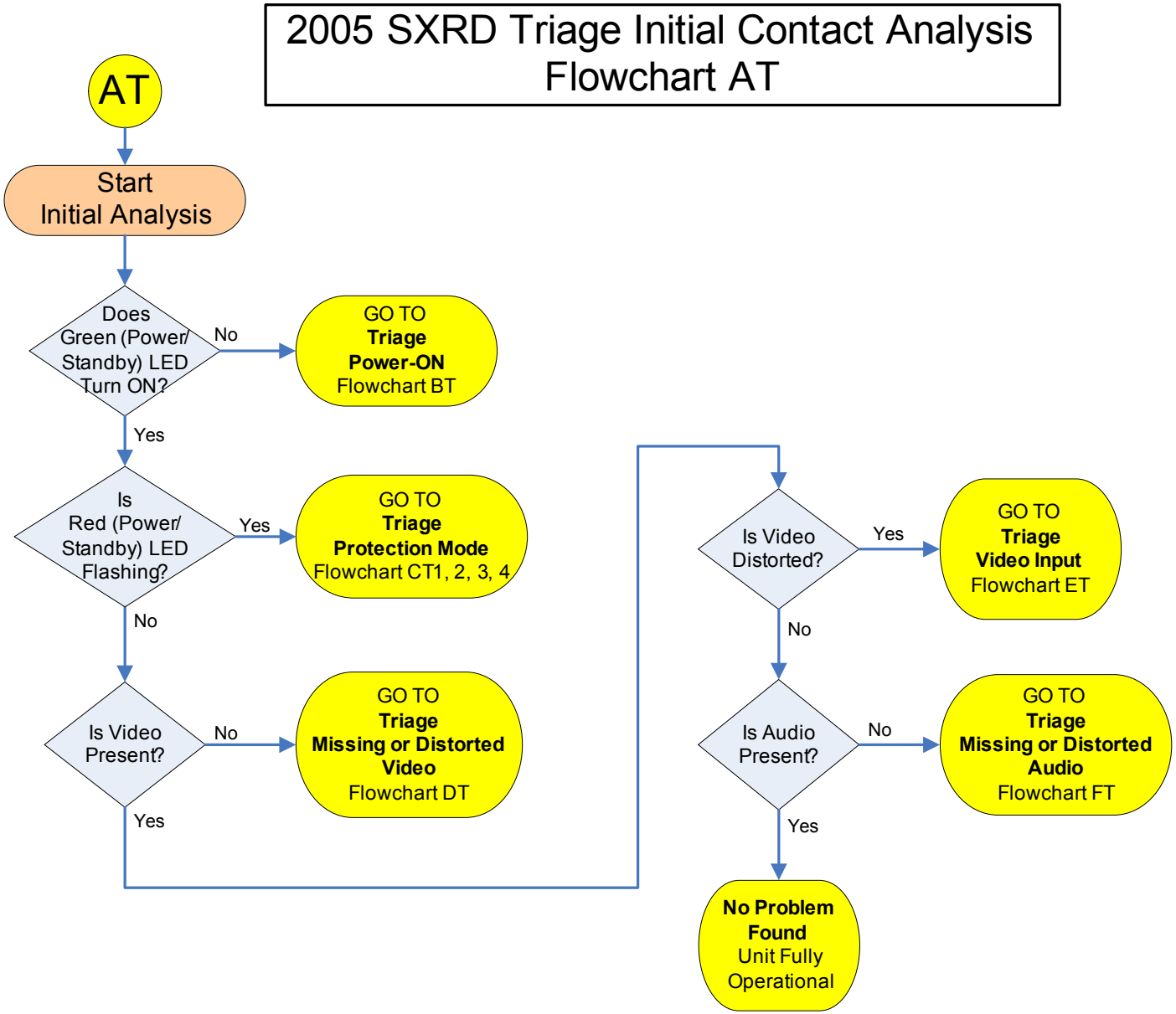
*Candela per Meter Square

PC Input

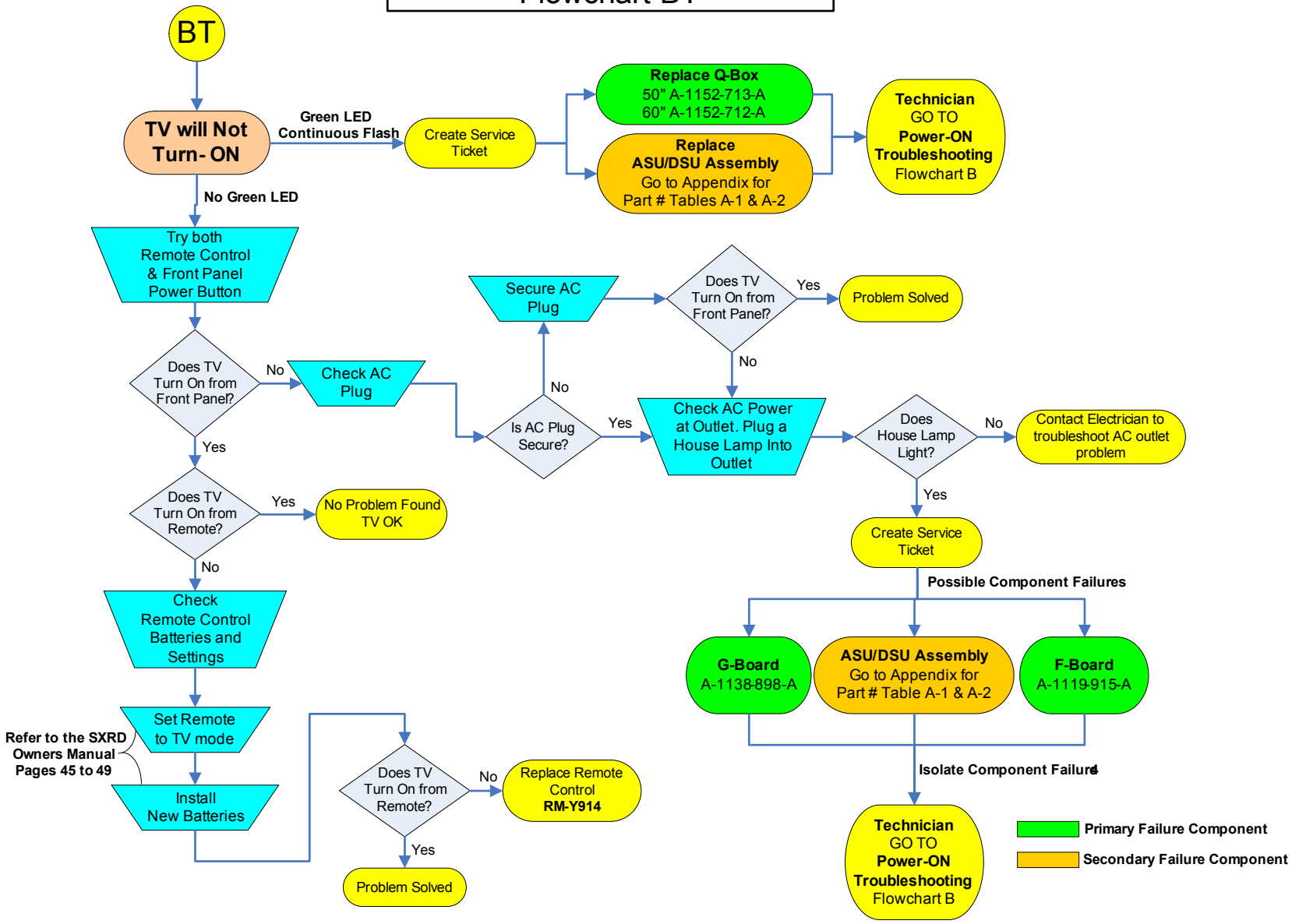
The 2005 SXRD models (KDS-R50XBR1 and KDS-R60XBR1) have a Personal Computer Input **(PC-IN)**, which connects directly to the PC 15 pin DIM connector (HD15 connector). Once connected the TV functions as a video monitor and audio output (separate Stereo Mini Plug) for the PC. There is a complete table of PC Input Signal Compatibility in the Owners Manual (Page 100). Table A provides the suggested PC Input Signals for best display results due to the 60Hz Vertical frequency.

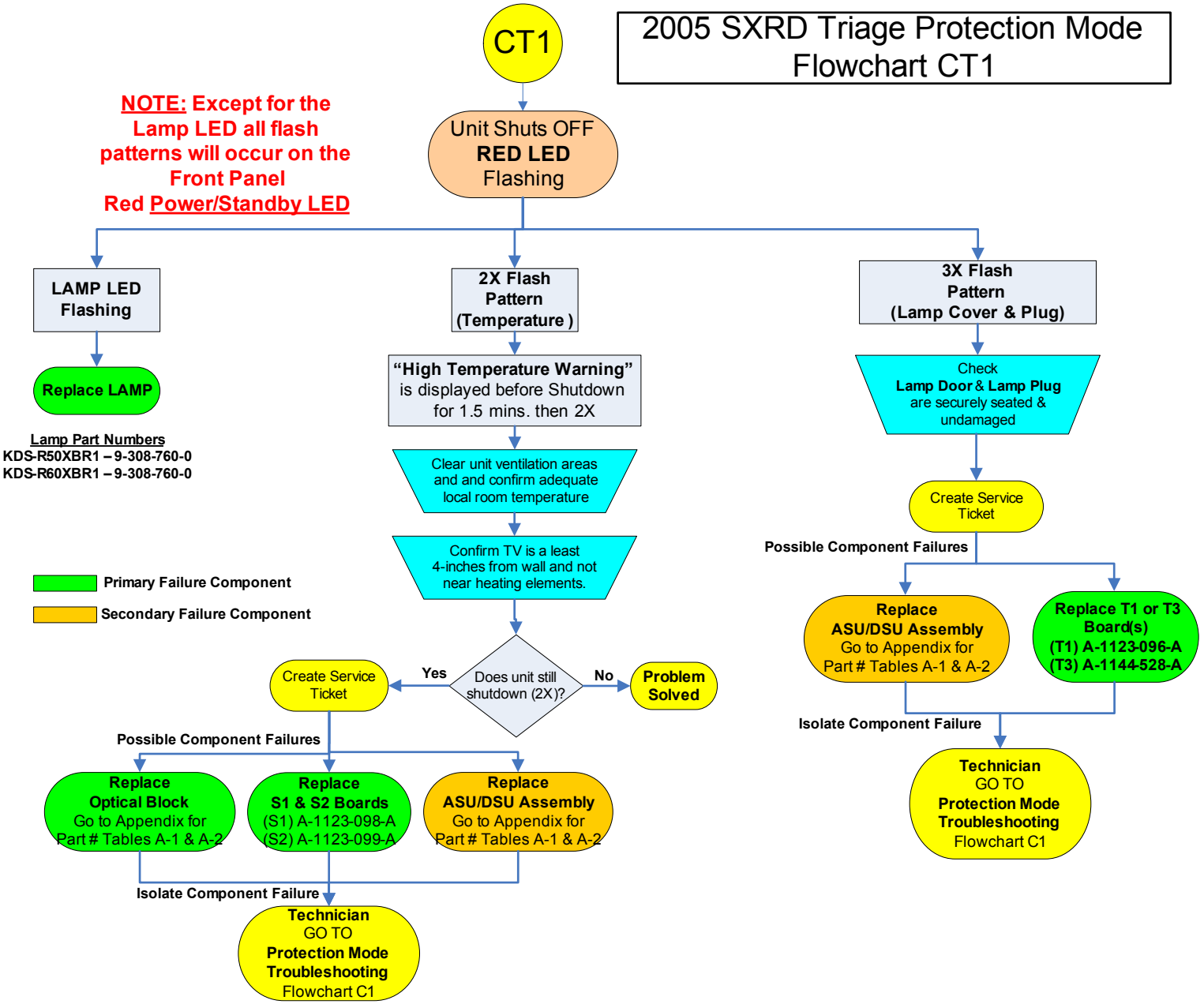
Table A – PC Input Signal Compatibility Chart (Best Results)

Signal Format	Horizontal (Pixel)	Vertical (line)	Horizontal Frequency (kHZ)	Vertical Frequency (Hz)
VGA	640	480	31.5	60
SVGA	800	600	37.9	60
XGA	1024	768	48.4	60
WXGA	1280	768	47.8	60
SXGA	1280	1024	64	60

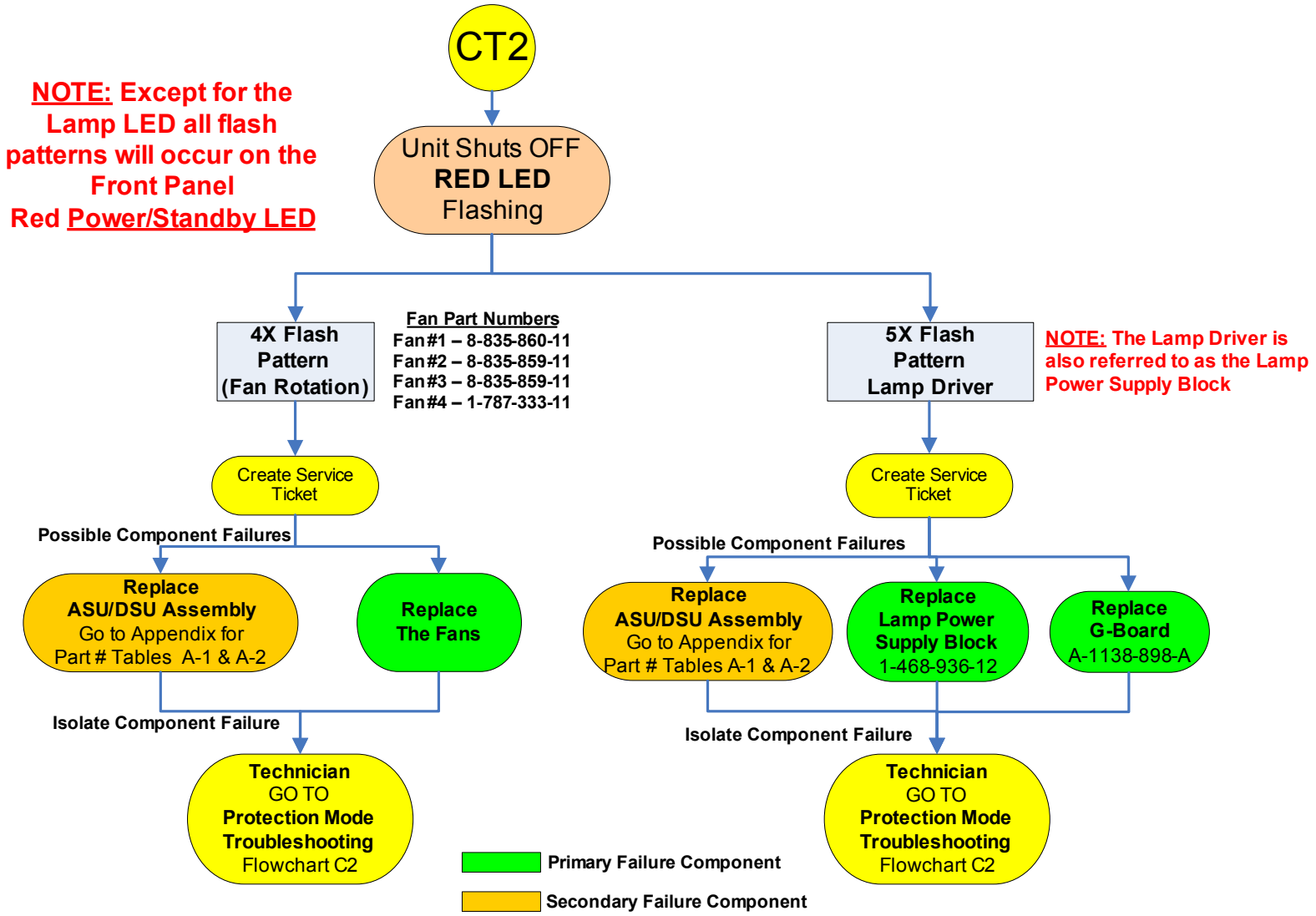

2005 SXRD Triage Initial Contact Analysis
Flowchart AT
AT
Start
Initial Analysis
Does Green (Power/ Standby) LED Turn ON?
No
GO TO Triage Power-ON Flowchart BT
Yes
Is Red (Power/ Standby) LED Flashing?
Yes
GO TO Triage Protection Mode Flowchart CT1, 2, 3, 4
No
Is Video Present?
No
GO TO Triage Missing or Distorted Video Flowchart DT
Yes
Is Video Distorted?
Yes
GO TO Triage Video Input Flowchart ET
No
Is Audio Present?
No
GO TO Triage Missing or Distorted Audio Flowchart FT
Yes
No Problem Found Unit Fully Operational

2005 SXRD Triage Power-ON Flowchart BT

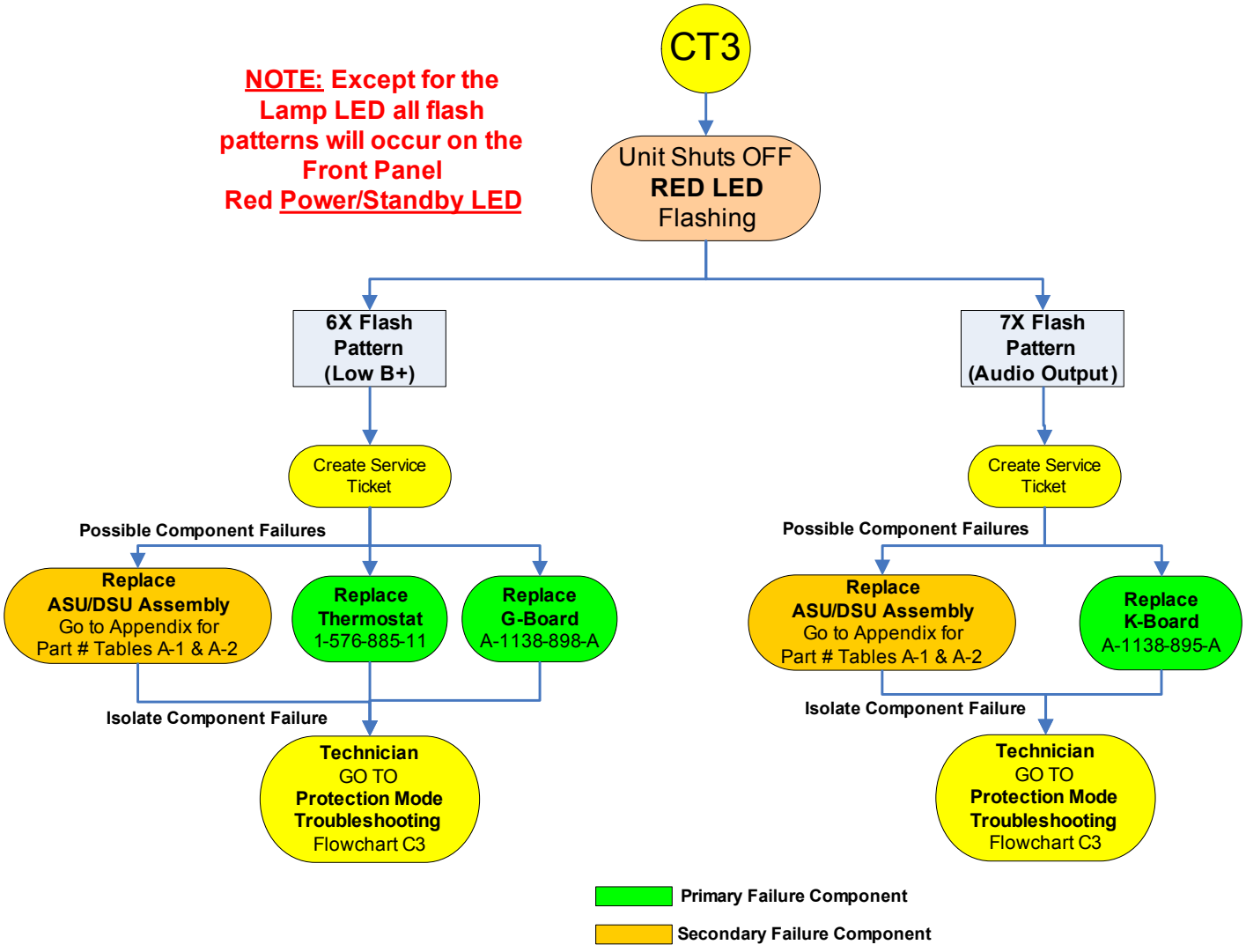



2005 SXRD Triage Protection Mode Flowchart CT1
CT1
NOTE: Except for the Lamp LED all flash patterns will occur on the Front Panel Red Power/Standby LED
Unit Shuts OFF RED LED Flashing
LAMP LED Flashing
Replace LAMP
Lamp Part Numbers
KDS-R50XBR1 – 9-308-760-0
KDS-R60XBR1 – 9-308-760-0
2X Flash Pattern (Temperature)
"High Temperature Warning" is displayed before Shutdown for 1.5 mins. then 2X
Clear unit ventilation areas and and confirm adequate local room temperature
Confirm TV is a least 4-inches from wall and not near heating elements.
Does unit still shutdown (2X)?
Yes
No
Problem Solved
Create Service Ticket
Possible Component Failures
Replace Optical Block Go to Appendix for Part # Tables A-1 & A-2
Replace S1 & S2 Boards (S1) A-1123-098-A (S2) A-1123-099-A
Replace ASU/DSU Assembly Go to Appendix for Part # Tables A-1 & A-2
Isolate Component Failure
Technician GO TO Protection Mode Troubleshooting Flowchart C1
3X Flash Pattern (Lamp Cover & Plug)
Check Lamp Door & Lamp Plug are securely seated & undamaged
Create Service Ticket
Possible Component Failures
Replace ASU/DSU Assembly Go to Appendix for Part # Tables A-1 & A-2
Replace T1 or T3 Board(s) (T1) A-1123-096-A (T3) A-1144-528-A
Isolate Component Failure
Technician GO TO Protection Mode Troubleshooting Flowchart C1
Primary Failure Component
Secondary Failure Component

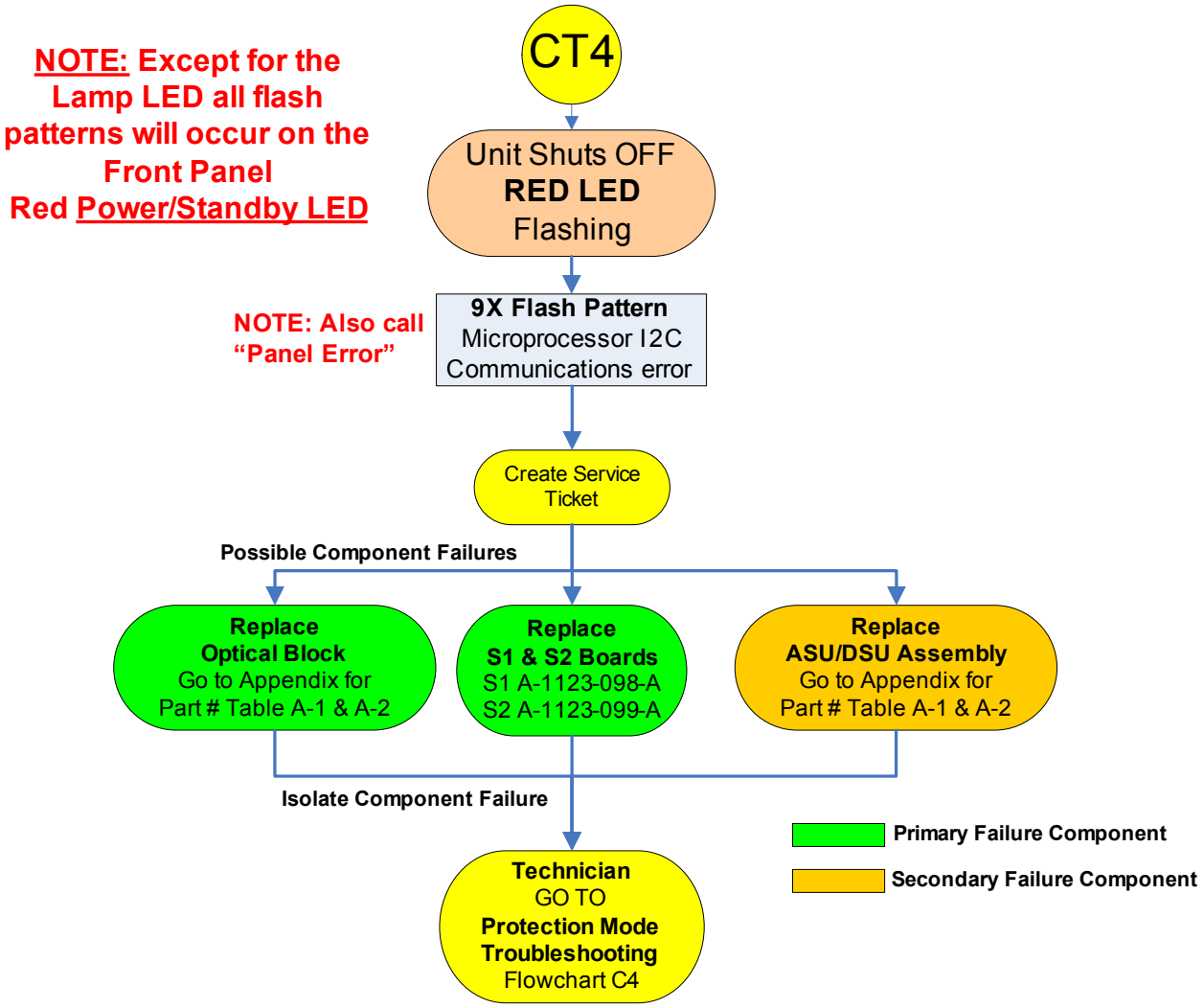
2005 SXRD Triage Protection Mode Flowchart CT2



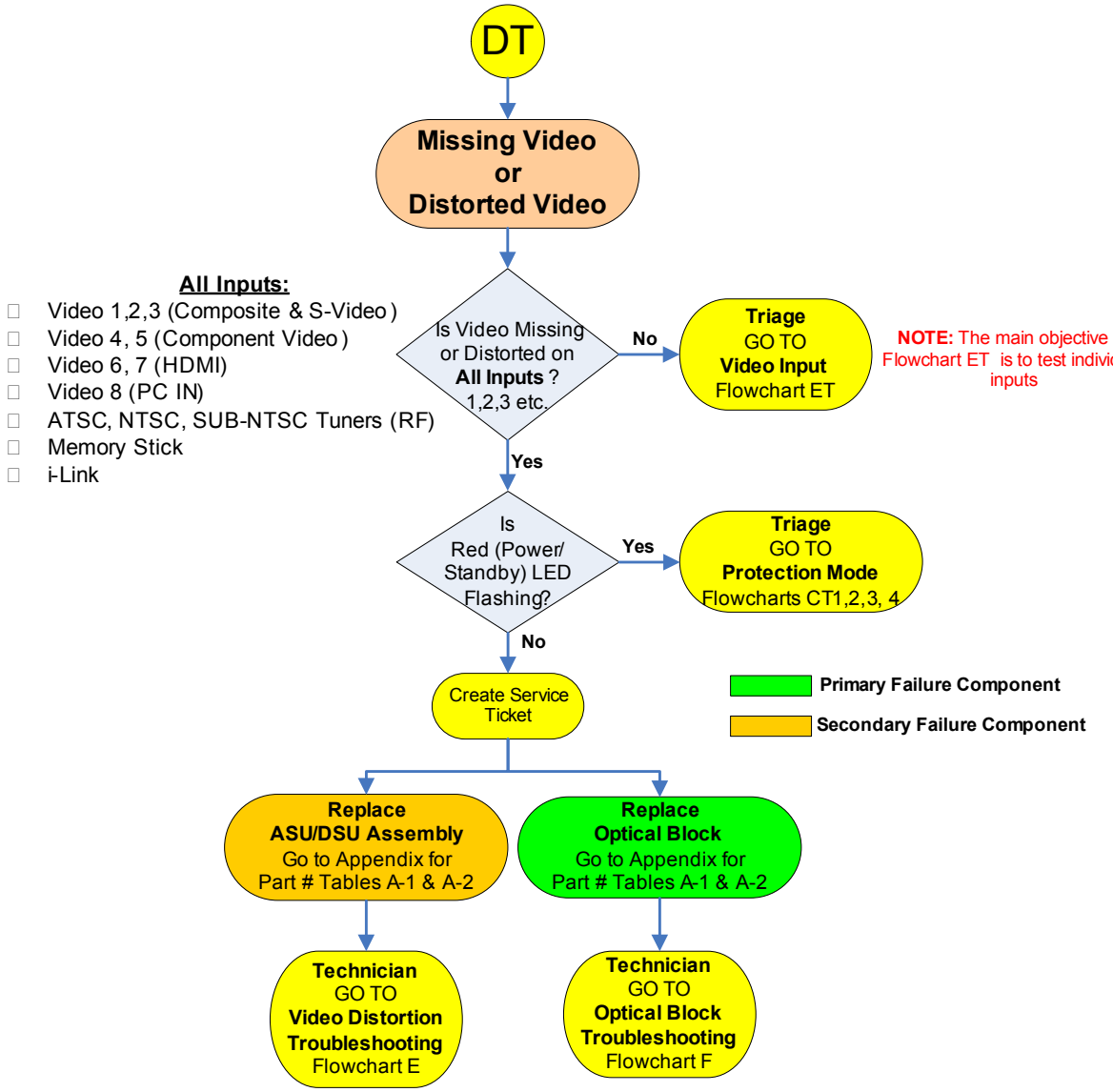
2005 SXRD Triage Protection Mode Flowchart CT3



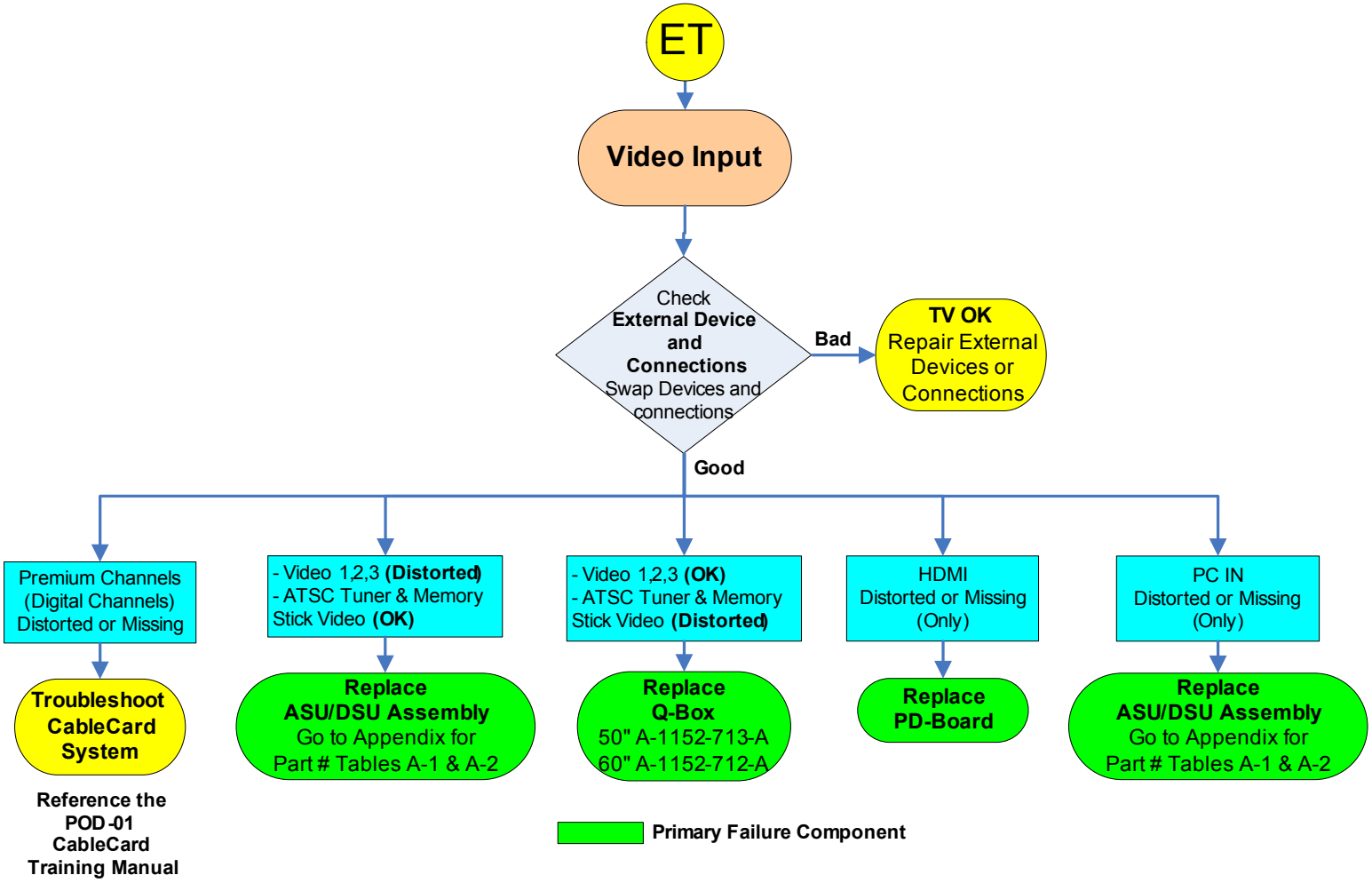
2005 SXRD Triage Protection Mode Flowchart CT4



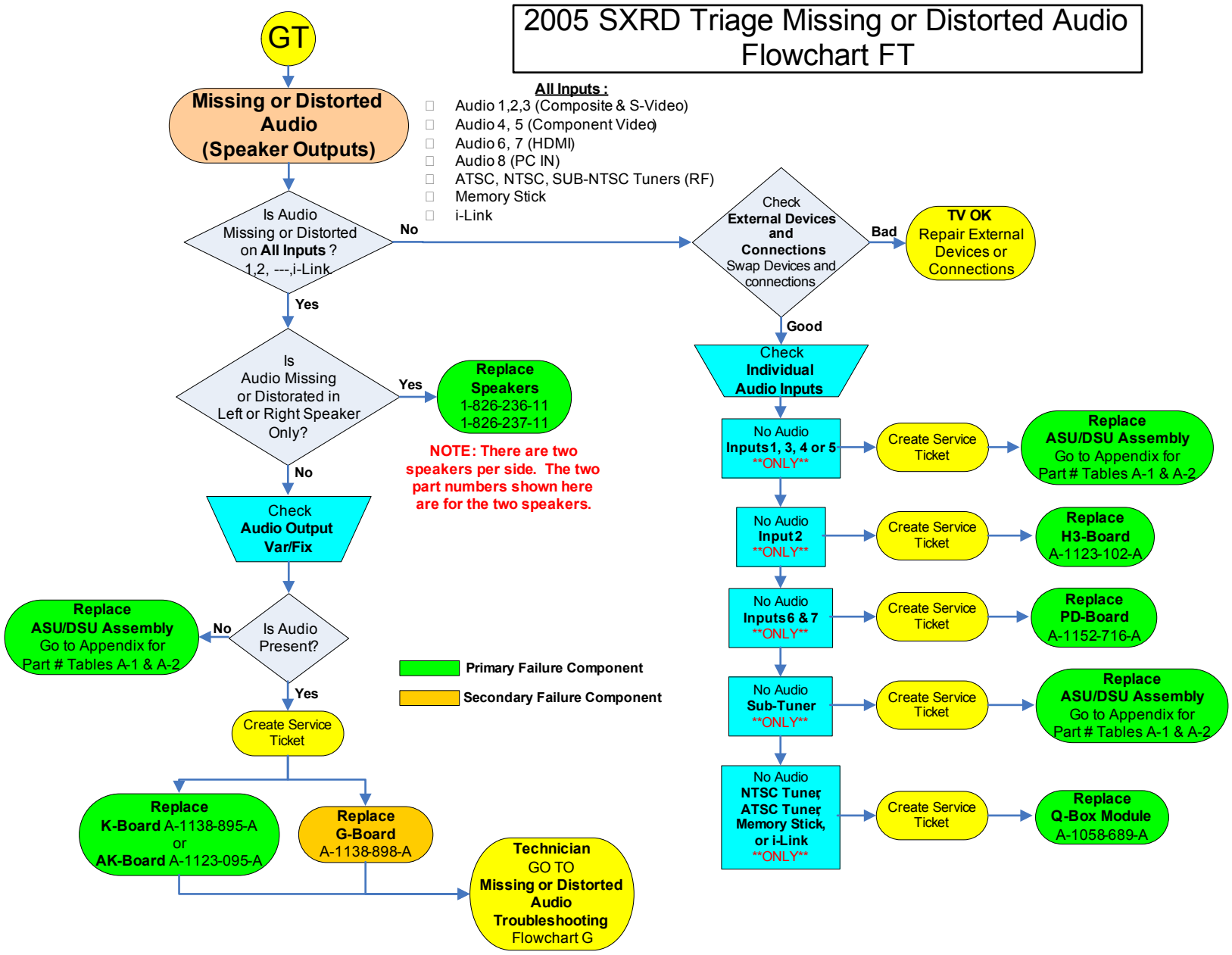
2005 SXRD Triage Missing or Distorted Video Flowchart DT



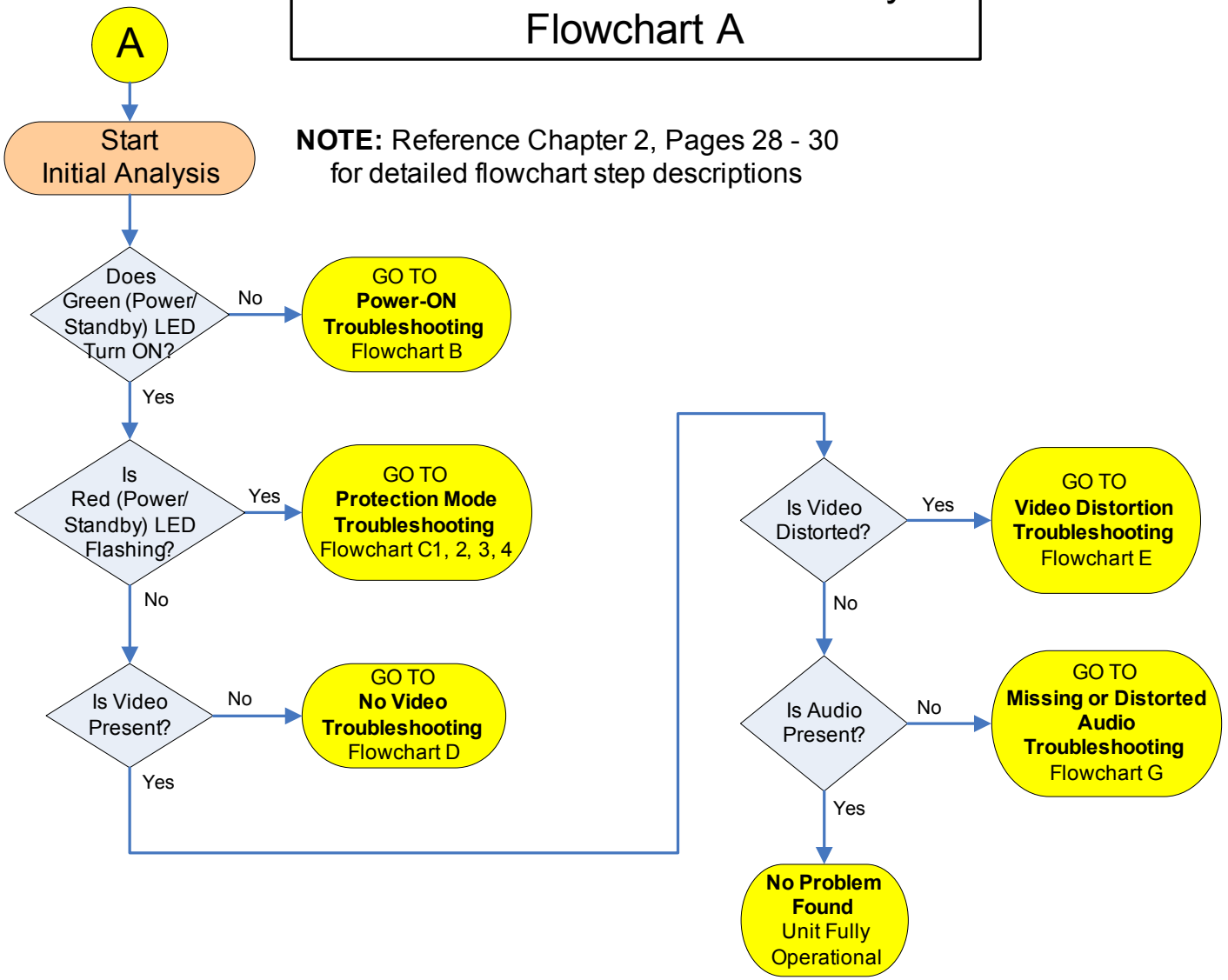
2005 SXRD Triage Video Distortion Flowchart ET



