SONY

Training Manual

KDL52XBR5

FIX-2 Direct-View LCD Television Chassis

Circuit Description and Troubleshooting Guide

MODELS:

KDL-40V3000	KDL-46V3000	
KDL-40VL130	KDL-46VL130	KDL-52W3000
KDL-40W3000	KDL-46W3000	KDL-52WL130
KDL-40XBR4	KDL-46XBR4	KDL-52XBR4
KDL-40XBR5	KDL-46XBR5	KDL-52XBR5

Course : CTV-43

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Chapter 1 – Introduction

The FIX-2 chassis is one of several LCD Flat Panel designs introduced for the Bravia™ 2007 model year. 14 models are included in the lineup to provide the customer with a choice of entry, intermediate and high-end “Full 1080” panel resolutions. The following models utilize the FIX-2 chassis:

KDL40V3000	KDL46V3000	
KDL40VL130	KDL46VL130	KDL52W3000
KDL40W3000	KDL46W3000	KDL52WL130
KDL40XBR4	KDL46XBR4	KDL52XBR4
KDL40XBR5	KDL46XBR5	KDL52XBR5

The key items that differentiate the models (aside from LCD panel size) is types of video inputs provided and a new frame doubling circuit used exclusively in the XBR series. The only difference between the XBR4 and XBR5 models is cosmetic. The XBR4 models are available with optional bezels to change the color and appearance of the unit where the XBR5 is a fixed piano black color.

V Series: Available as the introductory model, 2 HDMI, 2 component, 2 composite, and a PC input are available at the rear of the cabinet. Video 2 input (located on the left side) accepts composite video input only.

W Series: The upgrade to the W series includes an additional HDMI input at the left side of the unit along with composite.

XBR Series: Contains the same video inputs as the W series. An additional circuit (known as Motionflow™) is added between the video processing circuits and LCD panel to double the 60HZ frame rate to 120HZ.

Features

LCD Panels

All LCD panel sizes have a pixel resolution of 1920 X 1080 to allow full HD display from devices generating 1080p. Backlighting is generated by Wide Color Gamut Cold-Cathode Fluorescent (WCG-CCFL) tubes for increased color uniformity and accurate grey scales.

Processed video enters the panel as 10-bit RGB for increased grayscale levels.

New XMB® Customer Menu

Standing for Xross Media Bar (pronounced cross media bar) the customer Graphics User Interface (GUI) has been improved to make navigation of the setup features easier. Icons (similar to those found on many gaming consoles) are used extensively.

Internet Video Link

Yet another first for Sony, the Bravia™ model lineup will include a device known as Bravia Internet Video Link. Customers will have the ability to access internet video entertainment via a broad-band connection. Local news, weather and traffic along with access to selected digital media streaming can be viewed on the television independent of a computer.

The service USB port on the rear of the television will allow bi-directional communication with the device via the XMedia Bar™ feature included in the television. Sony will partner with selected channels on the internet and these will automatically appear on the screen for the customer to select.

HDMI 1.3 Support

HDMI version 1.3 has added several features to enhance picture and audio quality along with bi-directional communication between HDMI equipped devices. The added features that apply to display products are as follows:

Speed: Single link bandwidth is increased from 4.9GBS to 10.2GBS

Deep Color™: Increases RGB and component sample level from 24-bit to 30, 36, and 48 bit.

xvYCC: Removes previous color space limitations to allow for the reproduction of every color perceivable by the human eye.

CEC: Short for Consumer Electronics Control. Allows communication among HDMI devices for control. Uses the industry standard A/V link protocol. For example: Equipment can be set up so that when a DVD disc is inserted into a player, the television will turn on with the proper input setting along with the audio equipment turning on and being set for the proper input and audio format.

Bravia™ Theater Sync

A feature incorporated within the television to utilize the CEC feature of HDMI 1.3

1080p Input

Unit can receive 1080p source content via the HDMI, component and PC inputs. 24-frame content is also supported.

New Circuit Descriptions

Figures 1-1 through 1-8 contain overall block diagrams for the various versions of the FIX2 chassis. Due to the significant variation between the models (primarily due to additional circuits to drive the panel backlights) separate block diagrams are needed to clarify the circuit descriptions. Explanations will be given starting with the entry level 40-inch V series and the differences between the models will be discussed.

40” V Series

Figure 1-1 illustrates the overall block diagram for the 40” V series models. New to the FIX2 chassis is the combining of the digital decoder IC (for ATSC/QAM signals) on the same circuit board as the video processing circuits. Each circuit will be discussed below.

FB3 Board

All video signals are processed on this board. It accepts digital and analog sources. Analog sources are A/D converted by the Bravia™ Engine. Digital sources are directly processed and scaled to the 1920 X 1080 resolution of the LCD panel. All resolutions other than 1080p are frame doubled to 60HZ. The BE microprocessor is also located on this board and is primarily tasked to controlling the video process circuits and its proper handling of the incoming video sources.

AU Board

All analog video sources enter the AU board and are selected by a video switch IC to be sent to the FB3 board for processing. This board also contains all of the necessary circuits to process audio including a combination switch and digital signal process IC along with a class D amplifier for driving the speakers. A sub microprocessor is also located here and is responsible for controlling the operation of the unit and providing an interface for the user.

TUU Board

Digital and analog RF signals are selected here by a combination NTSC/ATSC/QAM tuner. An NTSC demodulator is located within the tuner while a separate demodulator is located on the board (external from the tuner) for digital signals. Unlike past models in which the digital information was sent to the decoder as an intermediate frequency RF, the digital television signals are sent to the decoder on the FB3 board as a demodulated digital stream.

HV2 Board

Known as the “front video” input, this board is located on the lower left side of the unit. The V series models only accept composite video sources. Also included on this board is L/R analog audio inputs along with output for headphones.

HW1 Board

All of the various function keys for operating power, channel selection and volume are located on this board.

HW3 Board

This board contains the remote IR receiver along with the function indicator LED lights for standby, power-on and timer.

GF1 Board

The standby and main switching regulator supplies are located here. All primary voltages sources originate at this point with additional regulators found on the UA, FB3 and DF1 boards.

DF1 Board

Powered by the GF1 board, this circuit contains an inverter circuit and generates the necessary high voltage and ballast control for the fluorescent backlights inside the LCD panel. This voltage is sent to the balancer board for distribution among the fluorescent tubes. The high voltage generated is monitored for adequate level along with current levels. If the high voltage is inadequate or non-existent or current levels reach unacceptable levels, an error signal is sent to the sub-micro on the AU board via the GF1 board.

Balancer

Along with providing even distribution to the backlight lamps, current monitoring for each individual lamp is monitored. If excessive or inadequate current is detected at one of more of the lamps, an error signal is sent back to the DF1 board, through the GF1 and finally to the sub-micro located on the AU board to place the unit into protect shutdown.

NOTE: *The balancer boards used in the FIX2 chassis are referred to as “inverter boards” in the service manual since that is the name they are registered under in the parts system. Technically, they are not inverters since there is no inverter circuit located on them. The DF boards used in all the models are true inverters. To avoid confusion, this manual will use the term “balancer” to refer to the high voltage distribution and current monitoring circuits for the lamps. The DF boards will be referred to as “inverters”.*

LCD Panel

An additional circuit is integrated with the LCD panel known as TCON. This circuit is responsible for the timing and allocation of the digital RGB video information to the correct pixels on the panel to generate a viewable picture. Sophisticated shielding is required for this circuit due to EMI issues so this circuit will be considered part of the entire LCD panel assembly.

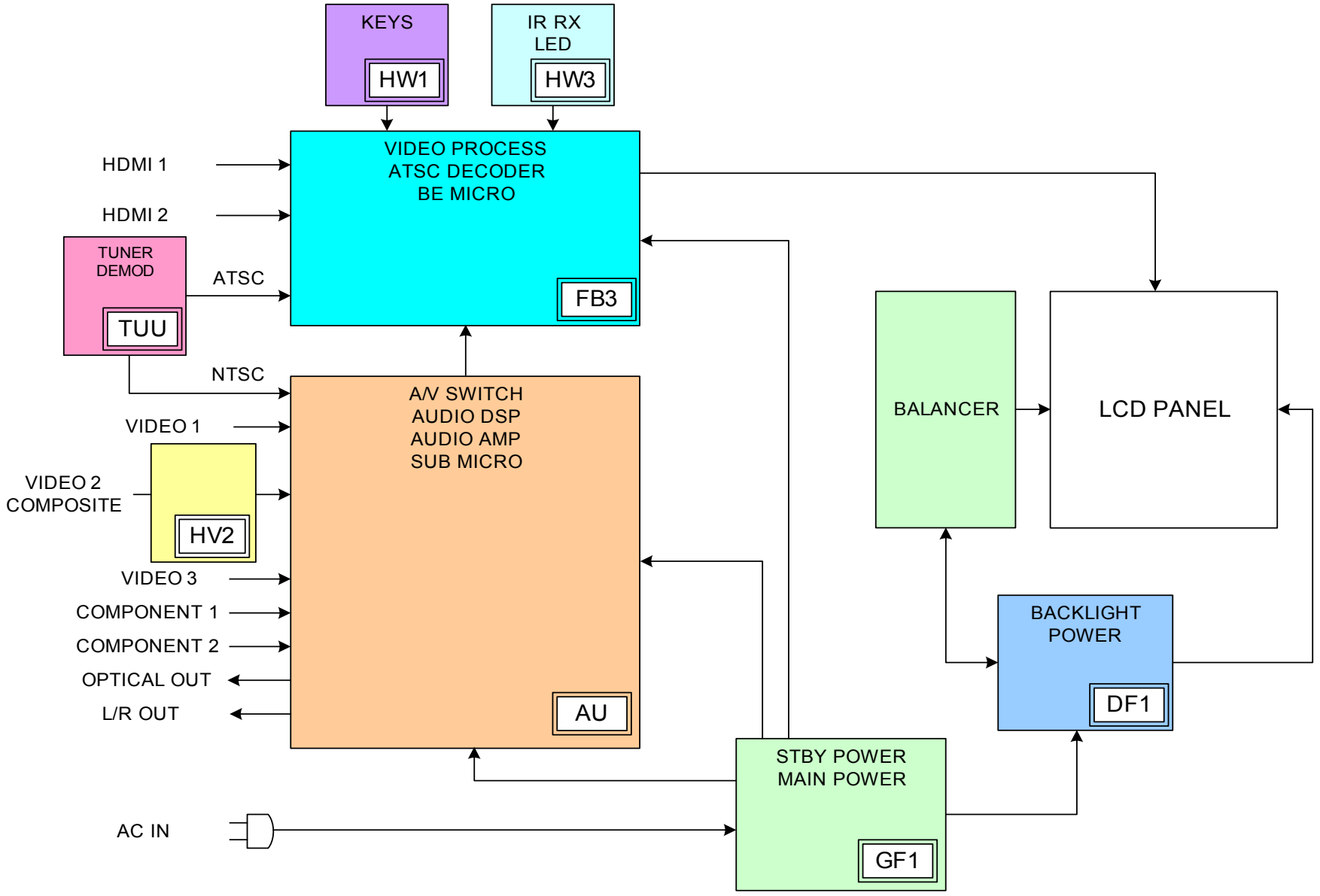


FIGURE 1-1
FIX2 40” V SERIES OVERALL BLOCK DIAGRAM

46” V Series

Most of the circuitry in the 46” V series is identical to those found in the 40” models with the exception of how the panel backlights are powered. In Figure 1-2, note the addition of another backlight inverter board and balancer. The backlights are powered by 2 circuits located on the DF2 and DF3 boards. This requires the use of 2 balancers located on both sides of the LCD panel. The overall block diagram is shown in Figure 1-2.

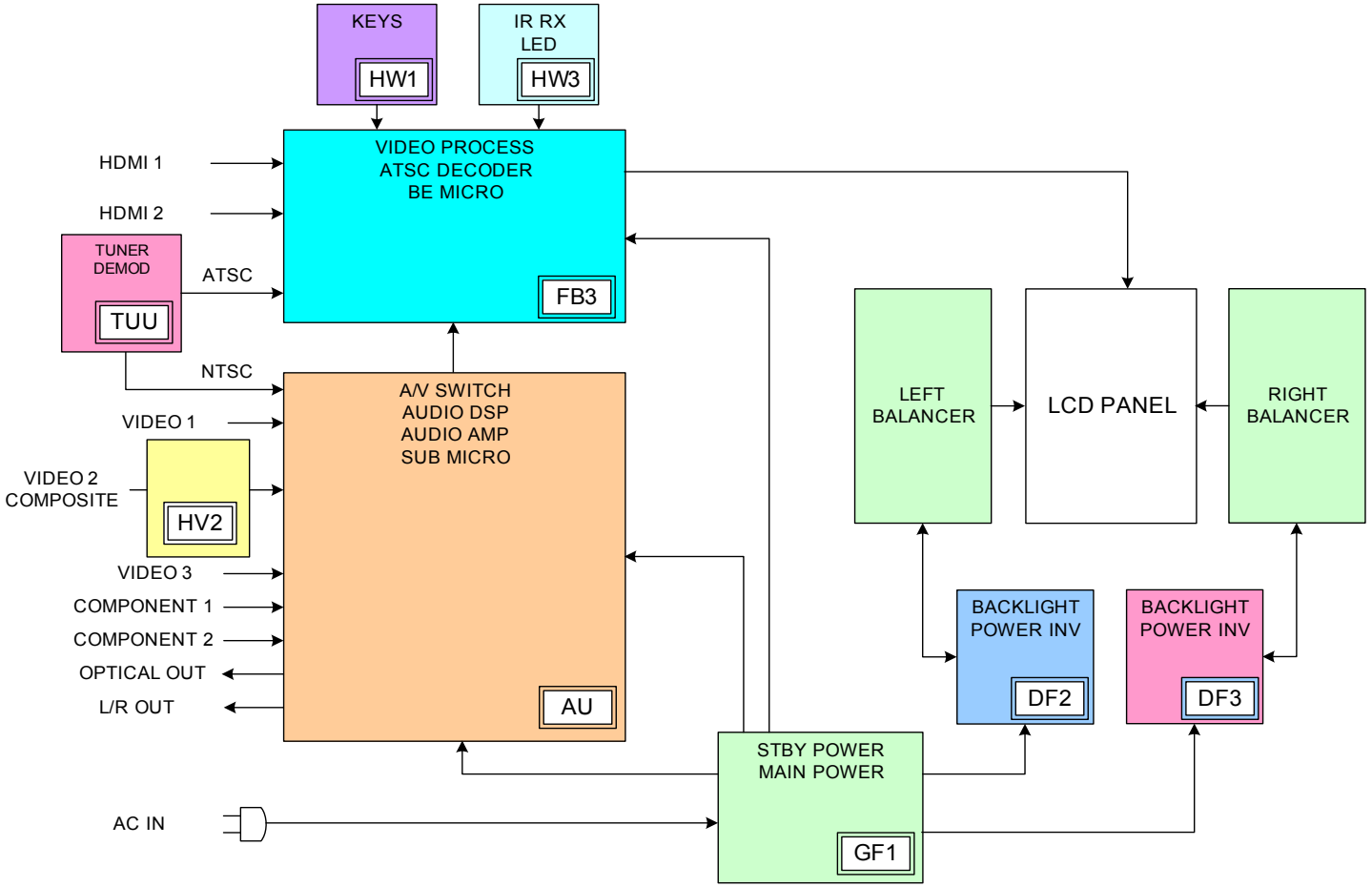


FIGURE 1-2
FIX2 46” V SERIES OVERALL BLOCK DIAGRAM

40” W Series

This intermediate level model is the same as the 40” V series with the HV2 board being replaced by a HW2 board as illustrated in Figure 1-3. This allows for an additional HDMI input along with a composite input. The video process board is also changed to a FB1 board versus the FB3 board found on the V series.