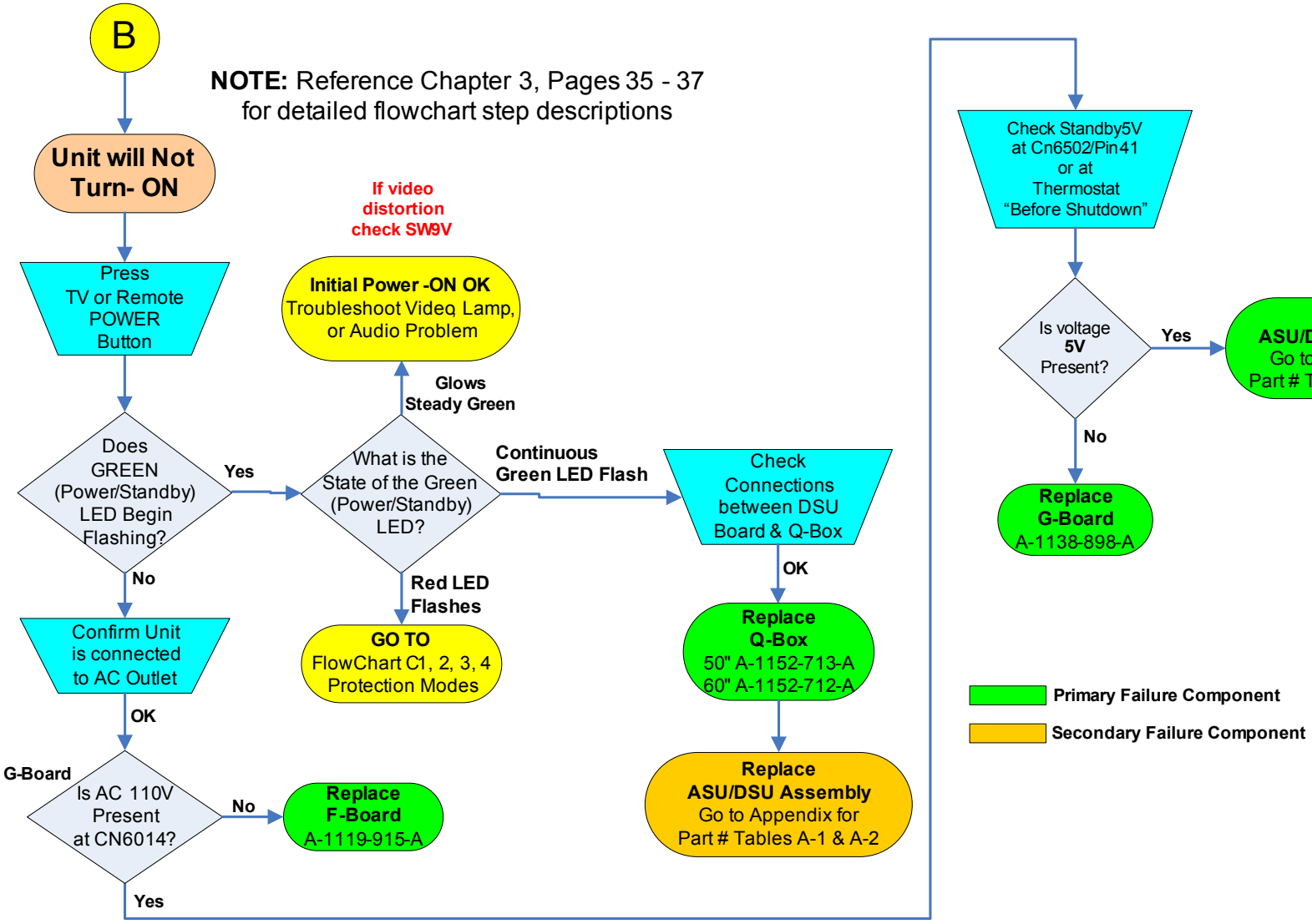
2005 SXRD Triage Missing or Distorted Audio Flowchart FT



2005 SXRD Initial Contact Analysis Flowchart A



2005 SXRD Power-ON Troubleshooting Flowchart B

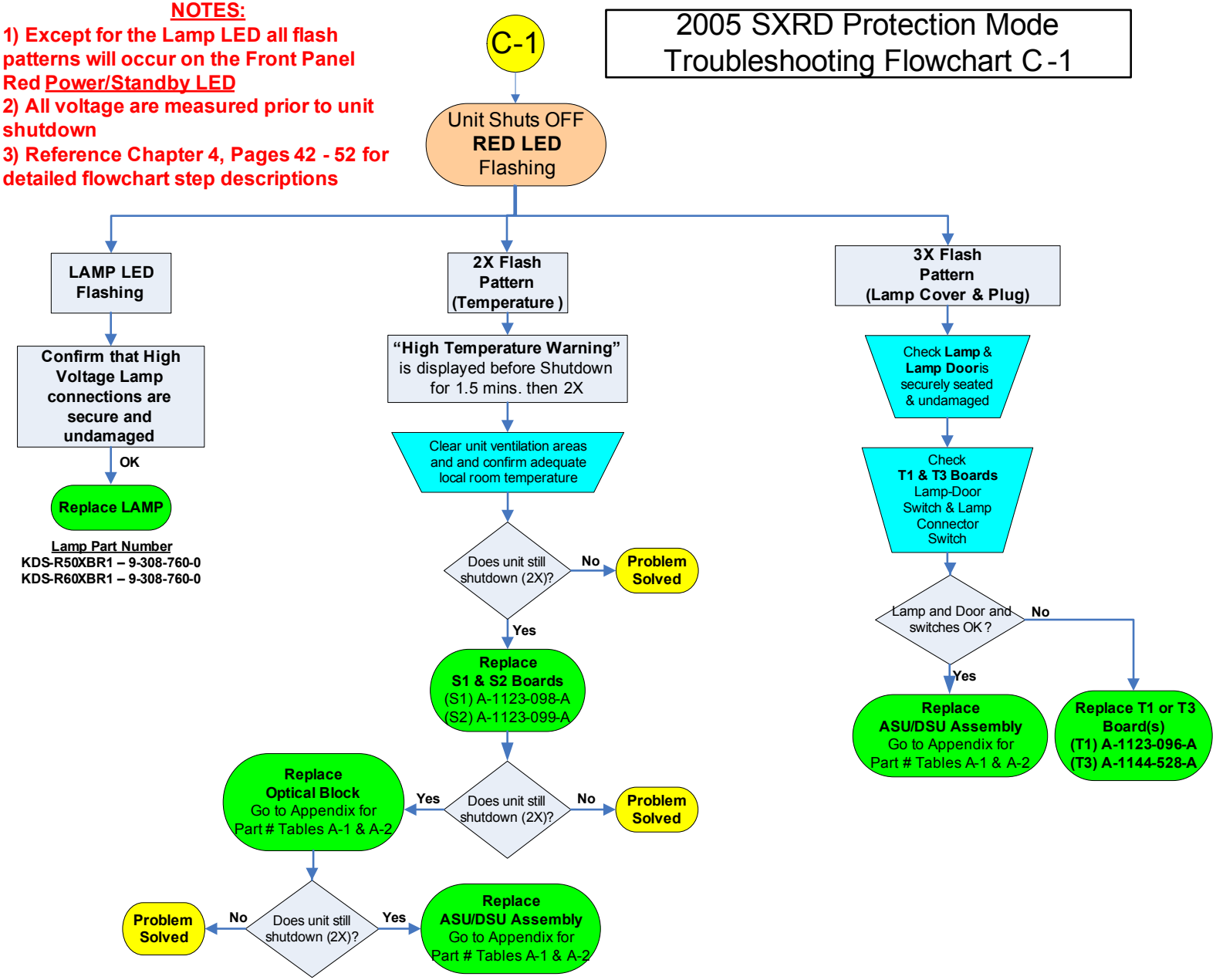


NOTES:

1) Except for the Lamp LED all flash patterns will occur on the Front Panel Red Power/Standby LED

2) All voltage are measured prior to unit shutdown

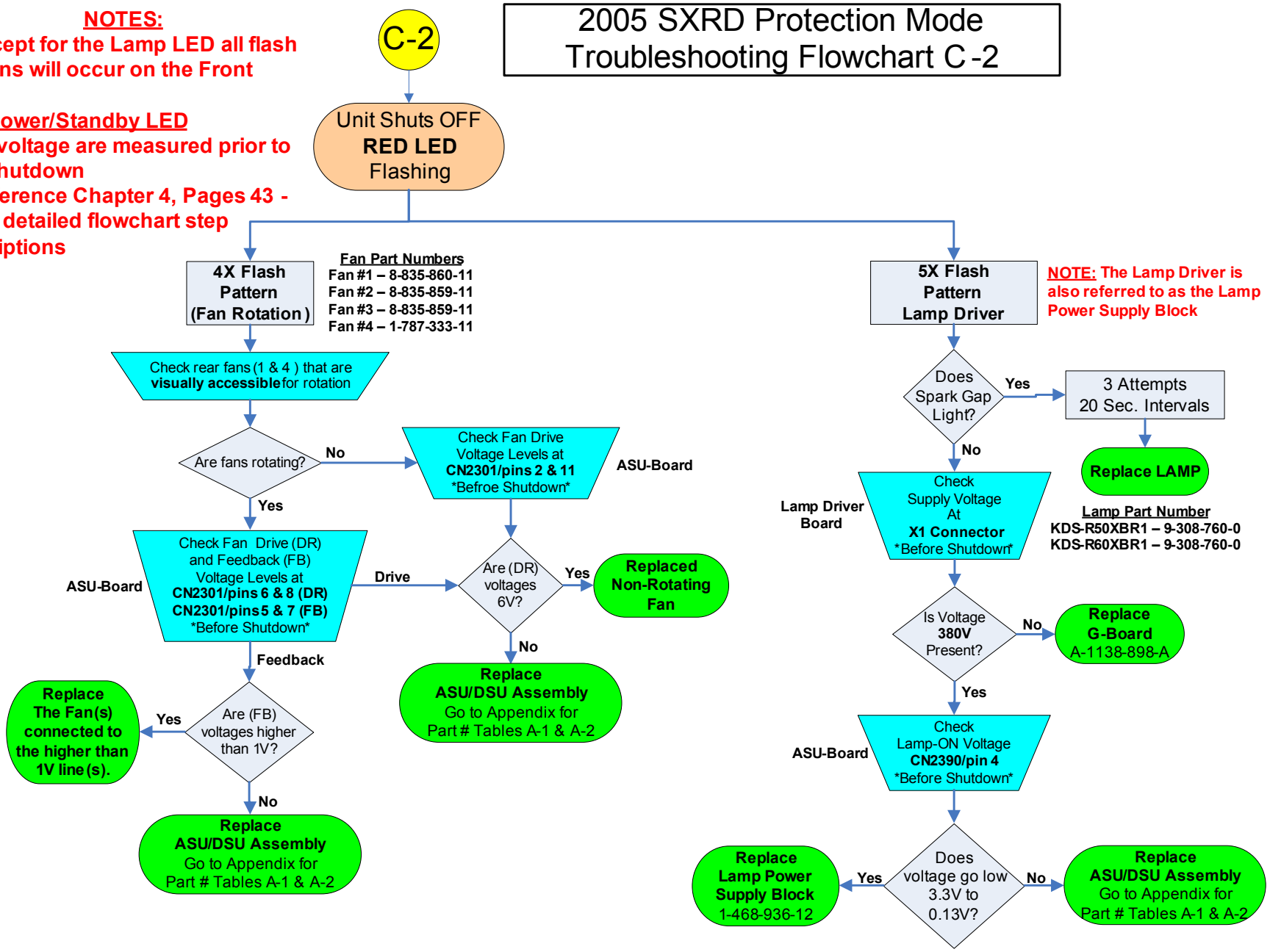
3) Reference Chapter 4, Pages 42 - 52 for detailed flowchart step descriptions



2005 SXRD Protection Mode Troubleshooting Flowchart C-2

NOTES:

1) Except for the Lamp LED all flash patterns will occur on the Front Panel
Red Power/Standby LED
2) All voltage are measured prior to unit shutdown
3) Reference Chapter 4, Pages 43 - 52 for detailed flowchart step descriptions



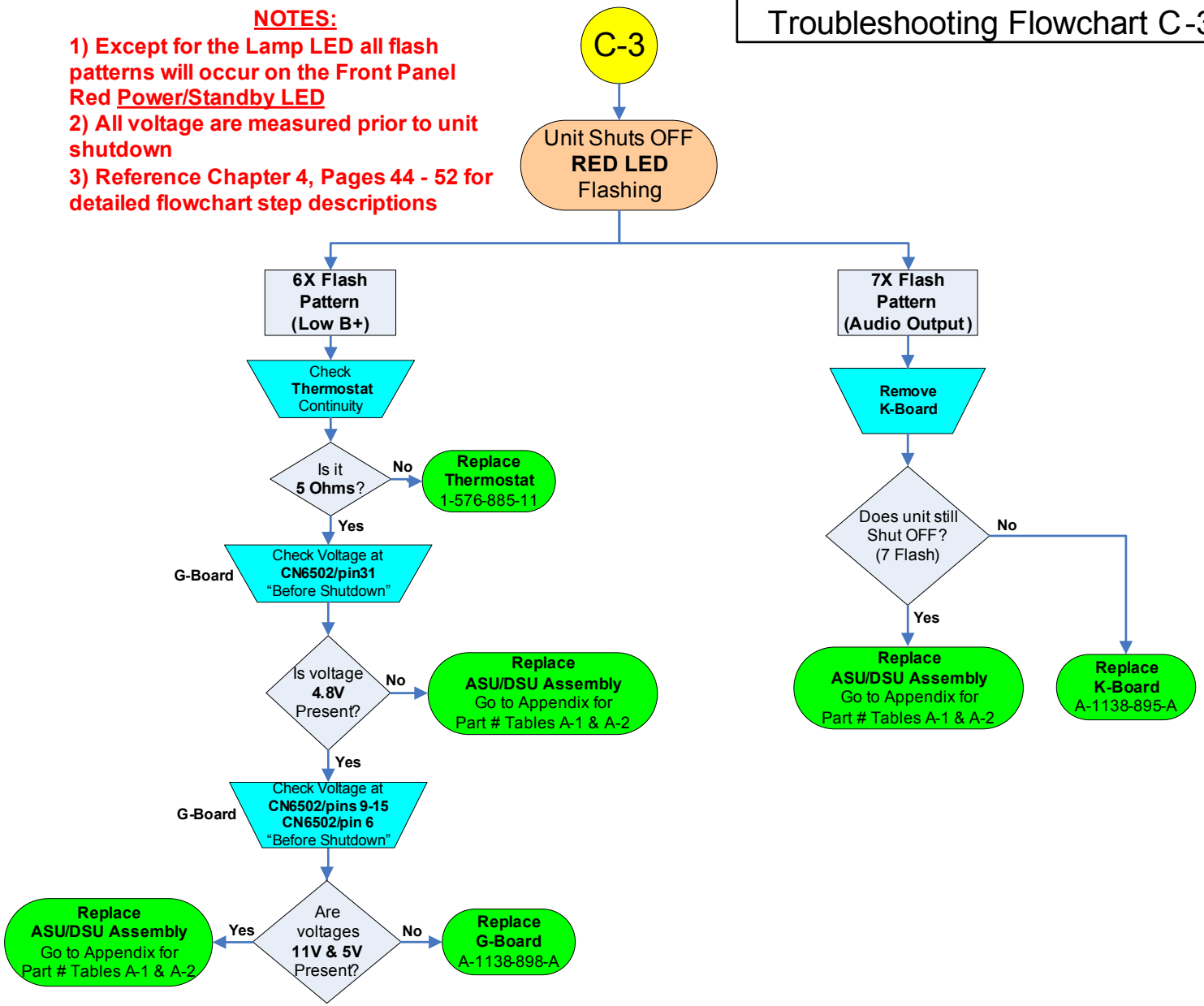
2005 SXRD Protection Mode Troubleshooting Flowchart C-3

NOTES:

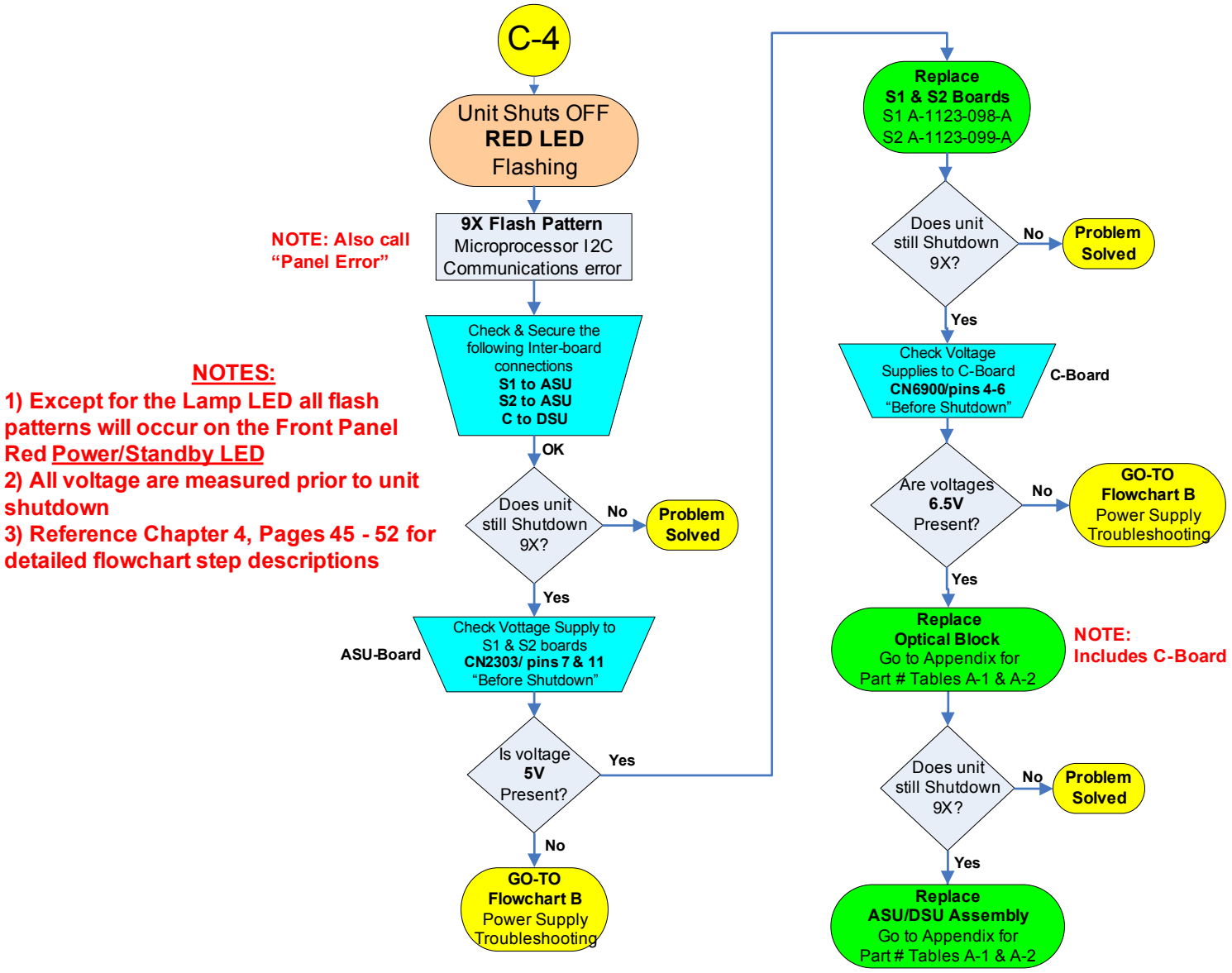
1) Except for the Lamp LED all flash patterns will occur on the Front Panel Red Power/Standby LED

2) All voltage are measured prior to unit shutdown

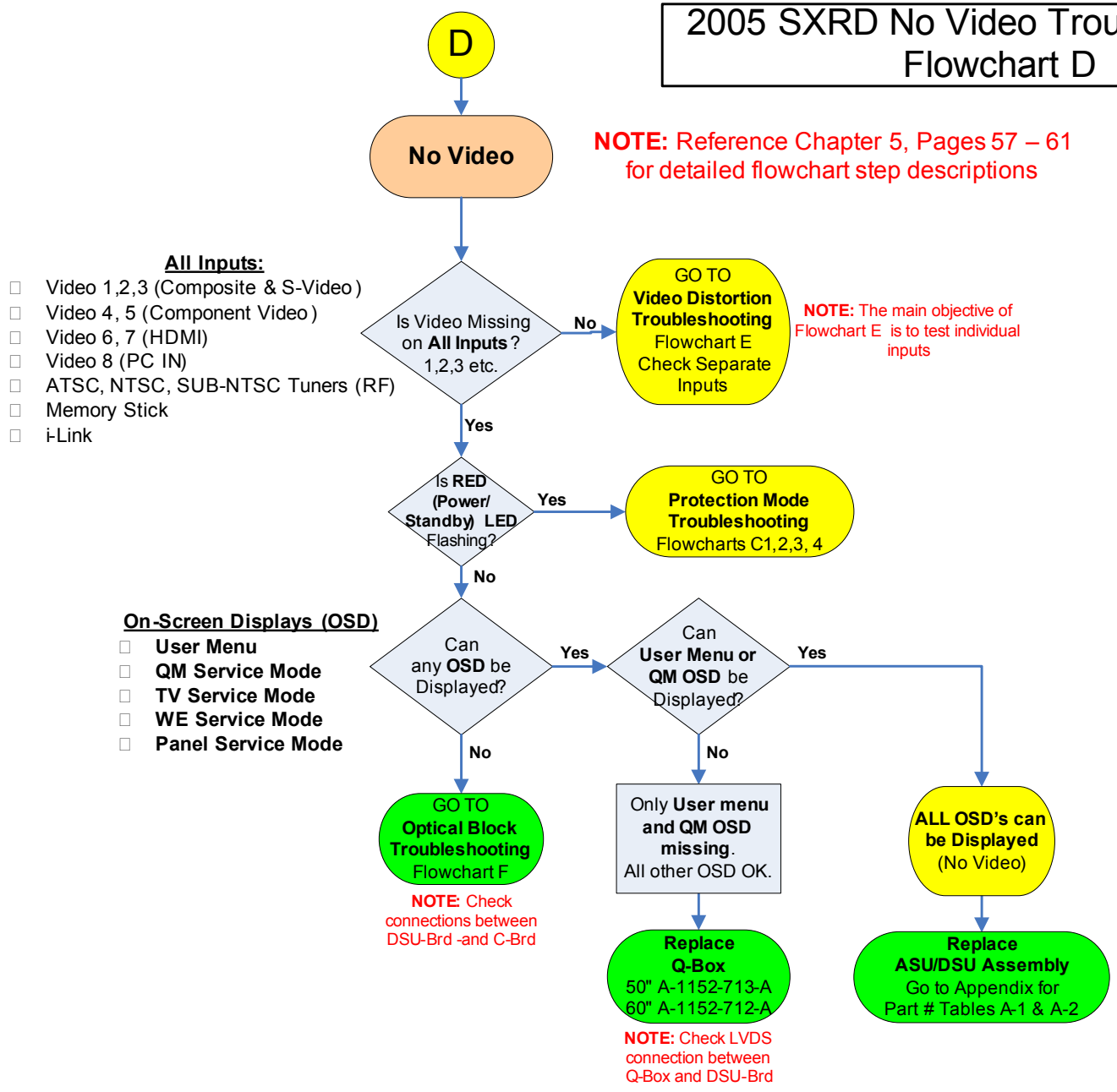
3) Reference Chapter 4, Pages 44 - 52 for detailed flowchart step descriptions



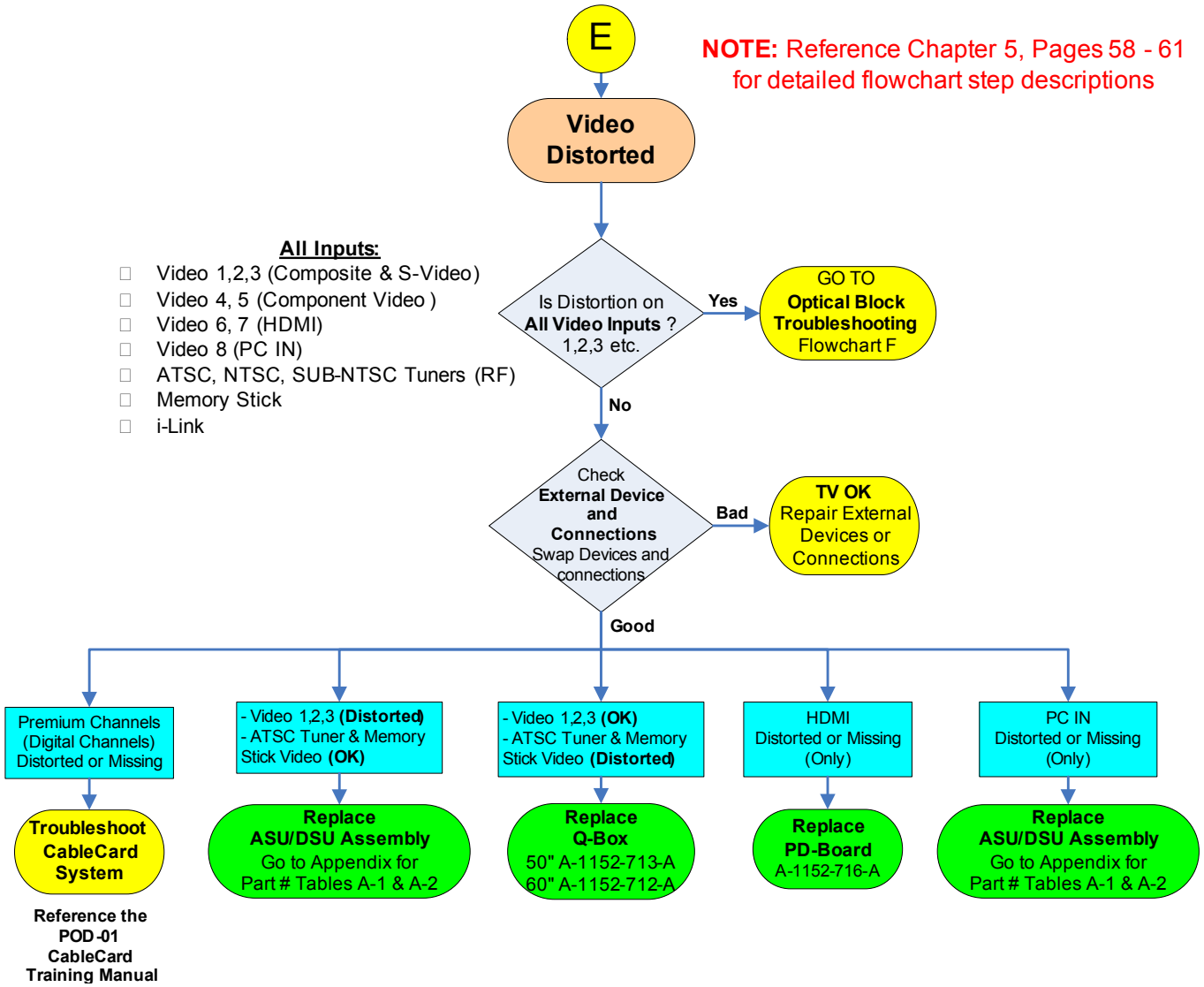
2005 SXRD Protection Mode Troubleshooting Flowchart C-4



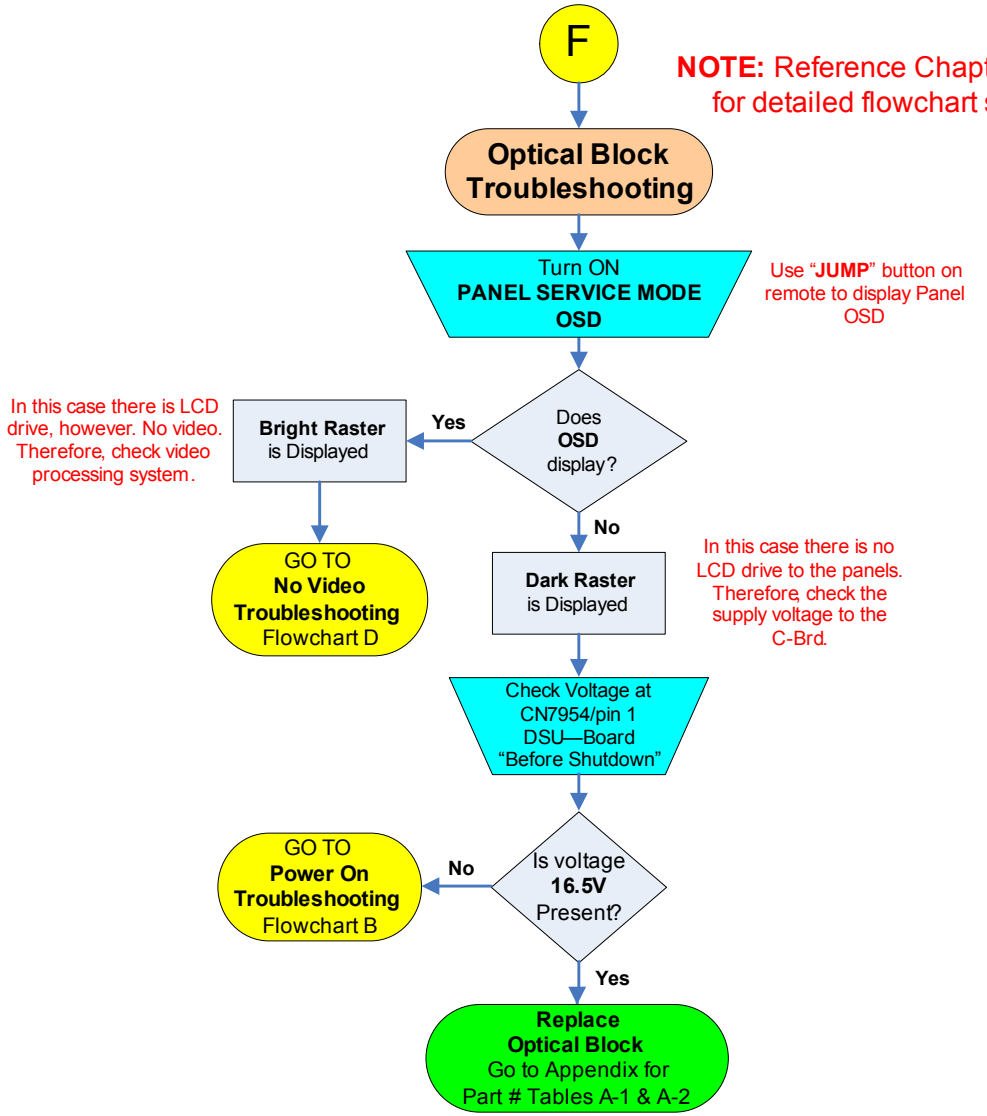
2005 SXRD No Video Troubleshooting Flowchart D



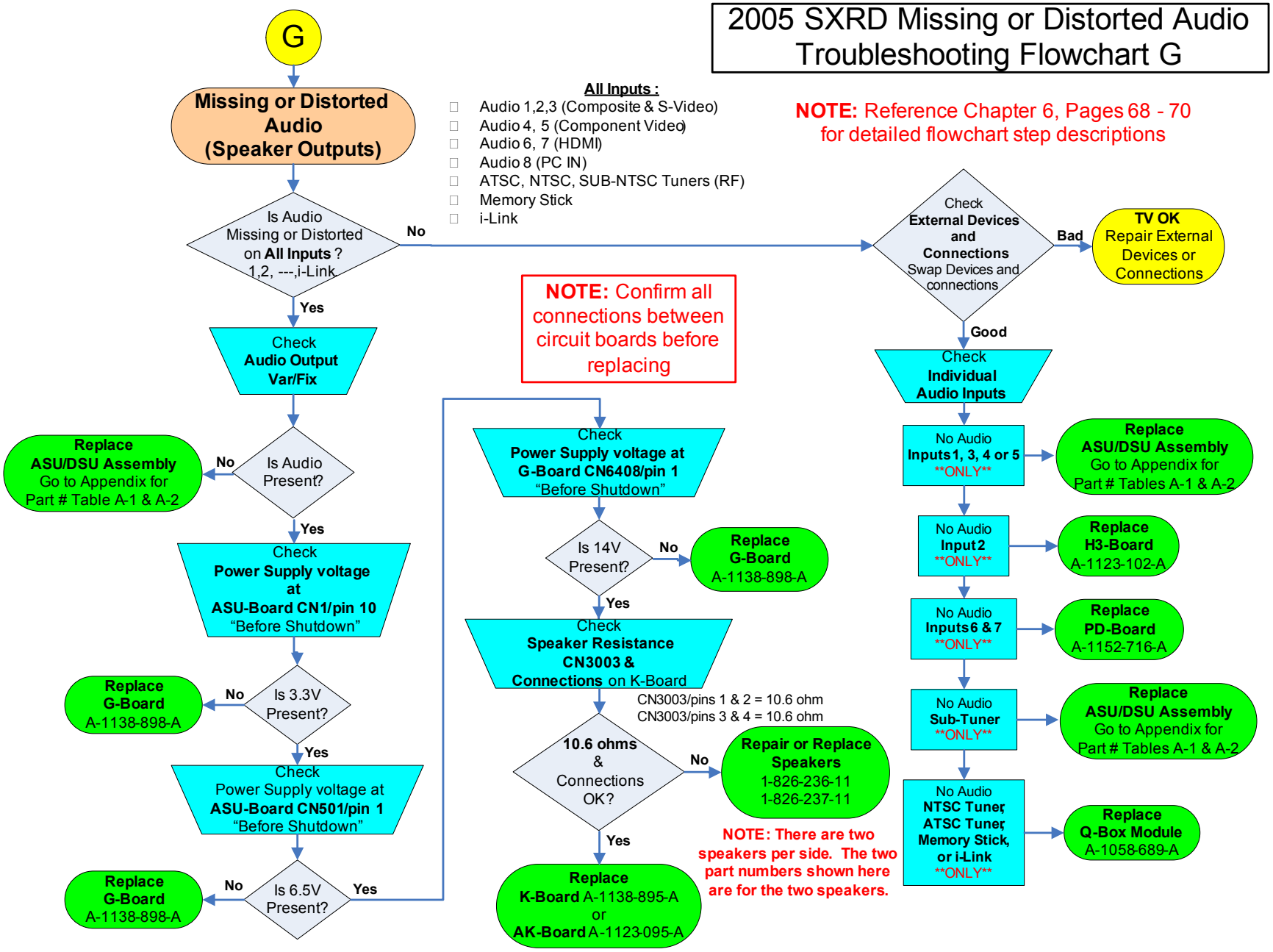
2005 SXRD Video Distortion Troubleshooting Flowchart E



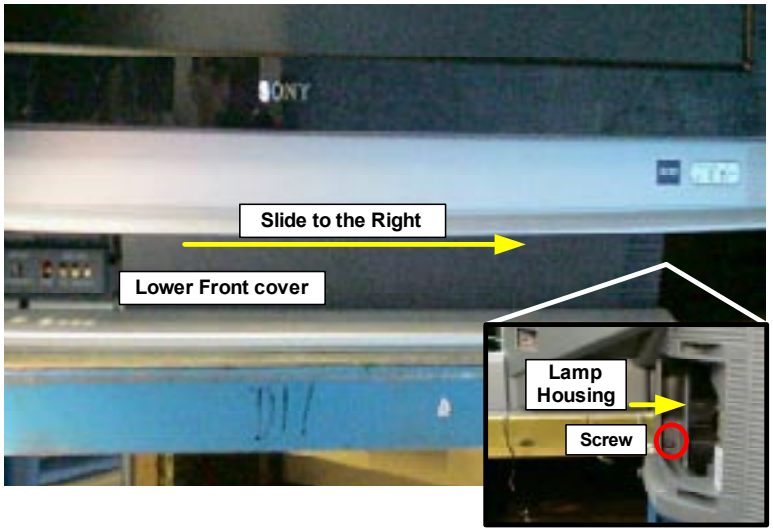
2005 SXRD Optical Block Troubleshooting Flowchart F



2005 SXRD Missing or Distorted Audio Troubleshooting Flowchart G

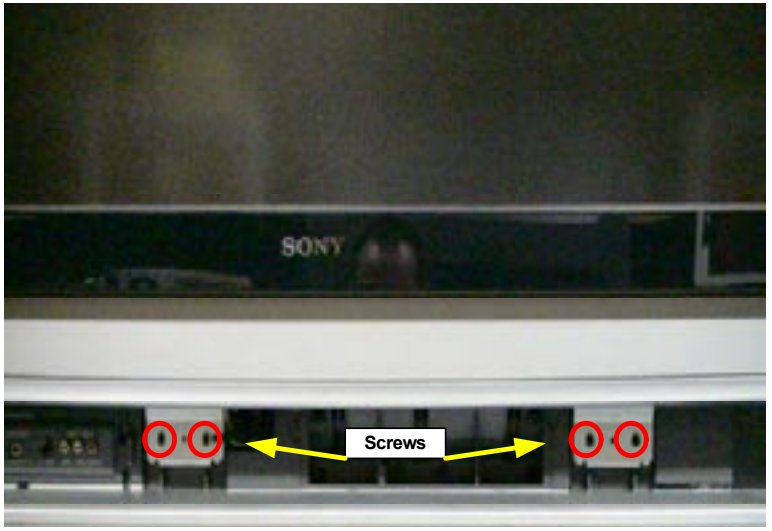


Screen Frame Removal



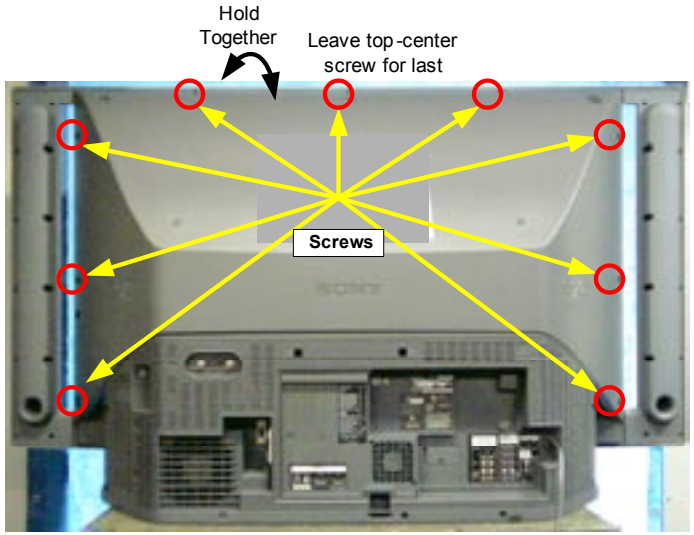
1

The lower front cover must be removed to access the screws that secure the two lower screen-frame brackets
Open the Lamp Door and remove 1 screw in the lower left hand corner when view from the rear of the unit .
Slide front cover to the right and remove.



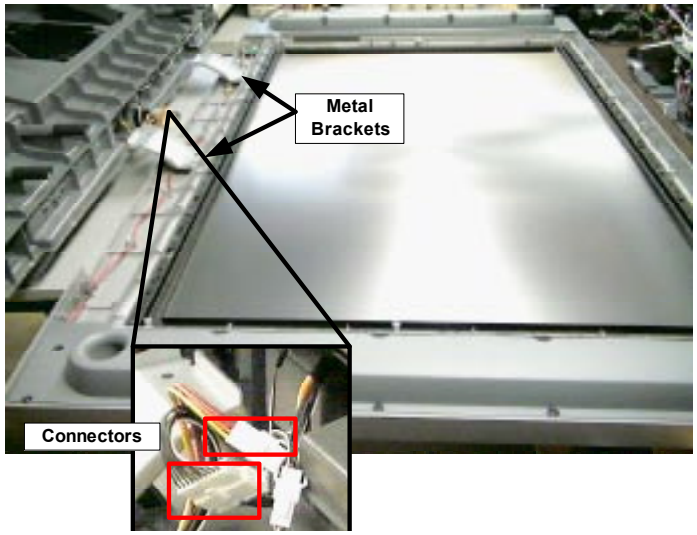
2

Remove 4 screws securing the lower screen-frame brackets.



3

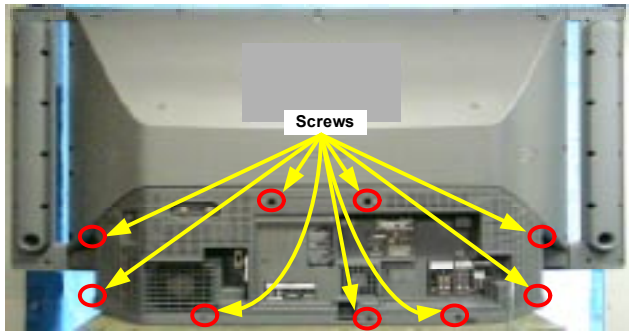
Remove 9 screws to release front Screen Frame assembly.
CAUTION: Leave the top-center screw in place while removing the eight other screws. Go around to the front of the unit. Hold the screen frame assembly and the rear mirror assembly together at the top while removing the last top-center screw. Pull the Screen Frame assembly off and lay down on a soft pad.



4

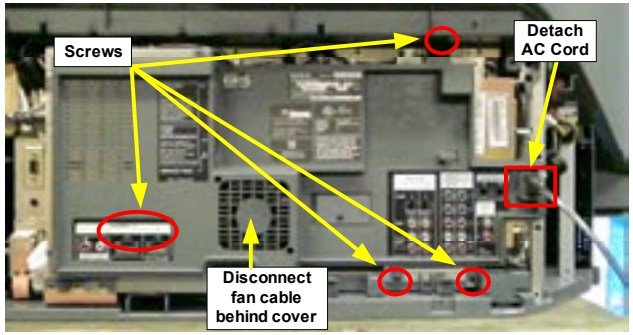
Disconnect 2 connectors
CAUTION: Do not stand the Screen Frame assembly on the metal brackets.

Rear & Sub Plastic Cover Removal



1

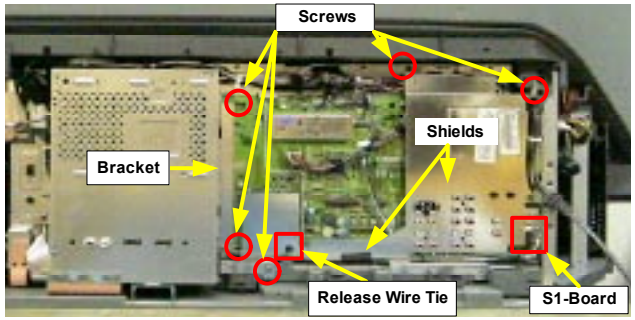
Remove 9 screws and pull rear plastic cover straight back and off.



2

Remove 5 screws and detach AC cord from the slot. Pull sub plastic cover **slowly** straight back and off.

NOTE: Be careful of fan wire and connector behind sub-cover. Disconnect fan cable to completely remove cover.



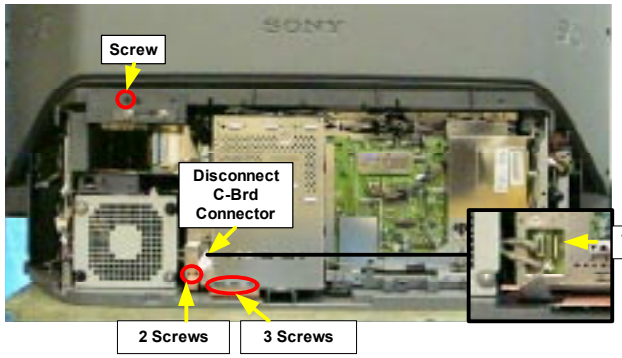
3

Remove 4 screws and release the one wire tie. Slide the bracket up slightly and pull off. Disconnect the S1-Board Remove both shields to access the ASU-Board.

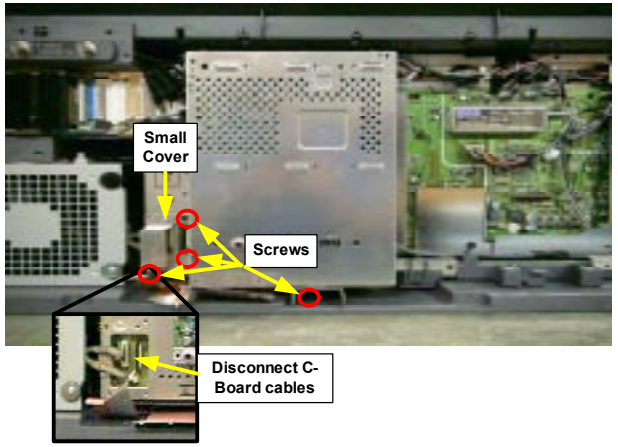
4

The ASU-Board can be probed for troubleshooting at this point of the disassembly process. It can not be remove at this point. Reference “ASU & G-Board Removal” section.

Chassis Assembly Removal

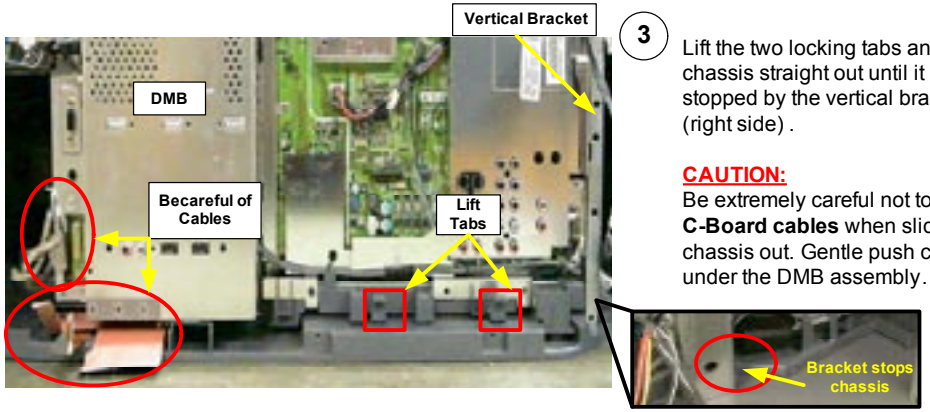


1 Remove 6 screws and disconnect the C-Board ribbon cable (Gentle press the Tan tab on the side of the connector to release cable.



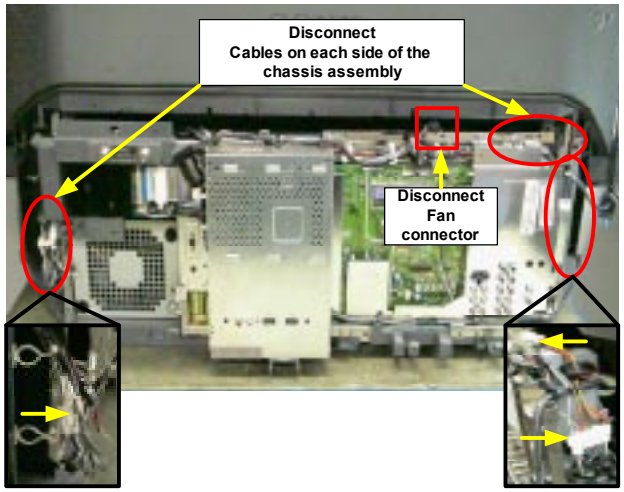
2 Remove the small cover (3 screw) and disconnect C-Board cables. Also remove 1 screw under DMB securing the chassis assembly.

CAUTION:
Be extremely careful not to damage **C-Board cables** while removing the Chassis Assembly.



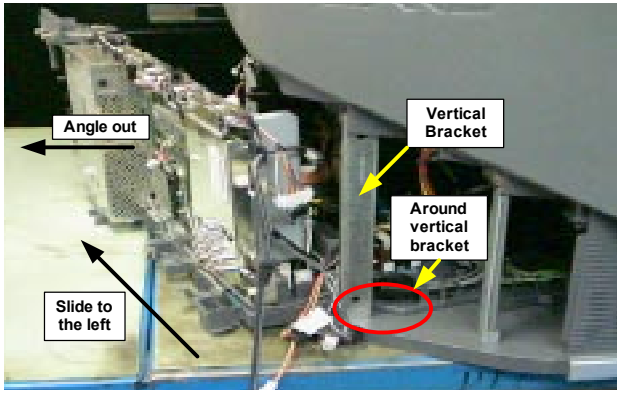
3 Lift the two locking tabs and slide chassis straight out until it is stopped by the vertical bracket (right side) .

CAUTION:
Be extremely careful not to damage **C-Board cables** when sliding the chassis out. Gentle push cables under the DMB assembly.



4

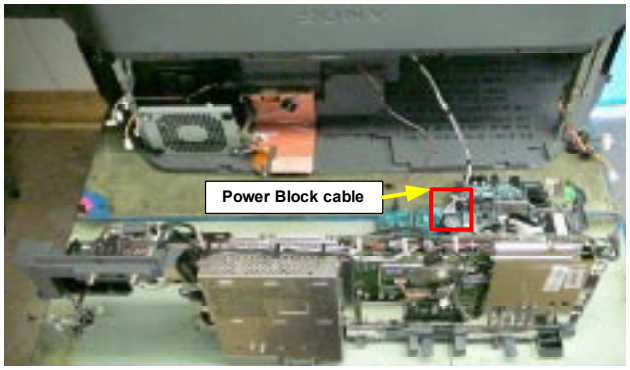
Slide Chassis out until it is stopped by the vertical bracket. Before attempting to remove the Chassis assembly disconnect the wires as illustrated in the photo.



5

Angle the left side of Chassis assembly out.
Slide the Chassis to the left (around the vertical bracket and pull chassis out.

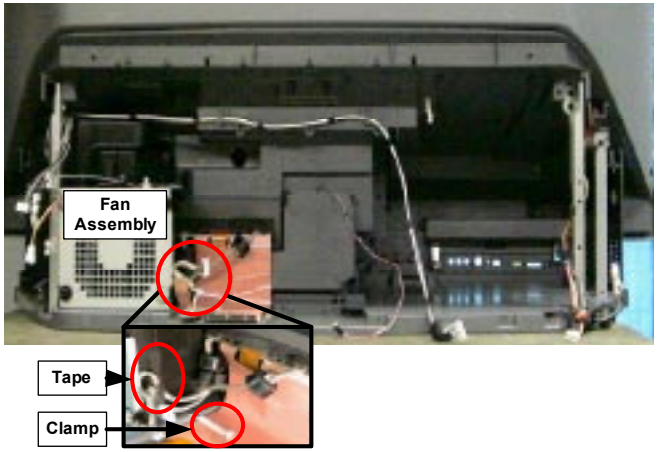
CAUTION:
Do not remove the vertical bracket. This bracket is critical support for the Upper mirror and screen block.



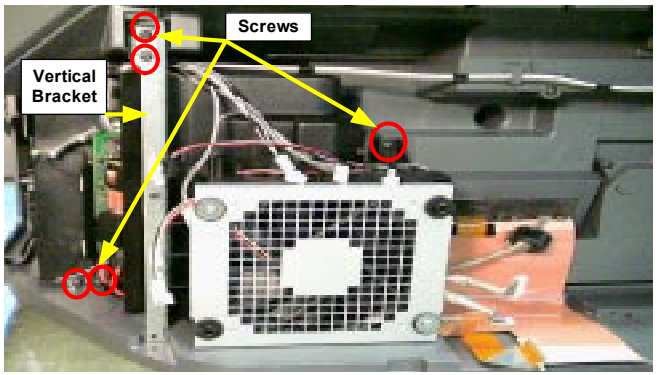
6

Completely remove the Chassis assembly and disconnect Lamp Power Supply Block cable.

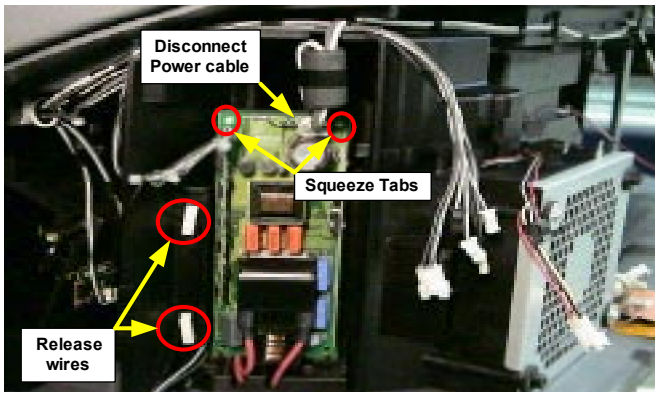
Optics Block & Fan Removal



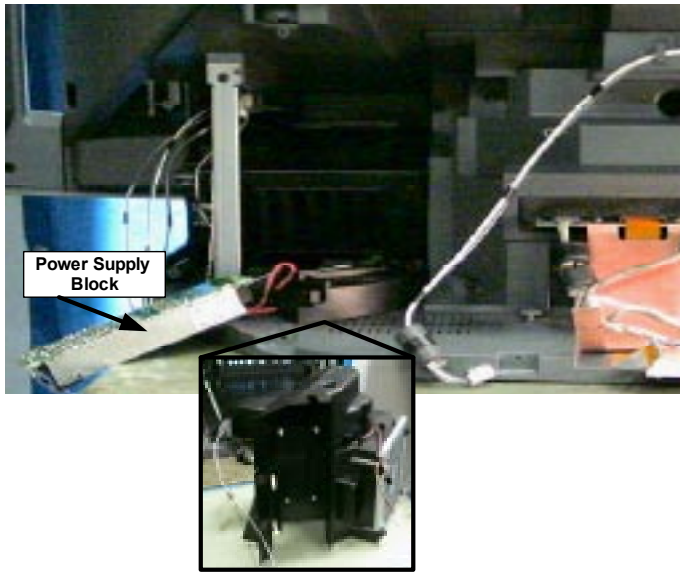
1 Before the Optical Block can be removed the Fan assembly must be removed.
First, remove cable clamp and wire tape.



2 Remove the 5 screws and the vertical bracket next to the fan assembly.

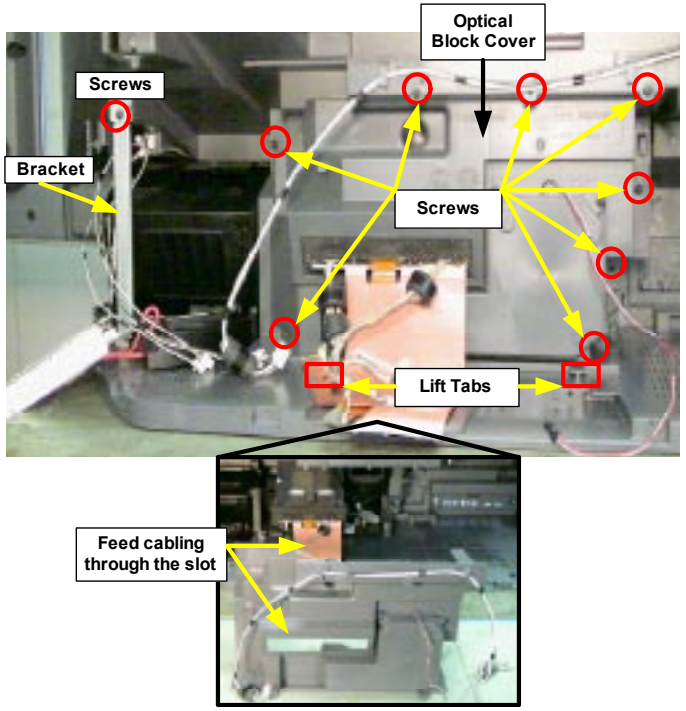


3 Detach the Power Supply Block from the fan housing.
Disconnect the power supply cable.
Remove wires from the two wire holders.
Squeeze the small tabs at the top of the board to remove board and lay to the side (the red wires will remain attached).



4

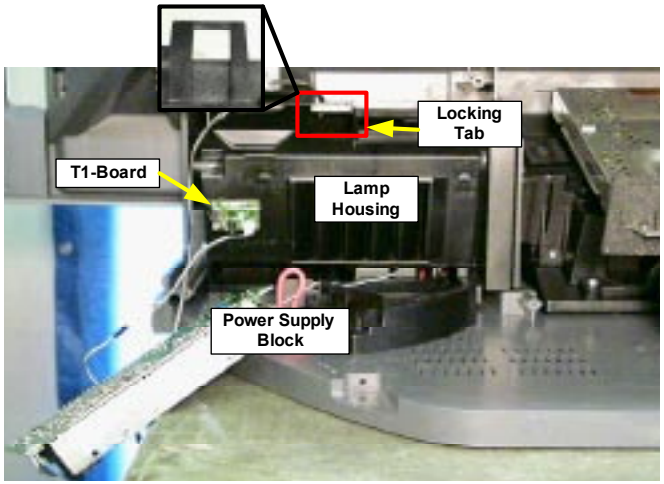
Grasp the Fan assembly and pull out to remove.



5

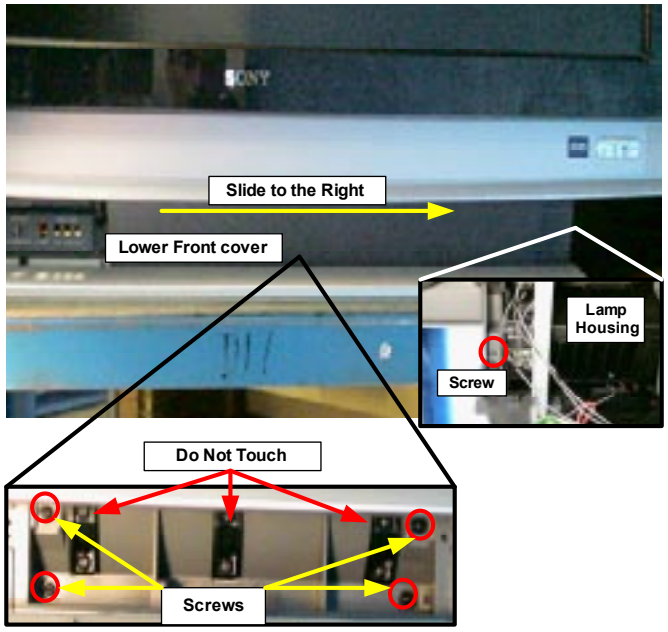
To access the Optics Block the gray plastic cover must first be removed.
Remove the 8 screws securing the Optics cover.
Lift the 2 tabs, and carefully slide cover back.
Also remove vertical bracket (1 screw).

CAUTION:
Lift the C-Board cables and carefully feed them through the slot in the plastic cover.



6

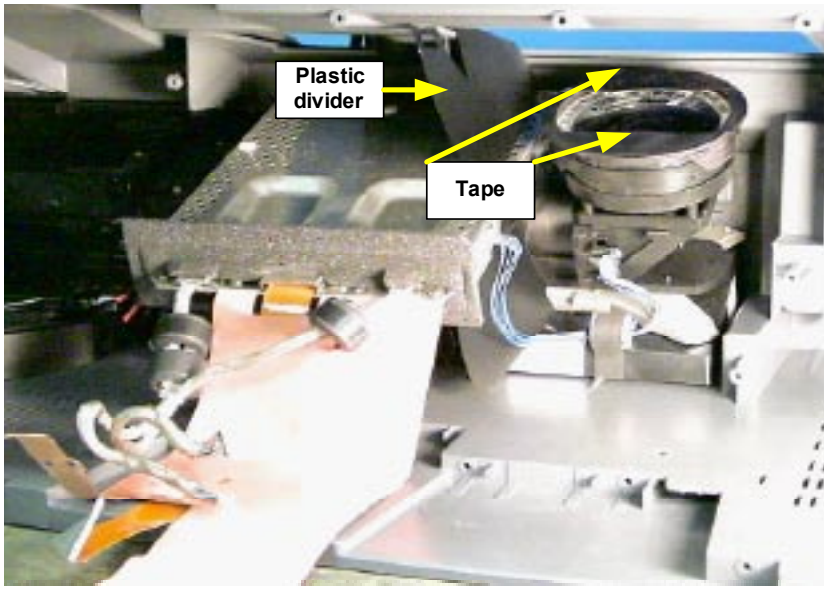
The Power Supply Block must be removed with the Optics Block because they are attached by 1 internal screw inside the Lamp Housing.
The left edge also blocks the Optics Block from being removed.
To remove the Lamp Housing lift the locking tab on the top of the cover and pull up and out.



7

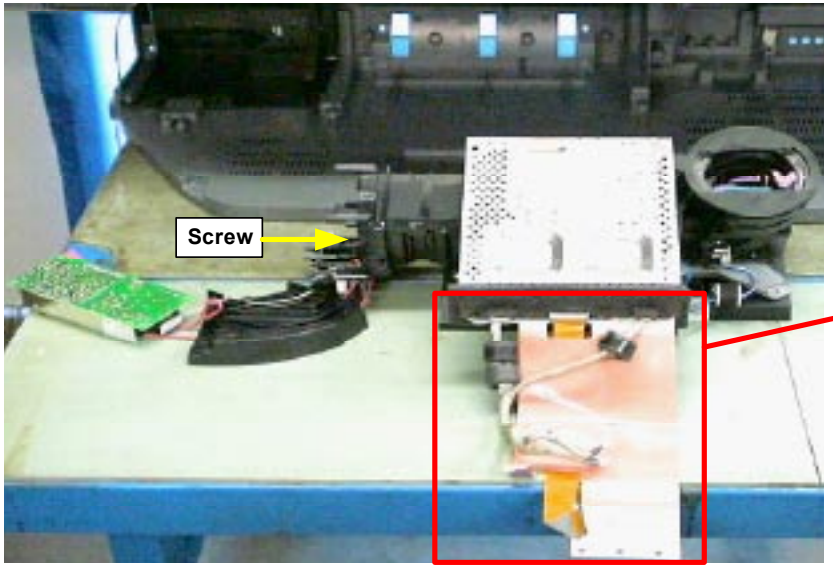
The lower front cover must be removed to access the screws that secure the Optics Block in place.
Remove 1 screw behind the cover in the lower right hand corner.
Slide front cover to the right and remove.
Remove the 4 screws securing the Optics Block.

CAUTION: Do Not Touch the 6 screws mounted in the black plastic under the lower front cover



8

CAUTION:
Take care not to damage black plastic divider (light shield) when removing and installing the Optics Block.
Do not remove or damage black tape on the lens. The black tape reduces glare and reflections.

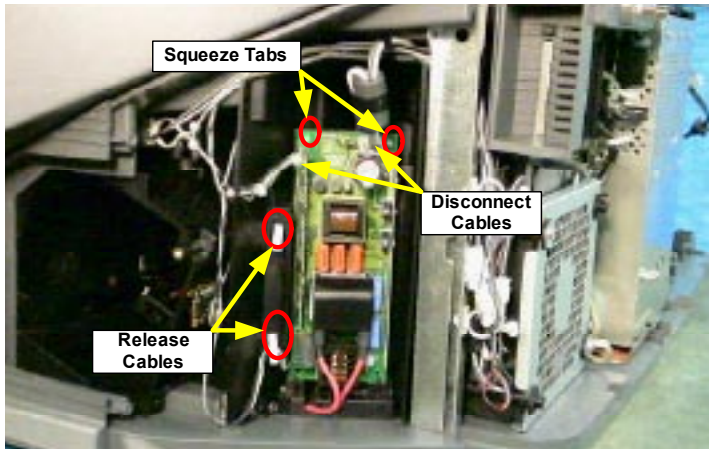


9

The Optics Block and Power Supply Block slide out together.
Remove one screw securing the Lamp plug to disconnect Power Supply Block from Optics Block.

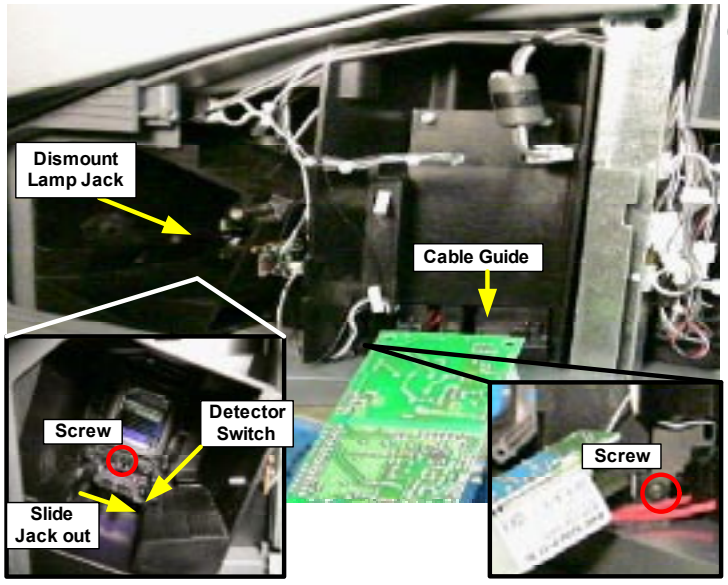
CAUTION:
All cabling must be removed from Optics Block. The cabling does not come as part of a new Optics Block.

Power Supply Block Removal



1

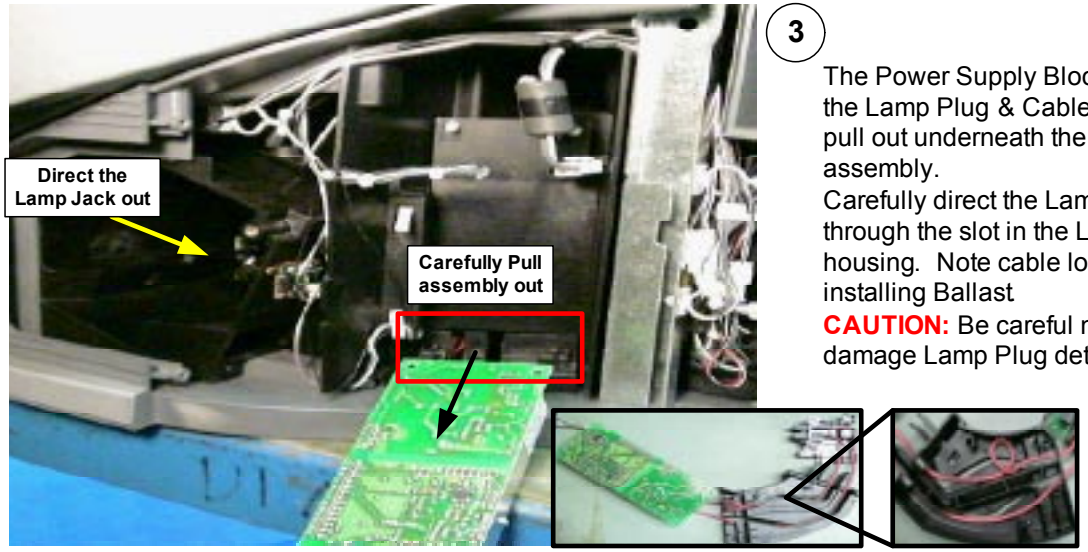
Use the following procedures to remove the Power Supply Block only without any other chassis disassembly.
Disconnect the power and sensor cables.
Release cables from 2 holders.
Squeeze the 2 upper white tabs and dismount the Power Supply Block.



2

Lay the Power Supply Block face down to the side of the unit .
Remove 1 screw securing the cable guide.
Remove 1 screw to dismount the Lamp plug.

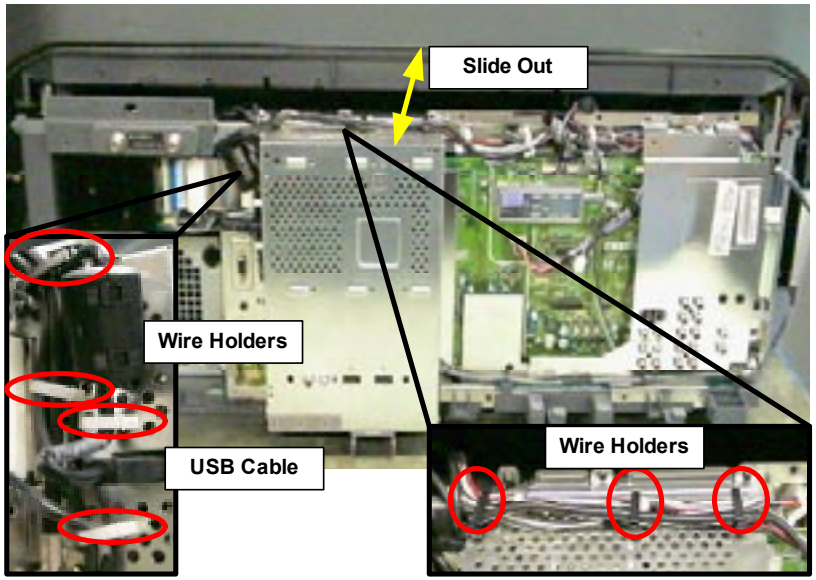
CAUTION: Be careful not to damage the Lamp plug detector switch when removing and installing the Power Supply Block.



3

The Power Supply Block (including the Lamp Plug & Cable Guide) is pull out underneath the Fan assembly.
Carefully direct the Lamp Plug through the slot in the Lamp housing. Note cable loop when re installing Ballast
CAUTION: Be careful not to damage Lamp Plug detector switch.

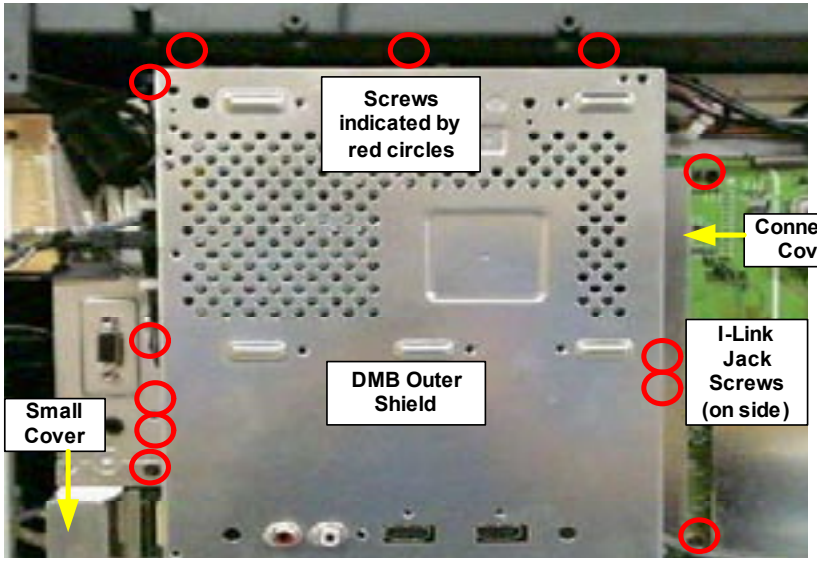
Q-Box & PD-Board Removal



1

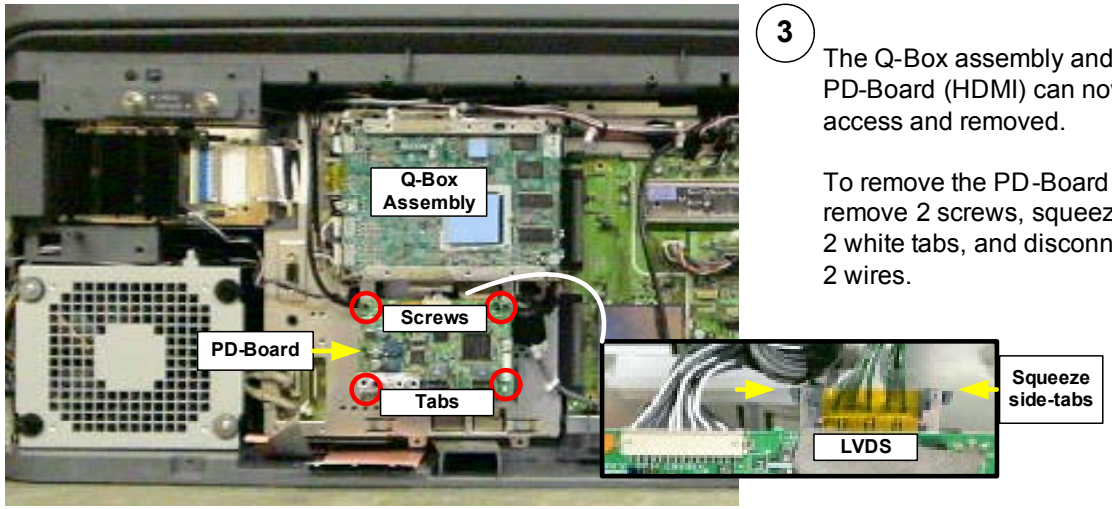
The Chassis only needs to be slightly slid out to access the screws and wire holders to access the Q-Box and PD-board.
Reference the “Complete PCB Chassis” section for details to free and slide out the chassis.

Remove all wires from wire holders.
Disconnect USB cable



2

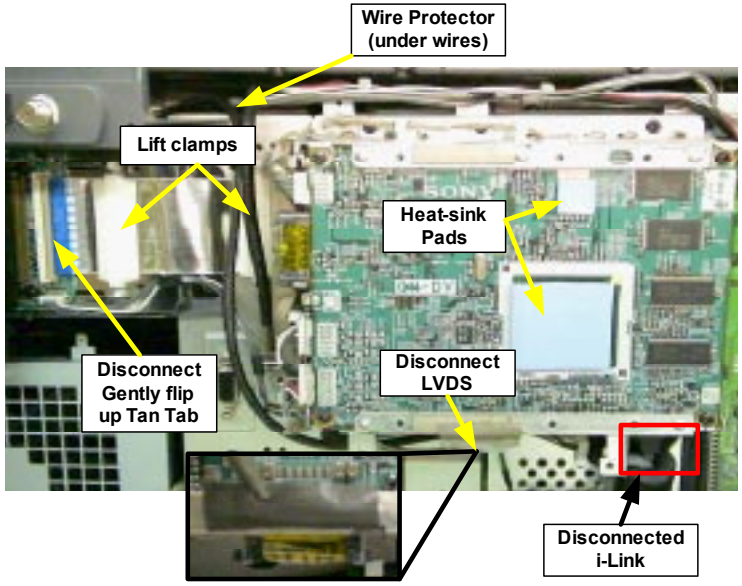
Remove 16 screws, Small Cover, and the Connector Cover to remove DMB outer shield.
When all screws are removed, pull the left-side of the shield out first to clear the i-link connectors on the right-side of the shield.
Once i-link connectors are clear pull shield straight off.



3

The Q-Box assembly and the PD-Board (HDMI) can now be access and removed.

To remove the PD-Board remove 2 screws, squeeze the 2 white tabs, and disconnect the 2 wires.

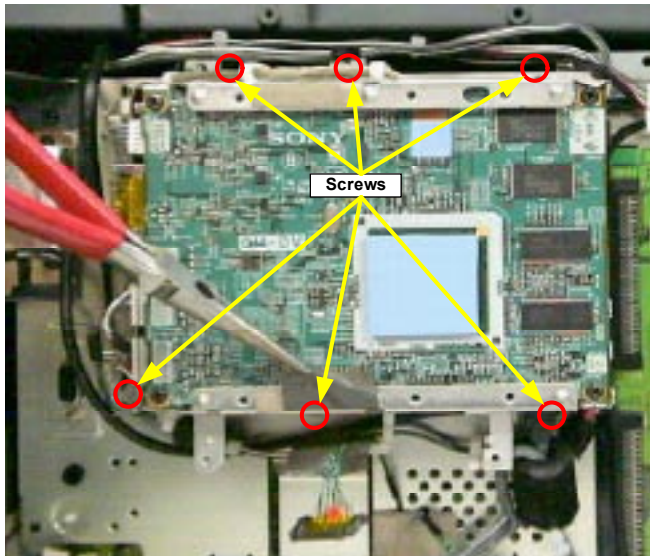


4

To remove the Q-Box module first disconnect the CableCard ribbon cable.
Remove 2 white cable clamps that hold down the ribbon cable.
Disconnect the cable from the CableCard board by lifting the Tan connector tab.

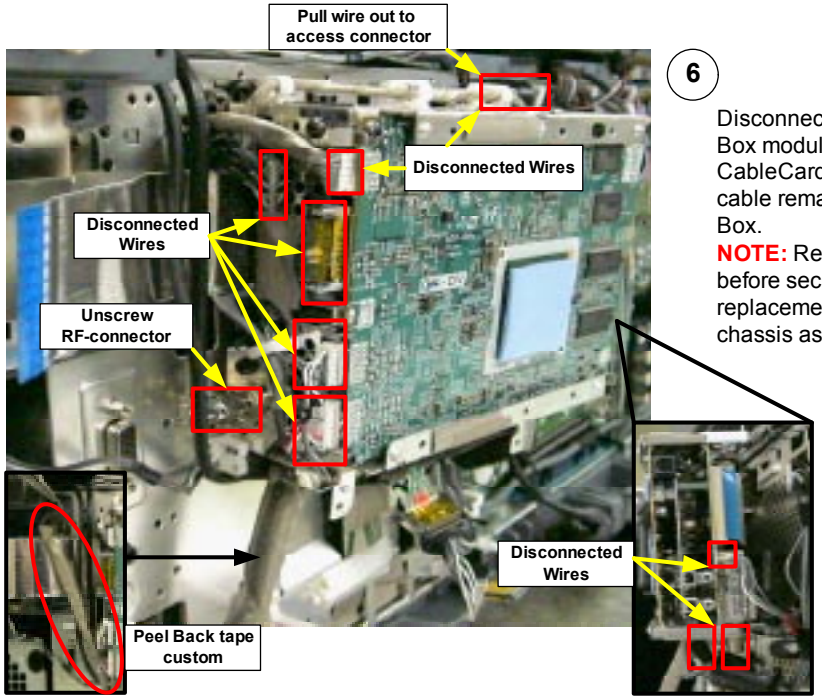
CAUTION: Make sure that the blue heat-sink pads remain in place. Also insure that black plastic wire protector remains in place.