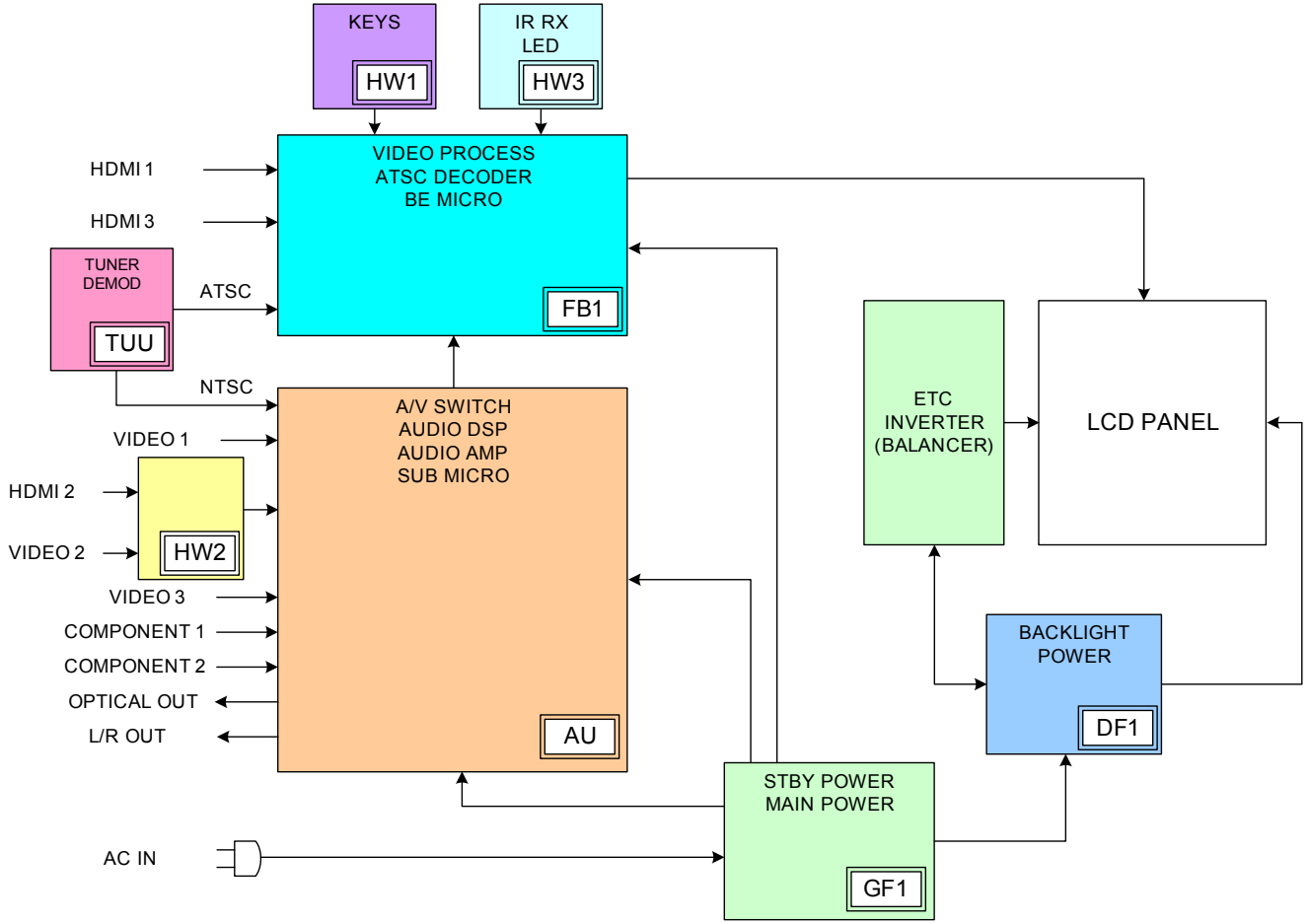


FIGURE 1-3
FIX2 40” W SERIES OVERALL BLOCK DIAGRAM

46” W Series

As with the 46” V series, 2 lamp inverter boards (DF2 and DF3) are utilized along with left and right balancers. A HW2 board replaces the HV2 to provide another HDMI input along with the composite input. This is shown in Figure 1-4.

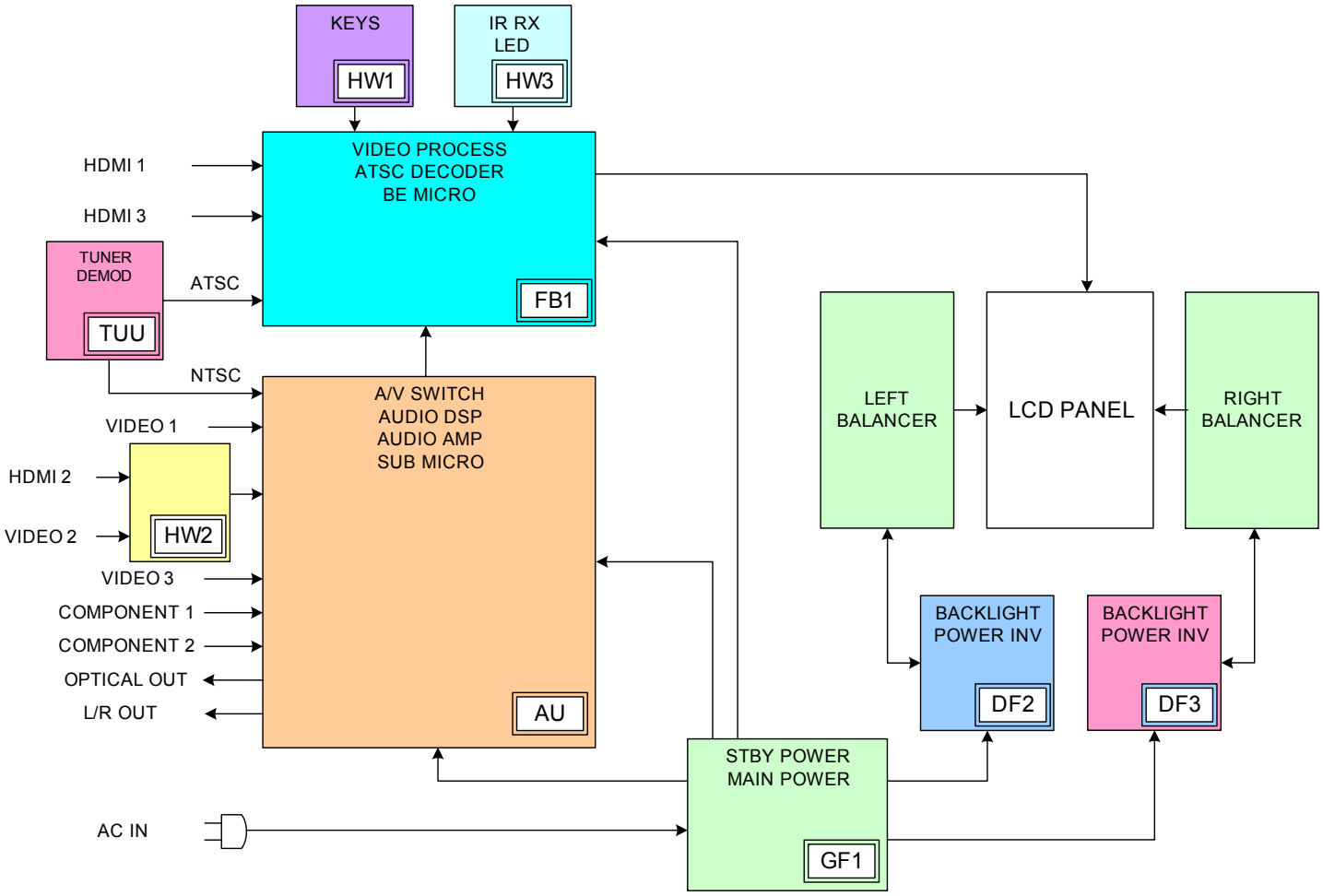


FIGURE 1-4
FIX2 46” W SERIES OVERALL BLOCK DIAGRAM

52” W Series

Having all the features of the W series models, the only difference lies, once again, in the increase of the LCD panel size. The DF4 and DF5 boards have more power capacity for the larger backlights along with the use of upper and lower balancer boards on the left and right sides. Note the use of a GF2 board instead of a GF1 for the power supply. although the circuits are virtually identical, the GF2 board has larger heat sinks and additional capacitors in the PFC circuit.

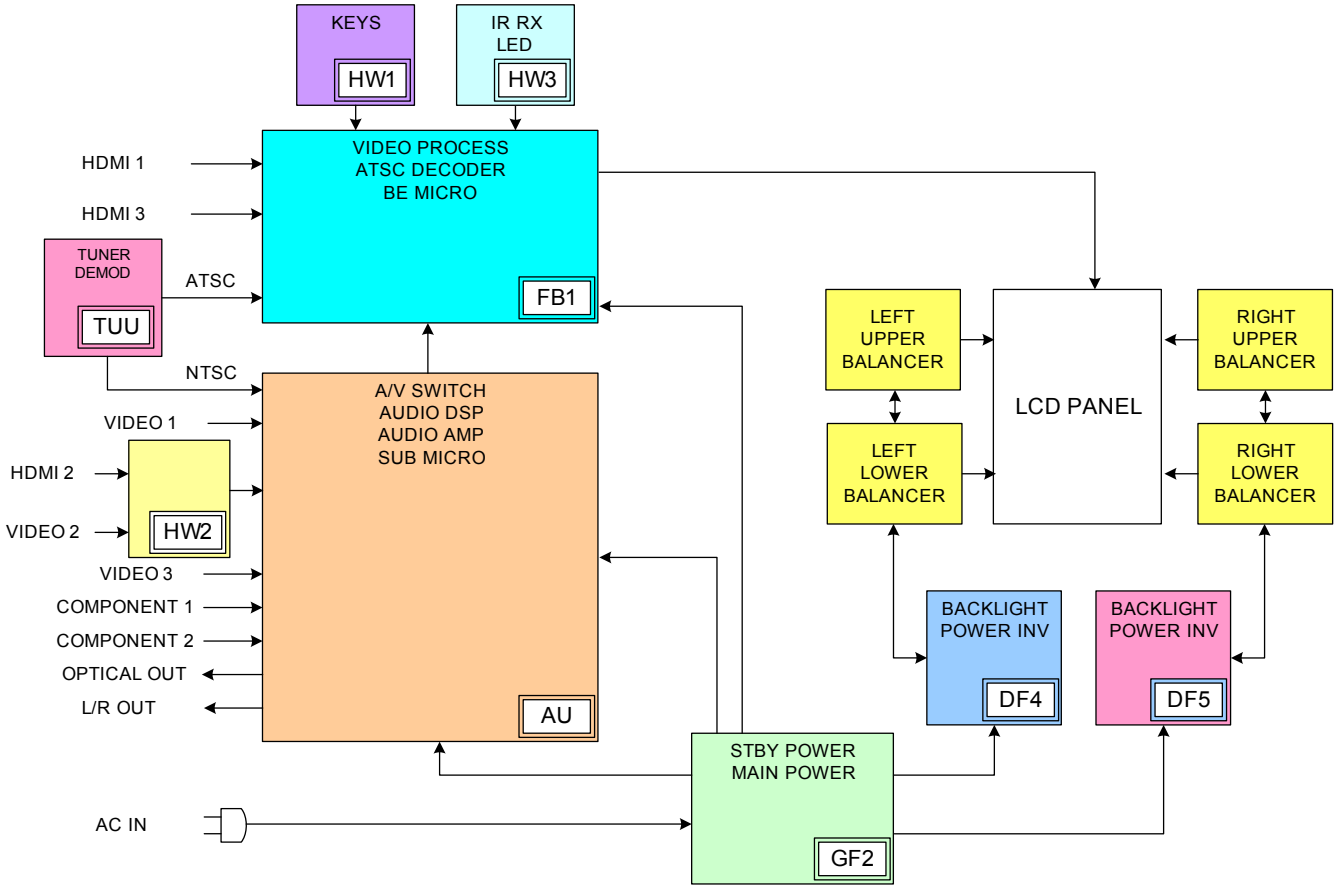


FIGURE 1-5
FIX2 52” W SERIES OVERALL BLOCK DIAGRAM

40”, 46” and 52” XBR Series

The XBR series models are unique in that an additional circuit has been added into the video path between the FB1 board and the LCD panel. The UB1 board captures the 60HZ video information exiting the FB1 board stores 2 frames into memory to be analyzed for movement of objects from one adjacent frame to another. This allows for additional frames to be created with information added based on the interpolation of the object movements. Frame doubling to a 120HZ refresh rate can now be accomplished. Used in conjunction with a higher speed LCD panel, the inherent “smearing” effect seen in conventional LCD panels is drastically minimized.

Note that the 40” and 46” XBR models utilize cooling fans on both sides of the panel rear. The remaining differences between the television sizes for the XBR series is the same as the V and W series. The different panel sizes will have unique inverter and balancer designs. The XBR series block diagrams are illustrated in Figures 1-6, 1-7, and 1-8.

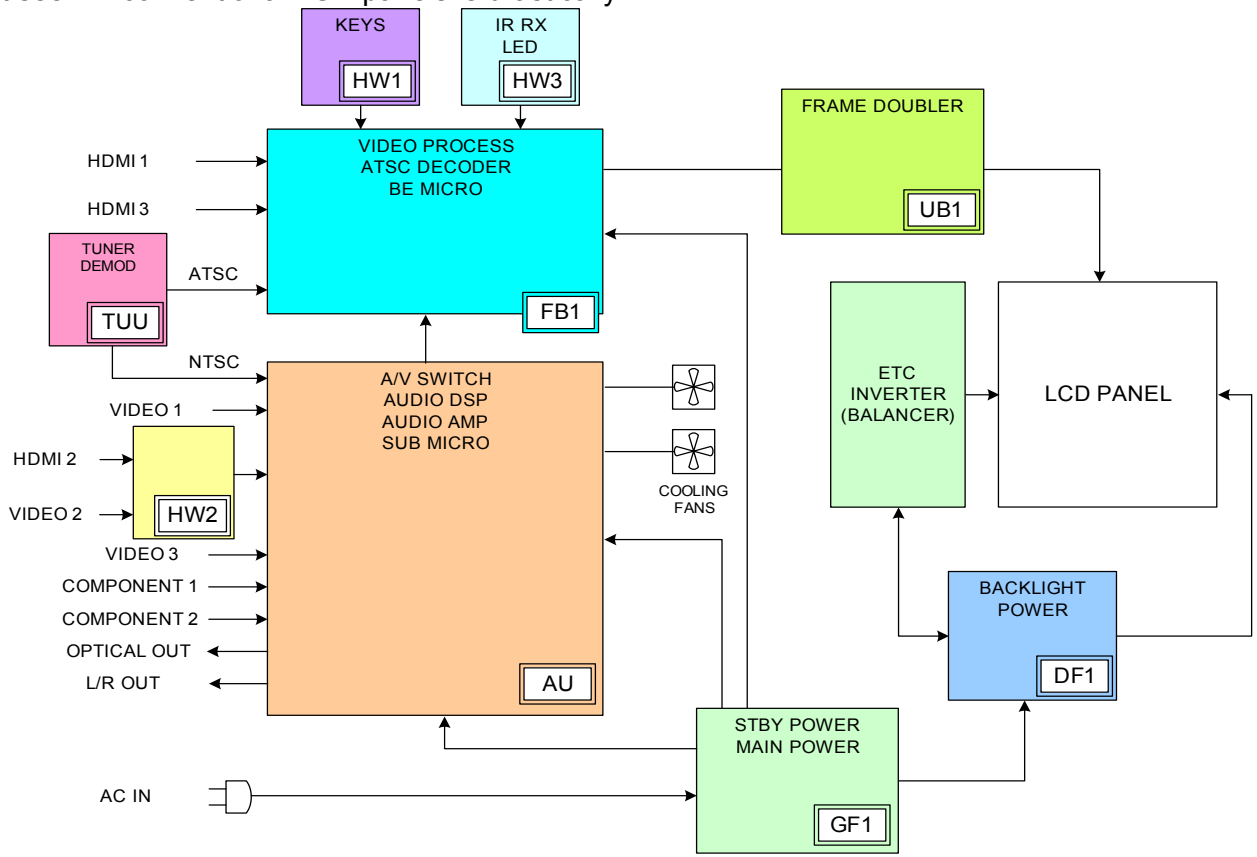


FIGURE 1-6
FIX2 40” XBR SERIES OVERALL BLOCK DIAGRAM

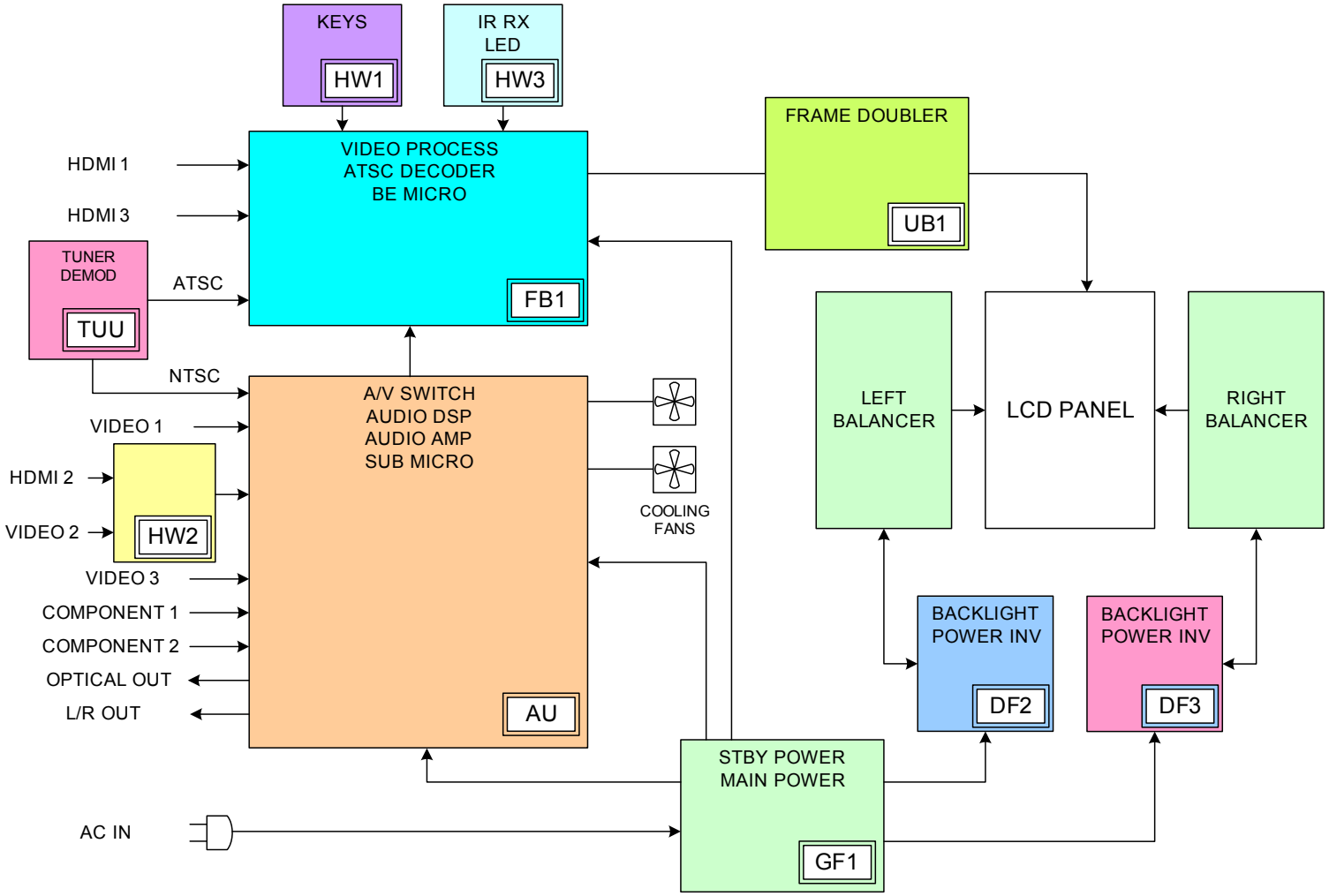


FIGURE 1-7
FIX2 46” XBR SERIES OVERALL BLOCK DIAGRAM

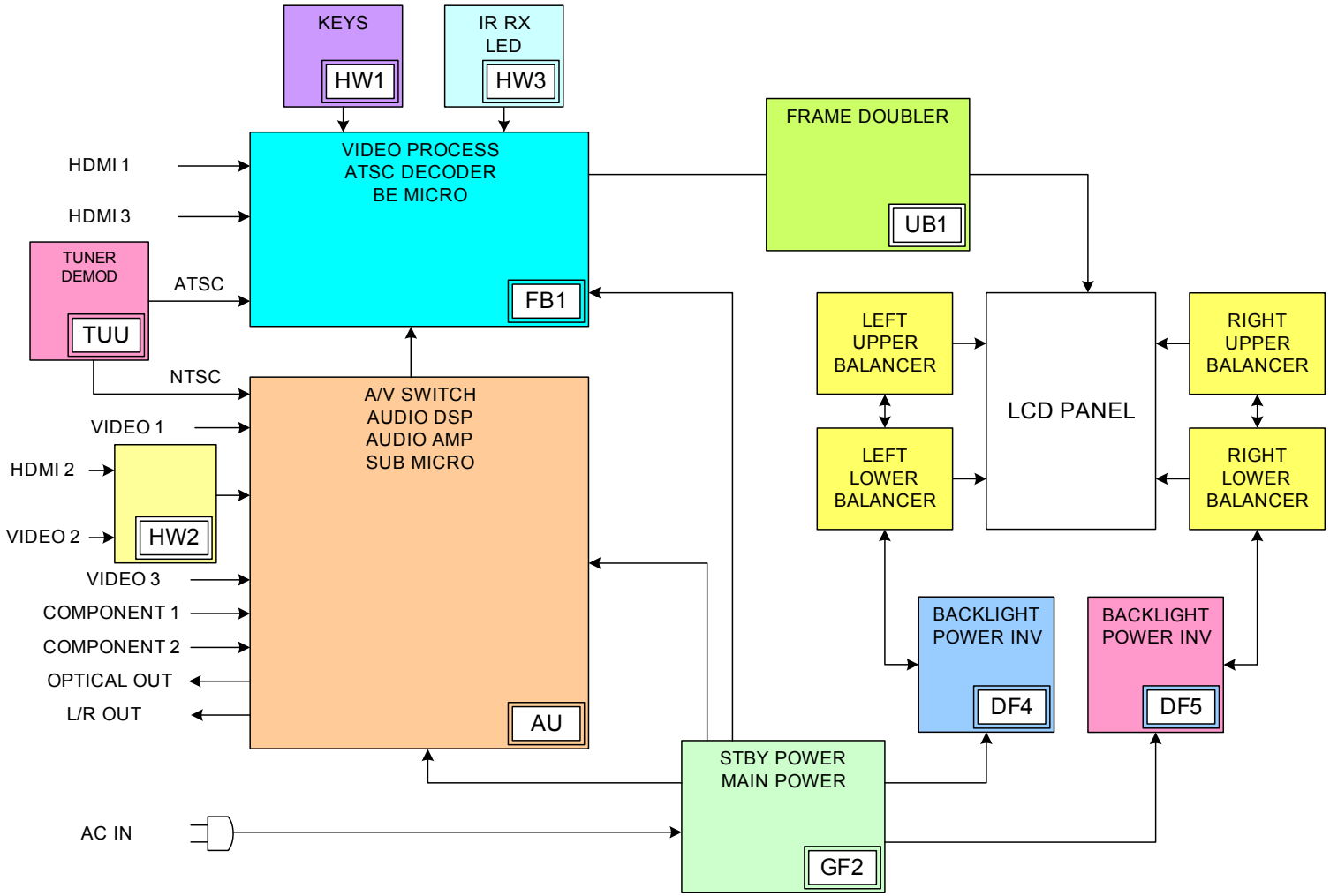


FIGURE 1-8
FIX2 52” XBR SERIES OVERALL BLOCK DIAGRAM

Circuit Board Locations

Figures 1-9 through 1-12 show the locations of the circuit boards for the V and W series models that are viewable when the rear cover is removed. Figure 1-12 is a view of the 46XBR series and is presented to show the location of the UB1 board for high frame-rate generation along with the use of 2 cooling fans. The 40” and 52” XBR models will also incorporate this board and it will be located in the same area below the TCON board.