Disconnect the LVDS cable located at the bottom of the Q -Box assembly



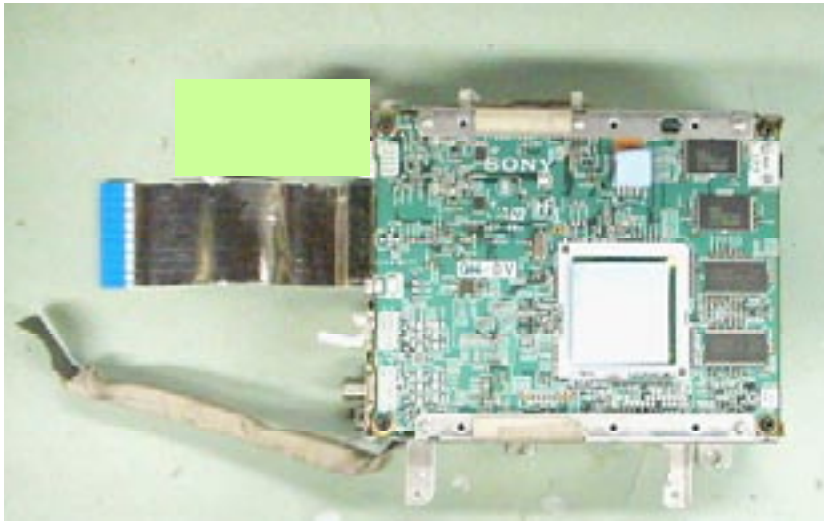
5

Remove 6 screws to free the Q-Box assembly.
Firmly grasp the assembly at the top and bottom and pull to dislodge it from the chassis frame.
CAUTION: Be carefully not to pull too far out and damage the wires still connected.



6

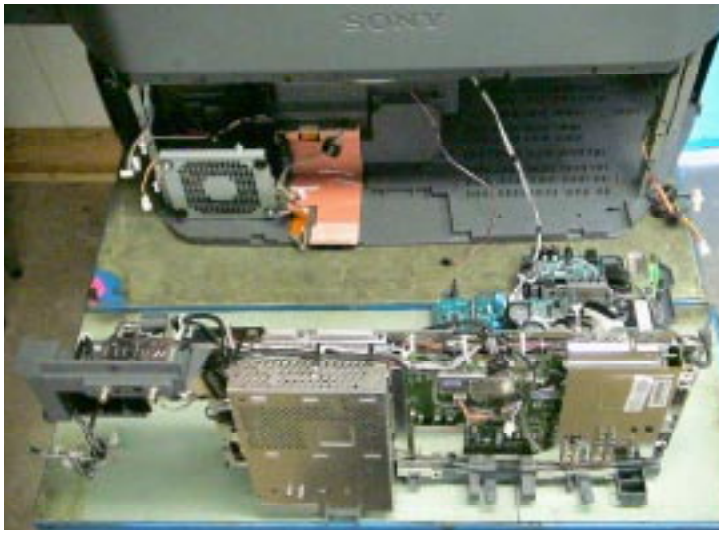
Disconnect all cables on the Q-Box module except for the CableCard ribbon cable. This cable remains apart of the Q-Box.
NOTE: Reattach all wires before securing the replacement Q-Box to the chassis assembly.



7

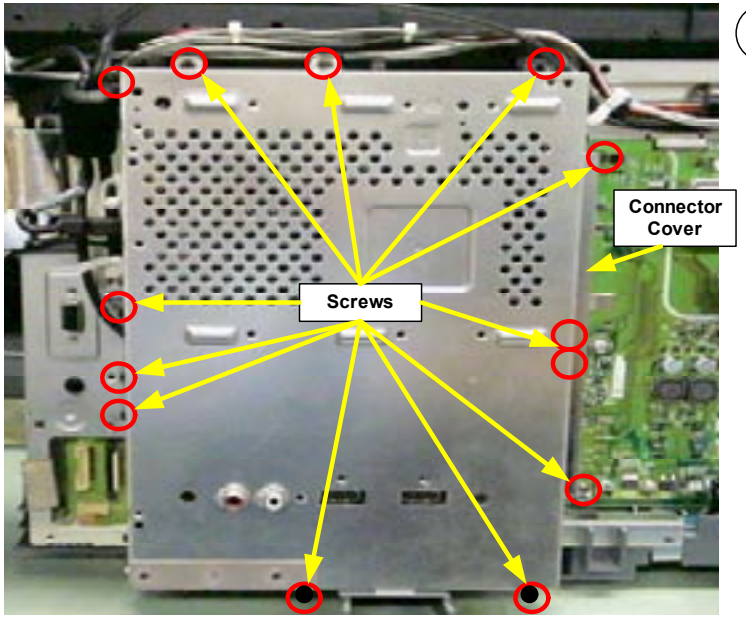
Q-Box assembly includes the QM, QI, QT, and QH boards.

DSU-Board Removal



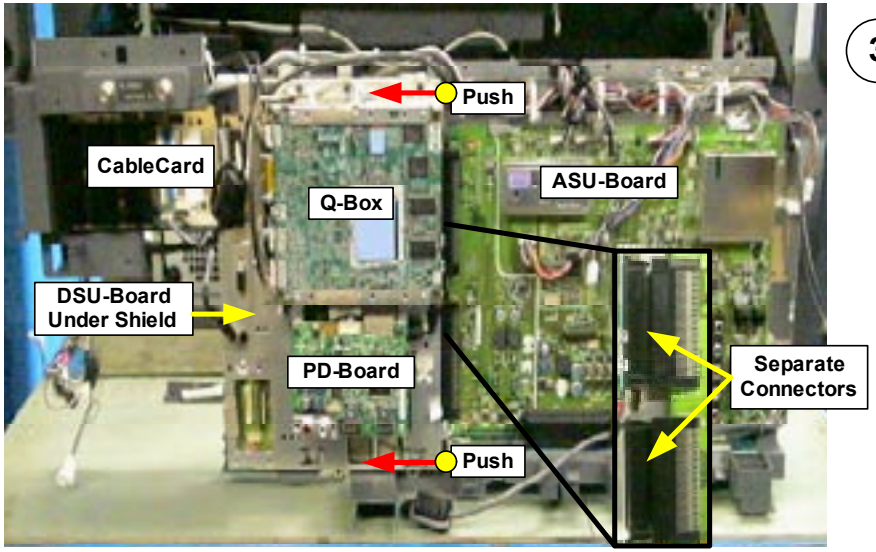
1

To access the DSU-Board, remove the Chassis assembly from the Bottom Cabinet. For instructions on removing the Chassis reference Chapter 3 – Chassis Assembly Removal.



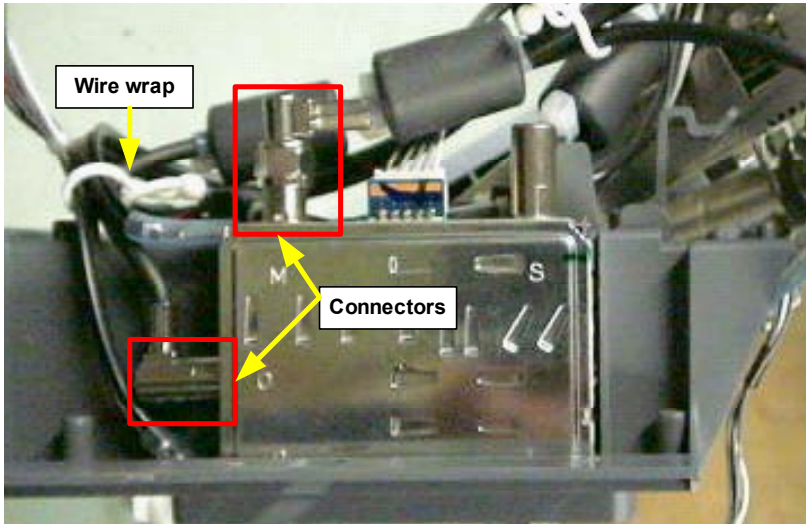
2

After removing the Chassis assembly, remove 16 screws and the Connector Cover to remove DMB outer shield.
When all screws are removed, pull the left-side of the shield out first to clear the i-link connectors on the right-side of the shield. Once i-link connectors are clear pull shield straight off.



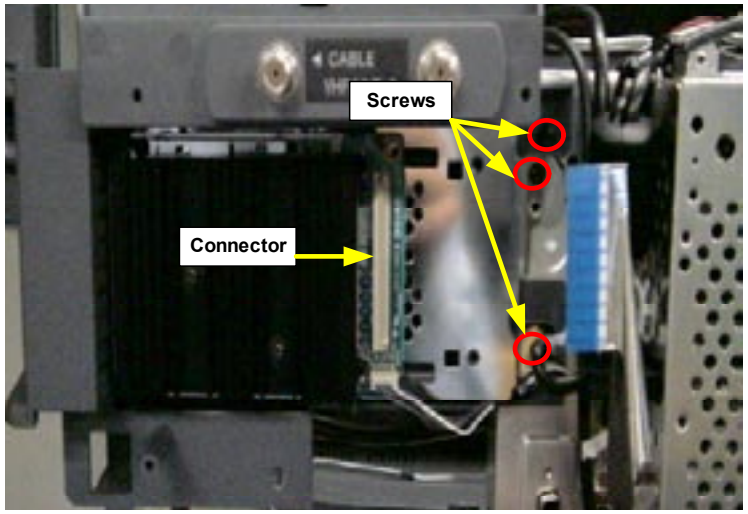
3

Grasp the top and bottom of the framing holding the Q-Box and PD-Board .
Push the framing to the left until the two connectors between the ASU-Board and the DSU-Board completely separate.



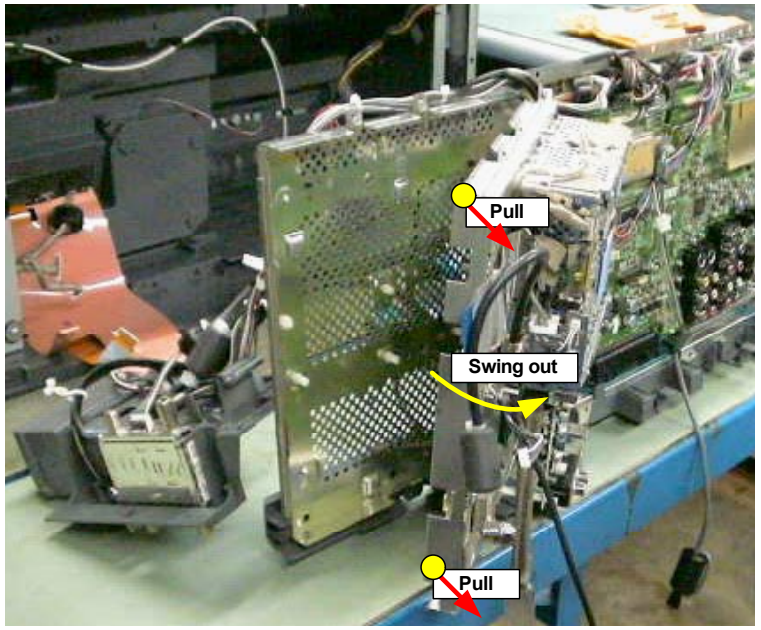
4

Release wire wrap and disconnect the two RF-connectors at the antenna switch.



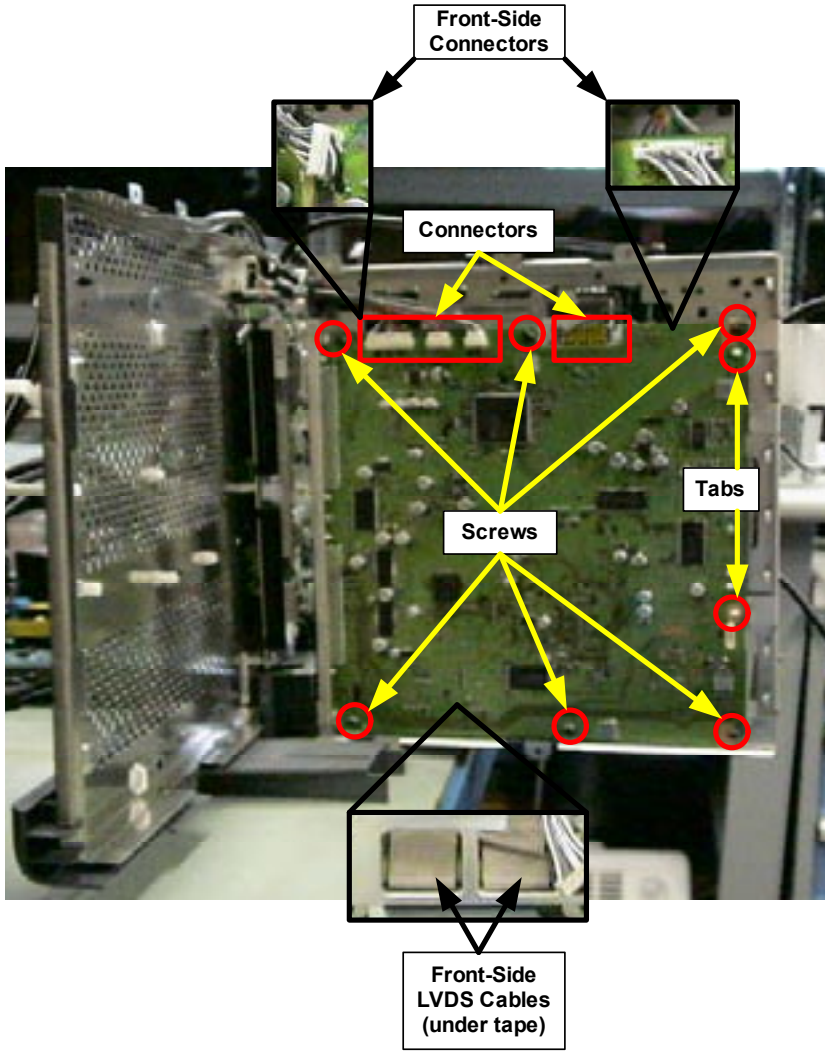
5

Disconnect the CableCard ribbon cable (Reference Chapter 6 page 14 for procedure).
Detach CableCard assembly from the Chassis assembly.
Remove 3 screws.
Lay the CableCard assembly to the side



6

Grasp the top and bottom of the DSU-Board shield on the far left side of the Chassis assembly and pull out. The Q-Box. PD-Board, and DSU-board will swing outward together.

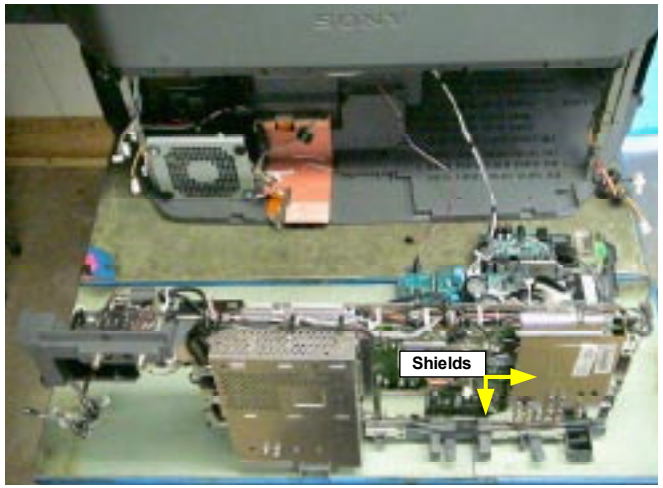


7 To remove the DSU-Board continue to pull the DMB and the DSU-Board assemblies away from the Chassis frame (swinging the assemblies to the right).
Remove 6 screws, and squeeze the two white tabs to release the DSU-Board from the shield.

CAUTION: Do not attempt to pull board off at this point because connectors on both sides of the board must first be disconnected.

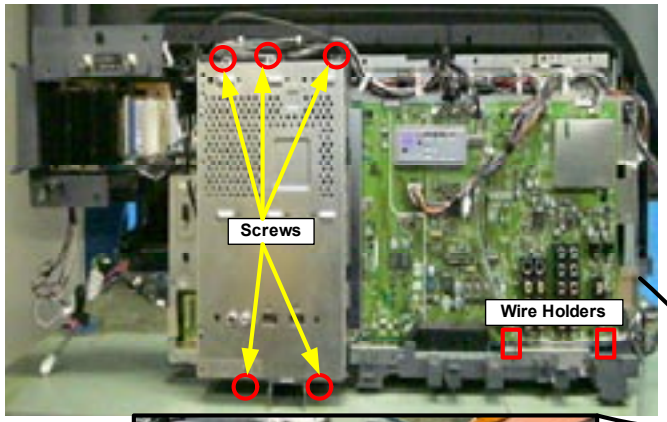
Disconnect all connectors on front and back-sides of the DSU-Board.

ASU & G Boards Removal



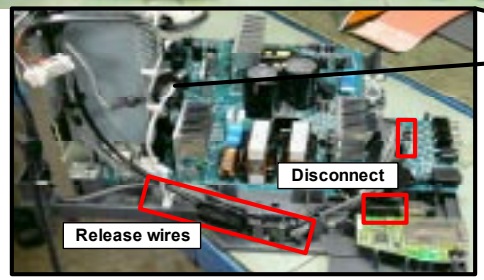
1

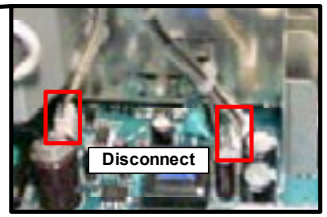
To access the ASU-Board and the G-Board, remove the Chassis assembly from the Bottom Cabinet (Reference Chapter 3 – Chassis Assembly Removal).
Remove the shields on the ASU-Board (Reference Chapter 2 – Rear and Sub Plastic Cover Removal).

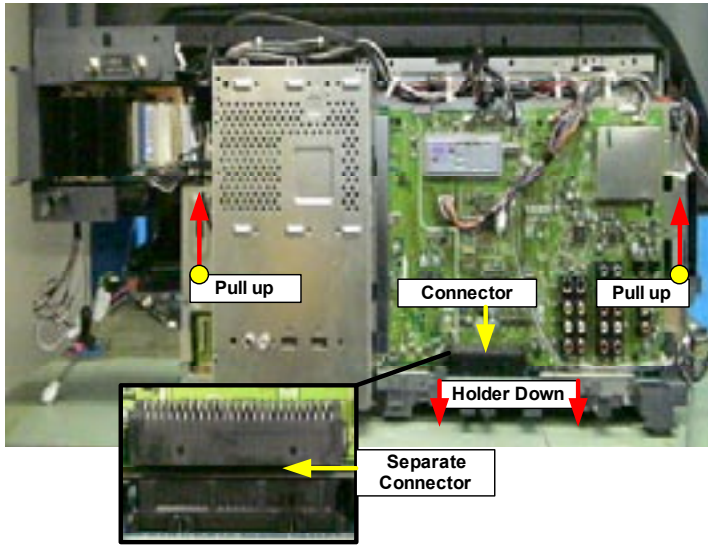


2

Remove 5 screws from the DMB shield. This will free the DMB and DSU-Board assembly so the connectors in step 4 can be separated.
Release 2 wire holders and disconnect wires behind the ASU-Board as shown in the picture inset.

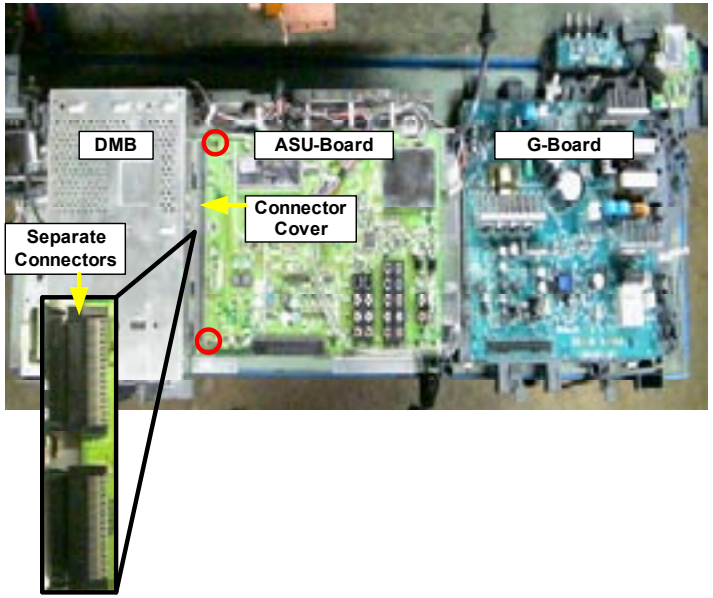






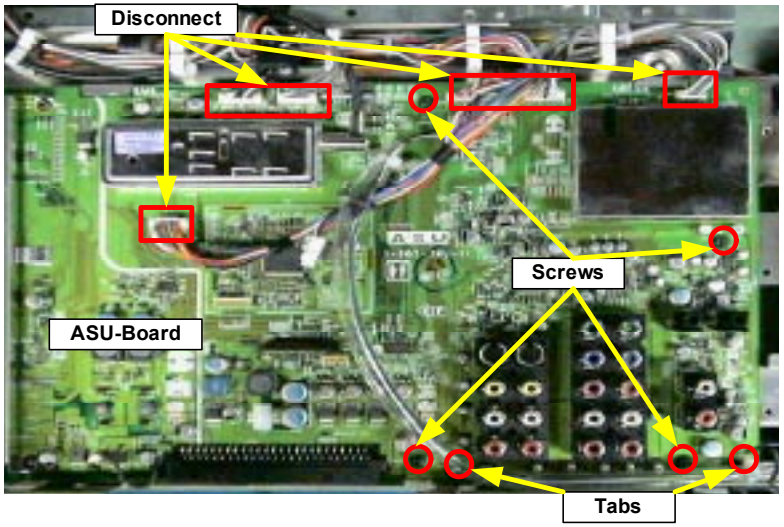
3

Grasp one side of the Chassis assembly at a time and pull up while holding down the lower chassis assembly until connector between ASU-Board and the G-Board begins to separate.
Repeat the above procedure with the other side of the Chassis assembly until the connector is completely separated.
Lift the complete ASU-Borad, DMB, and DSU-Board assembly off the G-Board assembly and set to the side.



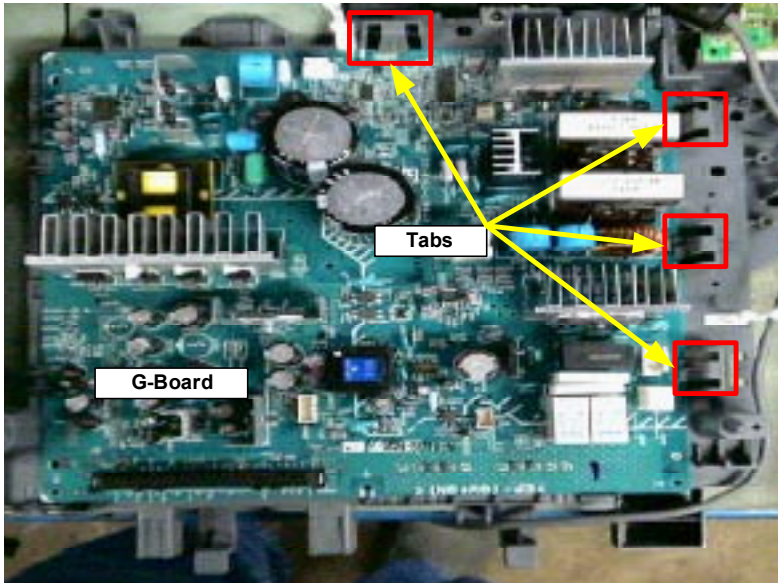
4

To remove the ASU-Board first remove connector cover (2 screws indicate by red circles) and separate the connectors between the ASU-Board and the DMB.



5

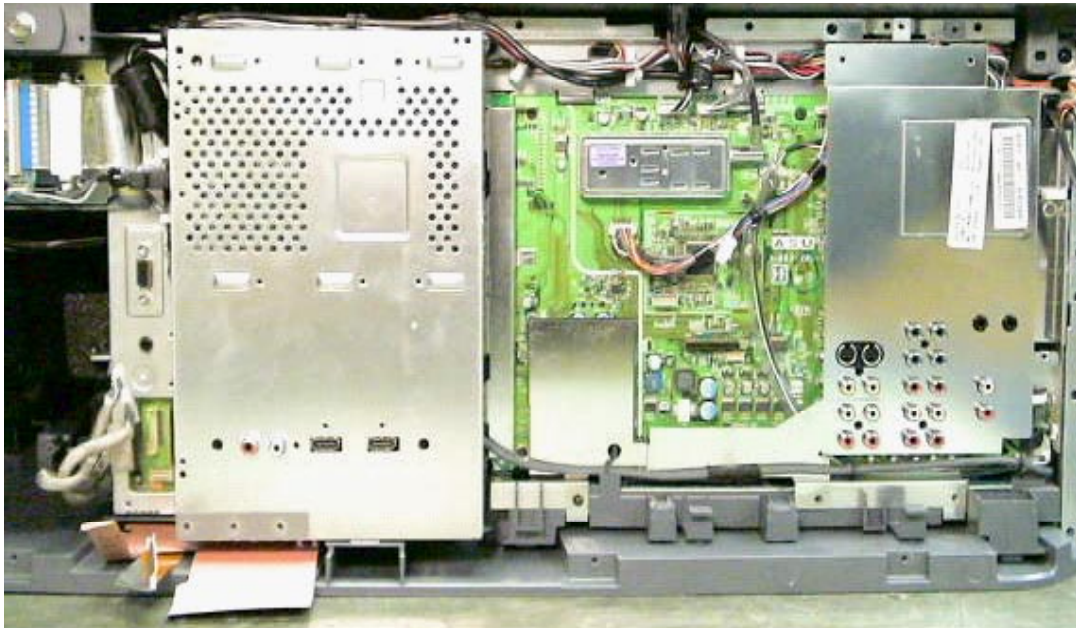
Disconnect all cables on the ASU-Board.
Remove 4 screws, squeeze the 2 white tabs and lift ASU-Board off assembly.

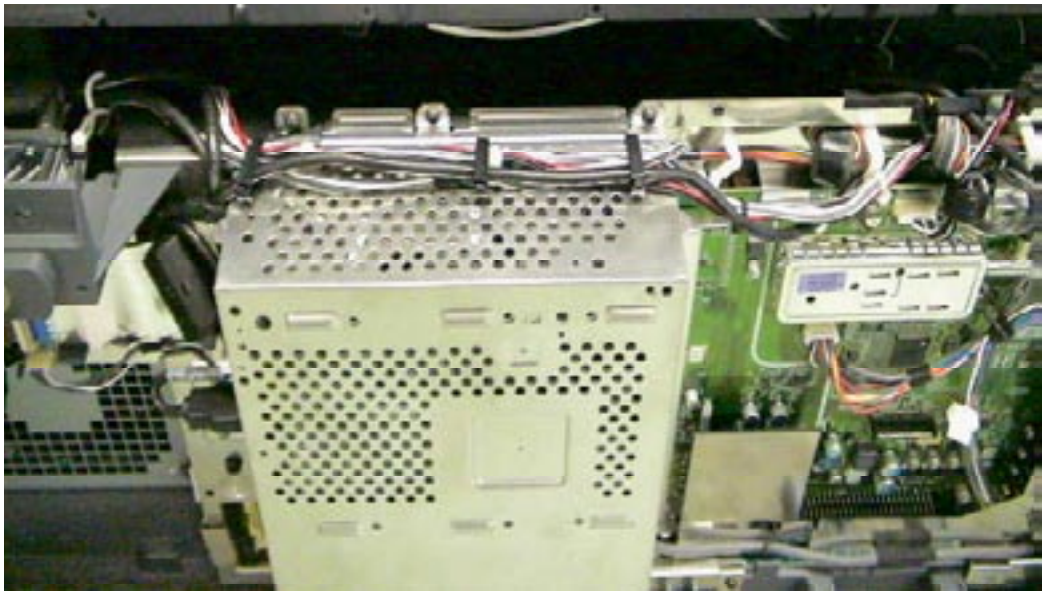


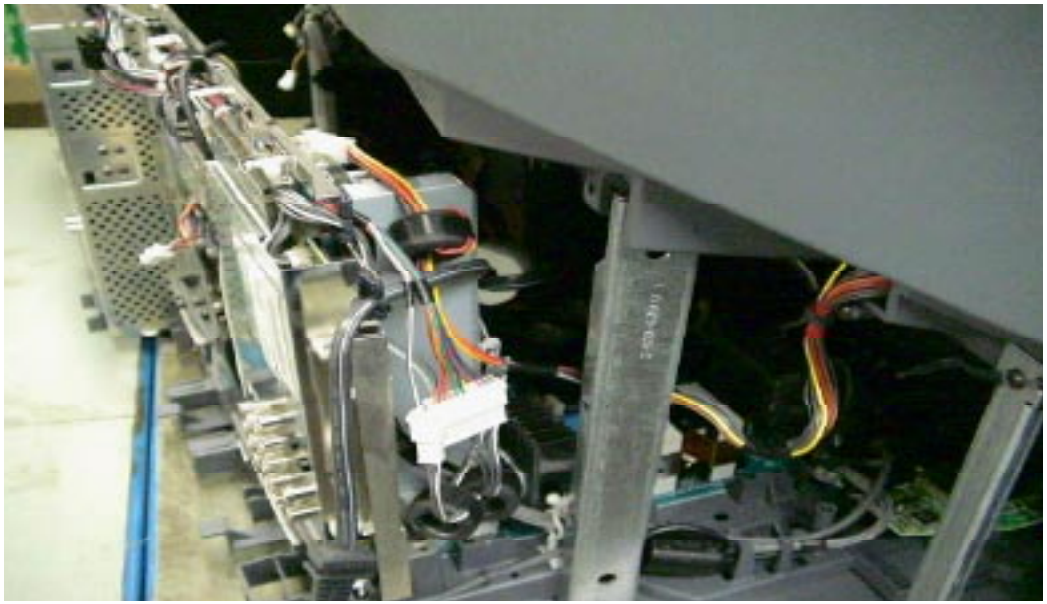
6

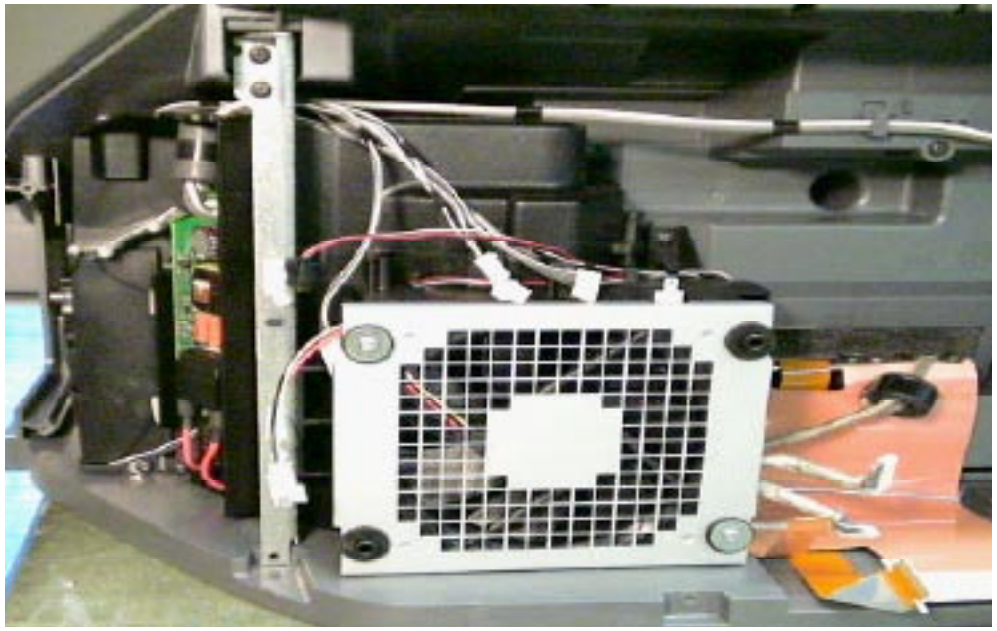
To removal the G-Board press the 4 gray tabs in and lift G-Board off the lower chassis frame.

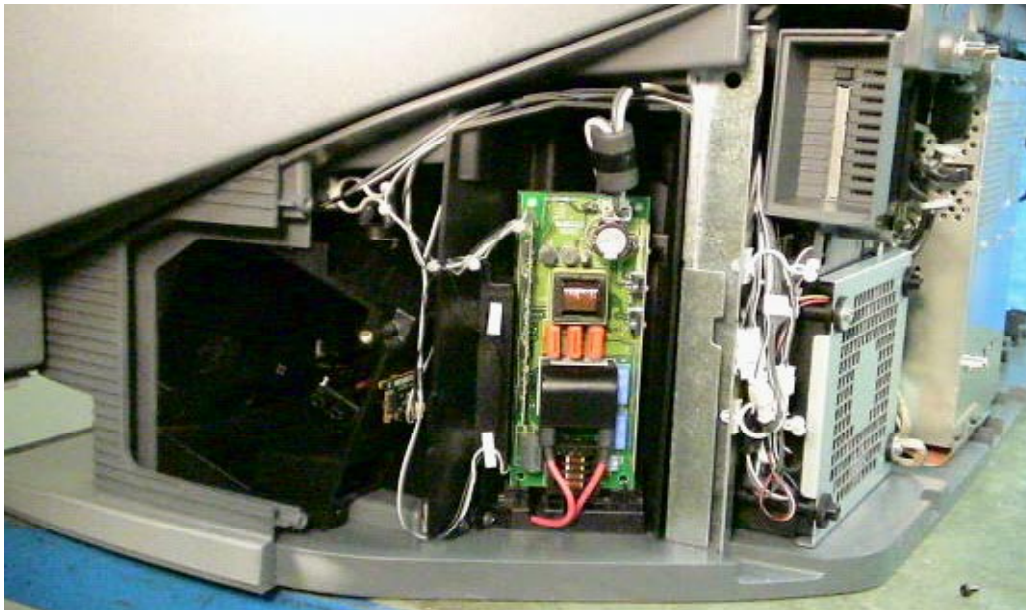
Wire Routing Diagrams

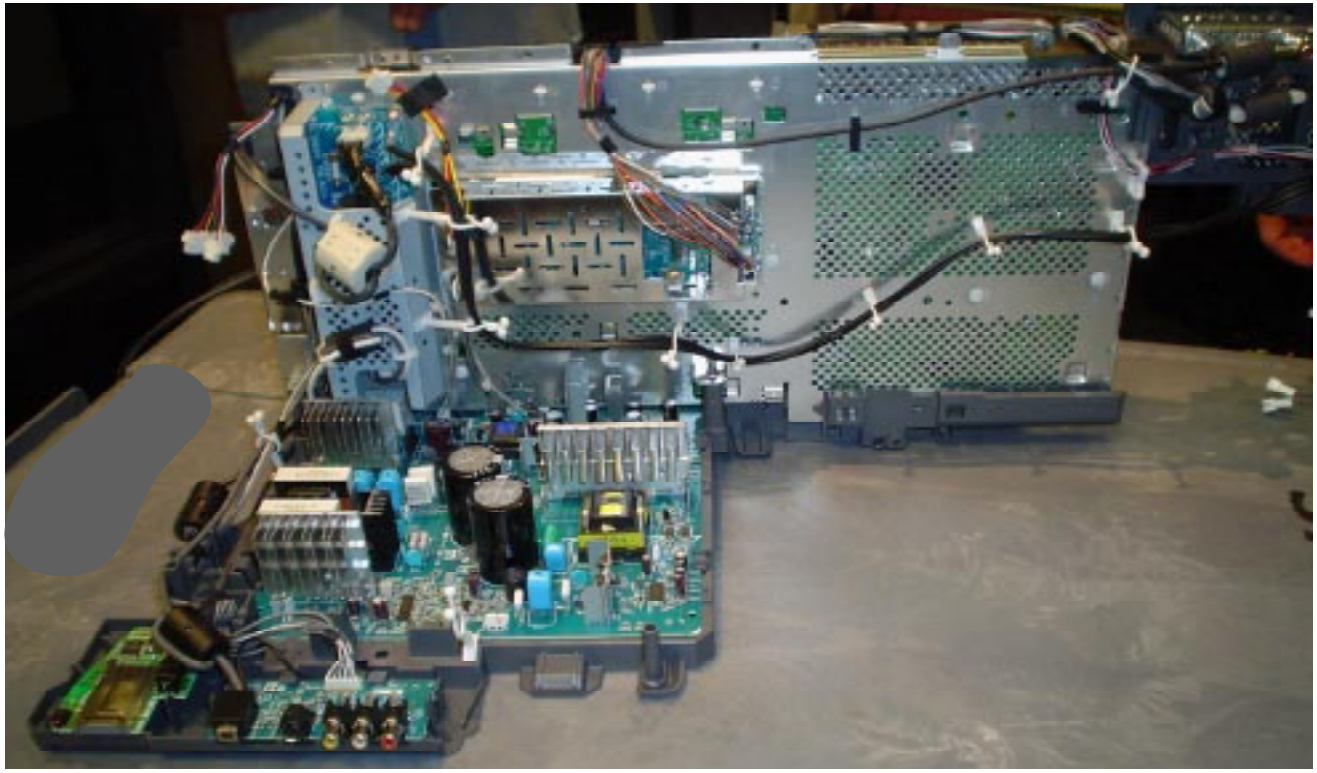












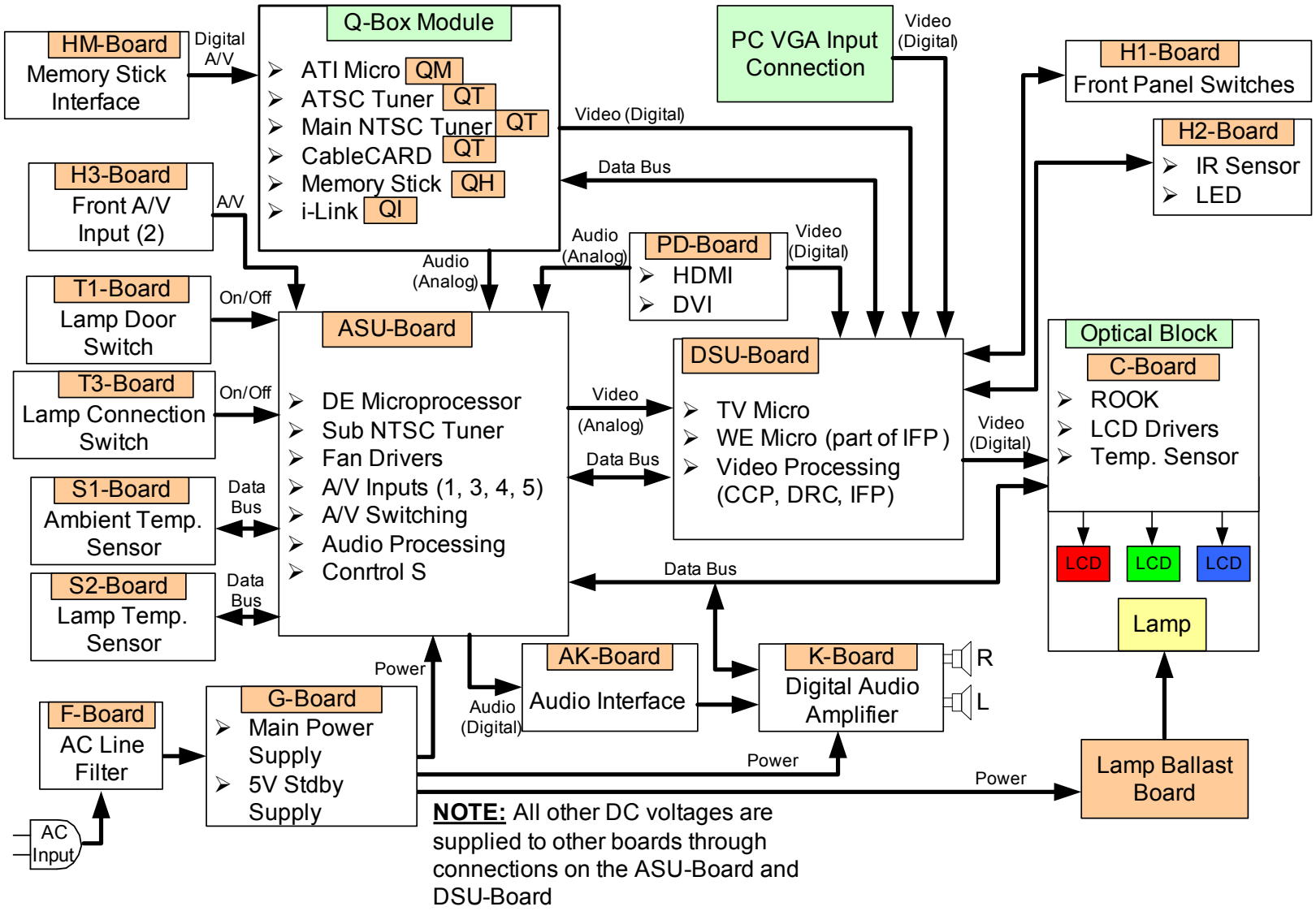


Figure 1-1
SXRD Chassis Overall PCB Block Diagram

PCB and Module Descriptions

F-Board (Power Supply)

The F-Board is the board connected directly to the AC outlet through the AC power cord, and includes the following components and circuits.