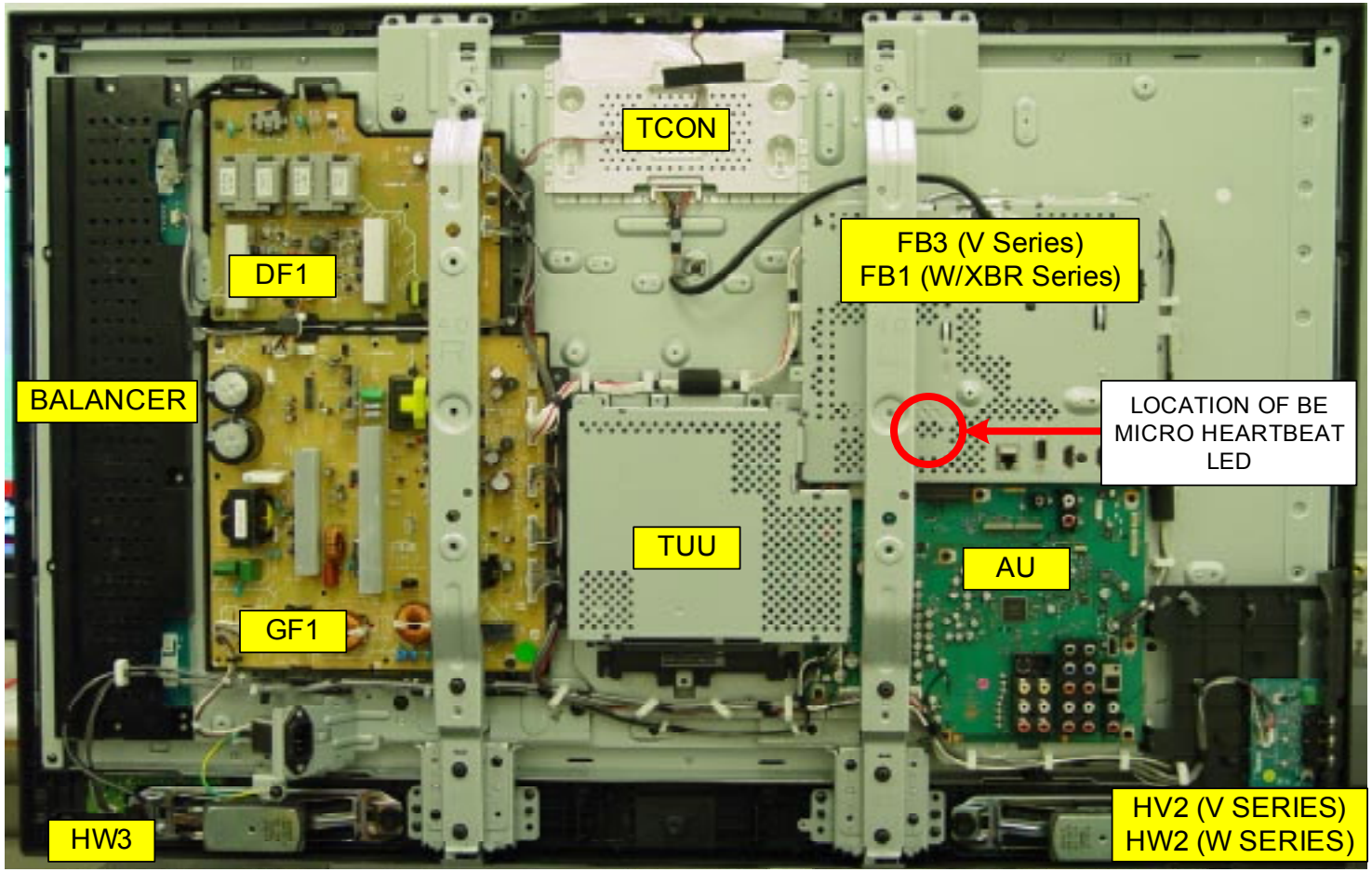


FIGURE 1-9
FIX2 40” V AND W SERIES BOARD LOCATIONS

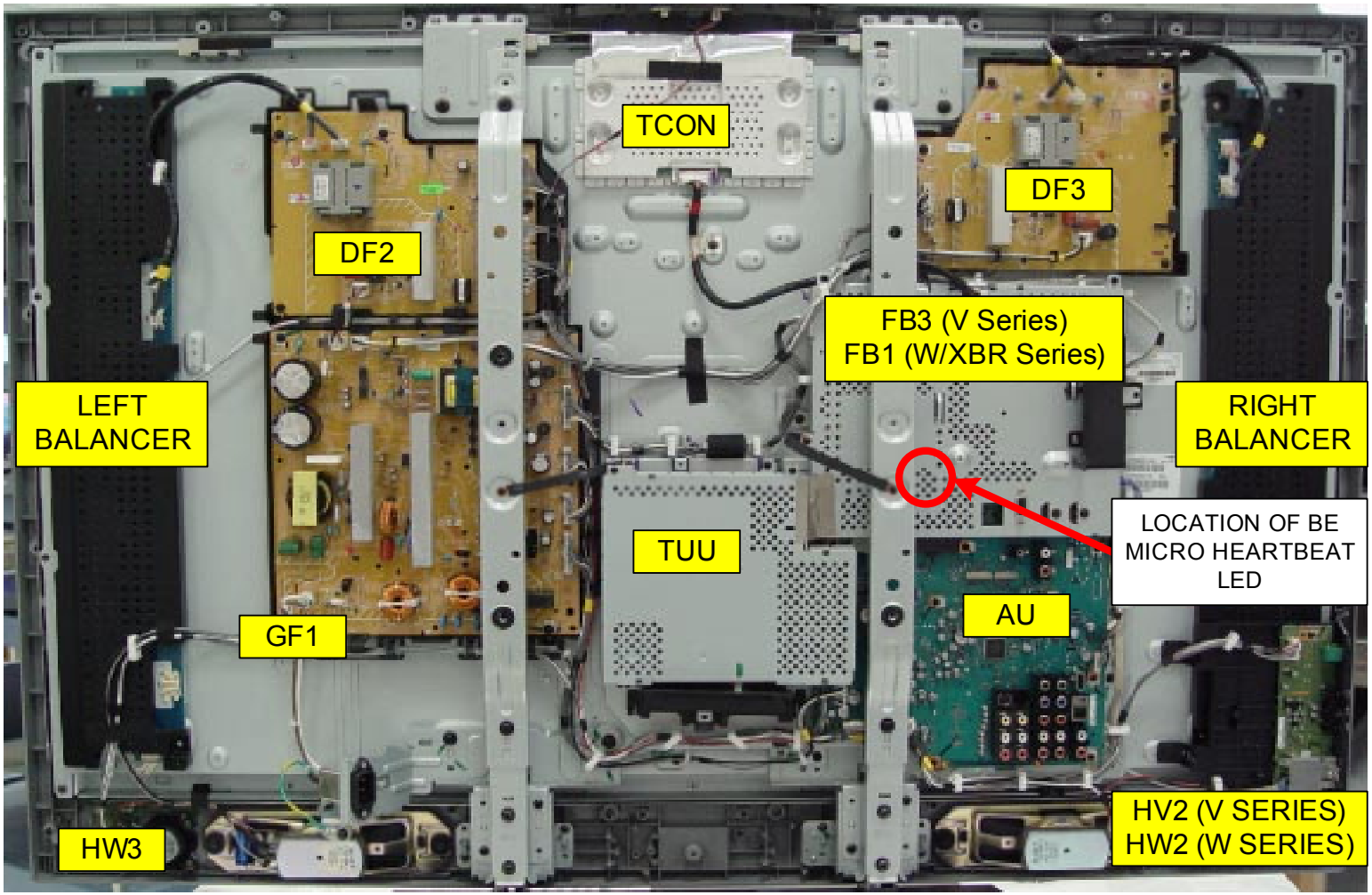


FIGURE 1-10
FIX2 46” V AND W SERIES BOARD LOCATIONS

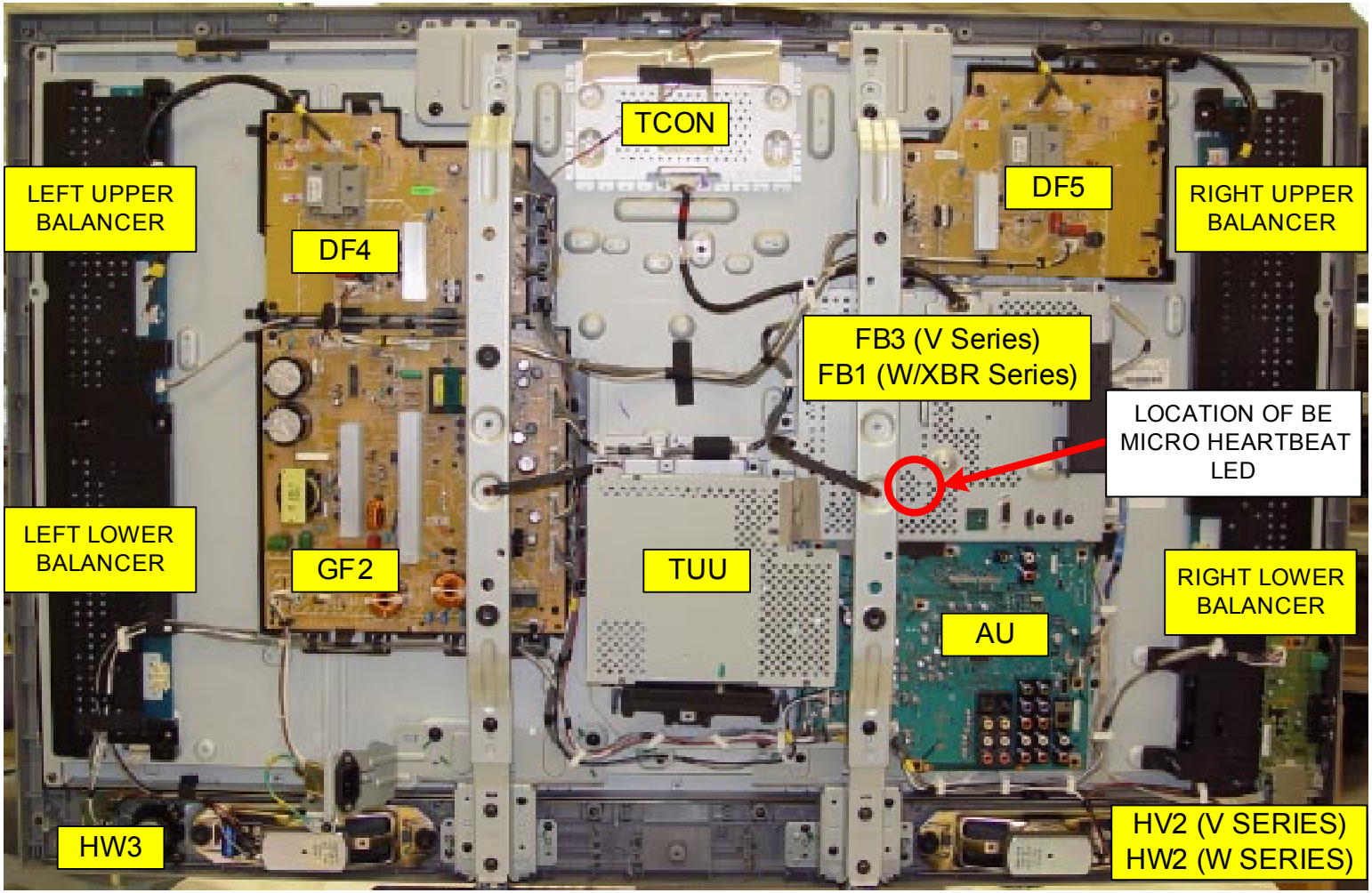


FIGURE 1-11
FIX2 52” V AND W SERIES BOARD LOCATIONS

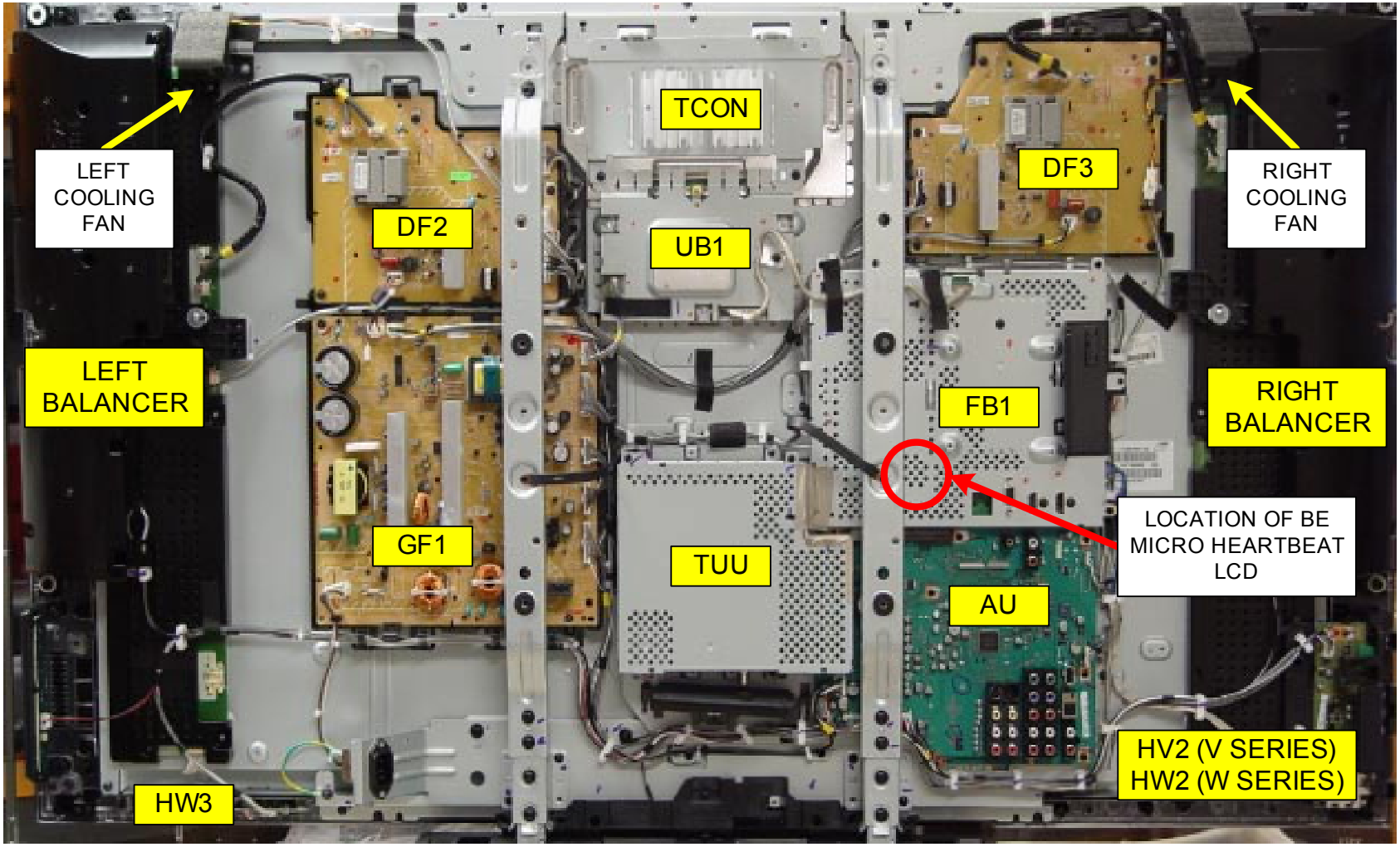


FIGURE 1-12
FIX2 46” XBR SERIES BOARD LOCATIONS

Chapter 2 – Video Processing

Overview

The FIX-2 chassis is capable of receiving various formats and resolutions of video content. The NTSC/ATSC/QAM combination tuner can receive all analog signals in the NTSC channel band 2 through 69 and cable channels 1 through 125. Digital channels can be received via terrestrial channels 2 through 69 and cable channels 1 through 135.

Digital video content can also be received via the HDMI inputs (2 for the V series and 3 for the W and XBR models). Video resolutions up to 1080p are supported. *Note: 24pfs video can only be received by the HDMI inputs. It is not supported via the analog component inputs.*

Analog signals can also be input at video 1, 2 and 3 as composite signals. Video 1 is the only input that accepts Y/C video along with composite. Component inputs 1 and 2 will accept resolutions from 480i up to 1080p. The PC input will also accept inputs up to 1080p.

The video input and process circuits are very similar among the V, W and XBR models with the exception of number of HDMI inputs and the use of an external Digital Reality Creation (DRC) circuit and a 120HZ frame doubling circuit on the XBR models. A circuit descript of theses circuits will begin with the V series and differences among the W and XBR models will be discussed separately.

V Series Video Circuits

In figure 2-1, an overall block diagram of the video selection and processing circuits is shown.

Analog Video Sources

All analog sources are selected by IC402 on the AU board. 480i, 480p, 1080i, and 720p signals are sent to IC4900 on the FB3 board in their original format where they will be digitized and processed along with being up-scaled to the 1920 X 1080 60HZ panel resolution. Note there is a main and sub video path exiting IC402. This model is capable of generating picture-in-picture (PIP). Any source can be displayed in the main path but only component video (including PC input) can be inserted into the PIP box. Dual tuner sources and any HDMI input cannot be viewed in PIP.

If the video resolution is a 1080p source (via the component or PC input) a different path is taken. These are sent to A/D converter IC4602 and continue on to HDMI receiver IC4500. A bus switch is located inside the IC to route the A/D converted video to video process IC4900.

Digital Video Sources

Digital video input can originate from the ATSC tuner or the HDMI inputs.

Digital Tuner Sources

Digital content from the tuner on the TUU2 board is demodulated by IC1002. The demodulated payload and overhead data packets are sent to the EMMA IC2000 on the FB1/FB3 board. The compressed MPEG2 video and digital audio content is extracted and sent to IC4900 where it will be processed.

HDMI Inputs

Note that the HDMI inputs are processed by HDMI receiver IC4500. Each HDMI input has it own EDID (Extended Display Information Data) IC (not shown). This is simply an EEPROM containing data regarding the display capabilities of this chassis and is read by the HDMI transmitting device to determine what resolutions can be transmitted. The HDCP (High-Bandwidth Digital Content Protection) key code is embedded within IC4900 to provide an authorized connection with the HDMI transmitting device. The V series has 2 HDMI inputs at the rear of the unit and the W and XBR series utilize a third HDMI input on the side.

Video Processing

All selected video enters the Video process IC4900. Composite video signals are comb-filtered and Y/C signals are decoded. All analog signal formats are processed by noise reduction circuits. The final processing performed is the up-scaling of all video content (except for 1080p) to the panel resolution of 1920 X 1080. All signals exiting IC4900 will be 1920 X 1080p 60HZ. There is a LVDS converter and transmitter located inside IC4900 to convert the 10-bit parallel RBG data to serial streams for transmission to the LCD panel. All operations performed by IC4900 are controlled by BE Micro IC5401.

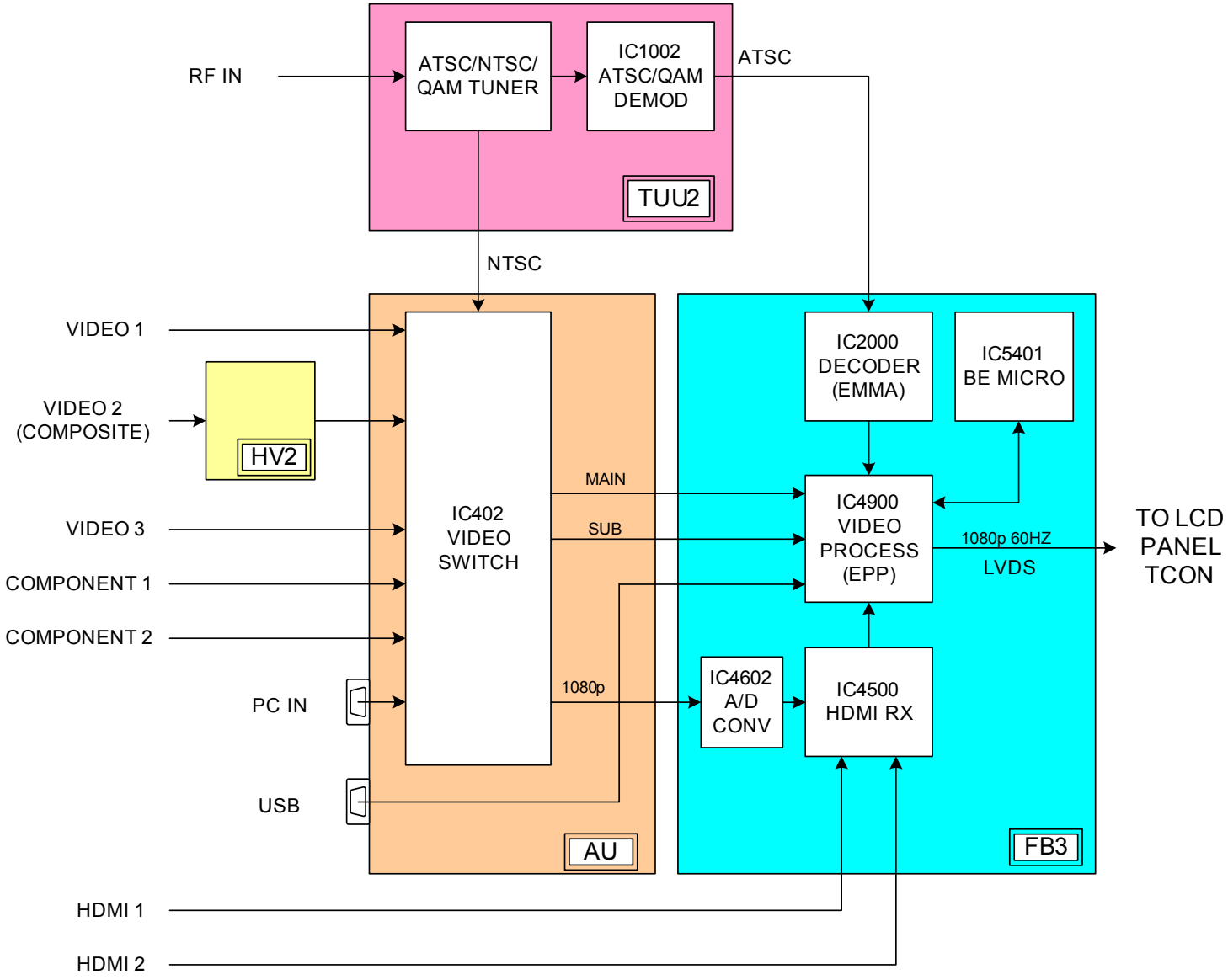


FIGURE 2-1
FIX-2 CHASSIS V SERIES VIDEO PROCESSING

W Series Video Circuits

Referring to Figure 2-2, the W series video process circuits are similar to those used in the V series. An additional HDMI input is provided along with extra video processing circuitry. They are as follows:

HW2 Board

Referring to Figure 2-2, the V series models use an HV2 board to supply composite video input at the side of the unit. In the V series an HW2 board is used to provide a third HDMI input in addition to a composite. A separate HDMI equalizer IC7062 and EDID IC7060 (both not shown) are also include on this board.

Composite to Component Processor (CCP)

Note the addition of CCP IC4700 which is not found on the V series FB3 board. The FB board on the W series is designated as the FB1 board. IC4700 processes the sub video path. This allows for component video to also be displayed in the picture-and-picture (PAP) feature that is not available in the V series models. This model is also limited in that 2 tuner sources and the HDMI inputs cannot be viewed in the sub PAP picture.

NOTE: If a PC source is used as the main picture, all other sources will only show in a PIP box.

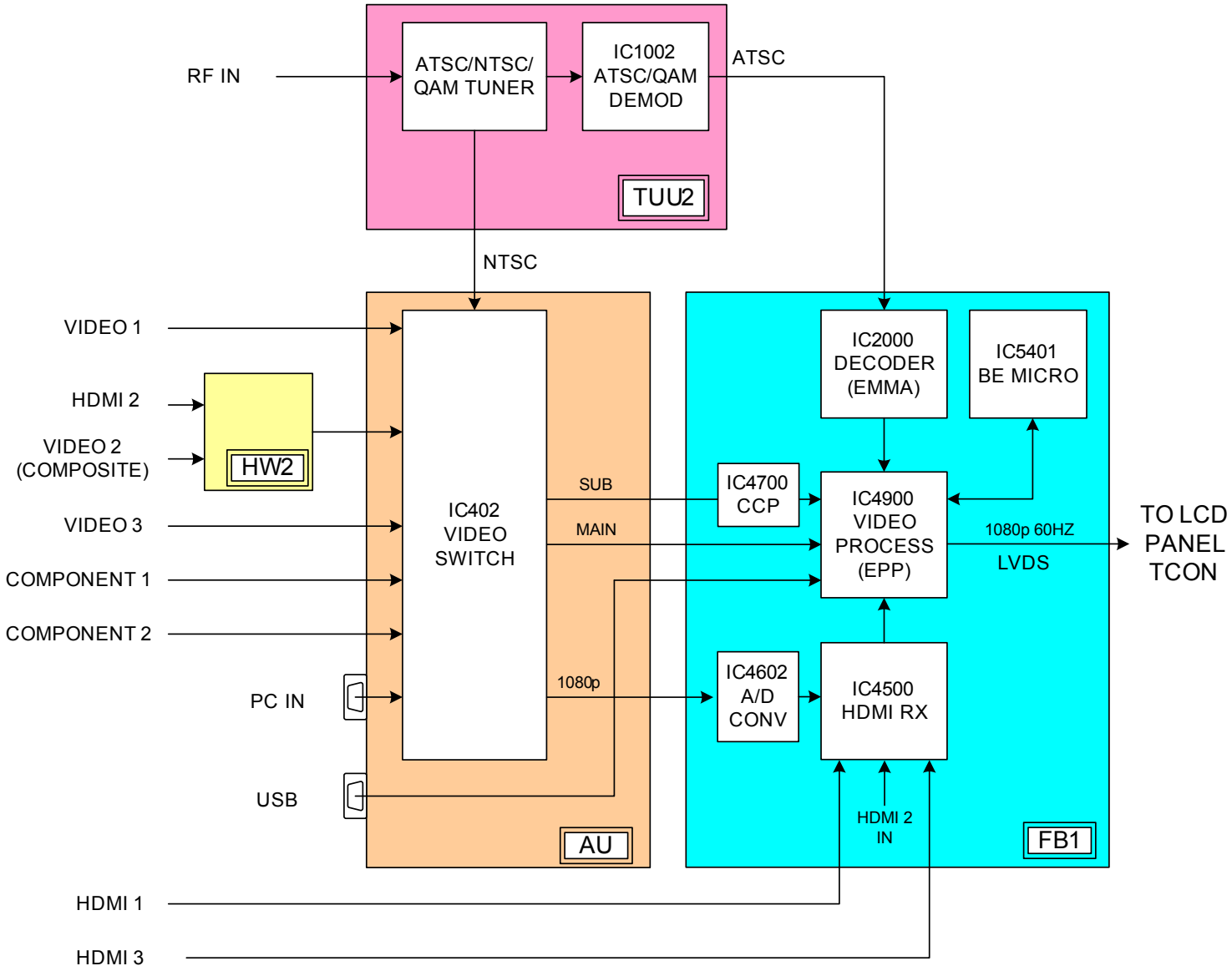


FIGURE 2-2
FIX-2 CHASSIS W SERIES VIDEO PROCESSING

XBR Series Video Circuits

This series contains the same additional circuit add-ons as the W series along with 2 significant circuit additions to further enhance the video quality for this high-end model. These are illustrated in Figure 2-3.

DRC Version 2.5

Unlike the V and W series models where the DRC is embedded within IC4900, the XBR models utilize and external DRC version 2.5 located within IC4800. This DRC version converts all analog signal formats of 1080i and below directly to 1080p.

Motionflow™ Frame-Rate Doubling

The UB1 board provides frame-rate doubling and is a new feature for this year's XBR models. The picture resolution exiting video process IC4900 is 1080p 60HZ. Highly sophisticated circuitry on the UB1 board captures the frames in memory, analyzes, interprets and predicts the movement between the frames. The video signals exiting the FB1 board are doubled to a 120HZ refresh rate. This, in conjunction with a specially designed LCD panel, produces pictures that are much clearer during rapid movements in the scene.

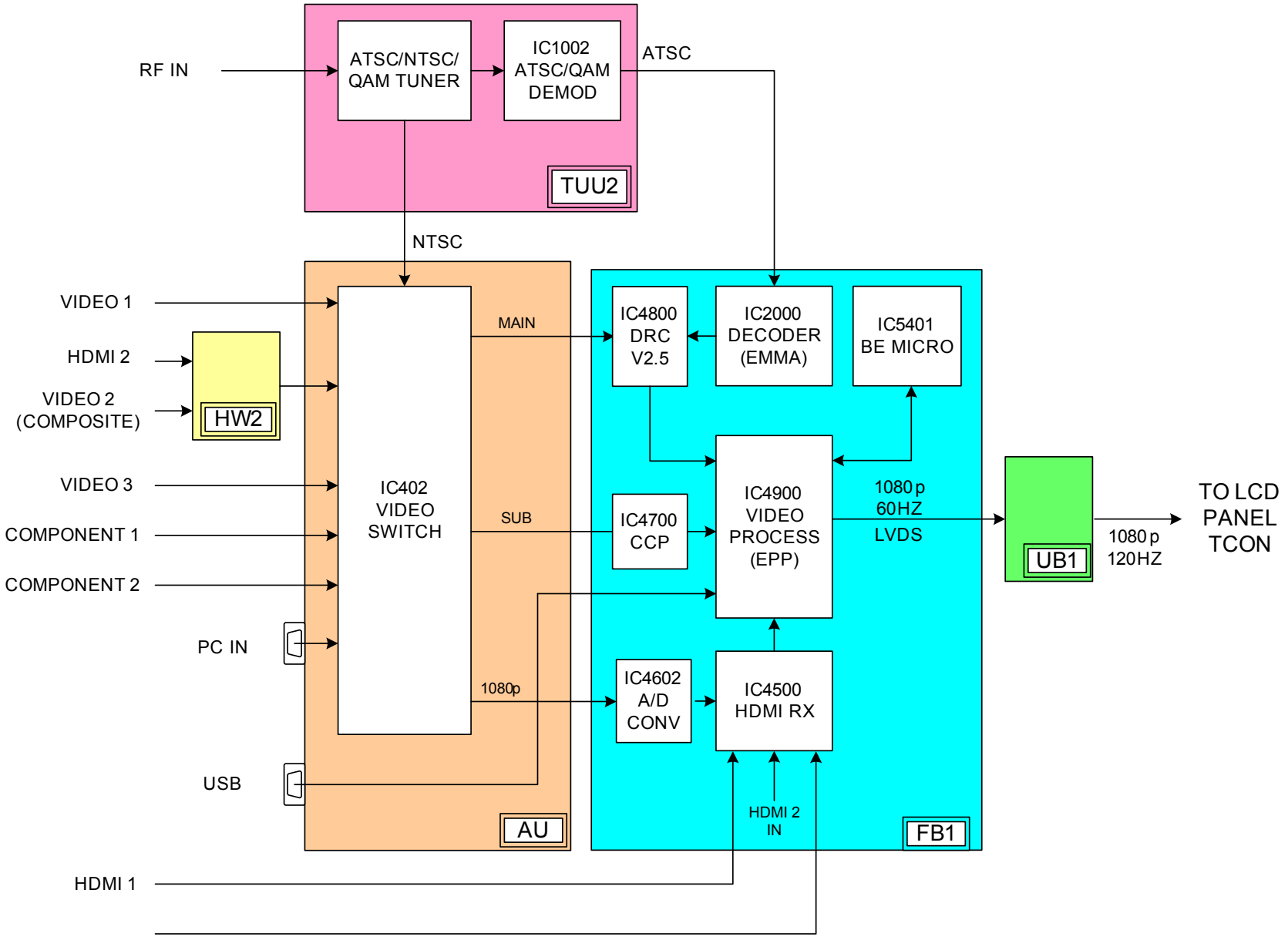


FIGURE 2-3
FIX-2 CHASSIS XBR SERIES VIDEO PROCESSING

Troubleshooting

Failures occurring in the video process circuits on the FIX-2 chassis can appear as improper video levels, distortion in the video, a loss of a primary color, or no video at all. In cases where no video is present, it is important to determine if the backlight lamp is on. In cases where a loss of video or distortion in the video appears on all inputs, it is vital that the LCD panel be eliminated as the cause. It is an expensive replacement part and more difficult to replace than the other components. Distortions in the picture are approached much in the same way as a loss of video. The troubleshooting flowcharts in Figures 2-5 and 2-6 should provide some guidance in isolating the cause of a video problem.

No Video

In a case where the customer complaint is “no video”, the first item to check for is the lighting of the backlight lamps. When the unit is powered up, the backlights will light within 4 seconds followed by video within 2 seconds. Unless the ambient light is extremely bright it is usually very easy to see the backlights light up. If the back cover is off, there are numerous holes in the rear of the panel chassis where the backlights can be easily seen. In almost all cases where the backlights do not light, the unit will shut down and indicate a diagnostics failure that will appear as a 6X (inverter) or 13X (balancer). This scenario is covered in Chapter 5 of this manual.

Assuming that backlighting is present, the presence of on-screen display (OSD) graphics is checked for next. If they are working, the input status or channel number should appear on the screen. The presence of these graphics is a clear indicator that the LCD panel is functioning properly. Since all graphics are generated on the FB1/FB3 board, it is known at this time that the last stages of the video process circuits are functioning properly. If OSD graphics do not appear, the failure could lie on the FB1/FB3 board but also leaves the LCD panel or the LVDS cable and connectors as a possible suspect.

The FB1/FB3 board can be further investigated by calling up graphics that are generated at the very end of the video processing circuits located inside the EPP IC4900. This is done by entering the service mode by pressing the “DISPLAY”, “5”, “VOLUME +” and “POWER” keys on the remote control when the unit is powered off. Wait about 15 seconds for service adjustments to appear on the screen. If nothing happens, start pressing the “JUMP” key on the remote 3 times, waiting about 5 seconds between jumps to see if graphics appear. The idea is to call up the BE Micro adjustment graphics that are generated within IC4900. If any adjustment data graphics appear during this procedure, the LCD panel is OK.

Another item to check is the “heartbeat” LED for the BE Micro. By looking into the ventilation holes of the shield on the FB1/FB3 board you should be able to see an amber-colored LED that is flashing once a second. The location of the graphics sources and flashing LED are illustrated in Figure 2-4.

The next item to check is whether the failure is occurring on all inputs. Video failures that are input specific are generally easier to troubleshoot, especially on the FIX-2 chassis since virtually all of the video signals are processed on the FB1/FB3 board.

SERVICE TIP: The goal when troubleshooting a “no video” condition is to eliminate the LCD panel as the cause. Keep in mind that it is very unusual for a LCD panel and the TCON circuits to cause a no video condition. The most common failure on LCD panels that causes no video is the failure of the backlights to turn on but this situation will cause a protect shutdown with an inverter or balancer failure error displayed by the timer LED. The FIX-2 chassis also monitors communications with the TCON (and UB1 board for the XBR models). Any operational failure in this area will also cause a shutdown with 5 blinks of the timer LED.

Distortions in the Video

To an experienced technician (especially those familiar with pixel-based display devices) finding the cause of a picture that is abnormal is usually a simple task because the display is operating, there is video present, and there is some kind of distortion that usually gives a clue as what the cause is. Trying to get a customer to explain why the picture is not right is another story. Distortion in the picture generally falls into 2 categories: Electrical or mechanical. Mechanical issues can be dirt contamination, damaged screens, physically distorted LCD panels or polarizers, or a loss of bonding on one of the pins of the flex cable sending timing pulses to the LCD panel. Mechanically caused distortions have one thing in common: The distortion tends to be in a fixed location and does not usually involve the entire picture.

Electrical distortions can, however, be stationary and fixed but generally involve the entire picture unless the problem is occurring in the final process stages driving the LCD panel. If a tab bond on a panel fails, this is a mechanical problem. If the LCD drive IC fails to send timing pulses to line on the panel it is considered an electrical problem. What is interesting is that both of these causes produce the same result. There will usually be one vertical line of red, blue or green continuously lit. If multiple vertical lines of one color appear and are evenly spaced, this is an electrical problem and usually involves the loss of one data line prior to being de-multiplexed by the LCD drive circuits on the TCON board. Using the OSD graphics is an excellent tool in isolating a distortion cause much in the same way as a no-video condition. Access to the test patterns is covered in the appendix section of this training manual.