- AC Main Fuse
- AC Line Filter Circuit

G-Board Power Supply)

Except some regulator circuits on various boards, the G-Board is the power supply system board, which includes the following components and circuits.

- Standby 5V Power Supply
  - 5V
- Main Power Supply
  - 11V
  - 16.5V
  - Thru 5V
  - 6.5V
  - Switched 9V
  - 380V
- Power Factor Circuit (PFC)
- Main AC Relay
- Inrush Current Relay

Lamp Power Supply Block (aka Ballast, Lamp Driver)

The 380V volts developed in the Main Power Supply on the G-Board powers the Lamp Power Supply Block. The Lamp Power develops approximately 12K voltages to initial ignite the High Voltage Mercury Vapor Arc Lamp. After the initial high voltage the Lamp Power Supply Block regulates the lamp voltage down to approximately 60V during normal operation. The lamp voltage must be strictly regulated to keep the current in the Lamp from running away and destroying the lamp.

ASU-Board (Audio/Video Switching, System Control, & Audio Processing)

The ASU-Board performs all the analog video and audio switching functions. The following video and audio inputs are switched on this board.

Video:

- Video Inputs 1, 2, 3 (Composite)
- Video Inputs 4, 5 (Component)
- NTSC Main Analog Tuner
- NTSC Sub Analog Tuner

NOTE: Video inputs from the Q-Box module (ATSC Tuner, i-Link, Memory Stick, and HDMI) go directly to the DSU-Board. In addition, the PC Input goes to the DSU-Board.

Audio:

All audio inputs are switched on the ASU-Board.

The following circuits are also located on the ASU-Board.

- DE Microprocessor
- Fan Driver Circuits
- Audio Processor
- Control S Input

DSU-Board (Video Processing)

The circuits located on the DSU-Board perform all video processing functions. It is the WEGA engine. The following circuits are included on the board.

- Composite/Component Processor (CCP)
- Digital Reality Creator (DRC)
- Image Format Processor (IFP)
- TV Microprocessor
- WE Microprocessor (part of the IFP)

AK-Board (Audio Output Processing)

The AK-Board (audio) takes the Sony/Phillips Digital Interface signal from the DSP on the ASU-Board and converts it to an IIS (PCM) signal for processing on the K-Board (audio).

K-board (Audio Output Amplifier System)

The K-Board is the S-Master digital audio amplifier system. It takes the IIS from the AK-Board and converts it to a PWM signal. The PWM signal is then amplified and low-pass filtered to develop the output analog audio signal.

Digital Module Block (DMB)

The term Digital Module Block (or DMB) is used to describe the shielded area that includes the Q-Box module and PD-Board (HDMI). However, the Q-Box module and PD-Board are separate and individual parts as described below.

Q-Box Module

The Q-Box module includes the QM, QH, QI, and QT boards and performs the following functions.

- ASTC Signal Processing and Control
- CableCard Processing and Control
- ATI Microprocessor
    - The ATI microprocessor becomes the Main microprocessor (the TV Micro on the DSU-Board is the standby micro) after initial power on. All user settings are store in an EEPROM in the Q-Box module.
- Memory Stick Signal Processing and Control
- i-Link Signal Processing and Control

PD-Board

The PD-Board performs all High Definition Media Interface (HDMI) & Digital Visual Interface (DVI) signal processing functions (a DVI-to-HDMI adapter is needed to input a DVI signal).

Optical Block

The Optical Block includes the C-Board, prisms, mirrors, SXRD panels and lenses necessary to process and modulate the lamp light and display the video information on the screen.

C-Board

The C-Board circuits perform the following primary functions.

- Gamma Correction
- White Balance Correction
- SXRD Panel Drive

S1-Board

Ambient Temperature Sensor IC

S2-Board

Lamp Temperature Sensor IC

T1-Board

Lamp Door Switch

T3-Board

Lamp Plug Connection Detection Switch

H1-Board

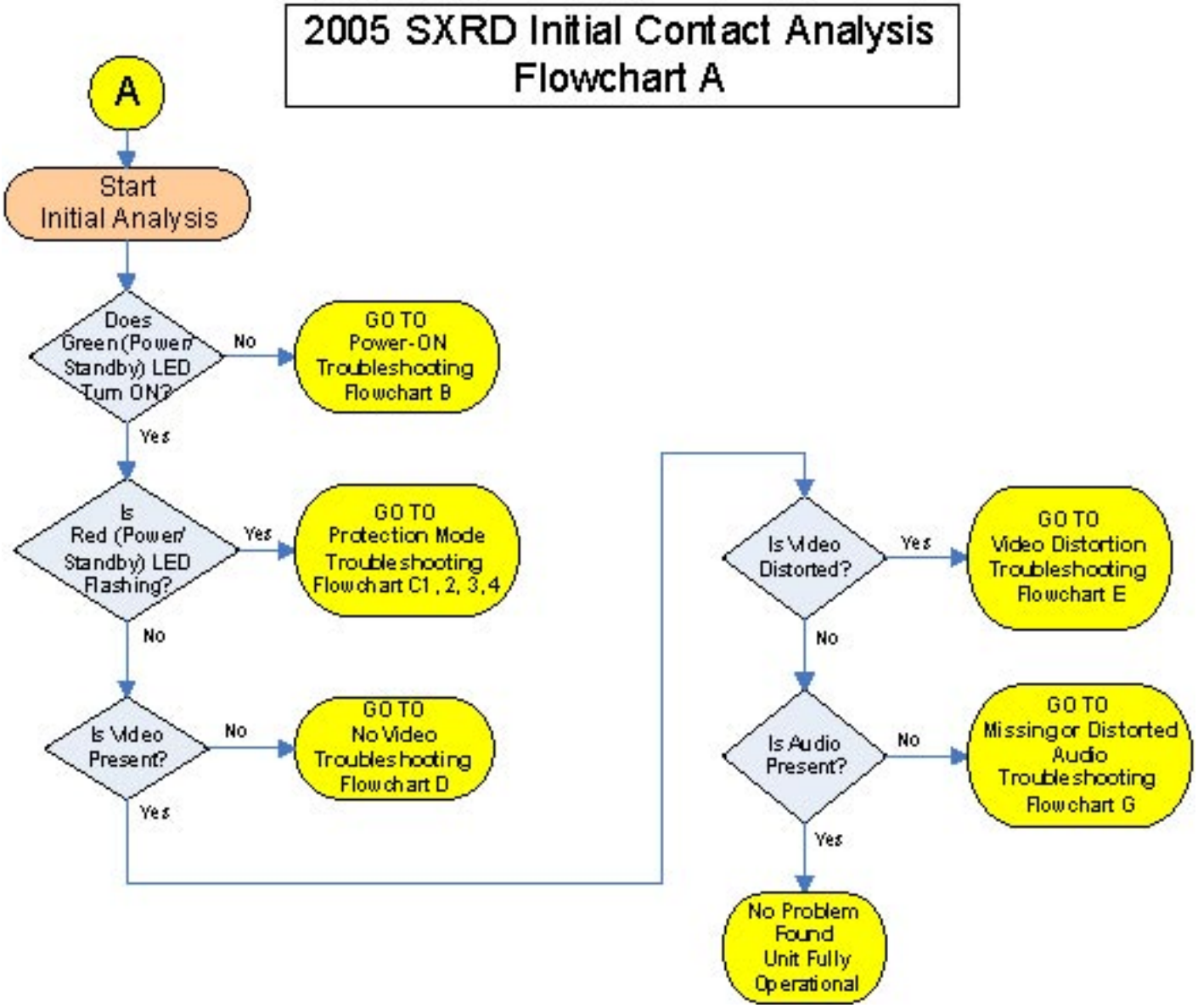
- Channel Up/Down Button
- Volume Up/Down Button
- Input Select Button
- Menu Button

H2-Board

Front LED’s (i.Link, STBY, Lamp, Power, Timer)

H3-Board

Front AV Input (S-Video, Composite, Audio LR)

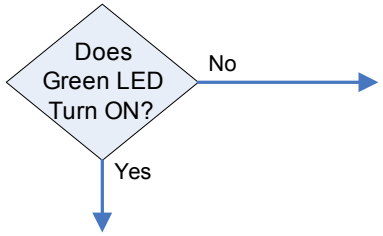

2005 SXRD Initial Contact Analysis
Flowchart A
A
Start
Initial Analysis
Does
Green (Power/
Standby) LED
Turn ON?
No
GO TO
Power-ON
Troubleshooting
Flowchart B
Yes
Is
Red (Power/
Standby) LED
Flashing?
Yes
GO TO
Protection Mode
Troubleshooting
Flowchart C1, 2, 3, 4
No
Is Video
Present?
No
GO TO
No Video
Troubleshooting
Flowchart D
Yes
Is Video
Distorted?
Yes
GO TO
Video Distortion
Troubleshooting
Flowchart E
No
Is Audio
Present?
No
GO TO
Missing or Distorted
Audio
Troubleshooting
Flowchart G
Yes
No Problem
Found
Unit Fully
Operational

Detail description of the steps in the Initial Contact Flowchart

The Initial Contact Analysis flowchart is a high-level diagnostic tool designed to quickly locate the general area of the failure, and the specific procedures (flowcharts) to troubleshooting and resolve the problem. **The flowchart asks the following five general questions, in the sequence shown, to take you from an overall power supply fault to a specific power supply, video, or audio fault.**

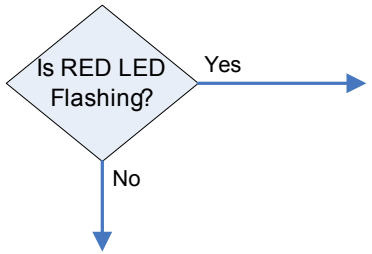
1) **Does the Green Power/Standby LED Turn On?**
2) **Is the Red Power/Standby LED Flashing?**
3) **Is Video Present?**
4) **Is the Video Distorted?**
5) **Is Audio Present?**

Let us briefly discuss the logic behind each of these questions.

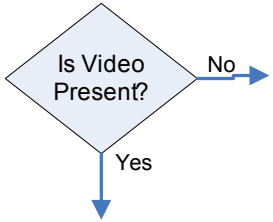


Does the Green Power/Standby LED Turn-On? This question will determine if there is a power supply problem. The basic idea is does the unit turn on and stay on. The 2005 SXRD models do not have a Red Standby/Timer LED, as was the case on previous models. The Red Power/Standby LED was a good indicator of a properly functioning Standby 5V power supply. The Standby 5V is active as long as the unit is plugged into the AC outlet, and the Red Power/Standby LED glow. However, in the absents of the Red Power/Standby LED the Green Power/Standby LED is the next best indicator of a proper functioning Standby 5V power supply.

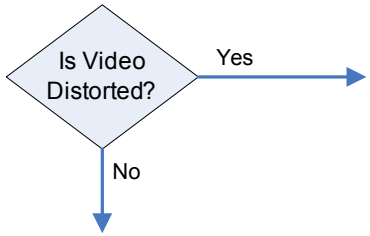
If the Green Power/Standby LED does not begin to flash after the “ON” button is pressed then you are directed to the “Power-On Troubleshooting Flowchart B” to troubleshoot a power supply failure.



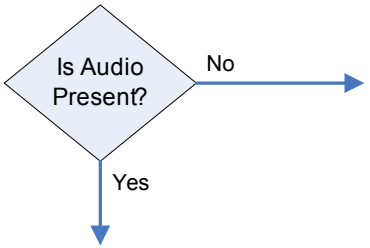
Is the Red Power/Standby LED Flashing? In some cases the Green Power/Standby LED will begin flashing, however, the unit may shut down with the RED Power/Standby LED flashing. In this case, the TV’s microprocessor has detected a system error and has gone into protection mode. If the Red Power/Standby LED is flashing the flowchart directs you to the “Protection Mode Troubleshooting Flowchart C1, C2, C3, and C4” to troubleshooting a protection error condition. The particular error is indicated by the unique flash pattern of the Red Power/Standby LED and there is an individual flowchart for each flash pattern.



Is Video Present? At this point the TV turns on properly and the Green Power/Standby LED is glowing steady. Consequently, this indicates a properly function power supply system, and properly operating circuits monitored by the various protection circuits (No Red Power/Standby LED). If a problems still exists it is mostly a missing or distorted video or audio condition. This question addresses a “No Video” condition. If the answer to this question is yes, you are directed to the “No Video Troubleshooting Flowchart D.” This flowchart provides detailed troubleshooting procedures specifically for a “No Video” condition.

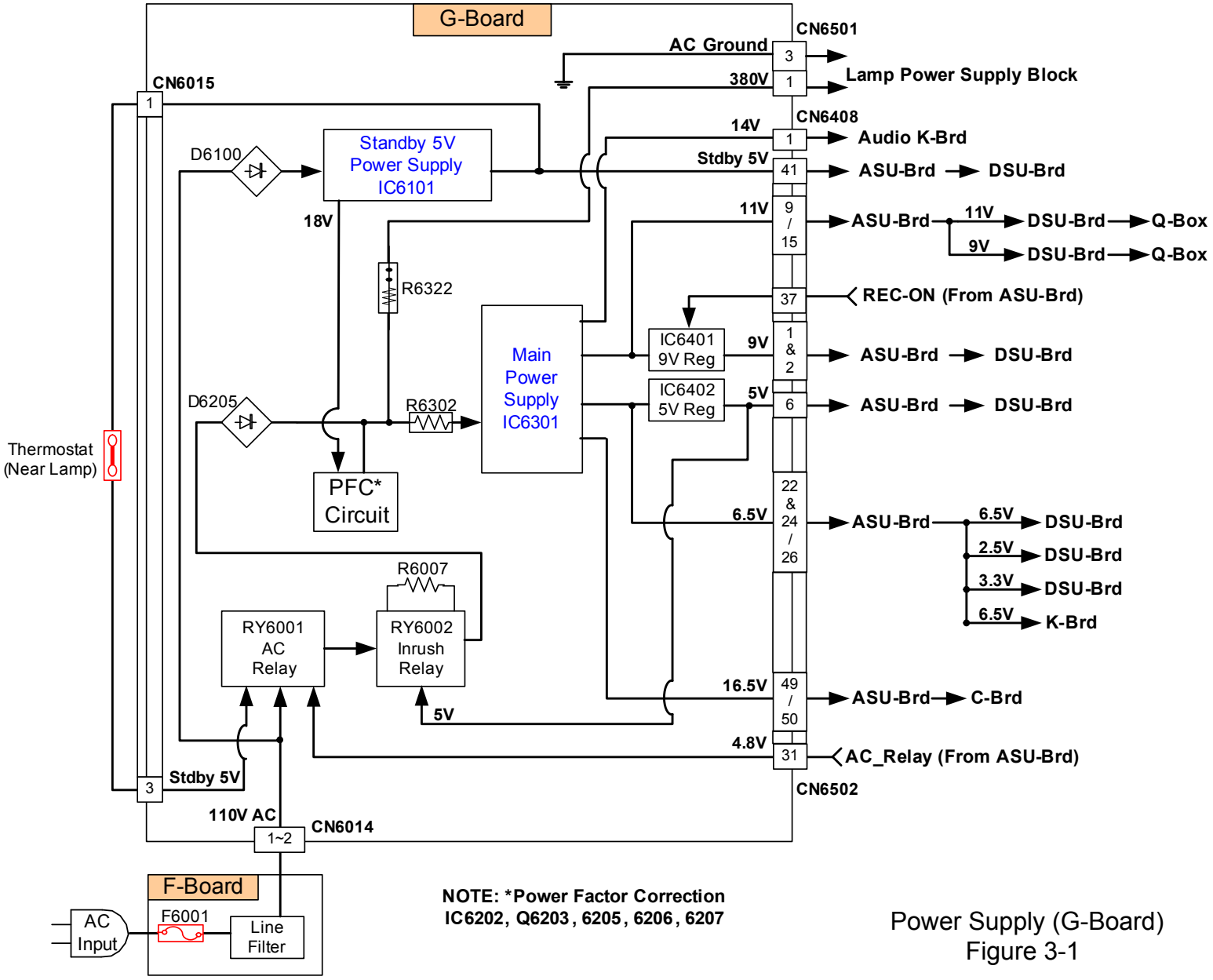


Is the Video Distorted? If video is present, however, it is distorted; you are directed to the “Video Distortion Troubleshooting Flowchart E”. The procedures in this flowchart are designed to troubleshoot an individual input problem.

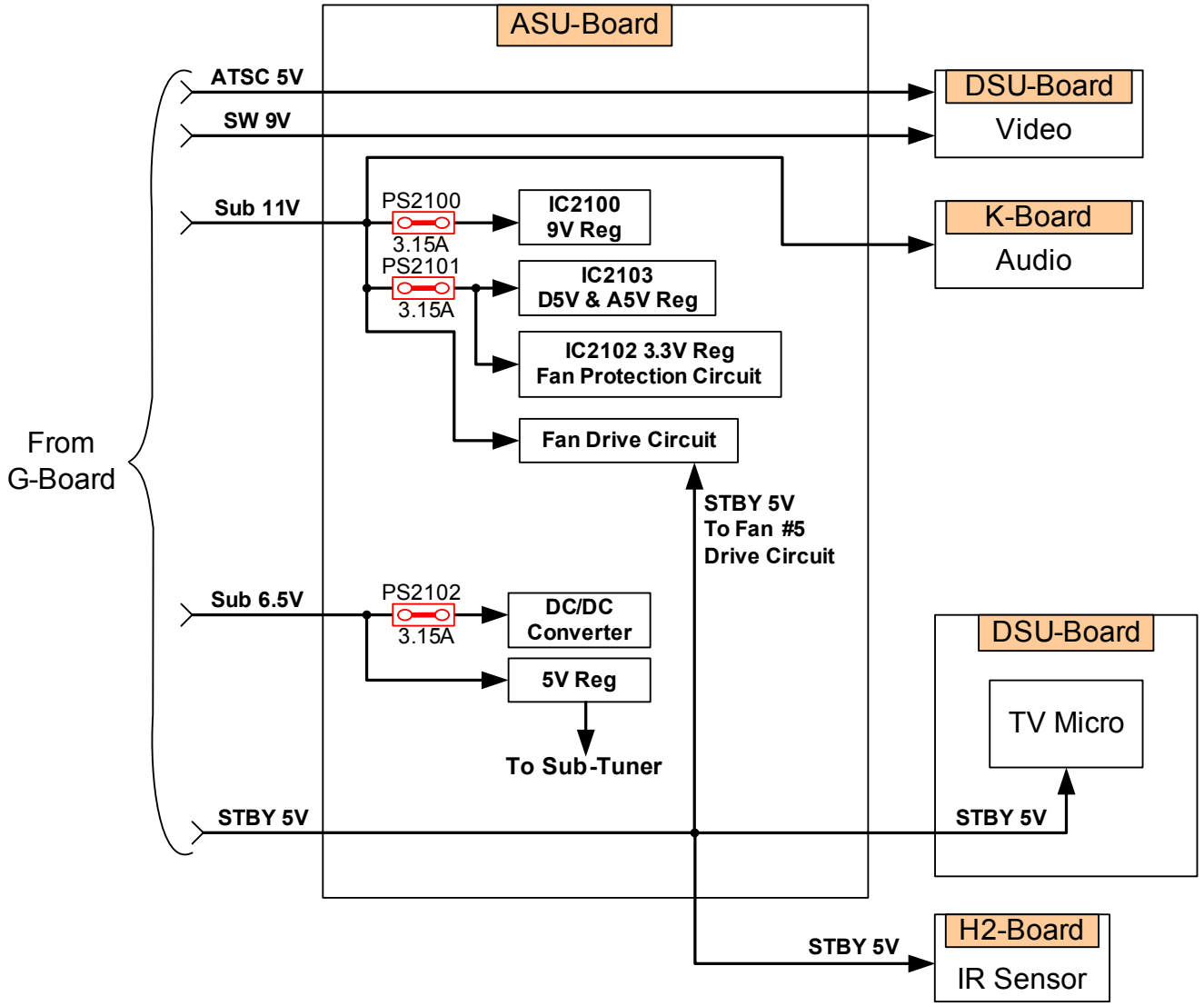


Is Audio Present? Finally, if the Green Power/Standby LED glows steady and the video is present and undistorted, then the only function left to check is the audio system. If the audio is missing or distorted you are directed to the “Missing or Distorted Audio Troubleshooting Flowchart G” for detailed audio system troubleshooting procedures.

If the Green Power/Standby LED glows steady, the video is present and undistorted, the audio is present and undistorted then the TV is working fine and you are directed to the final block in the flowchart shown below.



Power Supply (G-Board)
Figure 3-1



ASU-Board Regulators
Figure 3-2

Overall System Description

Reference Figures 3-1 & 3-2

The power supply system for the 2005 SXRD rear projection televisions consists of the **Standby (STBY) 5V Power Supply**, **Main Power Supply**, and the **Power Factor Control (PFC)** circuit. Aside from various regulator circuits, all power supply circuits are contained on the G-Board.

Both the Standby 5V and Main Power Supplies are switch-mode power supplies. The configuration and operation using the MCZ3000 converter IC is similar to previous models. This section will discuss effective and efficient methods to troubleshoot these circuits.

The AC (110V) is supply through the F-Board, which contains the main fuse F6001 and an AC line filter. The AC voltage is applied directly to the AC relay (RY6001) and the **Standby 5V** converter (IC6101). Consequently, as long as the TV is plugged into the AC outlet the Standby 5V circuit is activated and supplying STBY 5V to TV Microprocessor (DSU-Board), IR Sensor (H2-Board), and the Fan Drive circuit as shown in Figure 3-2. The TV Microprocessor and IR Sensor are therefore placed in standby mode waiting for an ON command from the remote control or the ON/OFF main unit button. The reason STBY 5V is supplied to the fan drive circuit is to enable the lamp cooling fans to run for a predetermined time (~2 mins) after shut-off and steadily reduce lamp temperature.

Also note that a rectified and filtered 18V from the Standby 5V input circuit is used to power the **PFC circuit**. The PFC circuit's primary purpose is to make the power supply circuits look like a purely resistive load to the external AC power network (current and voltage are in-phase). In reality the internal switch-mode power supply circuit is a highly inductive load (current and voltage are 90 degrees out-of-phase), which causes distortions and inefficiencies in the AC power network when connected directly to the AC power network.

The PFC circuit works basically like a switch-mode power supply (SMPS) in that it converts the rectified AC into a pulse train using a switching (or chopper) circuit. The pulses are then filtered (or smoothed) and the result is a regulated DC output.

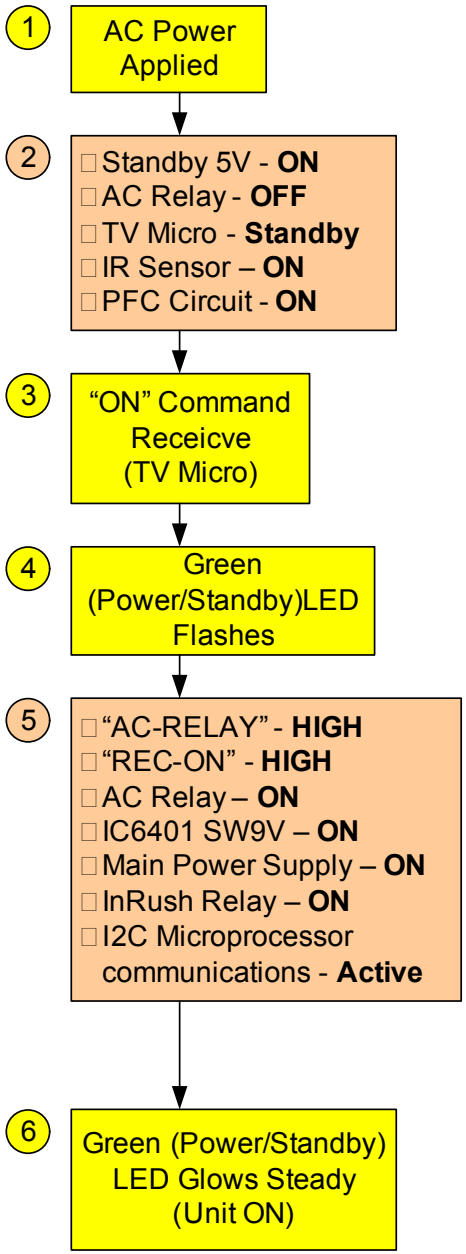
The PFC circuit differs from a SMPS in that it has the added function of ensuring that the current drawn from the AC power network is in-phase with the AC power network voltage. When this condition is achieved the AC power network current is effectively and efficiently used along with the voltage to produce the necessary device power consumption.

The **Main Power Supply** circuit IC6301 develops and supplies all other operating voltages (380V, 14V, 11V, 9V, 5V, 6.5V, 16.5V, and 4.8V) throughout the television as shown on Figure 2-1. The Main Power Supply is not active until an "ON" command is received and the AC relay is closed. To activate the AC Relay 5V is supplied through the Thermostat (CN6015/pin 3) to one side of the relay coil and the "AC-Relay" signal (CN6502/pin 31) is applied to a transistor (not shown), which supplies a ground to the other side of the relay coil. The "AC-Relay" signal will go high when the "ON" command is received, which will close the AC Relay switch, and pass AC voltage, initially, through the Inrush resistor (limiting the initial current surge) and to the Main Converter IC6301.

Once the Main Power supply is up and running the secondary voltages are developed. Notice that regulated 5V is fed back to the Inrush relay. This 5V activates the relay and bypasses the Inrush resistor (effectively removing the resistor from the circuit). The Inrush resistor is only needed in the circuit, at first, to limit the instantaneous AC current surge on initial power-on. In normal operation, both the AC Relay and the Inrush relay are ON.

To activate the SW9V regulator IC6401 the TV microprocessor IC7002 supplies the "REC-ON" signal at CN6502/pin 37.

Power-ON Sequence



1. The AC power cord is plugged into the AC outlet and the AC voltage passes through F-Board (Main Fuse OK) and is applied to the G-Board.

2. The AC voltage supplied to the G-board is applied directly to the AC-Relay and the Standby 5V power supply circuit. The Standby 5V is applied to the TV Micro and places it into standby mode. It also turns ON the IR sensor and PFC circuit.

3. The TV-Microprocessor located on the DSU-Board receives a ON command when either the ON /OFF button is pressed on the remote or the TV front panel .

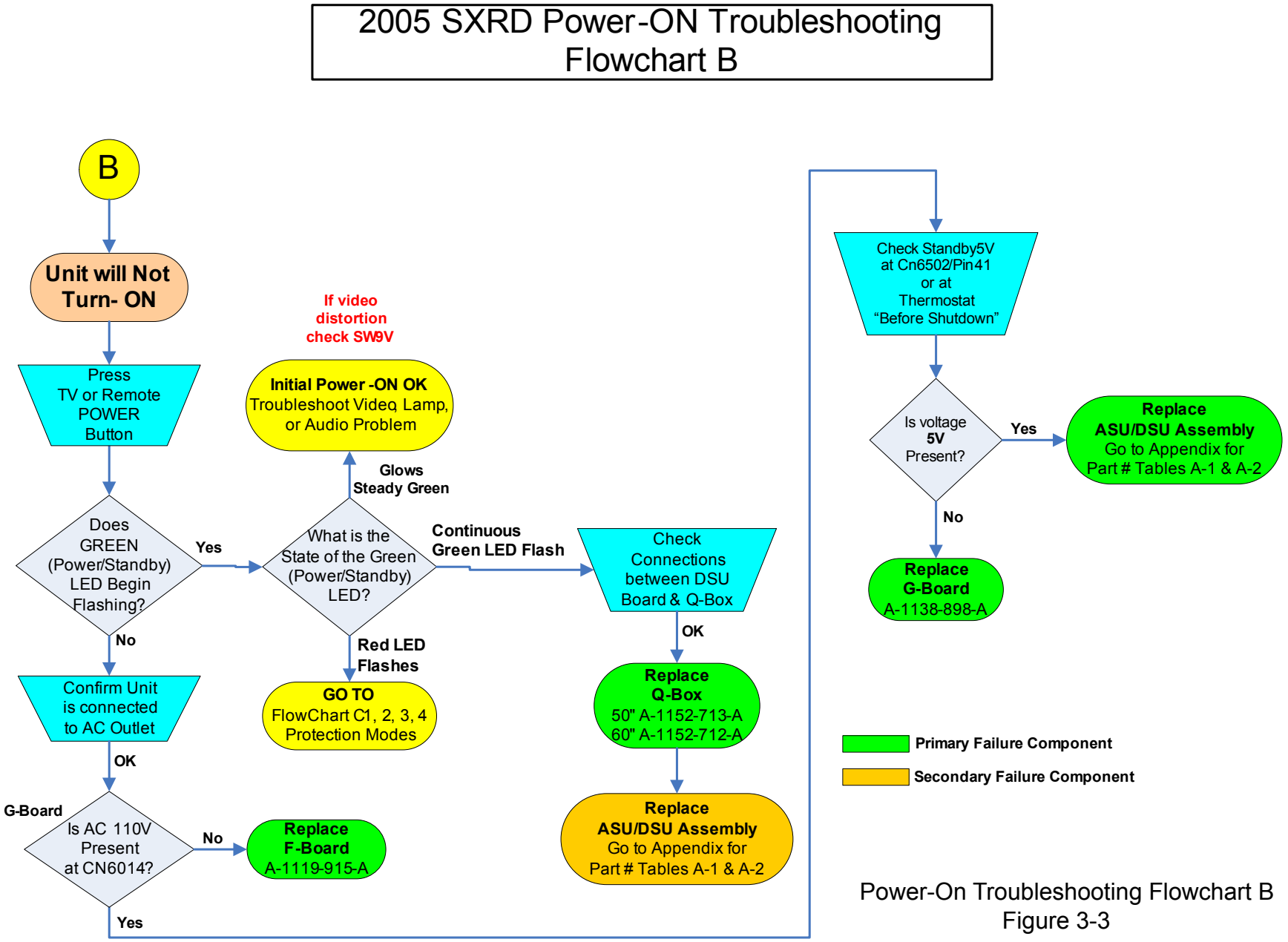
4. The Green (Power/Standby) LED on the TV front panel begins flashing immediately after the ON command is received and processed.

5. The Green (Power/Standby) LED continues flashing.
The TV microprocessor sends the “AC-RELAY” signal to turn the AC Relay ON, and “REC-ON” signal, which is the VCC for the SW9V Regulator IC6401.
The Main Power Supply IC6301 turns ON and all the television operating voltages are developed.
Regulated 5V is fed back to turn ON the InRush Relay , which bypasses the InRush resistor.
Operational acknowledgments are sent and received over the I2C bus between all microprocessors and other devices such as the temperature sensor ICs .

6. After all the power supply voltages and microprocessor communications have been successfully develop the Green (Power/Standby) LED will glow steady.
The Power-ON sequence is completed.

Troubleshooting Flowchart

Power-On

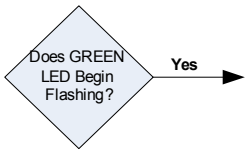


Power-On Troubleshooting Flowchart B
Figure 3-3

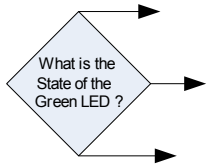
Troubleshooting Flowchart Step Descriptions

Reference Flowchart B, Figure 3-3

When troubleshooting a “Unit will not turn ON” problem in previous models the Red Power/Standby LED on the front panel, when illuminated, would indicate that at least the Standby 5V power was functioning. Unfortunately, there is no red standby LED on either of the two 2005 SXRD models (KDS-R50XBR1 and KDS-R60XBR1). Therefore, the only way to visually check if the Standby 5V circuit is functioning is to press the ON/OFF power button and watching for the Green Power/Standby LED on the front panel to begin flashing.



The first decision diamond in Flowchart B asks the question – **does the Green (Power/Standby) LED begin flashing**? If the answer is yes then you know that the Standby 5V and the TV Microprocessor are functioning (the TV Microprocessor controls the Green LED).

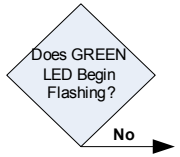


The next step is to check if the **Green (Power/Standby) LED Glows Steady Green, Continuously Flashes, or if the Red Protection LED begins flashing**.

If the **Green (Power/Standby) LED glows steady** then the Power-On sequence was successfully completed, and the power supply system and microprocessor communications are working fine. If there is still no video displayed or audio heard then your troubleshooting efforts should be turn to solving a video, audio, or lamp section defect.

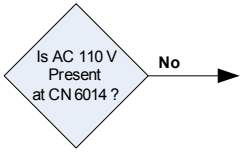
If the **Green (Power/Standby) LED flashes continuously** then there is a communications problem between the microprocessors. In most cases, it will be a communications problem between the TV microprocessor on the DSU-Board and the ATI microprocessor in the Q-Box module. Confirm that all cables and connectors between the DSU-Board and the Q-Box module are securely seated and undamaged. If all connections are good then the most likely defect suspect is the Q-Box module. The fact that the unit successfully completes the power-on sequence indicates that the TV microprocessor is functioning properly.

If the **Red (Power/Standby) LED begins flashing** then the DE microprocessor has detected a system failure and has placed the unit in protection mode. The Red (Power/Standby) LED flash sequence (number of flashes between pauses) should be noted an proceed the indicated Protection Mode troubleshooting flowchart(s).

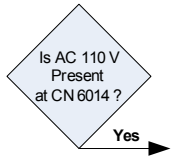


Let us go back one-step in the flowchart and follow the path for the situation when the Green (Power/Standby) LED does not begin flashing after the unit receives an ON command.

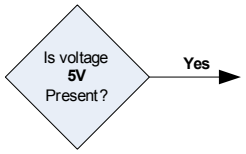
The first step in troubleshooting a no Green (Power/Standby) LED symptom is to confirm that the TV is securely plugged into a active AC outlet.



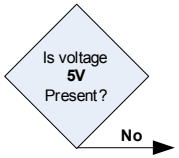
The next step is to confirm application of the AC voltage to the G-Board through the F-Board (Main Fuse). Check for 110V AC at CN6014 on the G-Board to confirm AC supply voltage. If the answer to the question diamond is No (AC is not present at CN6014) then check all connections between AC power cord and the F-board for loose connections or damage. Check the main fuse (F6001) on the F-Board. If all connectors and components are OK replace the F-Board.



If the answer to the question diamond is Yes (AC is present at CN6014), then the next step is to check if the Standby 5V power supply is functioning properly. Check for Standby 5V at CN6502 on G-Board (remove ASU-Board shields to access CN6502). An alternative Standby 5V checkpoint is at the Thermostat connector (or directly at the Thermostat) on the left rear side of the TV (no need to remove any shields).

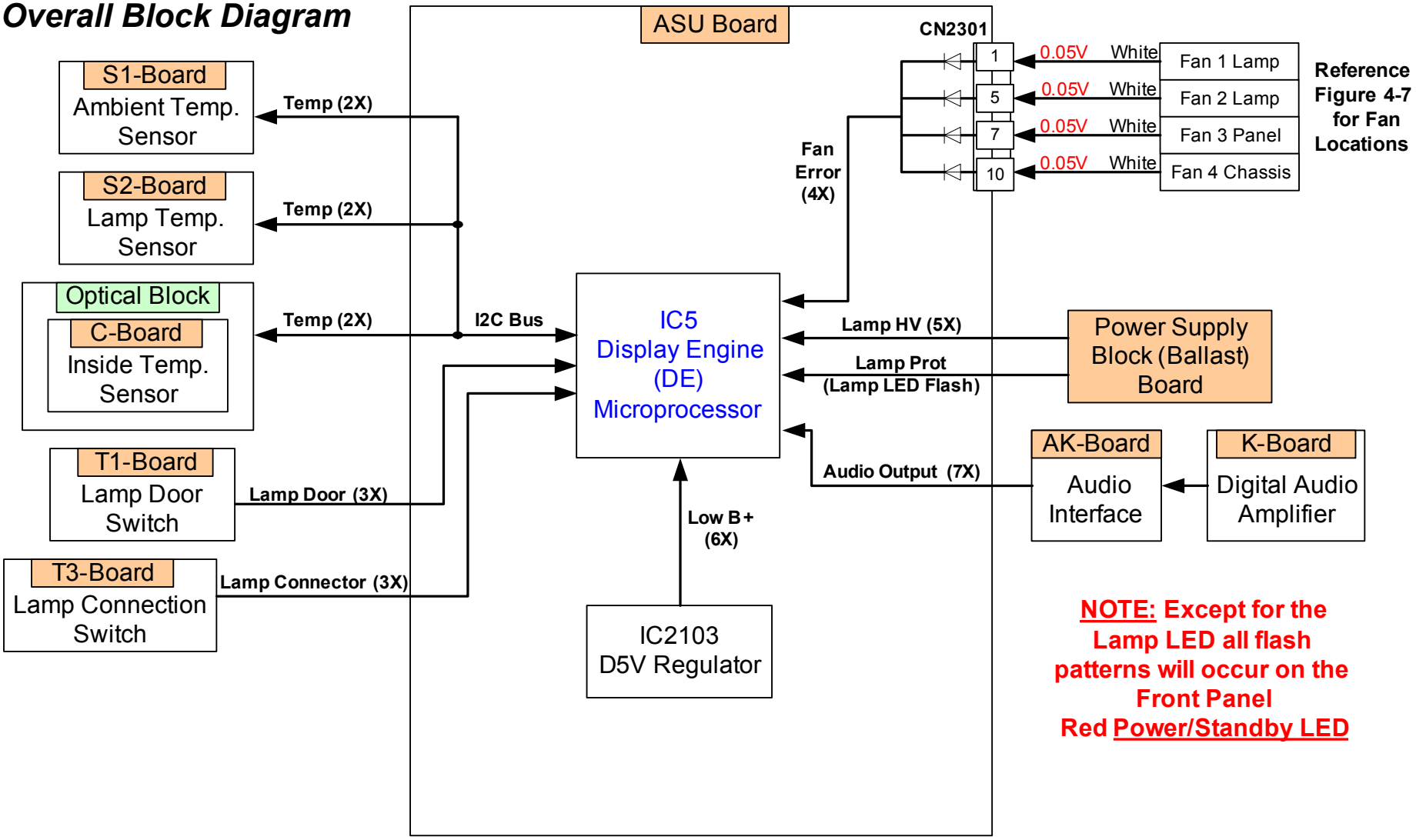


If the Standby 5V is present at the previously mentioned checkpoints then the Standby 5V power supply is functioning, and there is a possible microprocessor defect. In this case, replace the DSU-Board.



If the Standby 5V is not present at the checkpoints then the Standby 5V power supply is not functioning. In this case, replace the G-board.