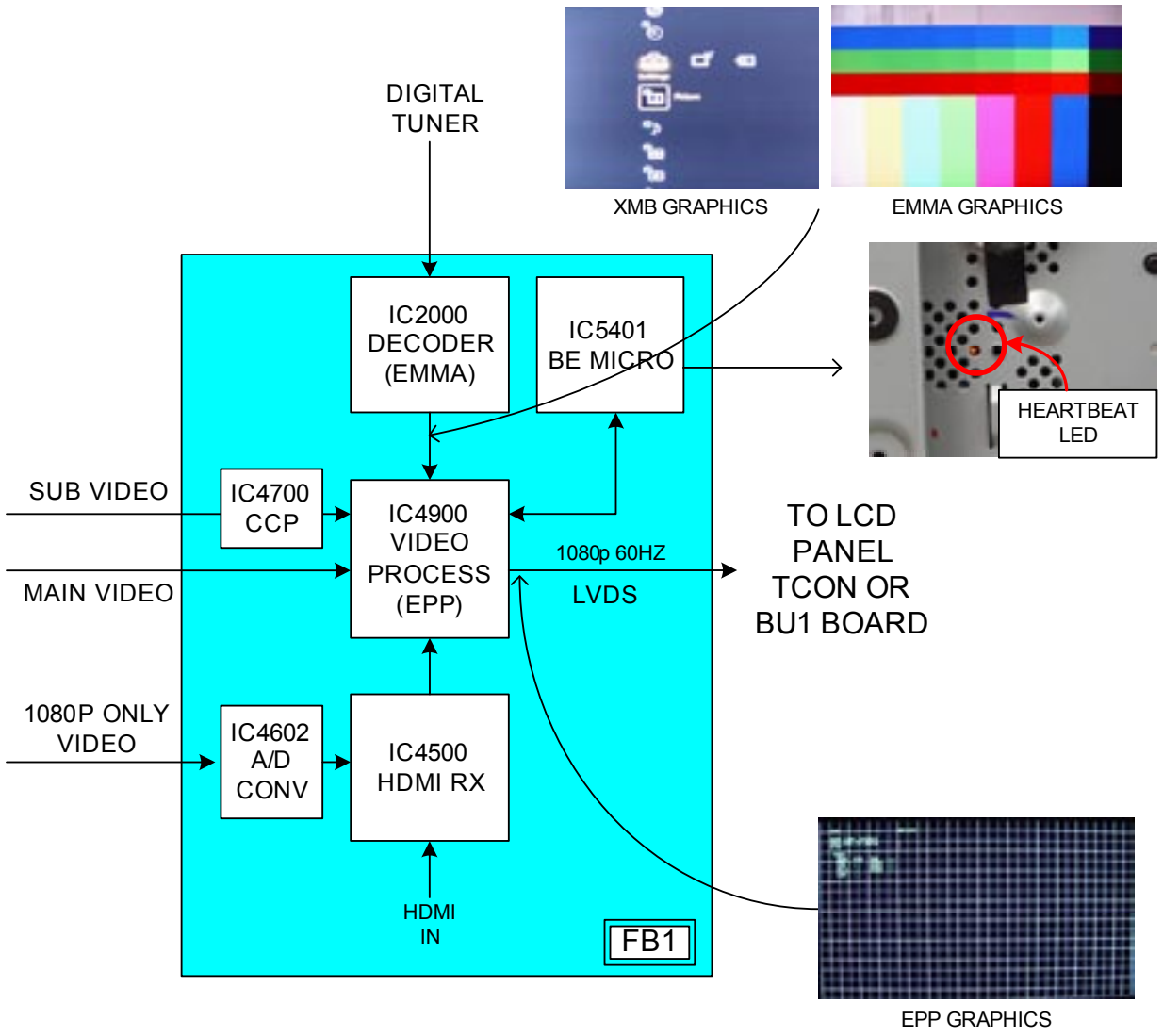


FIGURE 2-4
OSD AND TEST PATTERN GRAPHICS SOURCES

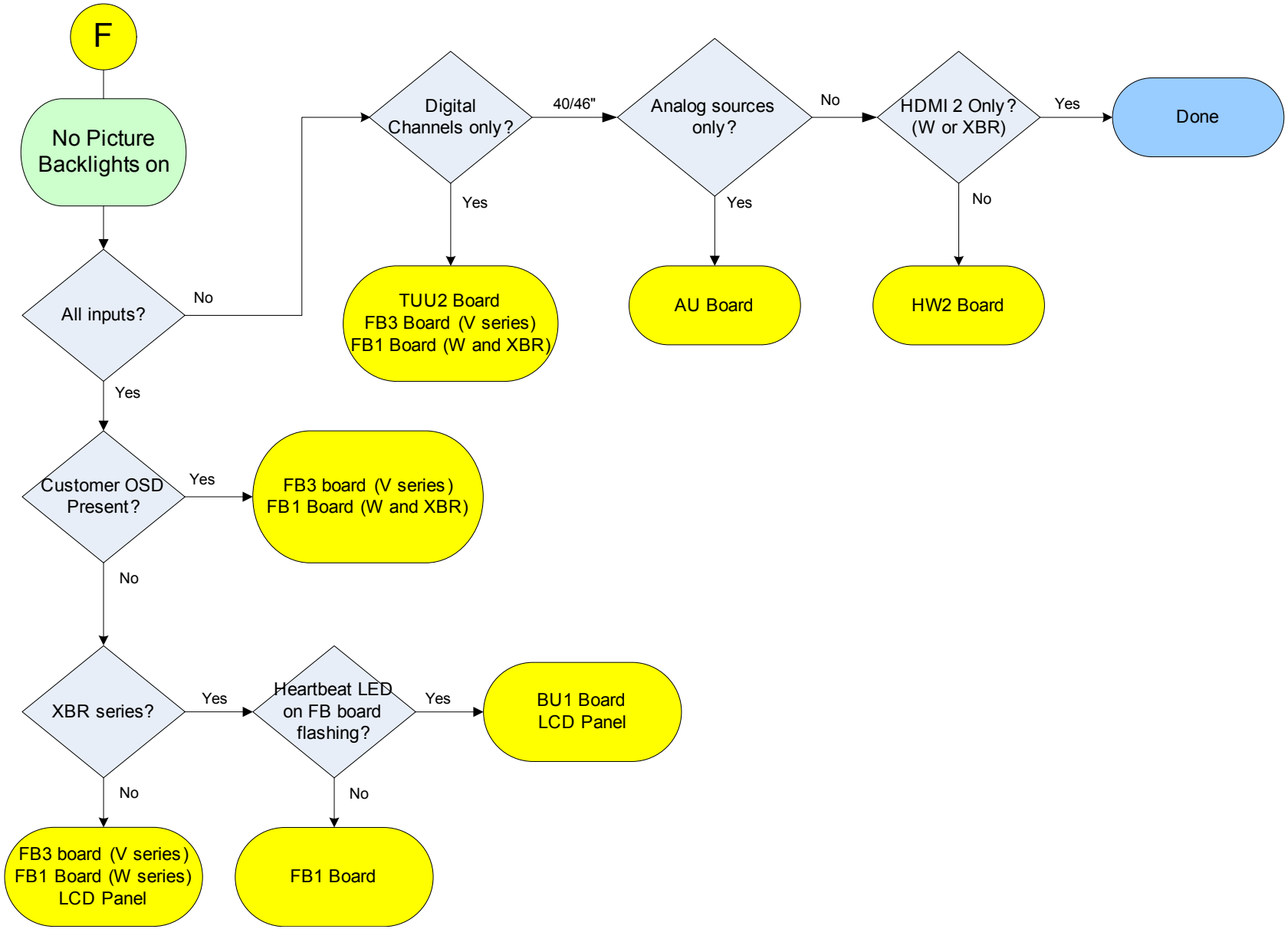


FIGURE 2-5
NO VIDEO TROUBLESHOOTING FLOWCHART F

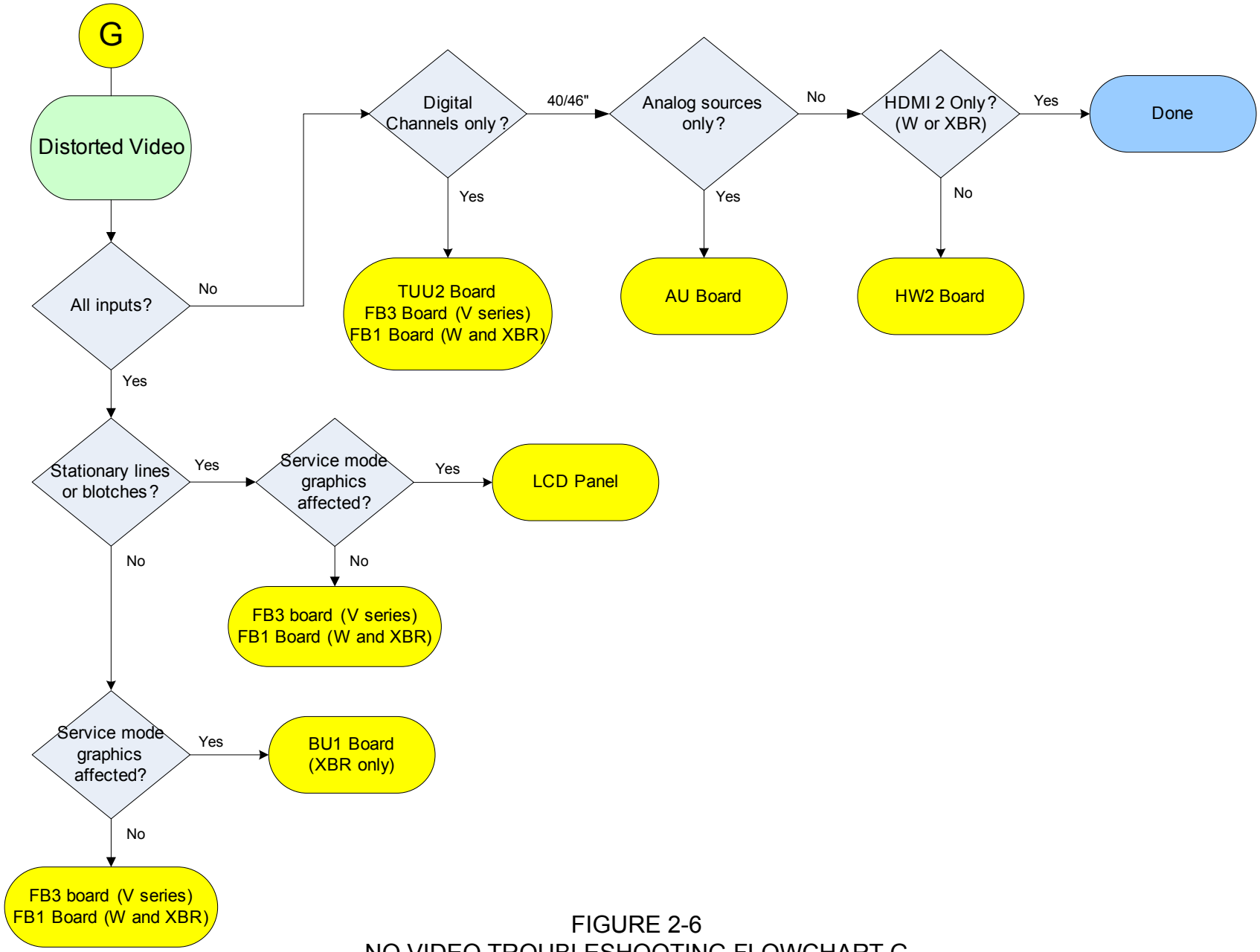


FIGURE 2-6
NO VIDEO TROUBLESHOOTING FLOWCHART G

Chapter 3 - Audio Processing

Overview

Figure 3-1 illustrates the audio process block diagram used in all of the FIX-2 chassis models. All audio sources are processed and amplified on the AU board. Various sources of analog and digital audio are available. Headphone audio is also provided via the HV2 (V series) or HW2 for the W and XBR series.

Analog Sources

All sources of analog audio are selected by audio switch and DSP IC802 located on the AU board. The selected analog source is A/D converted within IC802 for signal processing. Equalizing and surround effects are performed at this stage. Once processing of the audio has been completed, the left and right channels exit IC802 as analog and sent to audio amplifier IC808 where the analog channels will be converted to PWM for the class-D amplifier.

Digital Sources

Digital audio sources are available from the digital tuner or the HDMI inputs. Both digital tuner and HDMI audio is processed by the EMMA decoder IC2000 located on the FB1/FB3 board. The audio exits IC2000 as PCM to be processed by IC802 and enters audio amplifier IC808 the same way as analog sources.

Optical Out

The optical output jack at the rear of the unit will pass all selected audio sources except for Super Audio CD (SACD) or DVD audio sources hooked up to the HDMI inputs (for obvious copyright protection reasons). All analog sources (including that from the NTSC tuner) are output as 2-channel 48KHZ PCM. DVD players hooked up to the HDMI inputs will output 2-channel PCM regardless of what the HDMI audio output on the DVD player is set to. The internal speakers will output DVD audio regardless of what the HDMI audio of the DVD player is set to (unlike previous year's models).

If an ATSC compliant digital channel is received by cable TV (QAM) or terrestrial (8VSB) and a Digital Dolby® audio signal is embedded in the content, the optical out will pass this signal for use with a surround-sound amplifier that is compatible with Digital Dolby® 5.1 standards. Table 3-1 offers an overall view of what is output from the optical jack based on input selection.

AUDIO SOURCE	OPTICAL OUTPUT
DIGITAL TUNER 5.1	5.1 OR 2CH PCM
DVD HDMI 5.1	2CH PCM
ALL ANALOG AUDIO INPUTS	2CH PCM
NTSC TUNER	2CH PCM
SACD VIA HDMI	NO OUTPUT
DVD AUDIO VIA HDMI	NO OUTPUT

TABLE 3-1
OPTICAL OUTPUT RESULTS

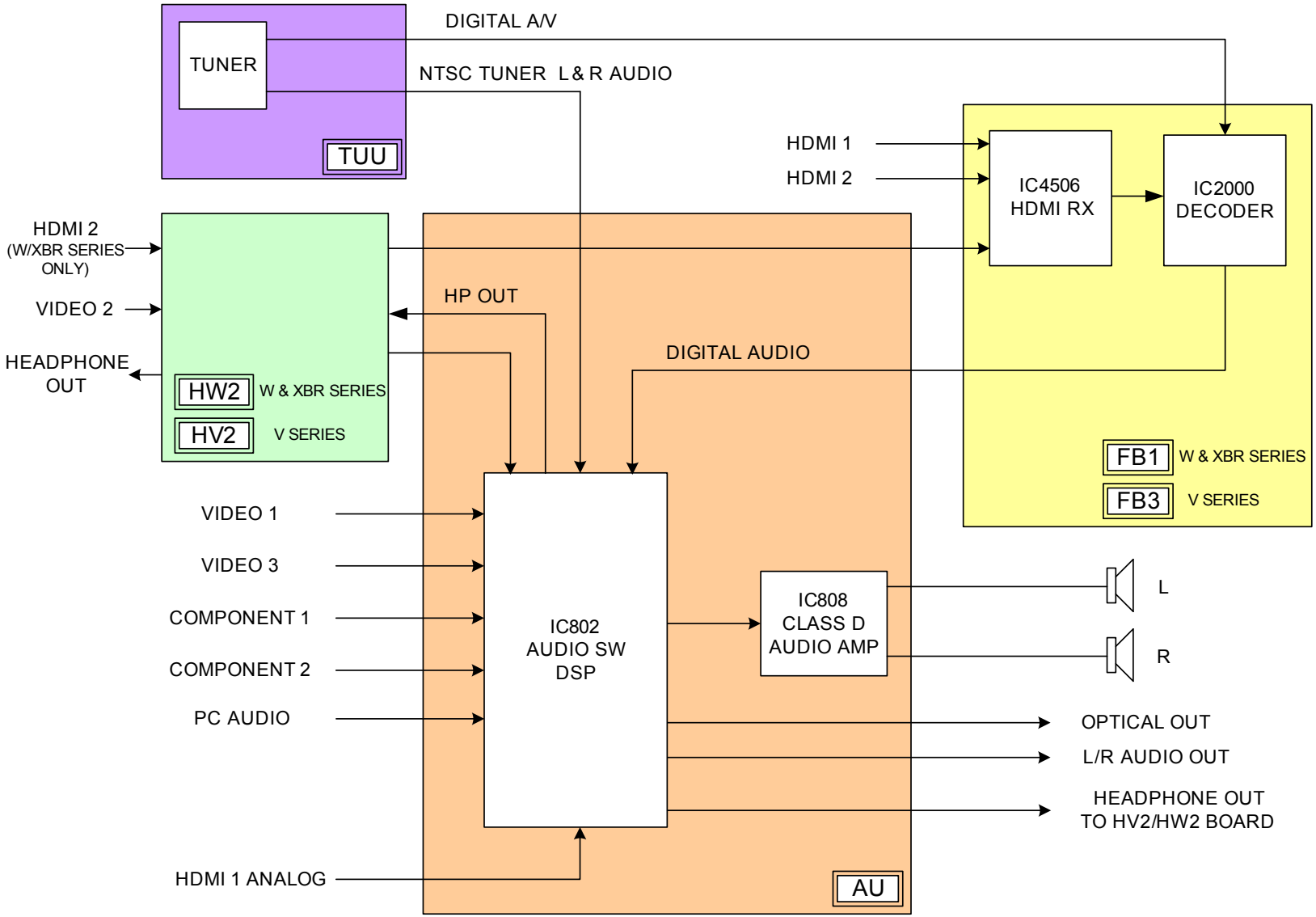


FIGURE 3-1
FIX-2 CHASSIS AUDIO PROCESS BLOCK DIAGRAM

Troubleshooting

Locating the source of an audio problem is relatively straight forward on this chassis. It is simply a matter of determining if the loss or distortion is input specific. A loss or distortion of all analog sources should be rectified by replacing the AU board. If the symptoms apply only to digital sources the FB1/FB2 board would be suspect. Use the troubleshooting flowchart in Figure 3-2 to assist in locating the source of the failure.

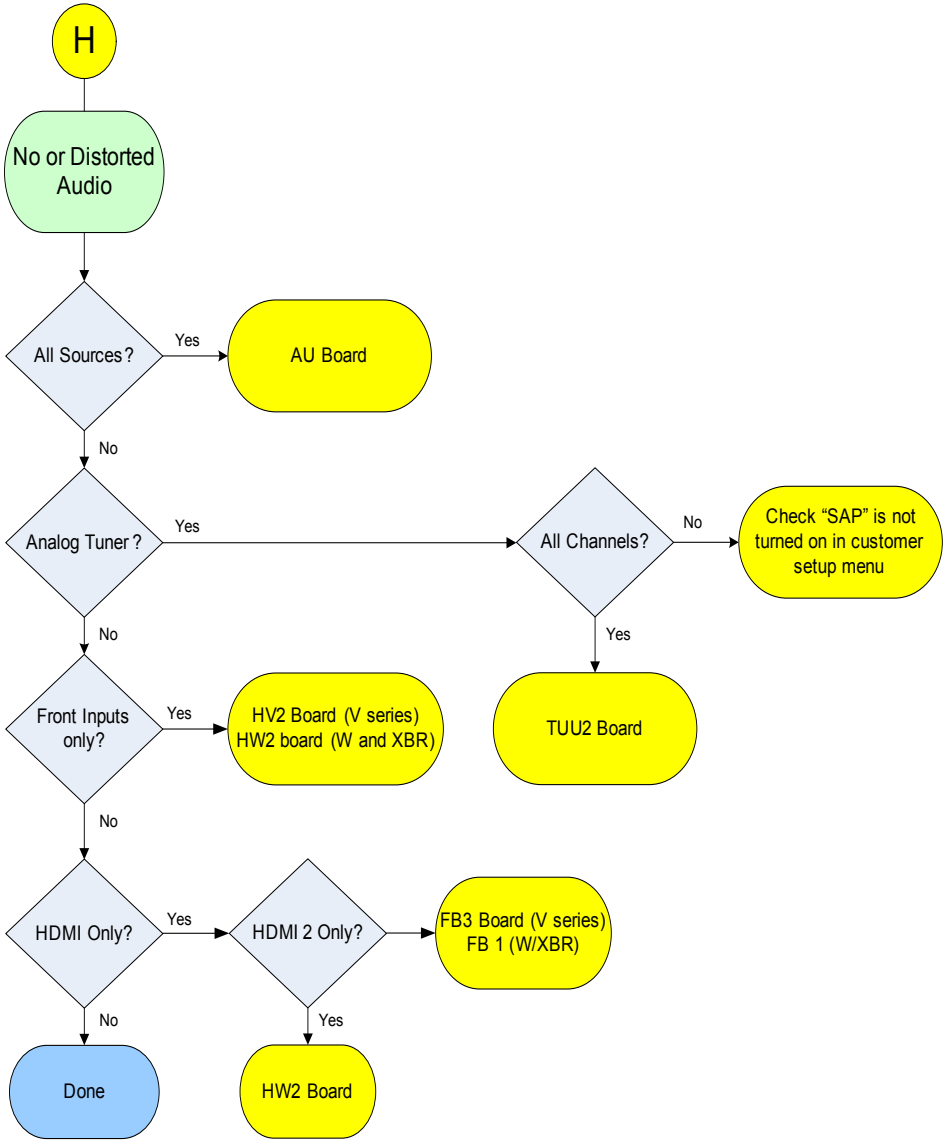


FIGURE 3-2
AUDIO TROUBLESHOOTING FLOWCHART

Chapter 4 - Power Supply

Overview

The power supply utilized in the FIX-2 chassis is a continuation design that has been used in Sony televisions for several years. A standby power supply runs continuously to provide voltages for the system microprocessor and remote IR receiver. A main switching power supply is activated when the unit is turned on to generate the voltages required for operation of the unit.

Figure 4-1 illustrates an overall block diagram of the power supply used in the FIX-2 chassis. The 40” and 46” models use a power supply designated as the GF1 board while the 52” models use a GF2 board. The GF2 board uses the same circuitry as the GF1 with larger heat sinks and higher value capacitors in the PFC circuit to handle the additional power consumption of the larger panel back lights.

Standby Power Supply

The standby supply consists of an integrated oscillator and drive circuits found inside IC6200. Transformer T6200 generates the STBY5V and STBY12V. The 5V is used to power the system microprocessor on the AU board (along with various other circuits that need to be constantly active) while the 12V is used to power the PFC circuit and main switching supply IC6100.

Main Switching Supply

The main power supply consists primarily of oscillator and PWM generator IC6100. A pair of switching transistors Q6100 and Q6101 drive transformer T6100. The main supply becomes active when a high is received from the sub-micro IC1205 (not shown) located on the AU board. This high enters at pin 7 of CN6154 and is approximately 4.6VDC. The PFC control circuits and IC6100 are activated when this line goes high.

Note R6009 in parallel with the power-on relay RY6000. Voltage is constantly supplied to the PFC and Main supply. When these circuits are turned on R6009 serves as a current limiter to help “soft start” the supply. Once the supply starts operating the regulated 12V source energizes the power relay RY6000 to shunt R6009.

Protection

Several areas on the power supply are monitored to protect the circuits. The most important is located within IC6100. If current draw becomes excessive on any of the secondary lines, IC6100 will stop oscillating. This will cause the unit to shut down and the unit will go into protect mode. The timer LED will flash in groups of 3 because the sub-micro on the AU board will detect the loss of the regulated 12 volt line. This will be discussed in detail in Chapter 5.

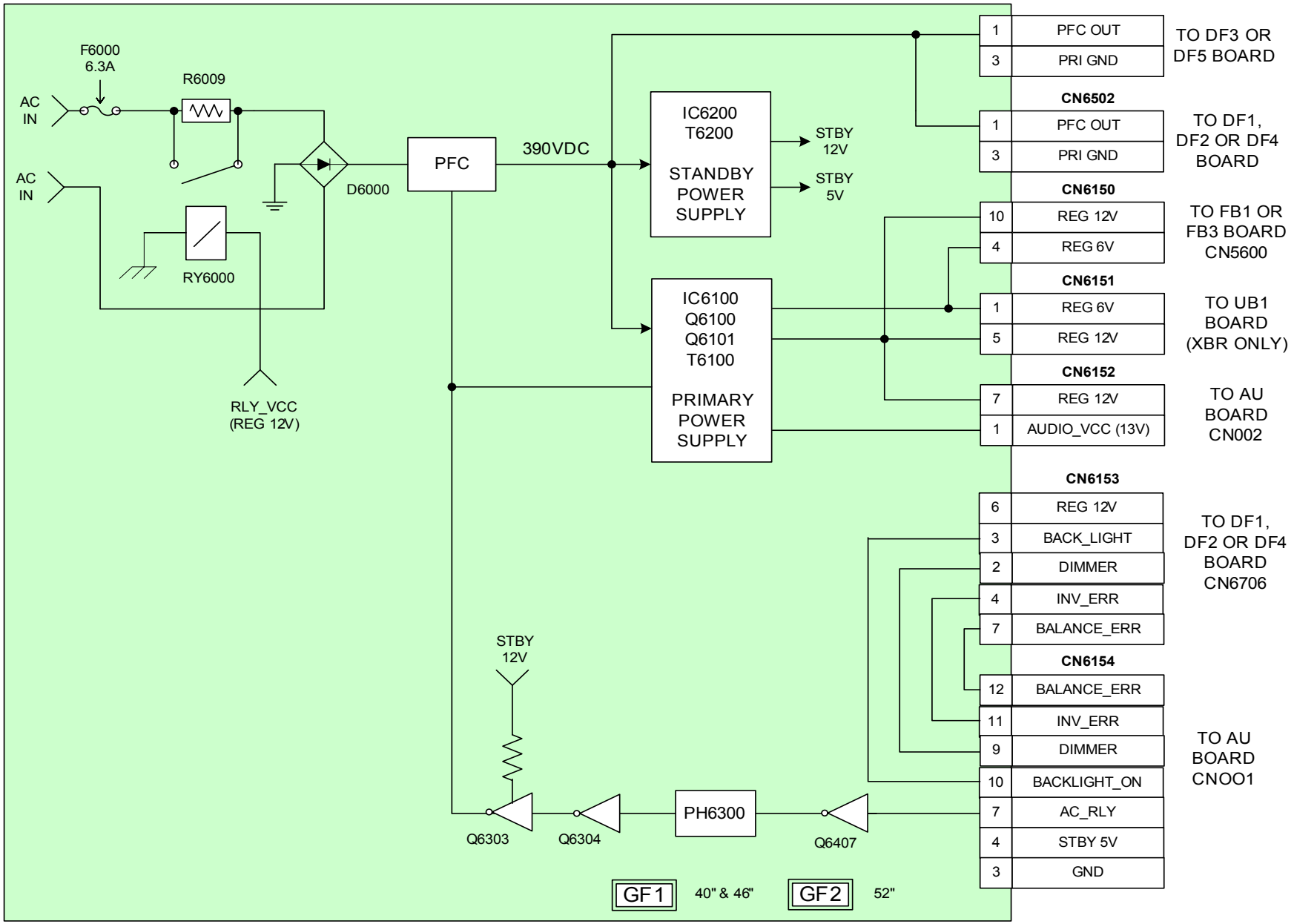


FIGURE 4-1
POWER SUPPLY BLOCK DIAGRAM

Troubleshooting

Failures in the power supply circuits can produce symptoms varying from a failure to turn on, erroneous voltages, or starting up and then stopping. A power supply that will not turn on can be caused by a failure in the standby circuit, a loss of the relay-on command from the Main Micro, or a failure of the main switching supply. Use the troubleshooting procedures below along with the flowchart in Figure 4-2 as a guide to determine what is causing the power supply problem.

Dead Set

The power supply has either failed, is not being told to turn on, or is turning on but immediately turning off. In most cases where the power supply starts and then stops, the AC relay can be heard engaging and then releasing. The timer LED will flash a diagnostics indication (usually 3 blinks). No relay being heard is usually caused by a failed standby or main switching supply. Past Sony televisions had a standby LED which was a good tool to determine if the standby supply was functional. The standby LED on the FIX-2 chassis is only active when the unit is being used as a PC monitor and the PC goes into standby o is turned off. The only way to check the standby is to check for 5 volts at pin 4 of CN6154. If this checks out OK, the presence of an AC relay high must be checked at pin7 of CN6154. If both check out OK, replace the power supply board.

Protection

Several areas on the power supply are monitored for protection. These include over-voltage for the PFC, 6V and 12V lines, thermal protection of the PFC circuit, and monitoring the AC relay to be certain that it has closed and shunted the current limiting resistor R6009. A failure of any of these monitoring circuits will cause the unit to shut down and blink the standby LED 2 times. These circuits are covered extensively in Chapter 5.

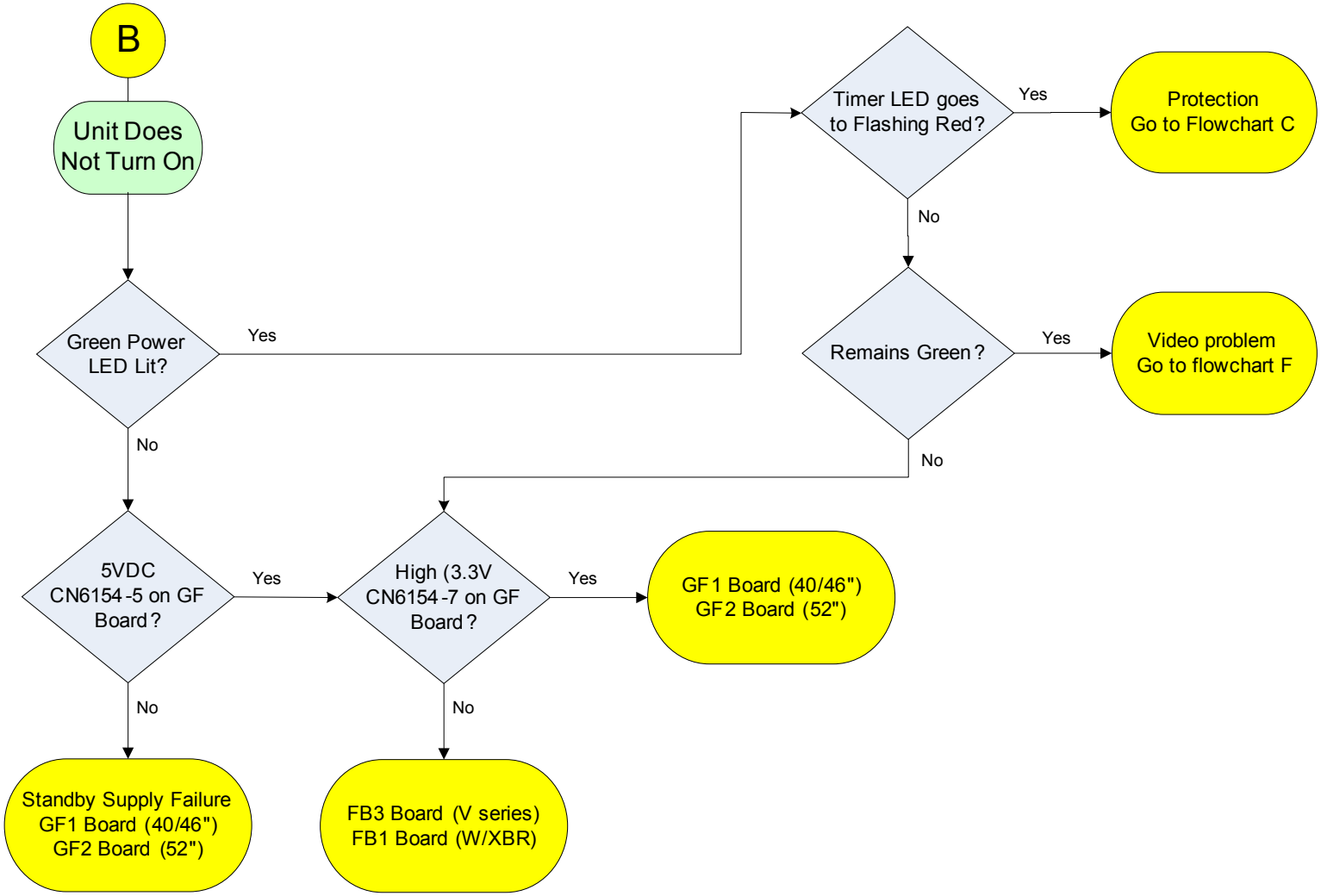


FIGURE 4-2
POWER SUPPLY TROUBLESHOOTING FLOWCHART

Chapter 5 - Protect Circuits

Protection

Several key areas of the FIX-2 chassis are monitored for temperature and voltage conditions. In all cases, the unit will shut down and display a diagnostics indication. The standby LED will flash red in a set number of frequencies, depending on what was detected. The flashes occur at one-second intervals followed by a 3 second separation interval of no flashes. All protect circuits are monitored by the Sub Micro IC1205 on the FB1 (W and XBR series) or FB3 (V series) board. Figure 5-1 illustrates a block diagram of the protect circuits. Table 5-1 contains a list the various diagnostic functions.

Voltage and Temperature Protection

Low Voltage (LVP) 3X

The regulated 12 volt source exiting the GF1 (GF2) board at CN6153-10 is monitored by Q1224 on the FB1 (FB3) board. Since the 12 volt line is monitored by the regulation feedback circuits of the main power supply, a loss of this voltage would cause a catastrophic rise in all other voltages generated by the main supply. If the 12V line fails, sub-micro IC1205 will turn the unit off and the standby LED will blink in sequences of 3.

Over-Voltage (OVP) 2X

Over-voltage conditions are monitored for the 12V and 6V lines generated by the main power supply. The PFC voltage is also monitored. An unacceptable rise in any of these voltages will cause the latch circuit, consisting of Q6405 and 6406, to pull down the AC relay high and turn the main power supply off. At the same time, a high is sent out of CN6154-5 to the sub-micro IC1205. The unit will shut down and the timer LED will blink in sequences of 2.

PFC Temperature (OTP) 2X

The temperature of the PFC drive components is monitored. If excessive temperature is detected, the same latch circuit that is used for OVP will be triggered and the diagnostics indication will be the same as an OVP condition (2X).

In-rush Current Resistor 2X

If AC relay RY6000 were to fail, all of the current used by the unit would cause R6009 to overheat. The voltage drop across R6009 is detected and will trip the same latch circuit that is used for OVP and generate an OVP diagnostics indication (2X).

Panel Temperature 7X

IC001 located on the AU board senses the relative temperature inside the cabinet. If the temperature becomes excessive, the unit will shut down and the standby LED will blink 7 times.

Speaker Protection 8X

The speaker output lines on the AU board are monitored for any DC voltage. If this is detected, the unit will shut down and the timer LED will blink 8 times

Panel Errors

Backlight (Inverter) Error 6X

The backlight inverter generates the high voltage (approximately 1.2 to 1.5KV RMS AC) to light the fluorescent tubes for backlighting. The 40" models use a single inverter (DF1), the 46" models use 2 inverters (DF2 and DF3). The 52" models also use 2 inverters (DF4 and DF5) which are not compatible with the 46" model inverters. When 2 inverters are used, each end of the backlights receives about 650V of AC voltage out of phase to generate a differential of 1.3KV. If one or more of the inverters fails, a high will be enter pin 4 of CN6153 on the DF1 (DF2) board. This high then exits pin 11 of CN6154 and goes to sub-micro IC1205 on the AU board. The unit will shut down and the timer LED will blink 6 times.

Balancer Error 13X

The balancer circuits are used to distribute the high voltage and to monitor the current draw for each backlight lamp. If a lamp draws insufficient current (weak or defective lamp) or a failure occurs on the balancer, the unit will shut down and the timer LED will blink 13 times.

Communications Errors

TCON Error 5X

Communications have been lost between the video processor on the FB1/FB3 board and the TCON (TFT Control) board which is part of the LCD panel. This can be caused by a defective FB1/FB3 board, a defective LVDS cable, or a TCON failure. On XBR models using the frame doubling UB1 board the problem could reside there.

DTT Error 10X

The EMMA decoder IC2000 located on the FB1/FB3 board is not communicating with the Sub-Micro IC1206 on the AU board.

Fan error 9X

The 40 and 46-inch XBR models are the only ones that have cooling fans. Although a fan error line is present on the schematic, and the fans have a rotation detect line, they are not monitored. This feature has not been included in the software and, altough it appears on the diagnostics page, you should never experience a 9X error on this chassis.