Overall Block Diagram



Protection Circuits Overal Block Diagram
Figure 4-1

Overall System Description

Reference Figure 4-1

The protection circuits (aka. self-diagnostics routines) for the 2005 SXRD monitor the following circuits and conditions in and around the TV for abnormalities. If a failure occurs the Green Standby/Power LED on the front panel will flash a unique pattern depending on the failure that occurred.

- Lamp Operating Condition (Lamp Red LED Continuous Flash Pattern)
- External Temperature (2X Red Power/Standby LED Flash Pattern)
- Internal Temperature (2X Red Power/Standby LED Flash Pattern)
- Lamp Temperature (2X Red Power/Standby LED Flash Pattern)
- Lamp Door Position (3X Red Power/Standby LED Flash Pattern)
- Lamp Plug Position (3X Red Power/Standby LED Flash Pattern)
- Fan Rotation (4X Red Power/Standby LED Flash Pattern)
- Lamp High Voltage (5X Red Power/Standby LED Flash Pattern)
- Power Supply and Regulator Output Conditions (6X Red Power/Standby LED Flash Pattern)
- Audio Output Circuit Condition (7X Red Power/Standby LED Flash Pattern)
- Device Acknowledgement (9X Red Power/Standby LED Flash Pattern)

The Display Engine (DE) microprocessor monitors all protection circuits. The DE microprocessor employs eight unique Green Standby/Power LED flash patterns to identify one or more of the circuit failures listed in the previous bullet list. Notice that in some cases the same flash pattern will occur for different failures, in these cases, you will apply further troubleshooting procedures to identify the exact area of the failure.

Protection Circuits Functional Description

NOTES: The titles for the protection circuits in this section are those used in the unit specific Service manual, excepts for those indicated, which are not listed in the service manual.

Lamp Error (Continuous Lamp Red LED Flash)

A current sensing circuit mounted on the Lamp Driver Module (or Lamp Power Supply Block) monitors the current drawn by the Lamp. As the lamp ages the **current it draw gradually decreases**, and once it falls below a predetermine threshold or stops completely the protection circuit detects a defective Lamp. The TV will shutdown and the Lamp LED flashes continuously.

Temperature Error (2X Red Power/Standby Flash Pattern)

The temperature error protection circuit monitors three areas for an excessive temperature conditions.

The **S1-Borad** (LM75 Temperature Detect IC) monitors the **local external ambient room** (or Air) temperature. The DE microprocessor regularly queries IC7100 on the S1-Board over the I2C bus for temperature information. The threshold is set to approximately 45 degrees Celsius. The S1-Board is located in the lower right rear corner of the unit on the ASU-Board shield when looking at the unit from the rear.

The **S2-Board** (LM75 Temperature Detect IC) monitors the **temperature**

near the lamp. The DE microprocessor regularly queries IC7120 on the S1-Board over the I2C bus for temperature information. The threshold is set to approximately 65 degrees Celsius, and is located in the lower left front corner of the unit on the front of the Lamp housing when looking at the unit from the rear.

There is also a LM75 mount on the **C-board**, which monitors **internal TV temperature**. The DE microprocessor regularly queries IC6901 on the C-Board over the I2C bus for temperature information. The threshold is set to approximately 90 degrees Celsius, and is located on the C-board atop the Optical Block. The C-board and Optical Block come form parts as an assembly.

When any one of the areas describe goes above the indicated temperature threshold the TV will shutdown and a 2X flash pattern on the Standby/ Power LED will occur.

Lamp Cover Error (3X Power/Standby Red LED Flash Pattern)

The DE microprocessor monitors the **lamp cover (or Door)** for proper closure. On the back of the lamp cover there is a tab, which depresses and closes a switch on the **T1-Board** when the cover is securely closed.

If the cover is not properly closed or if the tab, switch, or wiring is damaged then the TV will shutdown and a 3X flash pattern on the Standby/Power LED will occur.

The DE microprocessor also monitors the **Lamp plug connection** using the **T3-Board**, located inside the Lamp housing near the female side of the plug.

If the plug does not mate up properly or if the plug, switch, or wiring is damaged then the TV will shutdown and a 3X flash pattern on the Standby/Power LED will occur.

Fan Stopped (4X Power/Standby Red LED Flash Pattern)

All **cooling and exhaust fans** in the TV are monitor for **rotation**. If any one of the fans stops rotating for any reason such as, an obstacle blocking the blades or a defective fan the DE microprocessor will receive an error signal. The TV will shutdown and a 4X flash pattern on the Standby/ Power LED will occur.

Lamp Driver Error (5X Power/Standby Red LED Flash Pattern)

This protection circuit monitors the output of the Lamp Driver (aka Lamp Power Supply Block or Lamp Ballast) module for the presents of the **High Voltage Drive** (~12KV) for Lamp ignition and normal operating voltage (~60V) after initial lamp ignition.

NOTE: The lamp ignition High Voltage can vary between 5KV and 26KV, 12KV is the typical ignition voltage level. The actual value of the ignition voltage depends on the temperature of the lamp at the time of ignition.

This protection circuit also indirectly monitors the **380V** from the main power supply. If the 380V supply is missing the Lamp Driver will not be able to develop the high voltage, and therefore, the DE microprocessor will detect a lamp driver failure.

When either the high voltage output fails (Lamp Drive defective) or the 380V supply fails (Main Power Supply defective) the TV will shutdown and a 5X flash pattern on the Standby/Power LED will occur.

Low B Error (6X Power/Standby Red LED Flash Pattern)

The DE microprocessor directly monitors the DC voltage **output of the D5V regulator** IC2103 on the ASU-Board, and indirectly the SUB11V voltage output from the Main Power Supply. The SUB11V is the input voltage of the D5V regulator IC2103. Therefore, if either the D5V regulator, Main Power Supply, or the SUB11V voltage path to the D5V regulator fails the TV will shutdown and a 6X flash pattern on the Standby/Power LED will occur.

Audio Error (7X Power/Standby Red LED Flash Pattern)

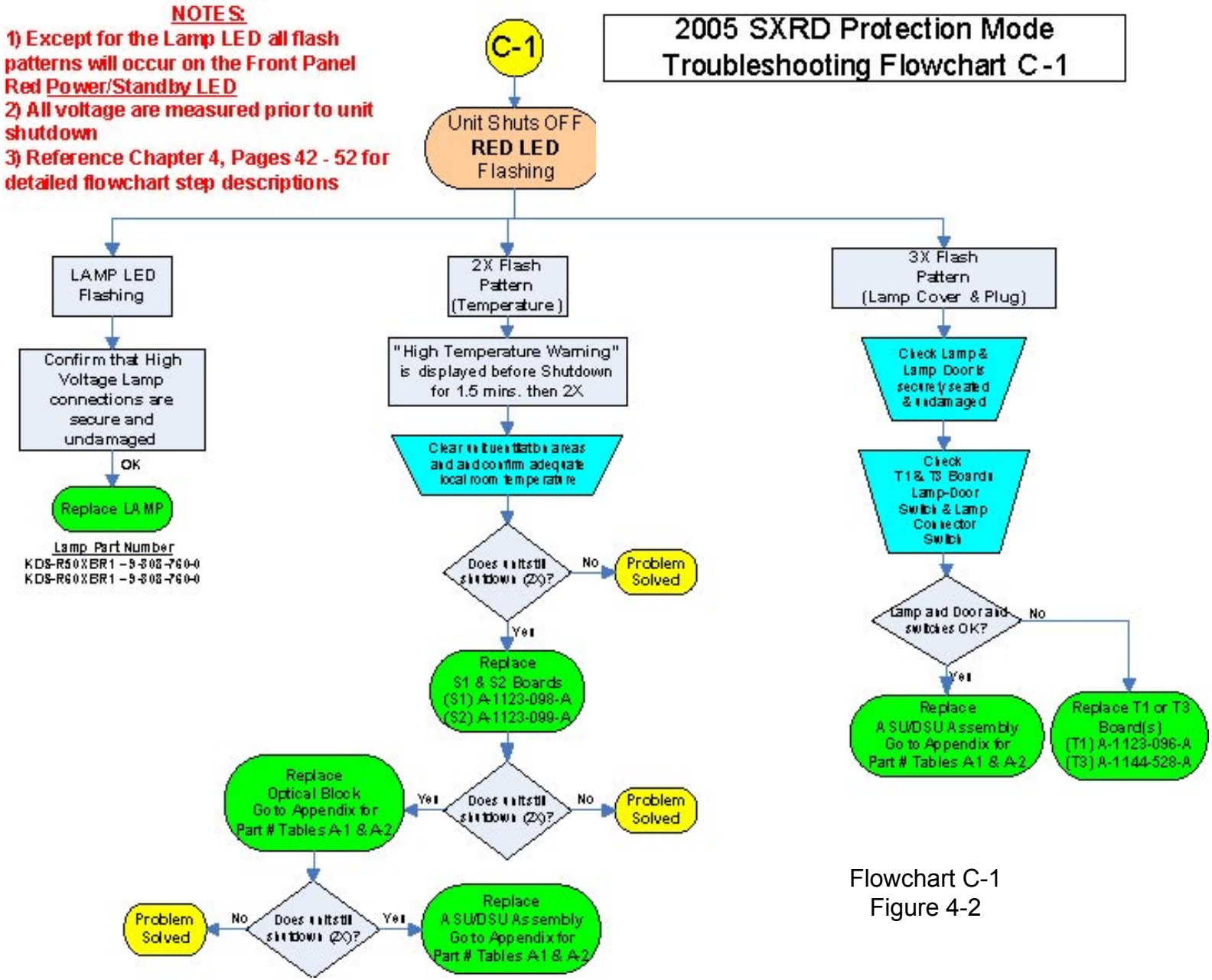
The protection circuit (IC2605, IC2606, and IC2608) mounted on the K-Board monitors the audio amplifier outputs (speaker lines) for a **shorted**

condition or for the presents of any **DC voltage level**. If either of these conditions is detected the protection alerts the DE microprocessor of the failure and a 7X flash pattern on the Standby/Power LED will occur.

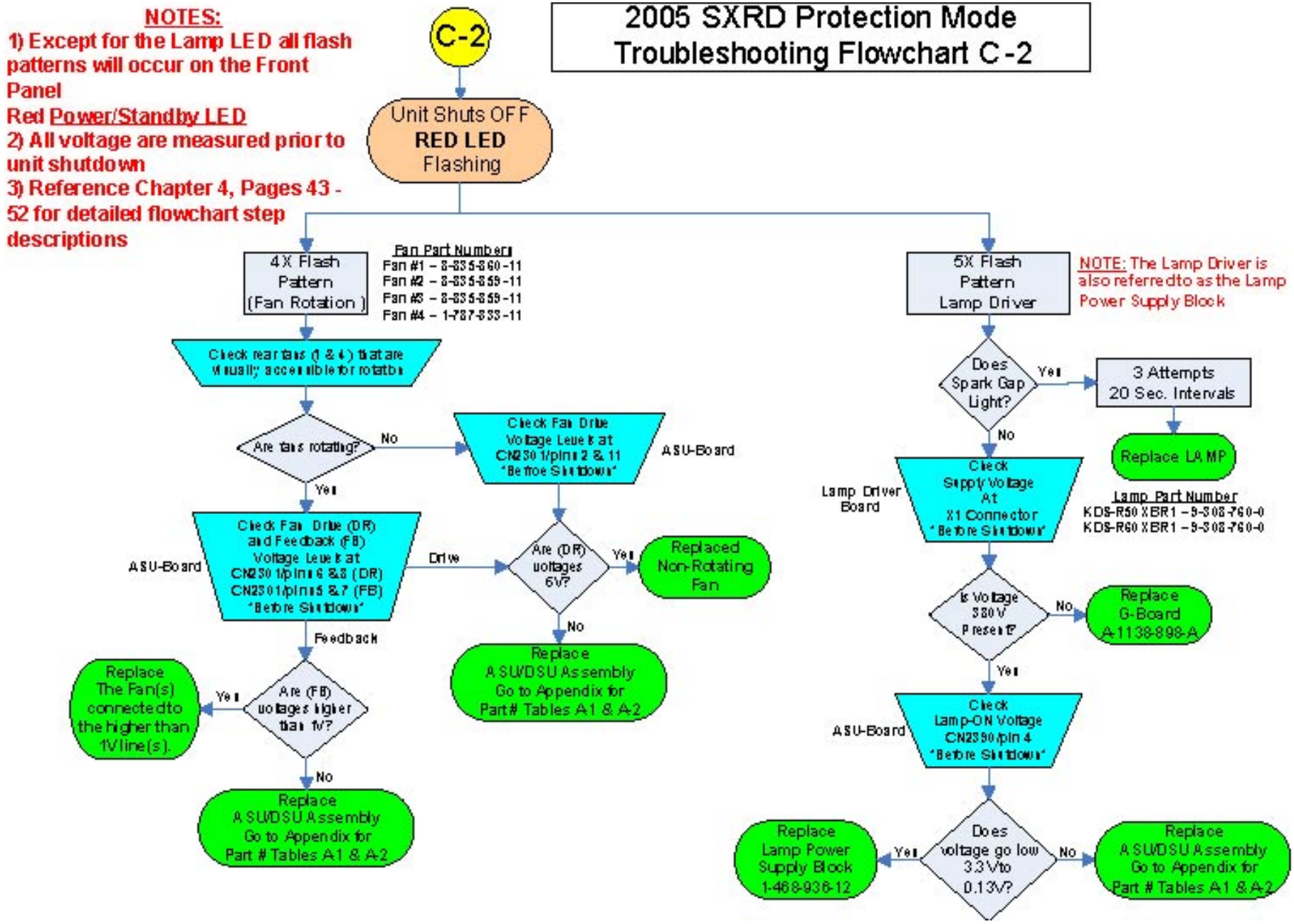
Panel Error or Device Acknowledgement Error (9X Power/ Standby Red LED Flash Pattern)

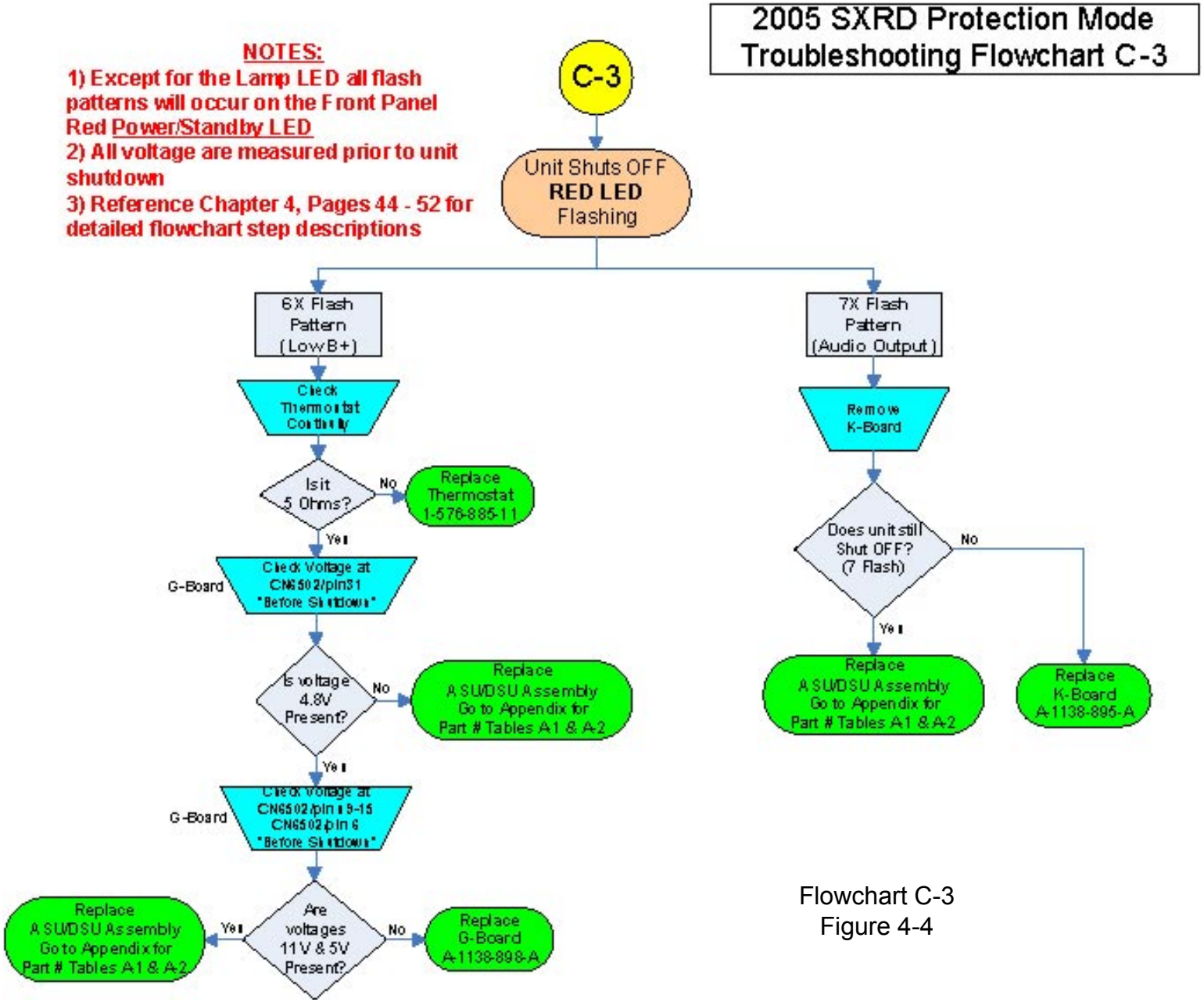
This DE microprocessor monitors the I2C communications between itself and the C-Board, S1-Board, and S2-Board. This protection circuit will trigger if the previously mention devices do not send an acknowledgement (over the I2C bus) during initial TV power-up, or if the I2C bus communications between these devices is interrupted during normal operation. In either case, the DE microprocessor detects the failure, the TV will shutdown, and the Red Power/Standby LED flashes a 9X flash pattern.

Troubleshooting Flowcharts

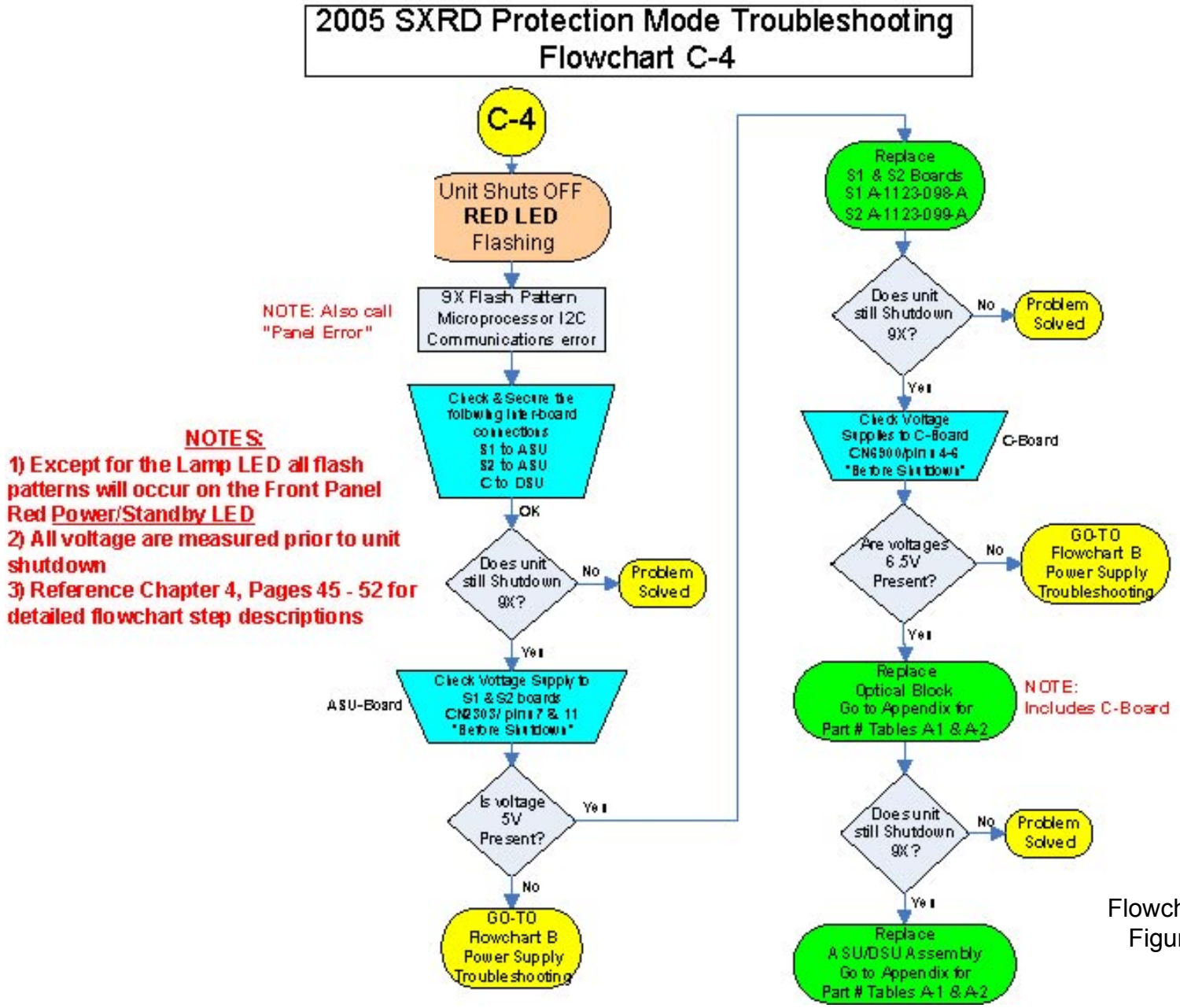


Flowchart C-1
Figure 4-2


NOTES:
1) Except for the Lamp LED all flash patterns will occur on the Front Panel
Red Power/Standby LED
2) All voltage are measured prior to unit shutdown
3) Reference Chapter 4, Pages 43 - 52 for detailed flowchart step descriptions
C-2
2005 SXRD Protection Mode Troubleshooting Flowchart C-2
Unit Shuts OFF
RED LED
Flashing
4X Flash Pattern (Fan Rotation)
Fan Part Number
Fan #1 – 8-835-360-11
Fan #2 – 8-835-359-11
Fan #3 – 8-835-359-11
Fan #4 – 1-787-333-11
Check rear fans (1 & 4) that are visually accessible for rotation
Are fans rotating?
No
Check Fan Drive Voltage Levels at CN2301/pins 2 & 11 "Before Shutdown"
ASU-Board
Yes
Check Fan Drive (DR) and Feedback (FB) Voltage Levels at CN2301/pins 6 & 8 (DR) CN2301/pins 5 & 7 (FB) "Before Shutdown"
ASU-Board
Drive
Are (DR) voltages 6V?
Yes
Replaced Non-Rotating Fan
No
Replace A SU/DSU Assembly Go to Appendix for Part # Tables A1 & A-2
Feedback
Are (FB) voltages higher than 1V?
Yes
Replace The Fan(s) connected to the higher than 1V line(s).
No
Replace A SU/DSU Assembly Go to Appendix for Part # Tables A1 & A-2
5X Flash Pattern Lamp Driver
NOTE: The Lamp Driver is also referred to as the Lamp Power Supply Block
Does Spark Gap Light?
Yes
3 Attempts 20 Sec. Intervals
Replace LAMP
Lamp Part Number
KDS-R50XBR1 – 9-308-760-0
KDS-R60XBR1 – 9-308-760-0
No
Check Supply Voltage At X1 Connector "Before Shutdown"
Lamp Driver Board
Is Voltage 380V Present?
No
Replace G-Board A-1138-898-A
Yes
Check Lamp-ON Voltage CN2390/pin 4 "Before Shutdown"
ASU-Board
Does voltage go low 3.3V to 0.13V?
Yes
Replace Lamp Power Supply Block 1-468-936-12
No
Replace A SU/DSU Assembly Go to Appendix for Part # Tables A1 & A-2



Flowchart C-3
Figure 4-4



Flowchart C-4
Figure 4-5

Troubleshooting Flowchart Step Descriptions

Lamp Error (Lamp LED)

LAMP LED Flashing

In most cases a flashing Lamp LED indicates a defective Lamp, and the Lamp must be replaced. However, an open circuit in the high-voltage cabling to the lamp will also case this failure indication. Therefore, before replacing the lamp confirm that the cabling and connections are good between the Lamp Drive board and the lamp.

Temperature Error (2X)

2X Flash Pattern (Temperature)

The TV first displays an error message (shown in Figure 4-6) before shutting down and activating the 2X flash pattern. The error message dialog box is displayed for approximately 1.5 minutes and then the TV shuts down. The dialog give the owner the oppurtunity to set the TV to “High Altitude Mode,” which will increase the fan speed.

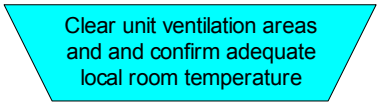
Temperature Error Message
Figure 4-6

Insert photo of the High Temperature error display

The main objective when a 2X flash pattern occurs is to determine which of the following possible defects are causing the excessive temperature condition.

1) Excessively ambient room temperature in the local area of the TV
2) Dust or objects blocking the ventilation areas on the TV
3) Excessive Lamp Operating temperature
4) Defective LM75 temperature detection IC

The first step is to check for proper ventilation and correct any abnormalities that will cause the TV to operate at high internal temperatures.



Check the following items:

- The TV should not be located too close any heating elements.
- The TV should be at least 4 inches from all walls and enclosures to ensure adequate ventilation.
- Check the vented areas on the **lower rear back cover** and the **two rear exhaust fan's** are clear of all dust and debris.

If all ventilation areas and fans are clear and the TV still shutsdown (2X) then the next step is to determine if one of the LM75 temperature detection IC's on the S1, S2, or C boards have failed. It is a process of elimination to determine which LM75 has failure.

As the flowchart illustrate start with the least expensive boards and work your way up.

Substitute new or known good boards in the following order.

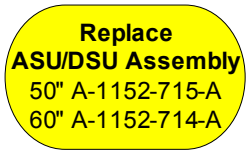
1) S1-Board

2) S2-Board

NOTE: The S2-Board is mounted in difficult-to-get-to spot. Therefore, the best way to substitute for the board, with very little disassembly, is to have a extra wire harness (between S-Board and Main Wire Harness) to connect the substitute board at the interconnect jack.

3) Optical Block (C-Board)

If the TV still shuts down (2X) after the previous substitutions then there is a problem with the DE microprocessor, consequently, the ASU/DSU assembly must be replaced.



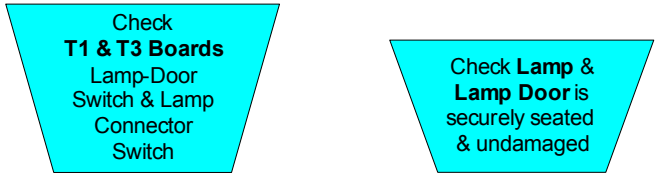
Lamp Cover/Plug Error (3X)

Two situations can cause the 3X flash pattern.

1) A problem with the **lamp door** positioning and closing of the door detector switch **(T1-Board)**

2) A problem with the positioning of the lamp and **lamp power plug** and the closing of the power plug detector switch **(T3-Board)**

The first step befire replacing any parts is to check for proper positioning of the lamp door and power plug. Furthermore, check for damage to the following items.



- The door tab which depresses the detector switch
- The lamp door detector switch
- The lamp power plug
- The lamp plug detector switch

If the door, door switch, lamp, or lamp switch are found damaged then the appropriate component must be replaced.

Replace T1 or T3 Board(s)
(T1) A-1123-096-A
(T3) A-1144-528-A

If the door, door switch, lamp, or lamp switch are found undamaged and all connections are secure then there must be a problem with the DE microprocessor and the ASU/DSU assembly must be replaced).

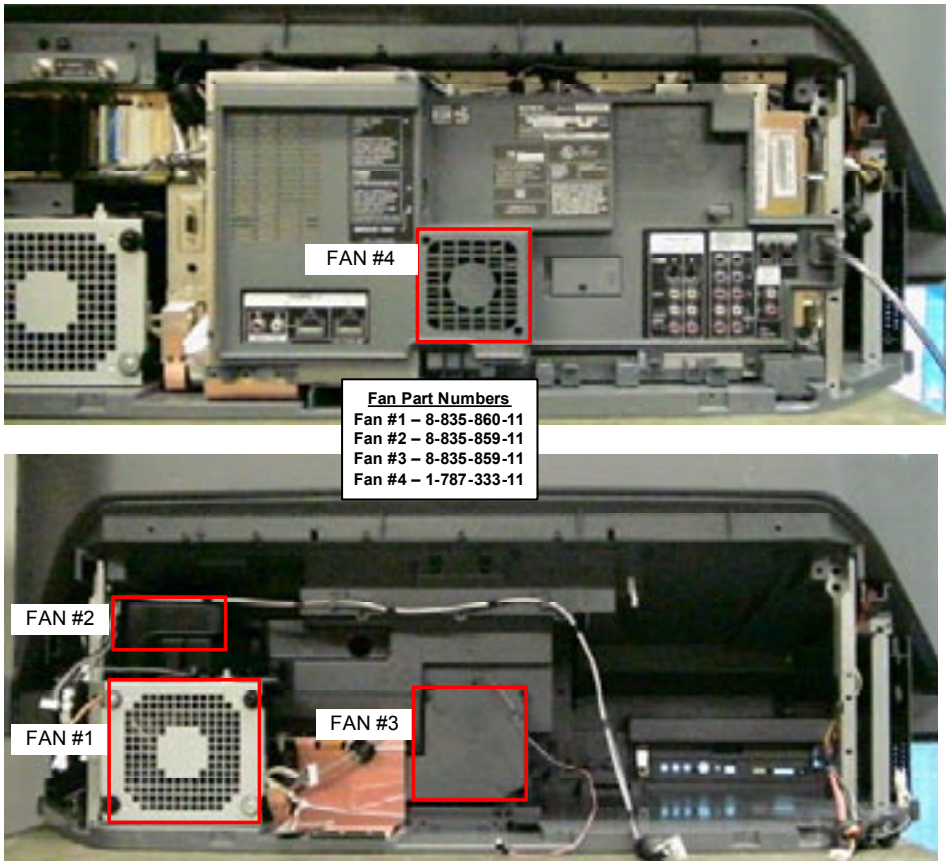
Replace ASU/DSU Assembly
50" A-1152-715-A
60" A-1152-714-A

Fan Error (4X)

4X Flash Pattern (Fan Rotation)

The main objective when this error occurs is to determine which of the four fans have stopped rotating. Visually check the two-rear exhaust (Fans 1 & 4, Reference Figure 4-7 for fan locations) fans first for rotation. Both fans should begin rotating immediately after the TV power button is pressed.

Check rear fans (1 & 4) that are **visually accessible** for rotation



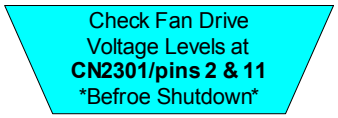
Fan Location & Numbering Diagram
Figure 4-7

Before replacing Fan #1 or Fan #4 for non-rotating check that the fans drive voltage is present at CN2301/pins 2 &11.

NOTE: Because the TV is shutting down the voltages must be measured prior to shut down.

The drive voltages should be 6V each. If both drive voltages are present replace the non-rotating fan. However, if either of the drive voltages is missing then there is a defective drive circuit on the ASU-Board. Replace the ASU/DSU assembly.

Reference Figure 4-1 for fan numbering and CN2301 pin numbering



The other two fans (Fans 2 & 3) are not visually accessible, and therefore, you will use the DC Fan Drive and Feedback voltages to check fan operation.

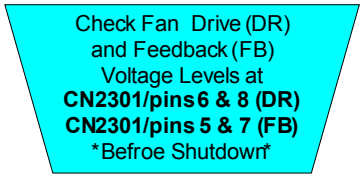
Check the Fan Drive voltages at CN2301/pins 6 & 8.

Check the Fan Feedback at CN2301/pins 5 & 7 on the ASU-Board.

NOTE: Follow the appropriate path on the flowchart for Drive or Feedback when troubleshooting.

The presence of fan drive voltage confirms that the drive circuits on the ASU-Board are functioning properly, and confirms that the fan is receiving its operating voltage.

The level of the feedback voltage confirms that the fan is rotating. The fan feedback voltage is 0.05V when the fan is rotating (normal operation). If the fan is not rotating the feedback voltage will be greater than 1V. Replace the appropriate fan if either feedback voltage is above 1V.



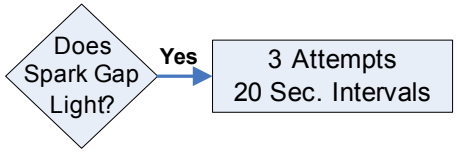
If both feedback voltages are at the proper level then the fans are rotating, however, the DE microprocessor is not processoring the information accurately. In this case, the problem is with the DE microprocessor. Replace the ASU/DSU assembly.

Lamp Drive Error (5X) (aka Lamp Power Supply Block)

This error indicates lose of the 12KV High Voltage Output (lamp ignition voltage) from the lamp driver board. The main objective when troubleshooting this error is to isolate to one of four areas.

1) The Lamp
2) The Main Power Supply (G-Board)
3) The Lamp Driver Board (Lamp Power Supply Block)
4) The TV Microprocessor (ASU-Board)

A completely open circuited lamp can cause a 5X flash pattern. Therefore, the very first component to eliminate form the suspects is the lamp.

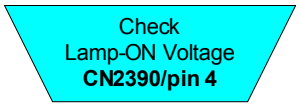


Visually check the spark gap on the lamp driver board for illumination during TV initial power on process. In normal operation the spark gap will flash ~5 seconds after the on button is pressed and the Green LED begins flashing. It should flash once and the lamp will light.

If the **spark gap flashes three times with a 20-second pause in between flashes** then the lamp drive is functioning properly, and the lamp is defective (replaced the lamp).

If the spark gap does not illuminate, then the next step is to check the 380V lamp driver supply voltage from the Main Power Supply (G-Board). Measure this voltage directly at the Lamp Driver board at the X1 connector at the top of the board. If the 380V is missing the power supply on the G-board is defective, replace the G-Board.

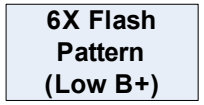
If the 380V is present then the next step is to check the **Lamp-On control voltage** from the TV microprocessor (ASU-Board). You can measure this control voltage at CN2390/pin 4 on the ASU-Board. The voltage should initially be at 3.3V while the Green LED is flashing and then go low to ~0.13V when the Green LED glows steady.



If the Lamp-On control voltage transitions from 3.3V to 0.13V properly then the TV microprocessor is instructing the lamp driver to turn on. At this point in the flowchart the lamp driver is receiving its 380V supply voltage and its Lamp-On voltage, however, the lamp driver does not function (no spark gap). In this case replace the Lamp Driver Board.

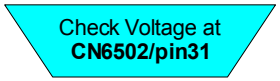
If the Lamp-On voltage does not go low (0.13V), then the problem is with the TV microprocessor, replace the ASU/DSU assembly.

Low B+ Error (6X)



In most cases, a defect in the **power supply output (G-board)** causes this error (6X), particularly a **missing Sub 11V** output. However, theoretically a defective TV microprocessor output can also cause this error, and therefore, consider this component when troubleshooting.

Your first step in troubleshooting this error is to eliminate the TV microprocessor as a suspect for the failure. Check for the presents of the AC-Relay voltage at CN6502/pin 31 on the G-board. This is the switched voltage from the TV microprocessor to turn on the Main AC relay and in turn the Main Power Supply. The AC-Relay voltage should switch to 4.8V immediately after the power on button is pressed.

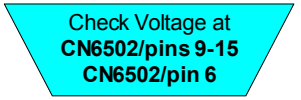


If the AC-Relay voltage is missing this indicates a failure in the TV microprocessor circuit on the ASU-Board, therefore, replace the ASU/DSU assembly.

If the AC-Relay is present the next step is to verify Sub 11V and regulated 5V Main Power Supply outputs.

Check for Sub 11V at CN6502/pins 9 through pin 15.

Check for regulated 5V at CN6502/pin 6.



At this point in the process the AC power is applied and the AC-Relay voltage has been received, and therefore, all Main Power Supply secondary voltages should be present. If the Sub 11V and/or regulated 5V is missing the Main Power Supply is defective, and the G-board must be replaced.

If the Sub 11V and regulated 5V are present and the unit still shuts down (6X) then there is a defect on the ASU-Board. The most likely suspect for failure is the D5V regulator on the ASU-Board. In this case, replace the ASU/DSU assembly.

Audio Output Error (7X)

7X Flash Pattern (Audio Output)

This error is relatively straightforward. The error occurs when one of the audio outputs is shorted or if a DC voltage level is present. In either case the problem exists on the audio board (K-Board).

Remove K-Board

Remove the K-Board to verify that the K-Board is causing the TV to shutdown (7X).

If the K-Board is defective, the TV will turn on with video and no audio.

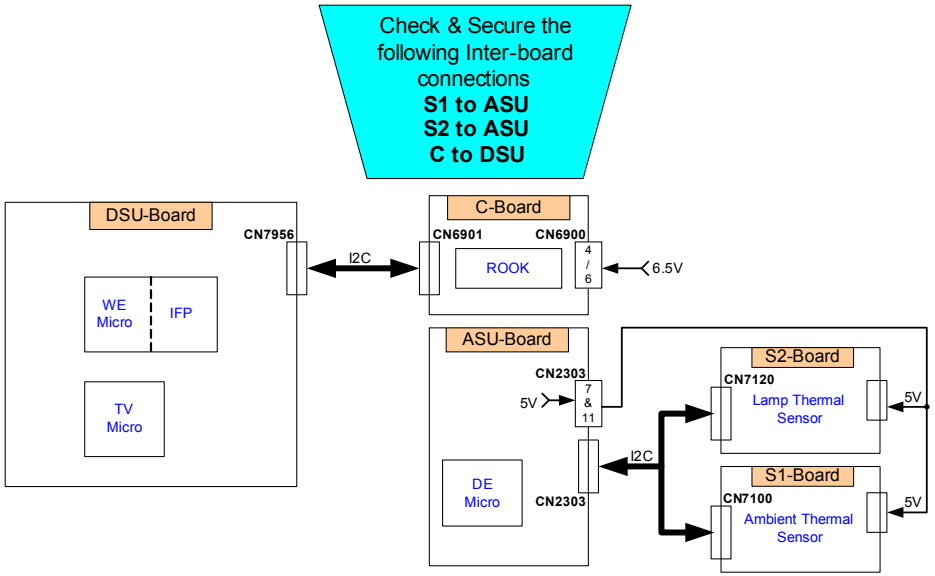
If the TV still shuts down (7X), then the problem is with the DE microprocessor, and consequently, the ASU/DSU assembly must be replaced.

Panel Error (9X)

9X Flash Pattern
Microprocessor I2C Communications error

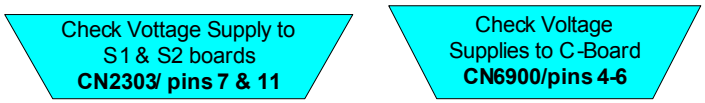
This error is somewhat deceiving because of the name Panel Error. An actual defect LCD display will not cause this error or any error for that matter. The likely reason for the name Panel Error is that a defective C-Board, which is the LCD display driver can cause a (9X) error. The S1-Board and the S2-Board can also cause a (9X) error.

The fundamental defect that causes this error is a loss of I2C communications (or Inter-IC Acknowledgement) between the C-Board, S1-Board, or S2-Board and the DE microprocessor. One or more of these three boards have failure to communicate (or acknowledge) the De microprocessor. Therefore, the fist step in solving the problem is to check for loose or damaged connections between all three boards and the ASU-Board or the DSU-Board (Reference Figure 4-8). Secure and/or repair connections where needed.



Inter-Board Connections
Figure 4-8

If all the inter-board connections are OK, then the next step is to determine which board has failure and is not communicating over the I2C bus. At this point you could just begin substituting known good boards to find the faulty board. However, to be more effective and efficient you should first confirm that each board is receiving the proper supply voltages. This step will quickly eliminate or detect a power supply failure, in which case, you need to go to the Power Supply Flowchart (B) and troubleshoot a power supply problem.



Check CN2303/pins 7 & 11 on both the S1-Board and the S2-Board for the presents of 5V.

Check CN6900/pins 4 through 6 on the C-Board for the presents 6.5V.

Once again, if the voltages are missing the defect exists in the power supply (reference Flowchart B for Power Supply Troubleshooting procedures).

If the power supplies are present at all the boards the troubleshooting process comes down to a process of elimination by substituting know good boards.

Substitute the boards in the following sequence for the most efficient and cost effective results.

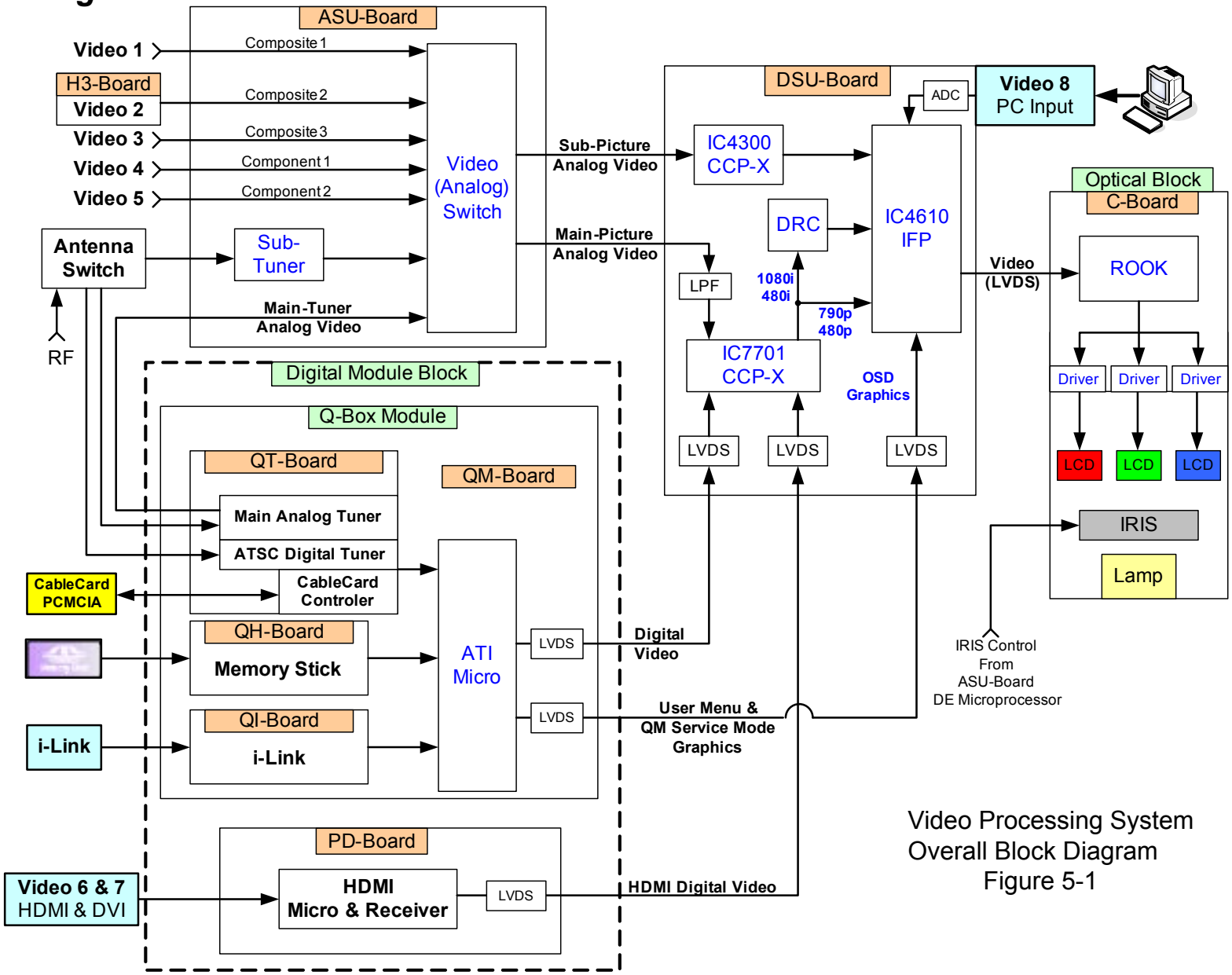
1) S1-Board

2) S2-Board

3) Optical Block (includes C-Board)

4) ASU/DSU Assembly

Overall Block Diagram



Video Processing System
Overall Block Diagram
Figure 5-1

Overall System Description

Reference Figure 5-1

The 2005 SXRD model includes the following video input sources.

- **Video 1, 2, 3**

  Video 1, 2, 3 are all three-wire cable inputs with the **Yellow** RCA jack transporting all the video information (Synchronization and Color information) and the **Red and White** transporting left and right audio information.

  Typical external devices are the VCR, DVD, and A/V Receiver units.

- **Video 4, 5**

  Video 4, 5 are both three-wire (Video) cable and separate two-wire (Audio) cable inputs. The three-wire **(Red, Green, & Blue or RGB)** cable transports the separate Red, Green, and Blue video information. A separate two-wire cable **(Red and White)** transports the left and right audio information for each input.

  Typical external devices are the DVD, DVR, Satellite Receivers units.

- **Video 6, 7**

  Video 6, 7 are both complete digital video (and audio in the case of HDMI) input sources. The 2005 SXRD models accept both High-Definition Multimedia Interface or HDMI (Video & Audio) and Digital Visual Interface or DVI (Video Only) input sources. The DVI connection needs a DVI-to-HDMI adaptor in order to connect to the HDMI connector input.

  Typical external devices are the DVD, DVR, Satellite Receivers, A/V Receiver, and Set-Top-Box units.

- **Video 8**

Video 8 connects directly to a Personal Computer or PC monitor output source using a HD15 or SVGA cable. The input accepts VGA, SVGA, XGA, WXGA, and SXGA resolution signals from the PC. A separate Stereo Mini Plug transports the audio for the PC input.

- **RF Inputs**
  - **NTSC Main Analog Tuner**

    This tuner receives and demodulates all analog CATV and Over-the-Air broadcast signals.

  - **NTSC Sub Analog Tuner**

    This tuner receives and demodulates all analog CATV and Over-the-Air broadcast signals. This tuner is used in multi-panel display such as, Twin-View and Favorites display modes.

  - **ATSC Digital Tuner**

    This tuner receives and demodulates all digital **(Unscrambled or In-the-Clear)** CATV and Over-the-Air broadcast signals. This tuner is used in multi-panel display such as, Twin-View and Favorites display modes.

- **CableCard**

The CableCard is used in conjunction with the ATSC Digital Tuner to receive and demodulate **(Scrambled or Premium)** CATV and Over-the-Air broadcast signals. The CableCard is purchased from the local cable service provider and is programmed for the particular channel package purchased by the customer.

- **Memory Stick**

JPEG photograph and MPEG1 movie are viewed using the Memory Stick media device and this input. This input supports all Memory Stick media up to and including the Memory Stick PRO 1GB. This input does not support high-speed transfer and MagicGate copyright protection features.

- **i-Link**

The i-Link connection is Sony's IEEE-1394 or Fire-Wire connection. The i-Link connection transports digital video, audio, and control information between any i-Link compatible device. The control information can be used to control the external device (e.g. a camcorder) from the TV remote control.

Typical external devices are the Camcorder, DVD, DVR, Satellite Receivers, and A/V Receiver.

Video Circuits Functional Description

Reference Figure 5-1

You can divide the Video Processing system into the following four separate sections.

- **Analog Video Switching Section**
- **Digital Video Circuits Section**
- **Video Processing Section**
- **LCD Drive Circuits Section**

The **ASU-Board** receives all **analog video inputs** (Video 1, 2, 3, 4, 5, Sub-Tuner, and Main Tuner), which are then applied to, and switched by IC303. The inputs are directed to either the Main or Sub analog output on IC303 depending on the display configuration. Only Video Inputs 1, 2, and 3 can be displayed in the right-side Sub-picture panel in the twin picture mode.

The Sub-Picture signal output (used for right-side panel picture for Twin and Favorite display modes) is applied to the Sub Chroma-Decoder IC4300 on the DSU-Board.

The Main-Picture signal output is applied to the Main Chroma-Decoder IC7701 on the DSU-Board.

The **Digital Module Block (DMB)** is the interface for all **digital video inputs** (ATSC Tuner, CableCard, Memory Stick, i-Link, and HDMI). The ATI microprocessor controls the switching for all digital inputs except for the HDMI, it also generates the User Menu and QM Service mode graphics.

NOTE: The Main NTSC Tuner is located in the DMB, however, the signal is sent back to the ASU-Board to be switched by IC303 along with the other analog signals.

The **ATSC tuner** receives all **digital CATV and Over-the Air signals (Unscrambled & Scrambled)**, however, without a CableCard inserted only the unscrambled (or In-the-Clear) signals will be displayed. To display scrambled (or premium) digital channels a CableCard or Cable-Box must be purchased form the local cable provider. In the case of a **CableCard**, the card is programmed for the particular channels paid for by the customer. The Cablecard is inserted into the PCMCIA slot and the cablecard control detects the received scramble channels and processes those scrambled channels purchasd by the customer for display.

The outputs (Digital Video, Digital Graphics, and HDMI) of the DMB are applied to the DSU-Board through two Low Voltage Differential Signal (LVDS) cables.

The **DSU-Board** contains two CCP-X IC's (Analog-to-Digital Conversion ADC and Chroma Decoders), one for the main-picture (analog and digital) processing and one for the sub-picture (analog only) processing. In the case of the Main and Sub-picture analog signals the CCP-X IC's perform ADC, Chroma Decoding, Block Noise Reduction, and for the composite 480i signal 3D comb filtering. For the Main-picture digital signal the ADC is bypassed since the signal is already in the digital format.

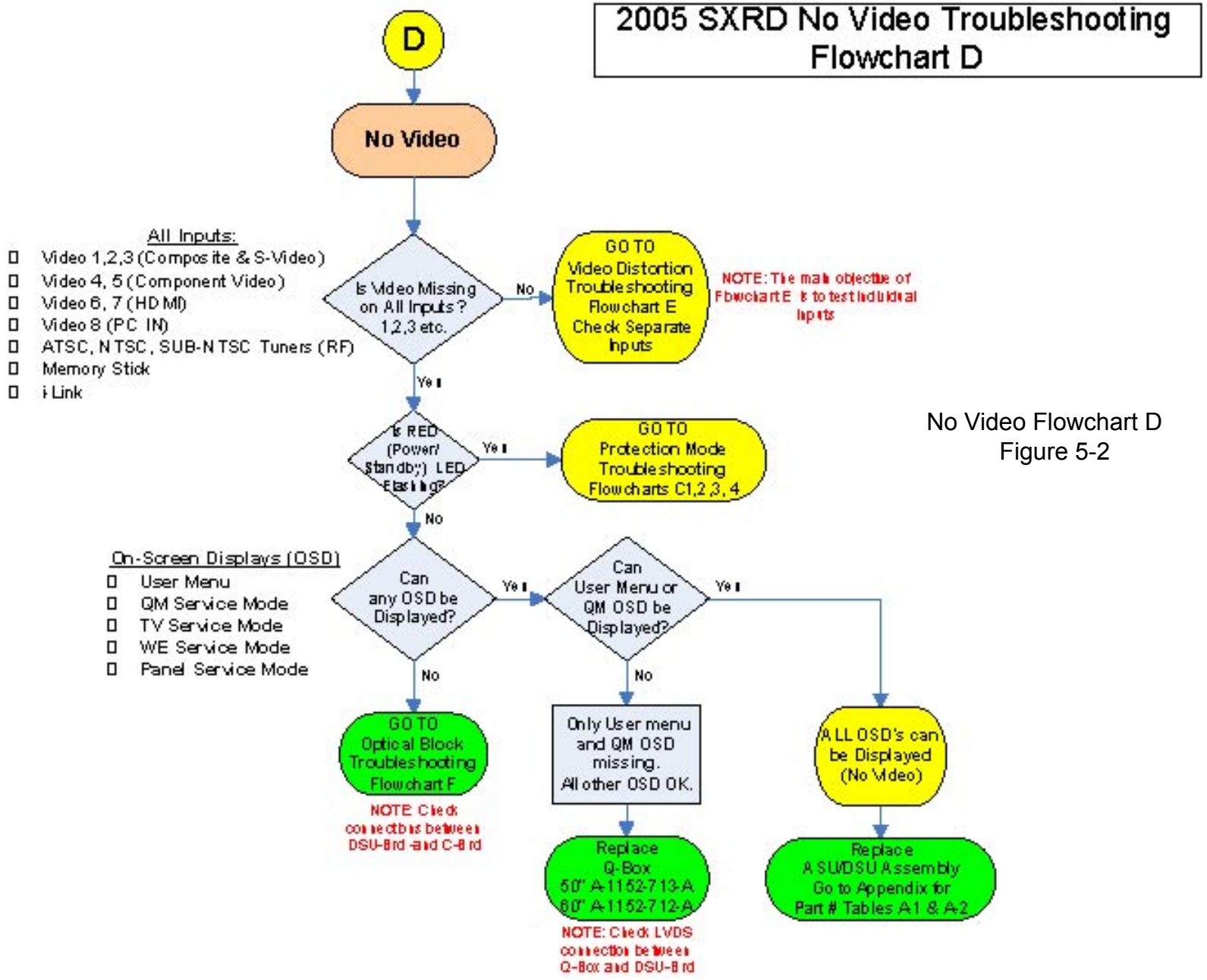
The **Digital Reality Creator (DRC)** is a line doubler and noise reduction circuit for the 480i signal. The DRC up-converts the 480i signal to a 1080i signal (High Definition Format). The DRC acts only as a noise reduction circuit fir the 1080i signal since it is already in a High Definition format.

The **IFP** IC4610 takes the 1080i (from the DRC), 720p, or the 480p (from the CCP-X IC7701) and performs the Interlace to Progressive scan conversion, and also performs the signal scaling process to develop a signal to equal to the resolution of the particular size LCD panels. The IFP also performs the same process on the sub-picture signal for developing the picture for the right pane in twin picture display mode, however, the sub-picture is only at the 480i format resolution level.

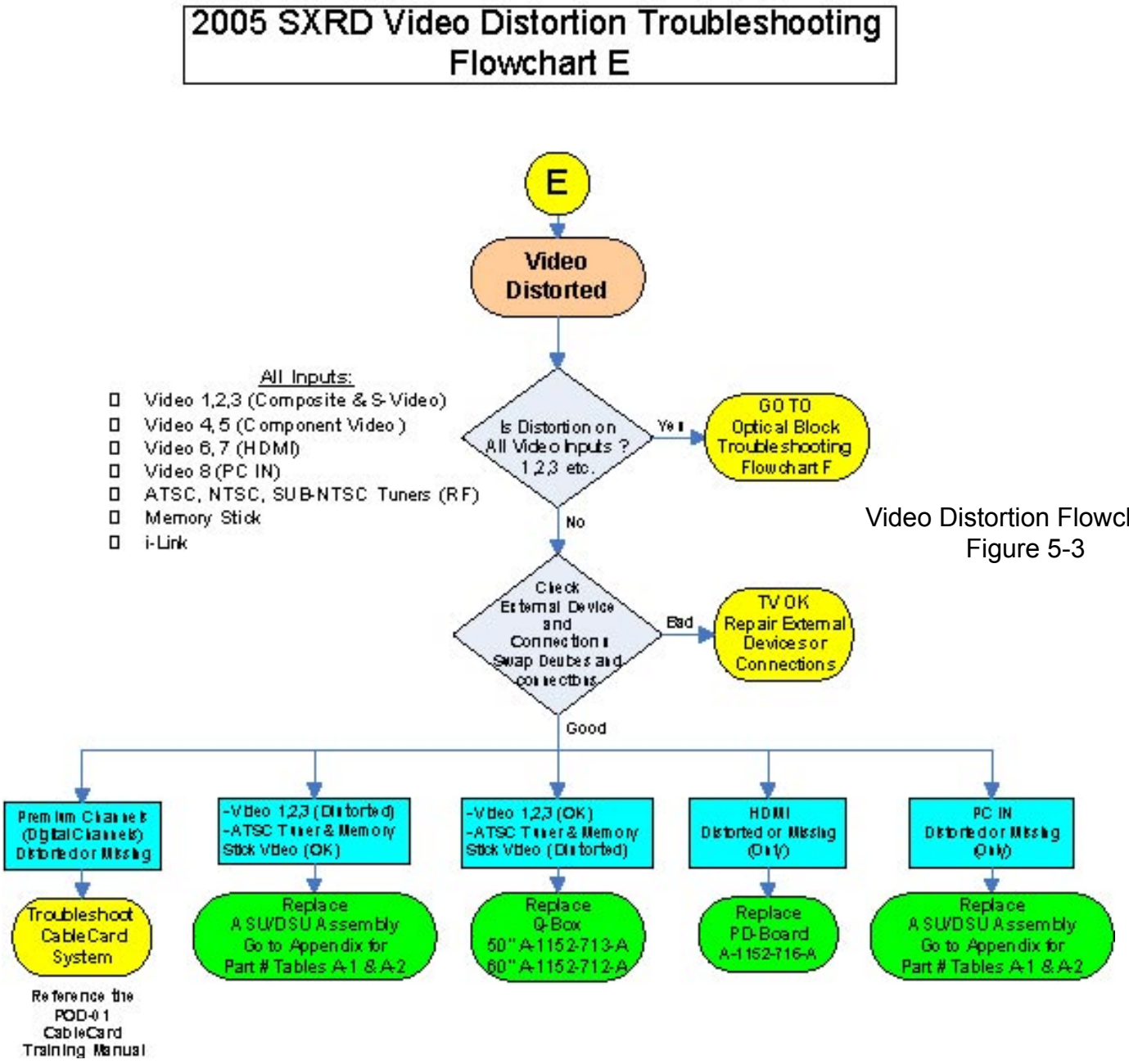
The **IFP** IC4610 receives the **PC Input** directly on the DSU-Board. The IFP is compatible with the VGA, SVGA, XGA, WXGA, and the SXGA formats at the 60hz vertical frequency rate.

The properly scaled IFP output signal (1080p) on the DSU-Board is sent to the C-board and the ROOK & LCD Drivers IC's. The ROOK IC9102 performs gamma control, and white balance control signal processing. The LCD drivers perform the actual individual pixel control for picture display. The SXRD panel has the full high-definition resolution of 1920 X 1080.

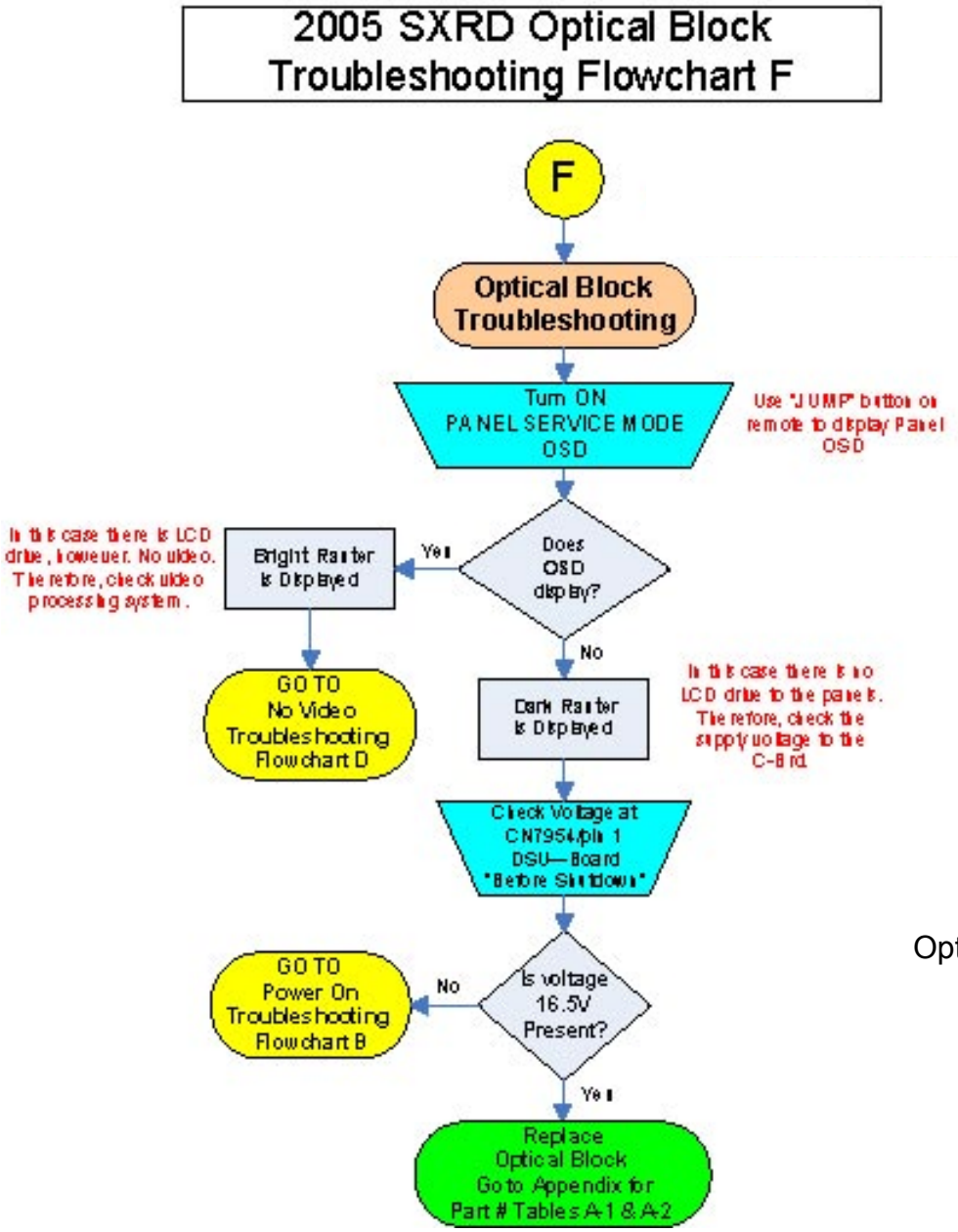
Troubleshooting Flowcharts



No Video Flowchart D
Figure 5-2



Video Distortion Flowchart E
Figure 5-3



Optical Block Flowchart F
Figure 5-4

Troubleshooting Flowchart Step Descriptions

When a video problem occurs you will experience one of the two following symptoms.

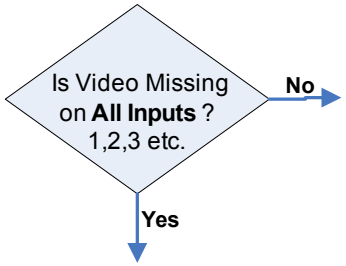
- No Video
- Distorted Video

The main objective when troubleshooting one of the previously listed symptoms is to determine if the defective exists in the Optical Block, ASU/DSU Assembly, or Power Supply System. The three following troubleshooting flowcharts have been designed to effectively and efficiently locate the defective component using mostly visual indicators and symptoms. The three flowcharts are as follows.

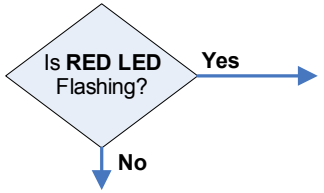
- No Video Troubleshooting Flowchart D
- Video Distortion Troubleshooting Flowchart E
- Optical Block Troubleshooting Flowchart F

No Video

The first step when a “No Video” defect occurs is to determine if video is missing on all video input sources, or if there is missing video only on one or two video input sources.

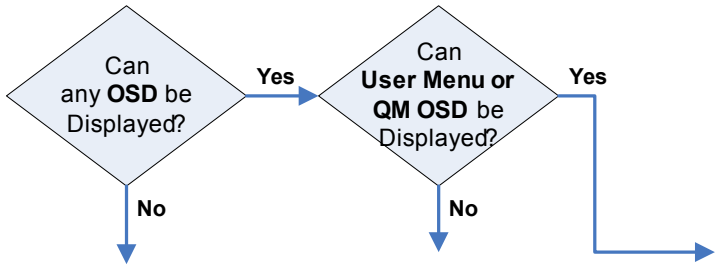


If the video is missing only on one or two inputs then you will go to the “Video Distortion” troubleshooting flowchart E, which will be discussed in the next flowchart description. However, if there is no video on all video input sources the next question to ask is, is the Red LED flashing. In other words, is the unit shutting down and going into protection mode.



If the Red LED is flashing, this means that a protection circuit has detected an error and the DE microprocessor is shutting the unit OFF and placing it into a particular protection mode. In this case, you should go to one of the Protection Mode troubleshooting flowcharts (C1, C2, or C3) found in the Chapter 4. Observe the Red LED flash pattern (e.g. 2X) and proceed to that particular flowchart.

If the Red LED is not flashing the next step is to check if any OSD’s can be displayed



On-Screen Displays (OSD)

Reference Figure 5-5

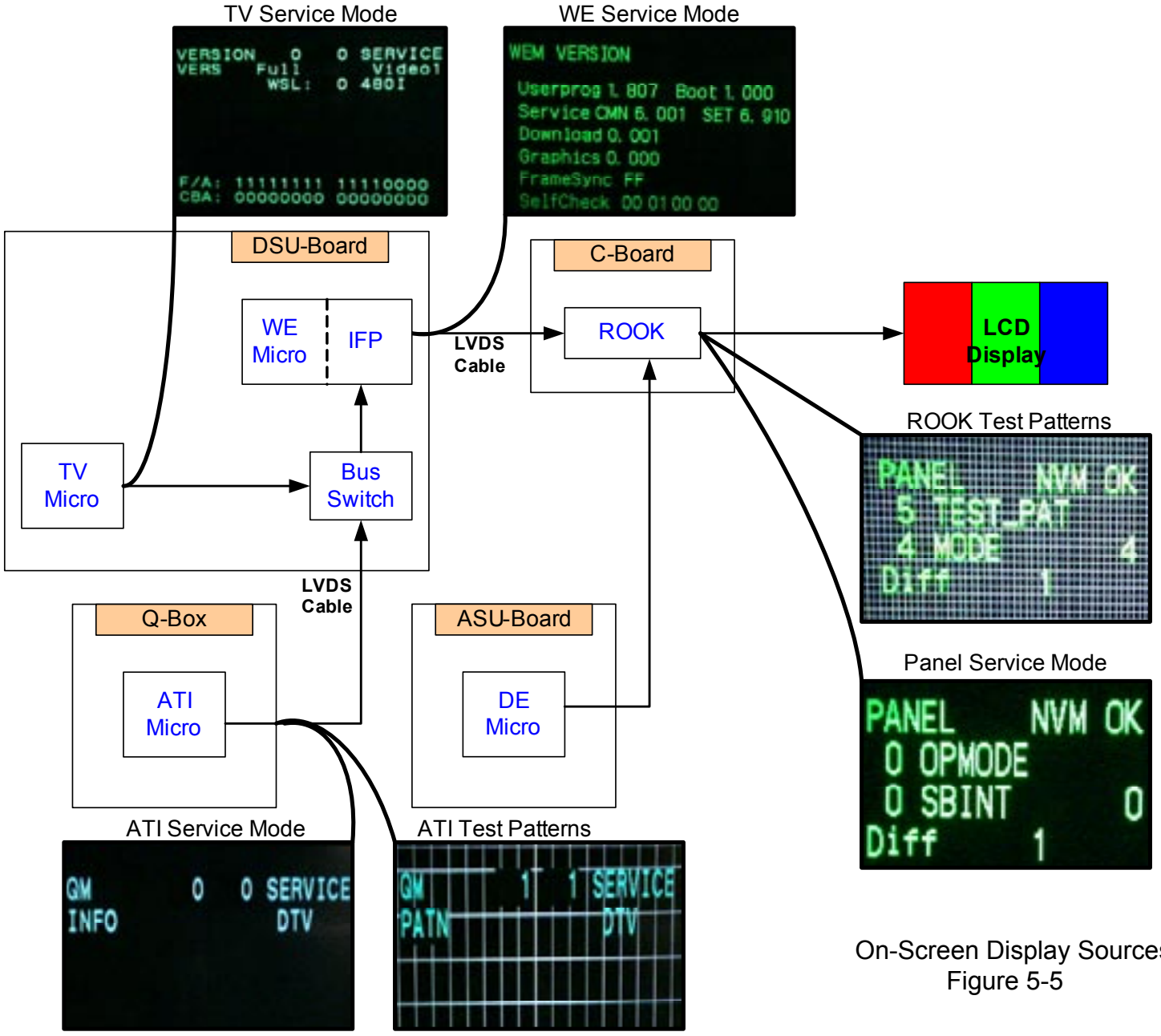
- **User Menu**
- **QM Service Mode**
- **TV Service Mode**
- **WE Service Mode**
- **Panel Service Mode (DE Microprocessor)**

For a detailed diagram showing the location of each OSD generator reference Figure 5-5. The various OSD's are very usefully in troubleshooting a video problem. As shown in the diagram the video system can be divided into four areas or boards (ASU-Board, DSU-Board, Q-Box, and C-Board), by verifying that the particular OSD can be displayed. For example, if the ATI Service Mode OSD were the only OSD missing (all other OSD's are OK) then this would point to a defective Q-Box module.

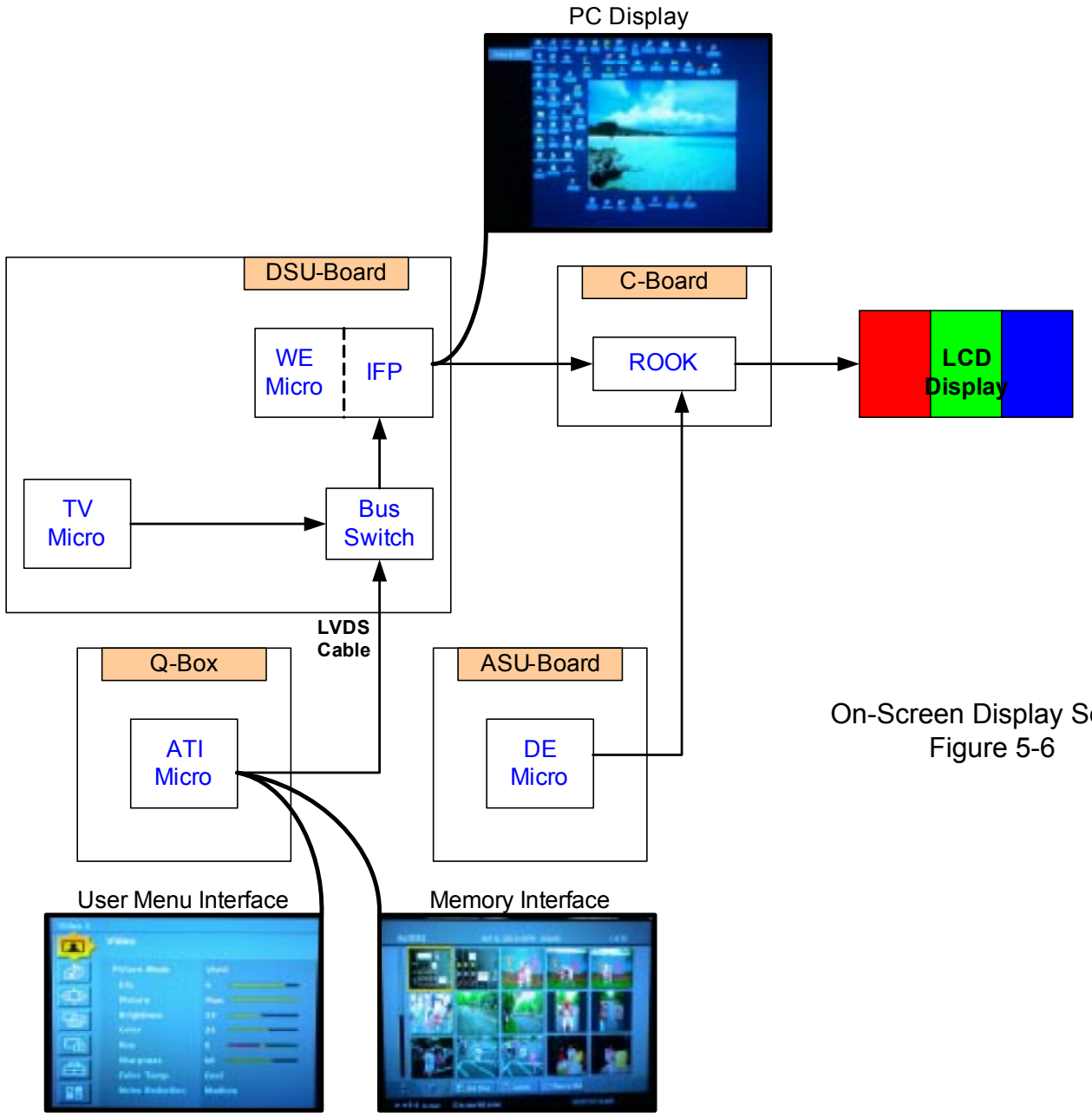
Another important OSD test is to attempt to display the ROOK test patterns. Note that the ROOK is located on the C-board, and therefore, is at the end of the video path just before the Optical Block (the C-board is part of the Optical Block). Consequently, if the ROOK test patterns can be displayed then this effectively indicates that the Optical Block is OK and the defective exists in the circuits before the Optical Block (e.g. the ASU/DSU Assembly).

If no OSD's are displayed then you should go to the Optical Block Troubleshooting Flowchart F next will be discussed in an upcoming flowchart description section.

If some OSD's can be displayed then depending on what OSD's are displayed will determine the defective area. As previously mention check the User Menu, which is developed in the Q-Box module, to determine if the defect is in the Q-Box module or in the ASU/DSU Assembly.



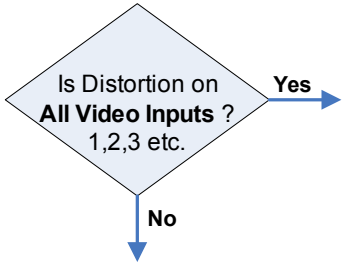
On-Screen Display Sources
Figure 5-5



On-Screen Display Sources
Figure 5-6

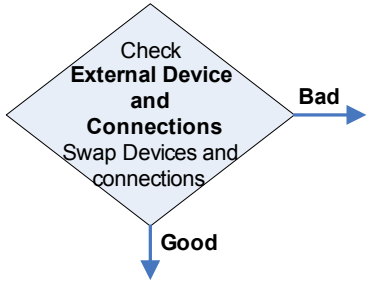
Video Distortion

The primary objective is to locate the defective component through viewing the individual video inputs. The first step when a “Distorted Video” defect occurs is to determine if the video distortion appears in all video input sources, or if the video distortion appears only in one or two video input sources.

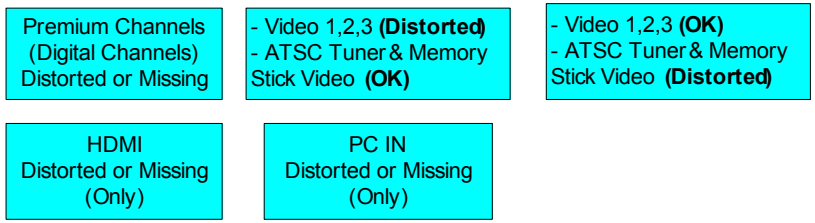


If the video distortion appears in all video inputs you should go to the Optical Block Troubleshooting Flowchart F, which will be discussed next. The reason for going to this flowchart is to quickly determine if the Optical Block if the defective component.

If the video distortion appears only in one or two video inputs then the next step is to eliminate the possibility of a defective or improperly connected external device such as, a VCR or DVD player. The quickest way to troubleshooting the external devices is to swap out the suspect device with a known good device at the particular input.



If the external device or connections are defective then the TV is OK and the external device needs to be service or the connection to the TV repaired. If the external devices and their connections are OK then the next step is to troubleshoot the problem by accessing and displaying each video input shown in the flowchart.



The rationale behind this troubleshooting method is that each of these video input takes an altogether or somewhat different path through the video processing system. This fact enables you to determine the defect, in some cases, down to the component level, and in almost all cases, down to at least the board level. For example, if the distortion appears in Video 1, 2, or 3, however, if does not appear in the ATSC Tuner or Memory Stick input, then the defect exists in the ASU/DSU Assembly. The reason for this conclusion is due to the fact the signal from Video 1, 2, 3 must travel completely through the ASU/DSU Assembly, and the ATSC Tuner or Memory Stick signal only travels partially through the ASU/DSU Assembly. The fact that the ATSC Tuner and Memory Stick are not distorted indicates that the Q-Box is functioning properly and the defect must be in the ASU/DSU Assembly.

The opposite of the previous conclusion is true if the video distortion appears on the ATSC Tuner and Memory Stick inputs but not on the Video 1, 2, 3. In this case, the defect would most likely exist in the Q-Box module. The reason for this conclusion relies on the fact that Video 1, 2, and 3 travels completely through the ASU/DSU Assembly and there is no distortion. This provides a strong indication that the ASU/DSU Assembly is functioning properly. The fact that the majority of the ASTC Tuner and Memory Stick signal path is through the Q-Box module and the signal is distorted provides strong evidence that the defect exists in the Q-Box module.

The same deductive reasoning can be applied when troubleshooting video defects using the other video inputs shown on the flowchart. This method simple involves knowing the path the input signal must take through the video processing system to reach the display. With this knowledge you can effectively divide the video system into distinct areas, and therefore, isolate the defect.

Optical Block

Optical Block Troubleshooting

The primary objective of this troubleshooting flowchart is to determine if the Optical Block, Video Circuits, or the Power Supply System is causing the abnormal TV operation. The very first step is to eliminate or confirm the Optical Block as the defect component. The quickest and surest way to confirm proper Optical Block operation is to access and display the ROOK test patterns.

Turn ON
PANEL SERVICE MODE
Internal Signal Generator

Because the ROOK IC7701 (located on the C-Board) generates the test patterns, the patterns are applied directly to the LCD drive IC's and LCD panels bypassing all other video processing circuits. Therefore, the Optical Block is isolated for troubleshooting purposes. If the patterns are displayed then the Optical Block is OK and the video processing circuits need to be examined.

Dark Raster
is Displayed

The next step is to check the raster intensity (or Overall LCD Panel Lighting) when the ROOK test patterns are turned off and the TV is in normal display mode. If the raster is dark, then this indicates no drive to the LCD panels and you should go to the No Video Troubleshooting Flowchart D to check the video processing circuits.

Bright Raster
is Displayed

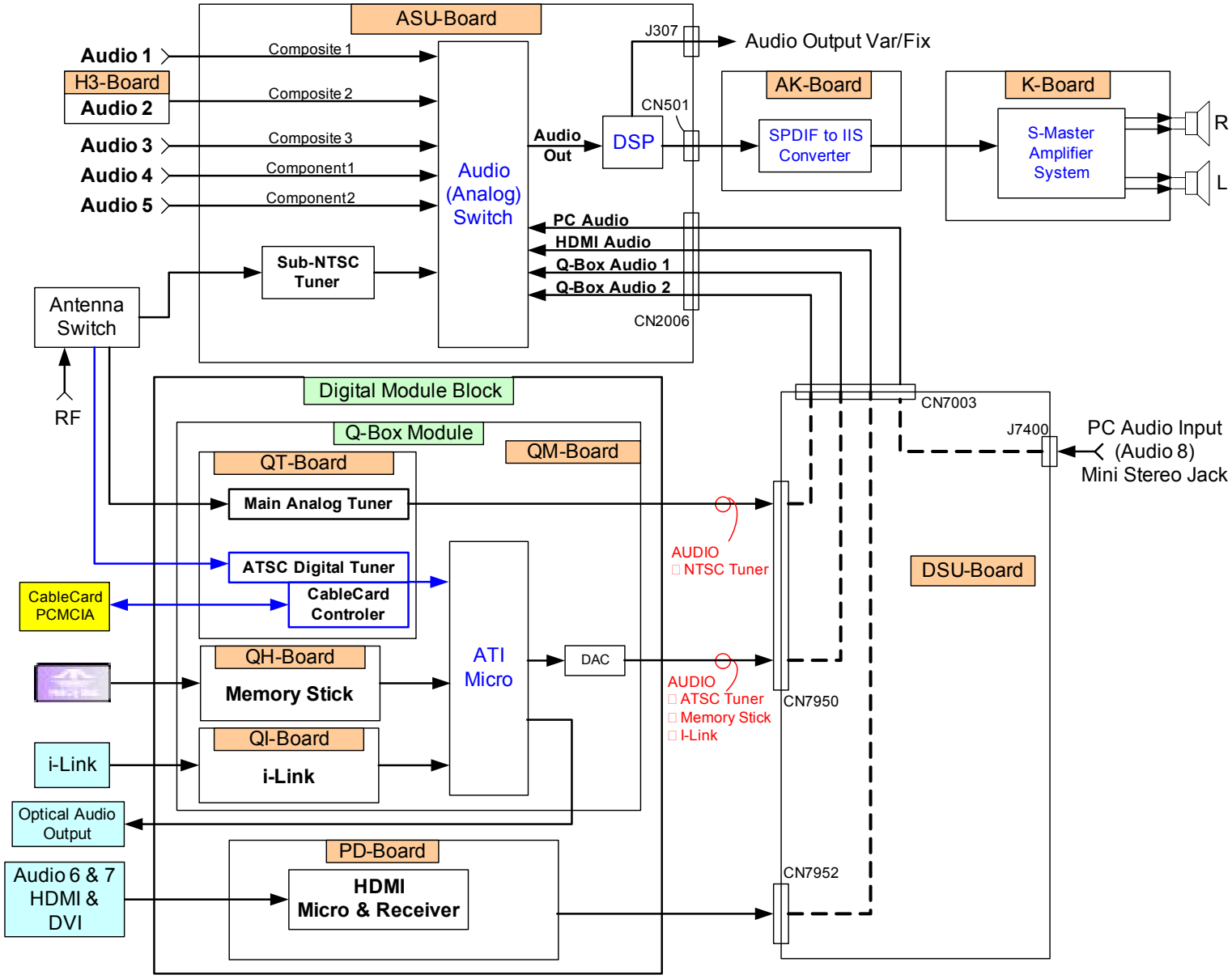
On the other hand, if the test patterns do not display and the raster is bright white, then the LCD panels are receiving drive signals from the LCD drivers. However, no video is reaching the LCD panels. Therefore, the next step is to check the power supply to the C-Board video circuits.

Check Voltage at
CN7954/pin 1
DSU--Board

The voltage at CN7954/pin 1 on the DSU-Board should be 16.5V. If the voltage is missing then you need to troubleshoot the power supply system, go to Power On Troubleshooting Flowchart B. The Main Power Supply develops the 16.5V.

If the 16.5V is present then the defect exists on the C-Board. In this case, replace the Optical Block because the C-Board comes as part of Optical Block assembly.

Overall Block Diagram



Overall System Description

Reference Figures 6-1

All audio inputs are routed through **IC507 (Analog Audio Switch)** on the ASU-Board. The only audio inputs not applied directly to the ASU-Board and IC507 are as follows.

- Audio Input 2
- NTSC Tuner
- ATSC Tuner
- Memory Stick
- i-Link
- HDMI or DVI

Audio Input 2 is first applied to the H3- Board and then to the ASU-Board and IC507.

The NTSC and ATSC tuners are located in the Q-Box module. Notice that the ATSC tuner audio passes through the NTSC tuner. The single tuner audio output from the Q-Box module passes through the DSU-Board before being applied to the ASU-Board and IC507.

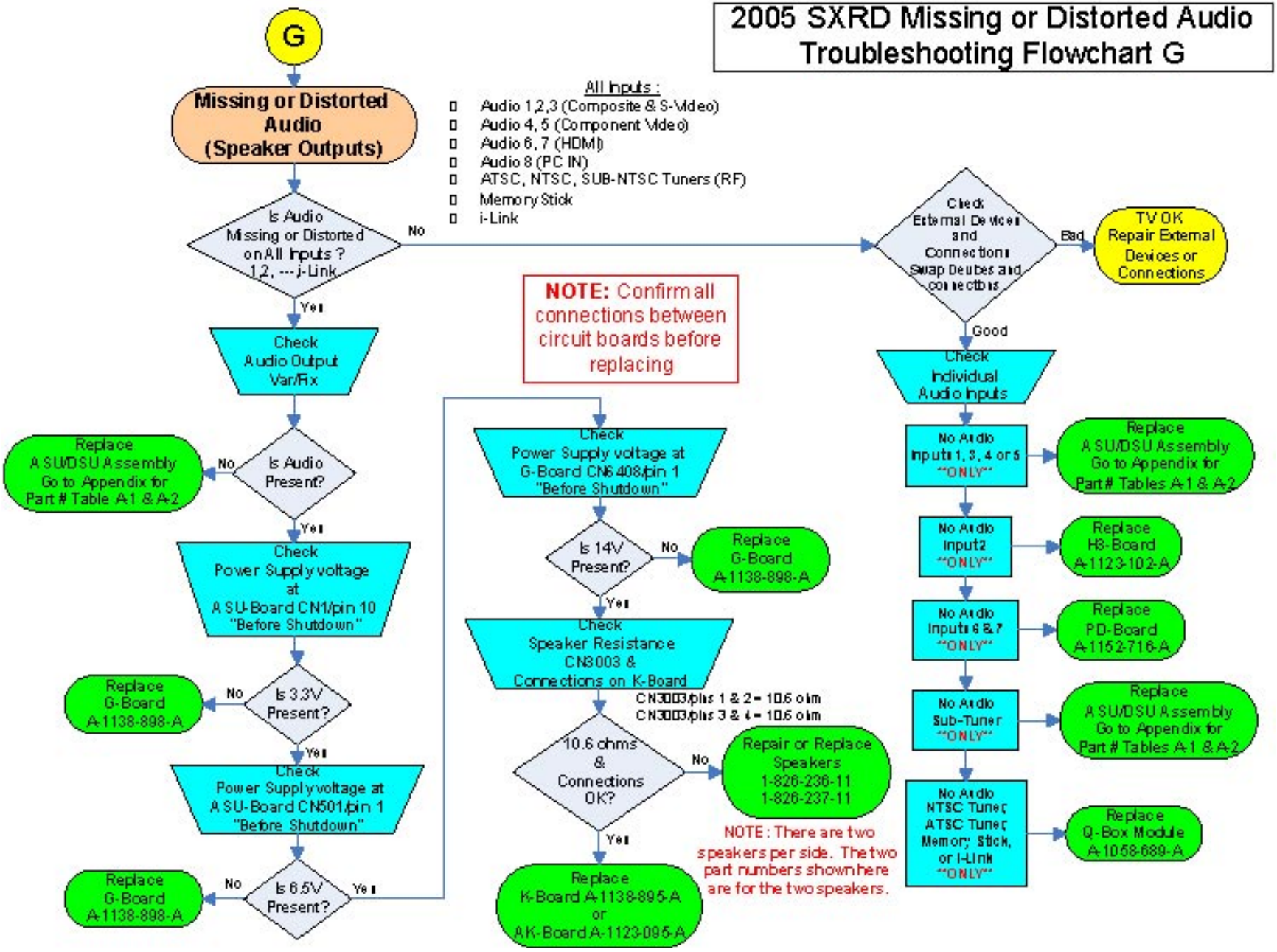
Memory Stick and i-Link are also located in the Q-Box module. The audio for these two sources is first applied to the ATI microprocessor, and the single output is D/A (digital to analog) converter. The resulting analog single passes through the DSU-Board before being applied to the ASU-Board and IC507.

The analog switcher IC507 single output (analog audio single) is applied to an A/D 9analog to digital) converter. The output digital signal is in the SPDIF (Sony/Phillips Digital Interface). The ASU-Board sends the SPDIF signal to the AK-Board.

IC2600 on the AK-Board performs the SPDIF to IIS conversion. The IIS digital signal is a PCM type digital audio format.

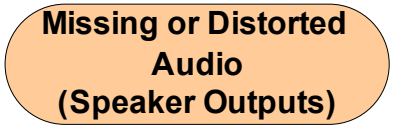
The IIS single is then applied to the K-Board where the S-Master digital audio amplifier system is located. IC3009 performs the IIS to PWM conversion. The PWM signal is then applied to IC3005 where it is amplifier before being applied to the Low-Pass output filter. The Low-Pass filter converts the PWM signal into an analog audio signal, which is finally applied to the speakers.

Troubleshooting Flowchart

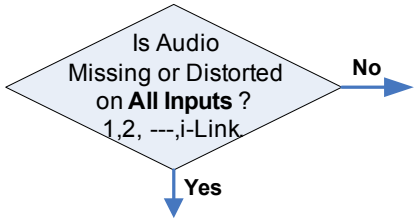


Troubleshooting Flowchart Step Descriptions

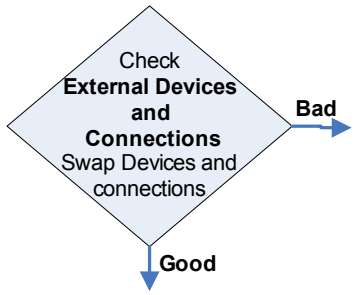
Reference Figures 6-1 & 6-2



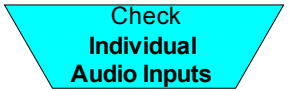
The first step when a "Missing or Distorted Audio" defect occurs is to determine if audio is missing on all audio input sources, or if there is missing audio only on one or two video input sources.



If the answer to this question is **"No"**, meaning that only one or two input sources are experiencing a problem, then the individual inputs must be check separately. The external devices and their associated cables connected to the faulty input should be check first.

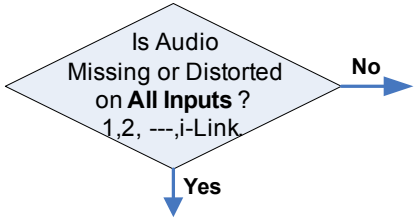


Substitute (or Swap) known good devices and cables on the faulty input. Connect the device and cable at separate times to determine if the device or cables are causing the problem. Obviously, you must replace the device or cabling if found to be defective (or Bad). However, if the external device and cables are OK, then the next step is to replace the unique board or module associated with that particular input source.



For example, consider the symptom of all or only one or two the Video 1, 3, 4, and 5 inputs are faulty. Logically the only device that could cause this symptom is the switcher IC507 on the ASU-Board. The most likely problem is one or more the switcher inputs are defective. In this case, replace the ASU/DSU Assembly.

Another example would be missing or distorted audio on the HDMI (video 8) input only. The only board that would affect only the HDMI audio input is the PD-Board. Therefore, replacing the PD-Board should fix this problem.



Let's going back to the first question diamond in the flowchart and consider how to solve an audio problem if the answer is **"Yes",** meaning, that all the audio input sources are missing or distorted.

Check for audio at the Audio Output Var/Fix to isolate the problem to either the main input switching circuits located on the ASU-Board, or the audio processing circuits located on the AK-Board and K-Board. The audio system is divided in half when accessing this checkpoint (Audio Output Var/Fix).

Check
Audio Output Var/Fix

If there is no audio present at the Audio Output Var/Fix jack then the problem exists in the audio switching circuits located on the ASU-Board. Replace the ASU/DSU Assembly to repair problem.

If there is audio present at the Audio Output Var/Fix then the audio switching circuits are OK and the problem is located in the audio processing circuits located on the AK-Board or K-Board. Before replacing either the AK-Board or the K-Board follow the next three steps in the troubleshooting flowchart to confirm the power supply voltages for each board. These steps will determine if the cause of a missing or distorted audio output is a missing or insufficient power supply voltage.

The power supply voltages are accessible on either the ASU-Board (3.3V and 6.5V) or the G-board (14V). The voltages can be check directly on the AK-Board and K-Board, however, the C-Board cables must be disconnected and the complete chassis assembly partially pulled out. In the case, the unit will go into protection mode after turning ON. Consequently, the voltages must be check prior to the unit shutting down.

You will first check the 3.3V and 6.5V power supply voltages to the AK-Board. The 3.3V powers both the AK-Board and the K-Board. The 3.3V is fed to the K-Board through an inter-AK-K board connector.

Check
Power Supply voltage at ASU-Board CN1/pin 10

(3.3V)

Check
Power Supply voltage at ASU-Board CN501/pin 1

(6.5V)

If either the 3.3V or 6.5V are missing then the problem exists in the power supply circuits. Replace the G-Board.

If both the 3.3V and 6.5V are OK, then the next step is to check the 14V power supply voltage directly connected to the K-Board. The 14V powers the digital output amplifier circuits.

Check
Power Supply voltage at G-Board CN6408/pin 1

IMPORTANT: To access the CN6408 when checking the 14V power supply voltage you must partially pull out the complete chassis assembly. Consequently, the C-Board cables must be disconnected. The unit will go into protection mode when turned ON. Therefore, place your meter on CN6408/pin 1 before pressing the ON button to check for the presence of 14V before unit shuts down.

If the 14V is missing then the problem exists in the power supply circuits. Replace the G-Board.

If all the power supply voltages (3.3V, 6.5V, and 14V) are present and at the designated level then the final check before replacing either the AK-Board or K-Board is the speaker system.

Check
Speaker Resistance & Connections on K-Board

The speakers should measure 10.6 ohms each. Measure the speaker resistance at CN3003/pins 1, 2, 3, 4. Confirm all speaker connections to the K-Board are secure and undamaged. Replace or repair the system if necessary.

If the speaker system checks OK, then the problem exists on AK-Board or the K-Board. Because both boards are located underneath a shield it is difficult to make any measurements to isolate the problem to either board. Therefore, the easiest way to determine which board is defective is through know good board substitution. Install the AK-Board and K-Board individually and test unit for proper audio.

Appendix

ASU/DSU Assembly Part Numbers Per Serial Number

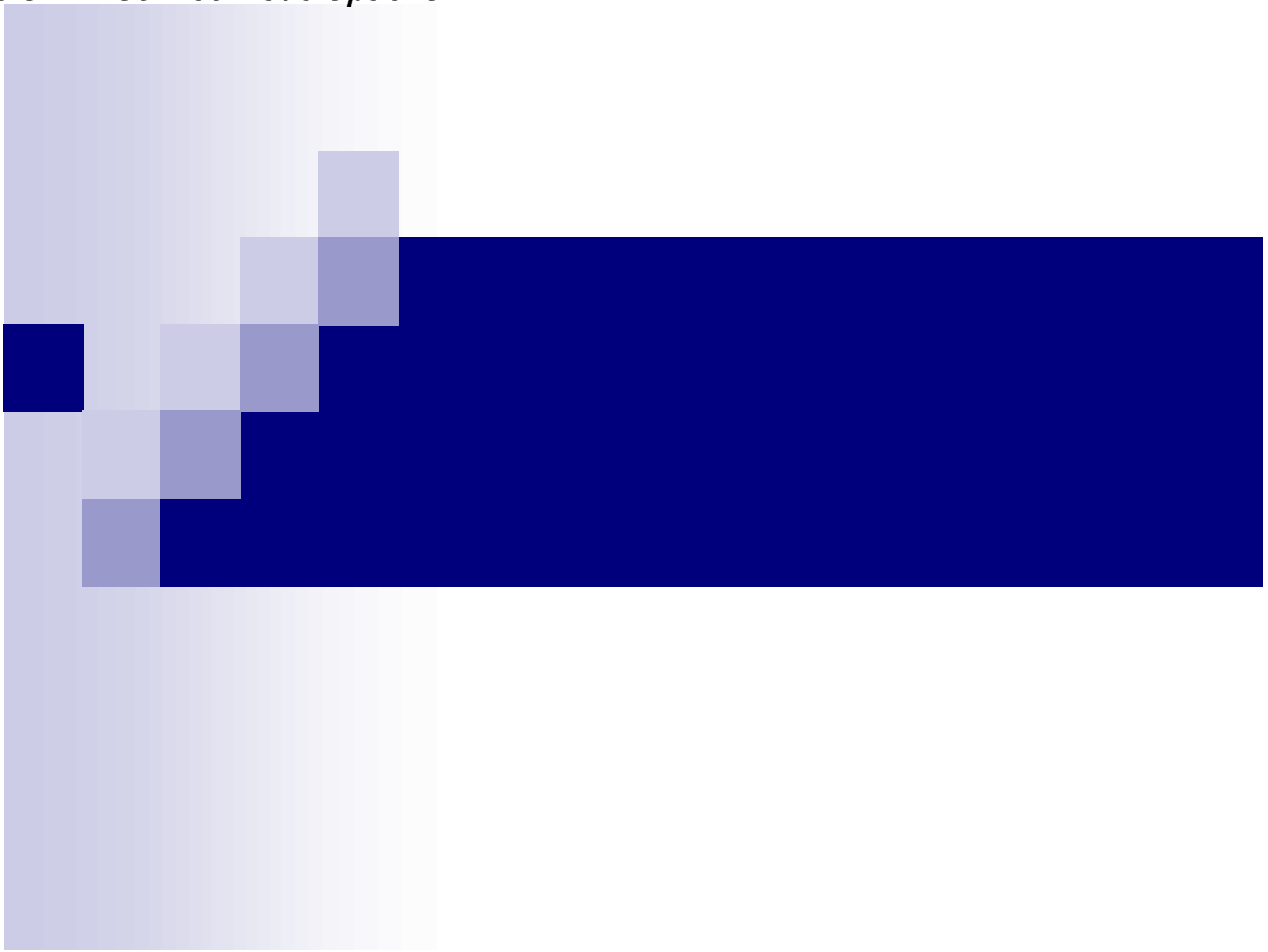
Table A-1 KDS-R50XBR1 ASU/DSU Assembly & Optical Replacement

KDS-R50XBR1	**Serial Number Range**	9000001 to 90xxxxx 9800001 to 98xxxxx	9100001 to 91xxxxx 9900001 to 99xxxxx
	ASU/DSU Assembly	A-1152-715-A	A-1152-715-B
	Optical Block	A-1148-155-A	A-1168-495-A

Table A-2 KDS-R60XBR1 ASU/DSU Assembly & Optical Replacement

KDS-R60XBR1	**Serial Number Range**	2000001 to 20xxxxx 9000001 to 90xxxxx 9800001 to 98xxxxx	9100001 to 91xxxxx 9900001 to 99xxxxx
	ASU/DSU Assembly	A-1152-714-A	A-1152-714-B
	Optical Block	A-1127-174-A	A-1168-494-A

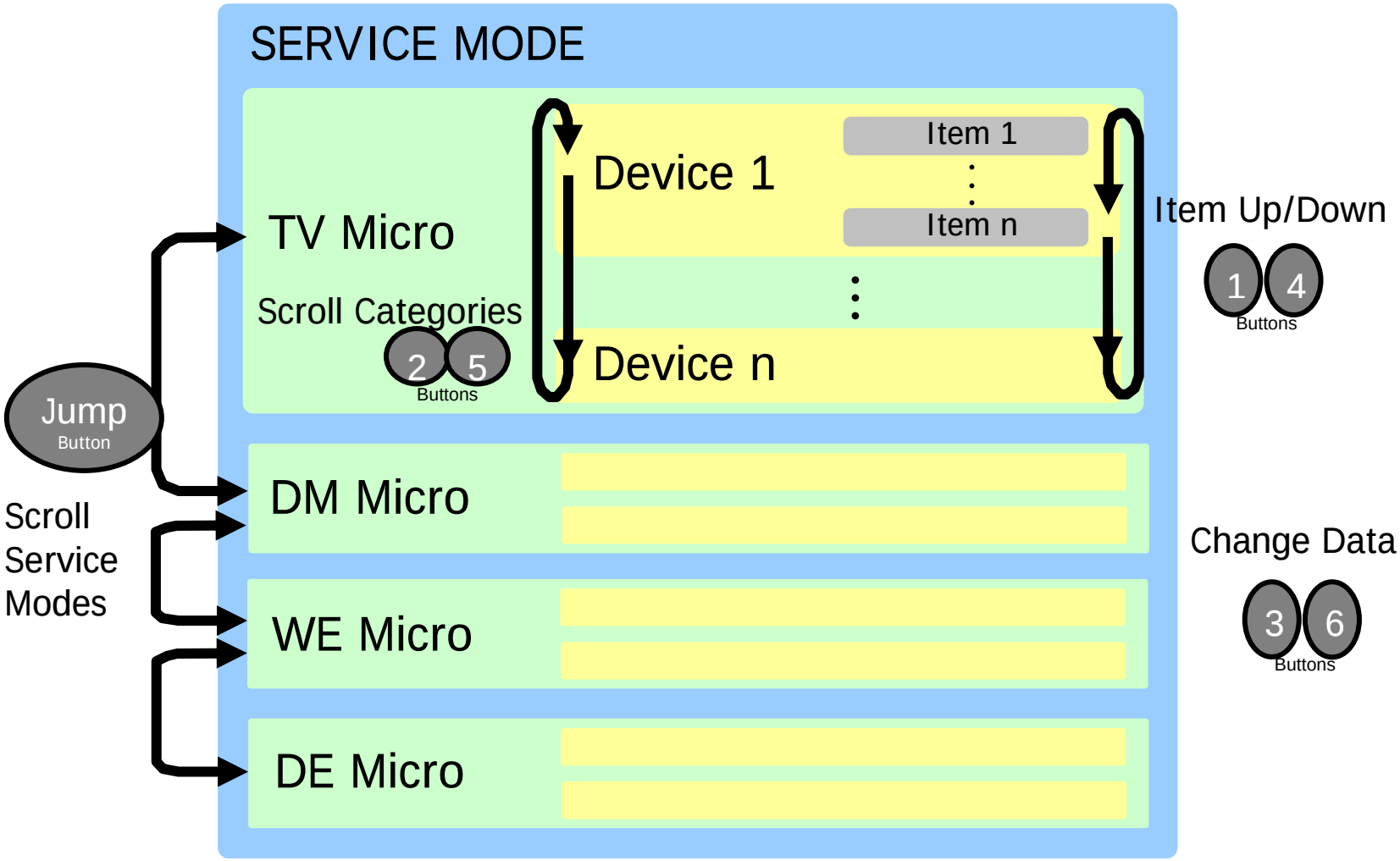
2005 SXRD Service Mode Options



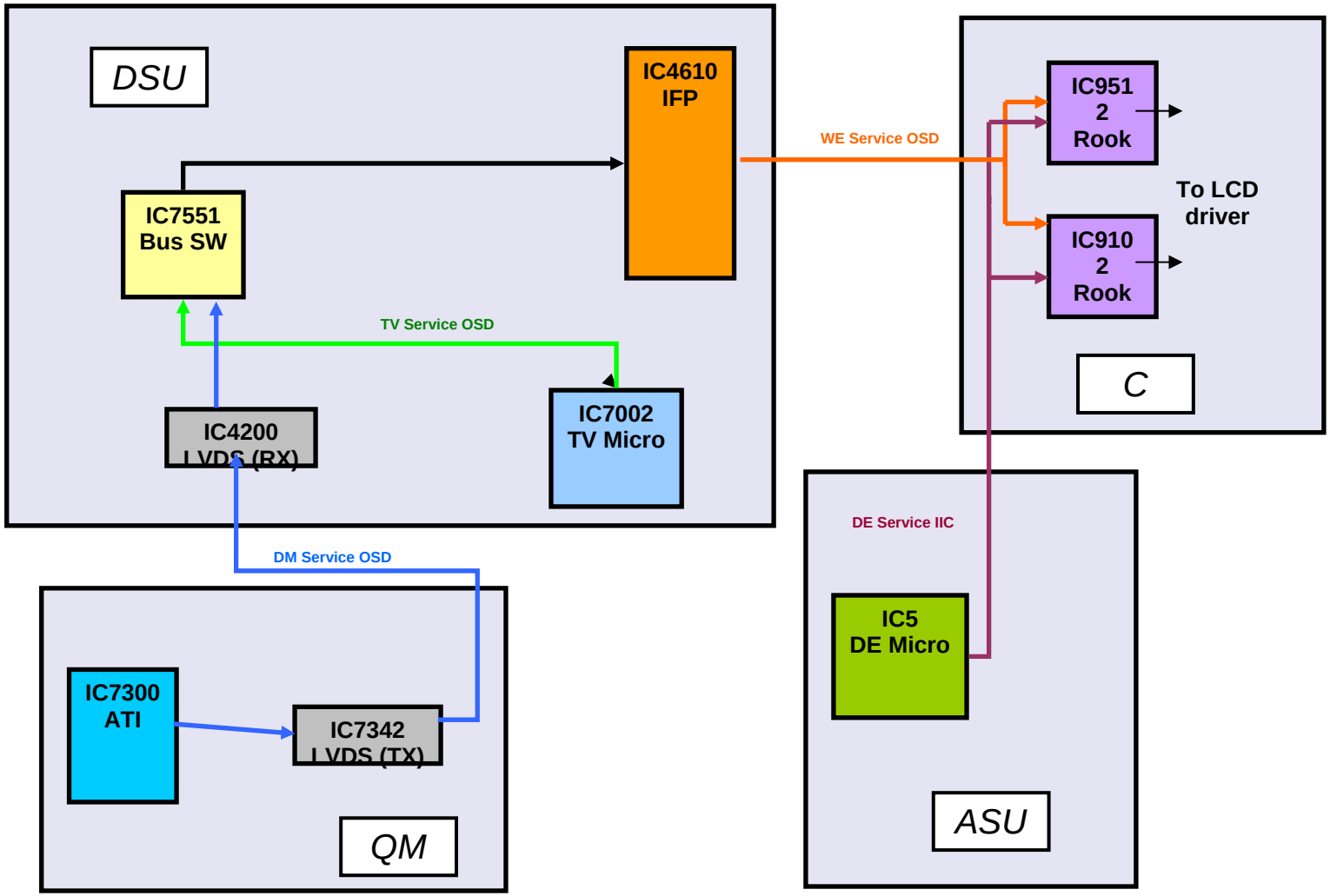
Service Mode Options

- There are 4 Service mode options for the KDSR50/60XBR1 controlled by each Micro.
- Each Micro generates it's own service OSD.
  - **TV Micro:** Use to display Software and NVM version information.
  - **DM Micro:** Use to display DMB test patterns, check tuning status, Host ID and save user and service related data.
  - **WE Micro:** IFP Device control
  - **DE Micro:** Use to display C board test patterns and adjust H/V center.

Navigating in Service Mode



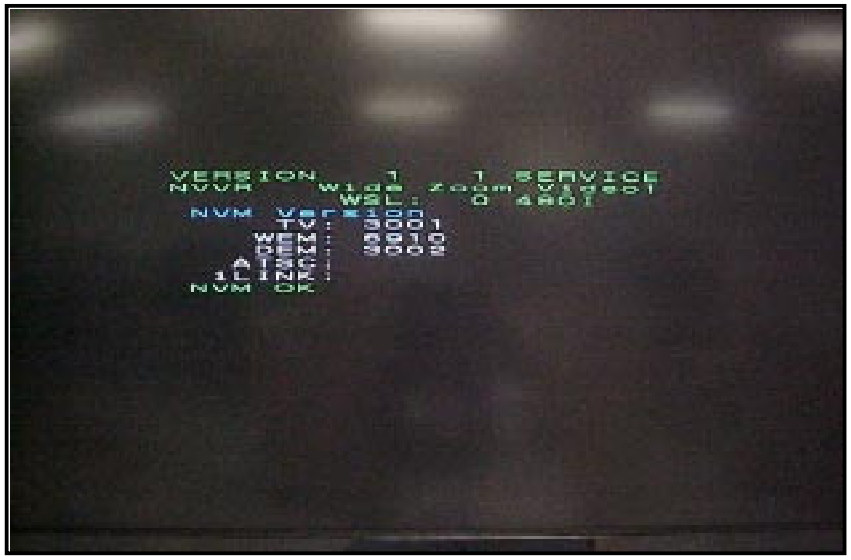
Service OSD Path



Verifying Micro Version

- To verify micro version:
  - Enter service mode [Display] + [5] + [Vol. +] + [Power].
    - The first service item is VERSION.
  - Toggle the data from 0 to 1 with the [3] button.
  - Micro versions are displayed to the right of each key device.

- To verify micro version:
  - Enter service mode [Display] + [5] + [Vol. +] + [Power].
    - The first service item is VERSION.
  - Scroll to Item NVVR by pressing the [1] button.
  - Toggle the data from 0 to 1 with the [3] button.
  - NVM versions are displayed to the right of each key device.



DMB Test Patterns

- The DMB is capable of displaying 2 sets of test patterns.
  - Service item “PATN” displays test patterns that take the same path as the main video from the DMB.
  - Service item “GTPN” displays test patterns that take the same path as the graphics generated in the DMB.

- To display the DMB internal test pattern:
  - Enter service mode: [Display] + [5] + [Vol. +] + [Power].
  - Once in service mode press the [JUMP] button one time on the remote to enter DM service mode. You will be in the “QM Info.” Screen.
  - Scroll to Item 1 “PATN” or Item 2 “GTPN”
  - using the [1] button on the remote.
  - You can scroll through the various test patterns using the [3] button on the remote.

DMB Test Patterns

The available “PATN” test patterns for the DMB are listed below:

1080i

1. Cross-hatch
2. Color Bar + Color Ramp
3. Window
4. Color Bar
5. White
6. White/Blue
7. Stair Step
8. Horizontal Burst
9. Horizontal Burst (Color)
10. Horizontal Ramp
11. Overscan
12. Cross-hatch (thick)
13. Diamond Dots
14. White

480i 21 -> 35 with the same patterns as above

480p 41 -> 55 with the same patterns as above

720p 61 -> 75 with the same patterns as above

***Some of the signals accompany 100 % AUDIO signal.**
Please note that "MUTE " or "Volume " does not work in this case.

C Board Test Patterns

- The Rook IC on the C board is capable of displaying test patterns. These are very important in determining if a video defect is related to the Optical Block or prior video processing stage (ASU/DSU etc.)
- To display the C board test patterns take the following steps:
  - Enter service mode [Display] + [5] + [Vol. +] + [Power].
  - Press the [JUMP] button three times until you arrive at the PANEL service mode.
  - Once in Panel Service Mode press the [2] button five times until you arrive at Device 5 TEST_PAT.
  - Once in TEST_PAT you must enable the test patterns by toggling the data from 0 to 1 by pressing the [3] button one time.
    - *Note the screen will turn all white, however service OSD will still be displayed.
  - Once test patterns are enabled you can display flat color fields or individual test patterns.

C Board Test Pattern Options

- To display flat color fields scroll to item 1 “IPT_RGB” under Device 5 TEST_PAT with the [1] button.
  - By default the data value will be 7 which displays an all white screen. Press the [6] button to change data values and display the individual color fields.
  - Data Value
    - 7= White
    - 6= Yellow
    - 5= Magenta
    - 4= Red
    - 3= Cyan
    - 2= Green
    - 1= Blue
    - 0= Black

    *Alternatively Items PAT_ENB & PAT_RGB can be used. These patterns do not have White Balance correction enabled.

- To display individual patterns scroll to item 4 “MODE” under Device 5 TEST_PAT with the [1] button.
  - To display test patterns press the [3] button on the remote:
  - Data Value
    - 0= Plain (white)
    - 1= Stripe
    - 2= Checker (small)
    - 3= Lattice
    - 4= Cross-hatch
    - 5=Cross- point
    - 6= Ramp
    - 7= Stair Step
    - 8= Checker (large)
    - 9= Diagonal
    - 10= Window

****Note if IPT_ENB is not returned to a value of “0” the test patterns will remain on screen when power is cycled. In this state the service OSD is not accessible. To clear the test patterns cycle AC power OFF/ON.**

Electrical H/V Center Adjustment

- H/V center adjustment may be necessary if the optical block is replaced. Unlike previous GW models H/V center is adjusted by the Rook ICs on the C board.
- Since the adjustment takes place at the end of the video processing chain there is no need to adjust H/V center for multiple Wide modes.
- Use the below Service Items to adjust:
  - 1 TG (Device)
    - VST_POS (for V center) Initial Data = 12
      - Adjust [1~25] Primary item for V center adjustment
      - First, try to adjust with VST_POS if you must change more than +13/-11 then start to change with FMDVPOS

***If "VST_POS" is changed greater than these limits then there could be issues with Gamma.**

    - HST_POS (for H center) Initial Data = 261

  - 17 FMD (Device)
    - FMDVPOS (Secondary Method for V center) Initial Data = 8
      - Adjust [1~17] Additional item for V center adj

H/V Center Adjustment Procedure

- Check H/V center with a monoscope pattern with wide mode set to Full. **(QM Cross hair test pattern #11 can be used if no other source is available)**
- To adjust H/V center take the following steps:
  - Enter service mode: [Display] + [5] + [Vol. +] + [Power].
  - Press [JUMP] button on remote three times until you arrive at PANEL service mode.
  - Scroll to Device “TG” by pressing the [2] button one time.
  - Once in Device “TG” scroll to item 4 “VST_POS” to adjust vertical center.
    - Use the [3] and [6] buttons to adjust as needed.
  - Scroll to item 5 “HST_POS” to adjust horizontal center.
    - Use the [3] and [6] buttons to adjust as needed.

  *** Note after adjusting press [mute] + [enter] to write new settings.**

Lamp Timer

- To check the lamp timer take the following steps:
  - Enter Service mode [Display] + [5] + [Vol. +] + [Power].
  - Press the [JUMP] button three times to arrive at PANEL service mode.
  - Once in PANEL service mode press the [2] or [5] button until you arrive at Device 20 “Timer”
    - Lamp time is shown to the right

- To reset the lamp timer:
  - Scroll to Item 1 LMPRST by pressing the [1] button.
  - Toggle the data from 0 to 1 with the [3] button and write changes by pressing [mute] + [enter].

- To check operation time:
  - Scroll to item 2 OPERAT by pressing the [1] button.

*** Note lamp and operation time are written to NVM after power off is performed by the remote or front panel button. If AC On/Off is performed lamp and operation time accrued since last power on are NOT written to NVM.**

DMB Diagnostics

- The following Information can be determined in QM service mode:
  - ATI Software version/System Status
  - Tuning status
  - POD Key
- User and Service data can be saved to memory stick.

System Status

- To view the system status page:
  - Enter service mode [Display] + [5] + [Vol. +] + [Power].
  - Press the [JUMP] button one time to arrive at the DM service mode.
  - Press the [3] button one time to display the system status screen.

Indicates SW version

Color Code Chart

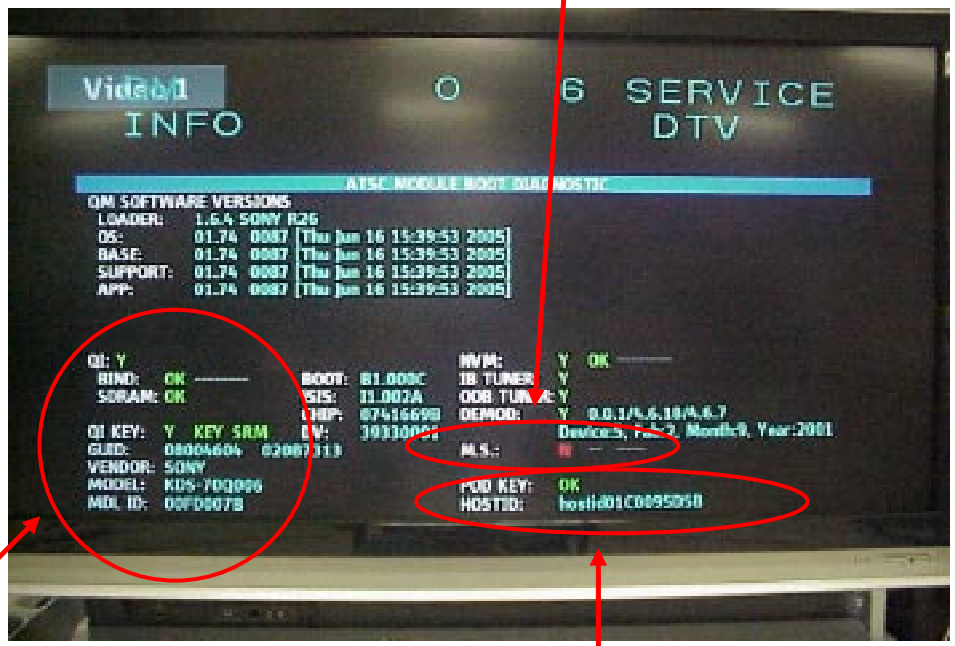
COLOR	MEANING (standard)
WHITE	Label Text
CYAN	Information
GRAY	Disabled
GREEN	OK/Good/Valid
YELLOW	Warning
RED	Error

Confirming Tuning Status

- To check the tuning status:
  - Enter service mode [Display] + [5] + [Vol. +] + [Power].
  - Press the [JUMP] button one time to arrive at DM service mode.
  - Press the [3] button seven times to display the Front End screen.
- Key Items to check include:
  - Verify the In Band and OOB status are “LOCK”.
  - SNR (Signal to Noise Ratio): There is no hard value to confirm signal strength is at an acceptable level but as a rule of thumb a SNR of >20 is usually acceptable. SNR of 25->30 is preferred.
  - Note if uncorrected errors is high it could indicate a weak or noisy signal is being received and the DMB is unable to correct. There is no hard value or threshold value.

Confirming Host ID and I.Link Status

- To check the Host ID, I.Link and MS status:
  - Enter service mode [Display] + [5] + [Vol. +] + [Power].
  - Press the [JUMP] button one time to arrive at DM service mode.
  - Press the [3] button six times to display the ATSC Module Boot Diagnostics.



User/Service Data Memory Stick Read/Write Feature

- The Digital Module service mode includes a feature that will allow the user/service data stored within the Digital Module to be read/written to a Memory Stick. This feature allows for a module to be replaced by Service personnel while preserving the user's TV configuration data. This feature will store/load both the factory default data (which is model specific) as well as the user's current settings.

Writing User/Service Data to Memory Stick

- When the DMB is replaced user data can be saved to memory stick as follows:
  - Enter Service Mode [Display] + [5] + [Vol. +] + [Power].
  - Once in service mode press the [JUMP] button on remote to enter DM service mode. You will be in the “QM Info.” screen.
  - Scroll down to item 12 “WUSR” using the [1] button.
  - Insert a memory stick and toggle the data from 0-1 using the [3] button.

Saving User/Service Data to DMB

- When the DMB is replaced user data can be written to the new DMB as follows:
  - Enter Service Mode [Display] + [5] + [Vol. +] + [Power].
  - Once in service mode press the [JUMP] button on remote to enter DM service mode. You will be in the “QM Info.” screen.
  - Scroll down to item 13 “RUSR” using the [1] button.
  - Insert the memory stick containing the saved data and toggle the data from 0-1 using the [3] button.

User Menu H/V Adjustment

- To adjust the user graphics position:
  - Enter service mode [Display] + [5] + [Vol. +] + [Power].
  - Press the [JUMP] button one time to arrive at DM service mode.
  - Scroll to item 8 GFXX or item 9 GFXY with the [1] button.
  - Adjust graphics position for each item by changing data with the [3] and [6] buttons.
    - 8 GFXX (H position)
    - 9 GFXY (P position)

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