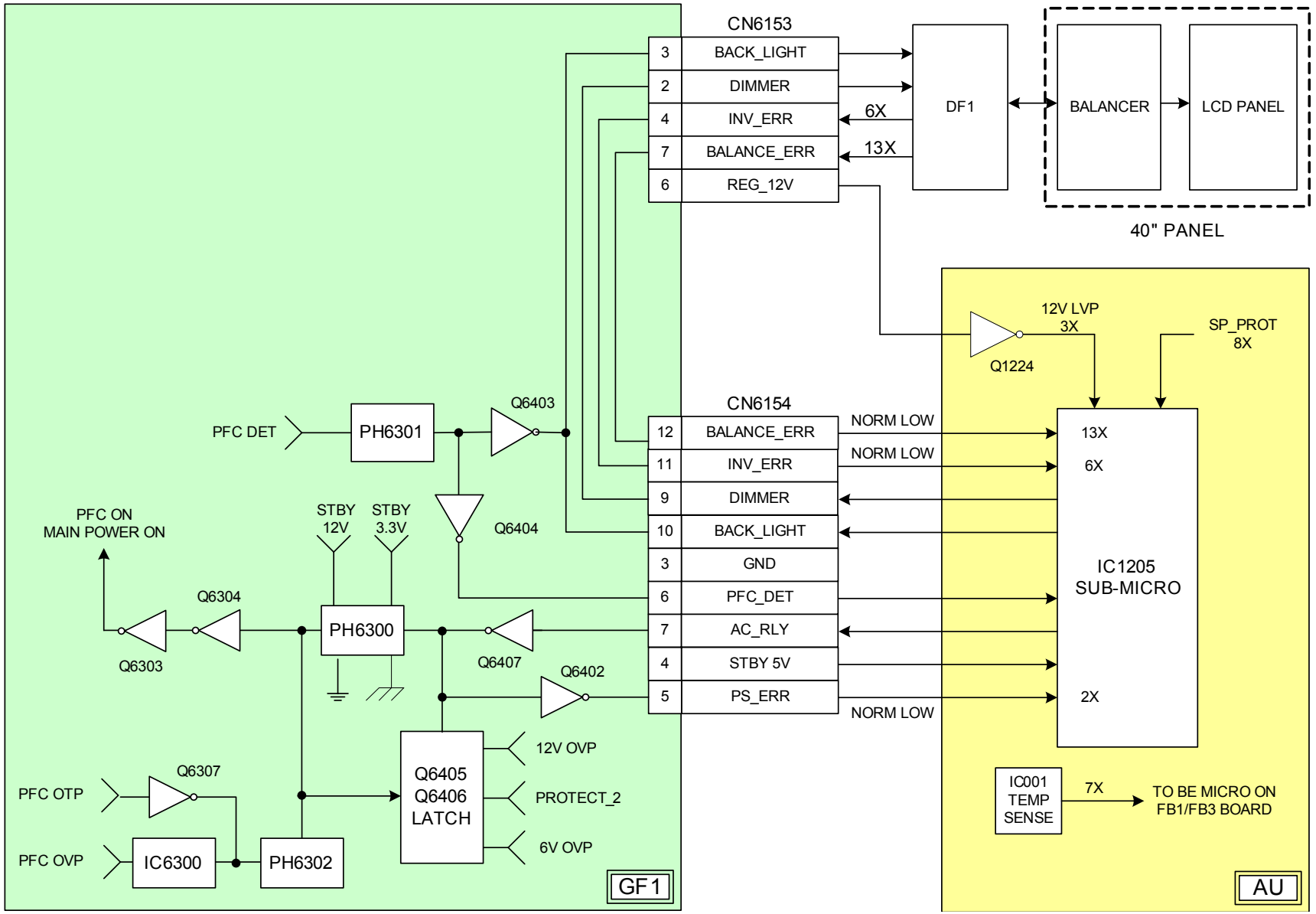


FIGURE 5-1
FIX-2 PROTECT CIRCUITS BLOCK DIAGRAM

# OF RED LED BLINKS	EVENT	DESCRIPTION	POSSIBLE REMEDY
2	POWER OVP	OVP OR OTP ON POWER SUPPLY BOARD	GF1/GF2 BOARD
3	POWER ERROR	LOSS OF REG12V FROM POWER SUPPLY	GF1/GF2 BOARD POSSIBLE AU BOARD
5	T_CON	COMMUNICATIONS FAILURE FROM B BOARD TO TCON	B BOARD, LVDS CABLE LCD PANEL
6	BACKLIGHT	INVERTER ERROR	INVERTER BOARD(S) GF1/GF2 BOARD
7	PANEL TEMP	EXCESSIVE PANEL TEMPERATURE DETECTED	IF IMMEDIATE, AU BOARD CHECK VENTILATION
8	AUDIO PROTECT	DC ON SPEAKER LINE	AU BOARD
9	FAN ERROR	FANS USED ONLY IN THE 40/46" XBR MODELS	NOT MONITORED
10	DTT ERROR	FAILURE OF EMMA IC2000	FB1/FB3 BOARD
13	BALANCER ERROR	ONE OR MORE BACKLIGHTS NOT FUNTIONING PROPERLY	INVERTER BOARD(S) LCD PANEL

TABLE 5-1
FIX-2 DIAGNOSTICS TABLE

Troubleshooting

Although the diagnostics error codes are a useful tool to aid in troubleshooting the unit, they can sometimes be vague as to what the cause of the failure is. An example would be a balancer error. Using a 52” model as an example, this error could be caused by failed DF4, DF5 board along with any one of the 4 balancer boards. A weak or defective backlight lamp could also be the culprit. In this case, it would require bringing 7 parts to the repair location (including the LCD panel). This is not cost effective. Always check the Sony knowledge base for any up-to-date information as this could minimize the number of parts to bring. Certain parts are eventually found to be the most likely cause and should be posted as a service bulletin or field problem report.

In certain cases, more than one part may need to be brought to the repair location. The flowcharts in Figures 5-8, 5-9, and 5-10 can be used to assist in determining which of the multiple parts should resolve the issue.

Panel Errors

Troubleshooting panel backlight errors seems to be a bit difficult for many technicians. In past models, a problem with the inverter or one or more of the backlight lamps would shut the unit down and display a diagnostic error simply defined as a “panel” error. The problem could be caused by a weak backlight, failed inverter or power supply. Once panels exceeded the 40-inch size, the backlights were driven by 2 inverter circuits.

The FIX-2 chassis uses a single inverter for the 40” panels along with a balancer circuit. This circuit is referred to as an “inverter” in the service manual although it does not contain any inverter circuits. The 46-inch panels use 2 inverters and 2 balancer circuits. The 52-inch panels also use 2 inverters with 4 balancers. Also new to the FIX-2 chassis is the use of 2 protect circuits that are related to the inverter and balancer circuits. One is called “Backlight” and the other “Balancer”.

The inverter generates the high voltage needed to fire the cold cathode fluorescent backlights. If excessive current is detected on this high voltage line, or if the voltage fails, the unit will shut down and should display 6 blinks from the timer LED. The balancer circuits are responsible for distributing the high voltage to each backlight lamp along with keepinng the current steady among the lamps. The balancer also provides protection if one or more of the lamps fails to start.

Balancer Errors

In Figure 5-2 a block diagram illustrates the key circuits used to drive the backlight lamps for a 40-inch panel. This requires the use of 16 lamps. High voltage at approximately 1500VRMS AC is applied to the balancer board by the inverter circuits located on the DF1 board. The high voltage AC is transmitted in bursts of 17 micro-second sinewaves. The duration of the bursts vary from about 30% at low backlight settings to 80% at full backlighting. The backlight level is adjustable by the customer and can also fluctuate because of the dynamic backlight control circuit used during dark scenes.

LCD panels at 32 inches or less use an inverter board mounted to one side of the panel to generate the high voltage for the lamps. In those designs, a low B+ voltage (usually 24 volts) supplies the inverter circuits. Each pair of lamps is driven by its own independent inverter drive circuit and the current of each lamp is controlled accordingly. The increased number of backlights and current requirements would be burdensome to a single board. Using one or more dedicated external inverter circuits becomes necessary.

The problem that arises with feeding high voltage to parallel arranged fluorescent lamps is making sure all of the lamps are “struck” or, in other words, ignited to their ionization point. If one or more of the lamps does not ignite, the remaining lamps that did will clamp the initial high voltage strike pulse. The other issue is maintaining even current draw among all of the lamps to ensure even backlighting of the panel. A circuit that is designed to balance the current among the lamps is necessary.

The balancer performs several distinct functions and a basic block diagram is illustrated in Figure 5-3.

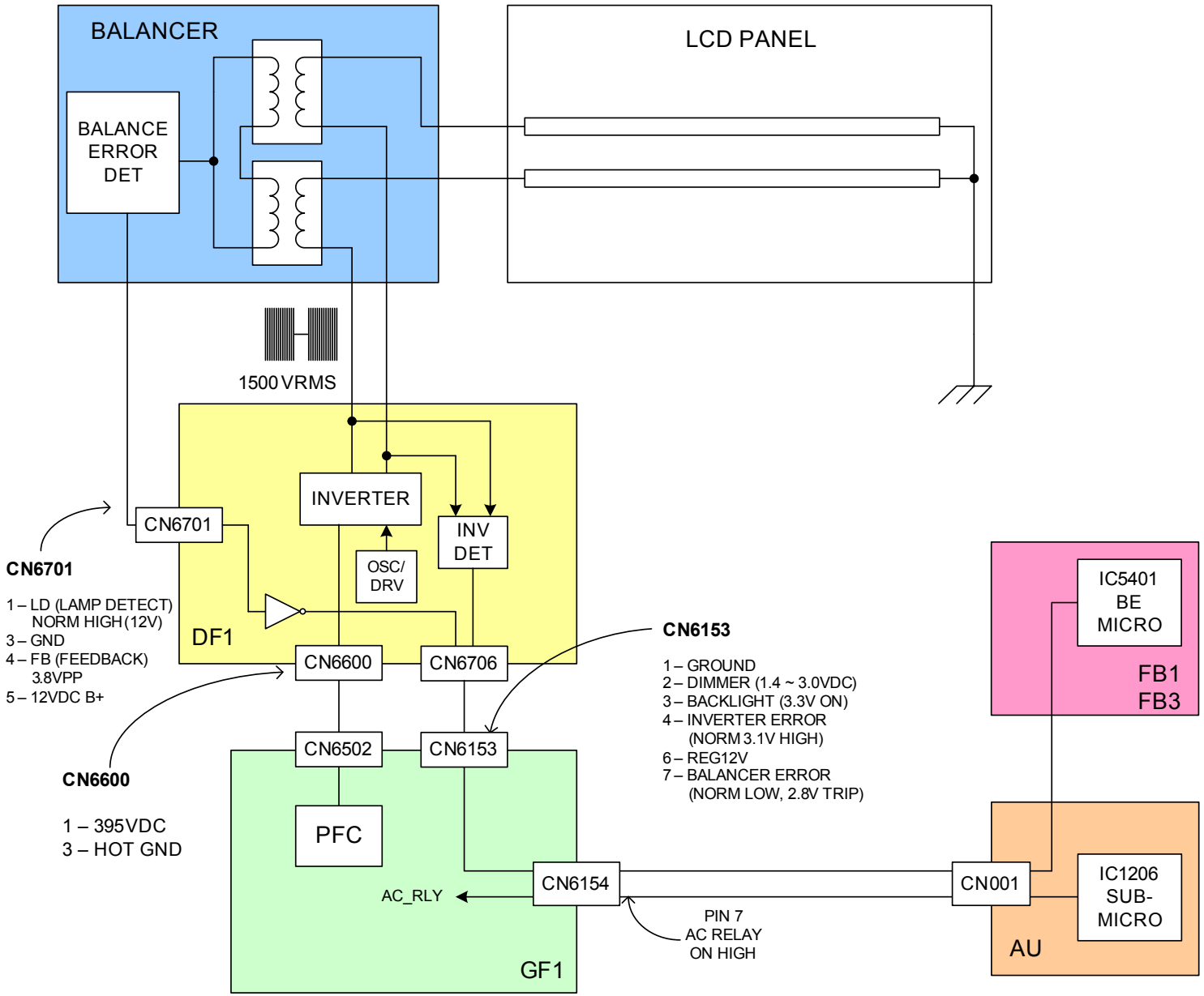


FIGURE 5-2
40” BACKLIGHT CONTROL AND MONITORING

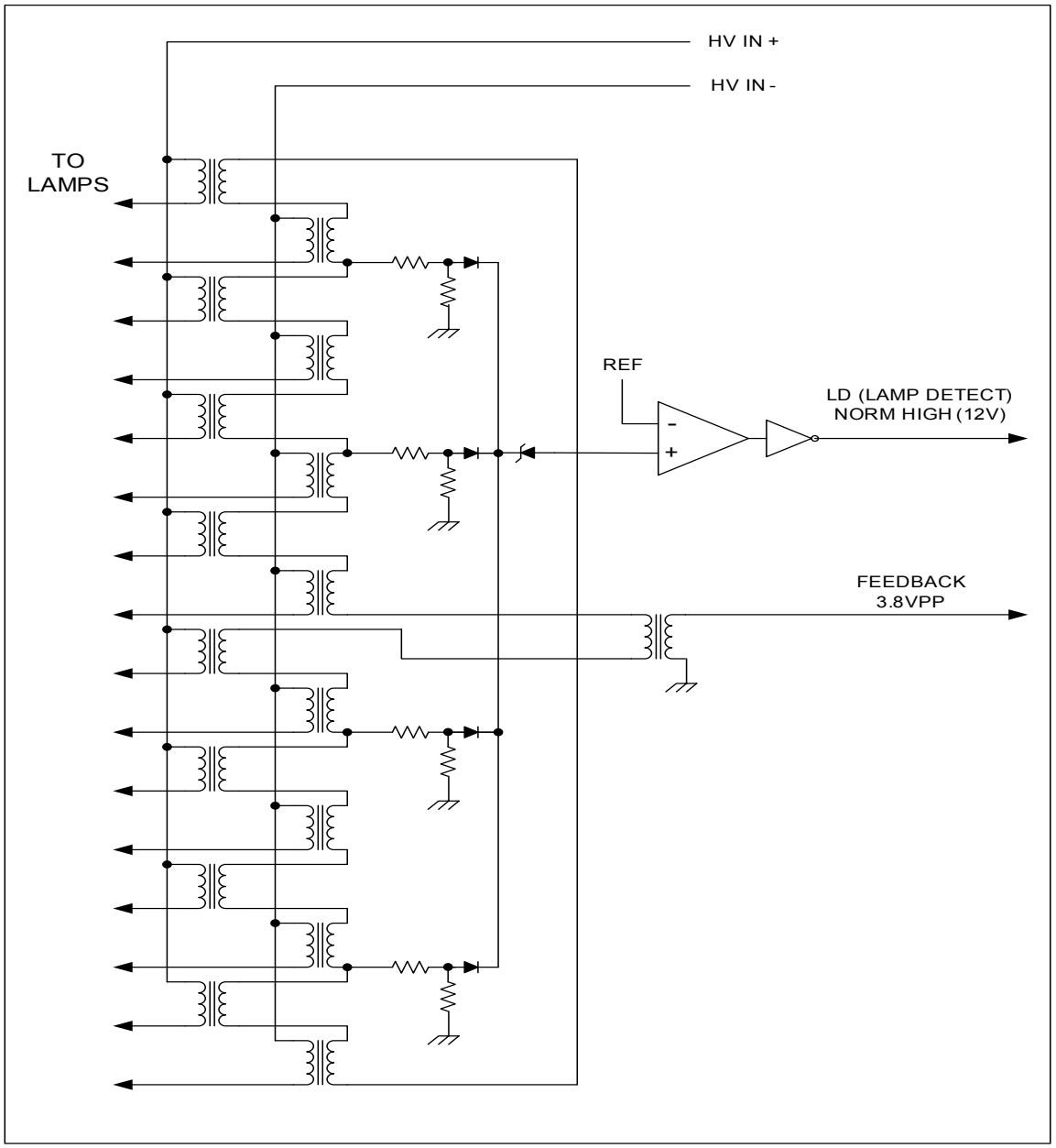


FIGURE 5-3
BALANCER CIRCUIT

Distribution of the High Voltage

The 2 out-of-phase high voltage lines are applied to each lamp with one line each feeding every other lamp. The lamps are driven with every other lamp out-of-phase in order to localize the high voltage field around each lamp and keep them from causing brightness fluctuations in adjacent lamps.

Maintaining Lamp Current Balance

Since the lamps are being driven by a common power source and are arranged in a parallel configuration, variances in lamp tolerances and aging of the lamps requires that the current drawn by the lamps be maintained steady to achieve balanced brightness (hence, the name “balancer board”). Each lamp is supplied with high voltage through the primary winding of a transformer. The secondary windings of each transformer are connected in series to form a closed loop. The circulating current in the secondary loop is what maintains the balance of the current being drawn by the lamps.

As long as all of the lamps are drawing acceptable current, the magnetizing energy between the primary and secondary of each transformer cancels each other out and prevents an inductive flux from being generated. If a lamp’s current draw drops, a differential in current will occur and the secondary will induce the difference into the primary and maintain balance in the current among the lamps. The circuit also helps during the initial “strike” of the lamps at turn-on since any lamp that does not light in unison with the others will receive a “kick” due to the imbalance on its transformer. In theory, assuming all of the lamps are identical and consuming exactly the same amount of current, the voltage in the secondary winding loop would be near zero. In reality, there will be some voltage in the loop as it performs its job of maintaining balance among the lamps and this is acceptable to a certain point. This is where the secondary loop functions as a protect circuit.

Balancer Protection

If one or more of the lamps fails to draw adequate current, the unit must go into protect mode since an out of balance condition can damage the other lamps and also cause damage to the circuit board due to arcing. This generally occurs when a lamp has weakened to the point where it will not turn on when struck. In this situation, there will be little or no current in the primary winding of that lamp and the current differential will cause an induced voltage between the primary and secondary windings.

4 sampling “taps” are taken along the secondary windings consisting of a resistor divider network and a diode. If an imbalance occurs one of the taps will detect a rise and the rectified voltage will exceed the zener diode rating (7 volts). A comparator will detect the zener diode firing and send a high the inverter transistor. Under normal conditions, the Lamp Protect (LD) line will be high (12VDC) and goes low if a balancer error is detected. The low is detected by pin 1 of CN6701 on the DF1 board. The unit will shut down and blink the timer LED in groups of 13.

Feedback

The final function of the balancer circuit is to provide feedback to the inverter circuit in order to maintain steady drive voltage. An additional transformer is included in the loop to provide an overall sample. This feedback signal is approximately 3.8VPP. This signal is sent back to the primary inverter (the one with the oscillator) to keep the lamp brightness steady.

Backlight Errors

Referring, once again, to Figure 5-2, the high voltage AC for the backlight lamps is generated by the inverter circuits on the DF1 board. The positive and negative sides of this AC voltage is sampled and sent to an inverter detect circuit. If one or both of the AC lines fails, the inverter detect circuit notifies BE Micro IC5401 on the FB board. The line is normally high (approximately 3.1VDC) and goes low when an inverter failure is detected. The low exits the DF1 board at pin 4 of CN6706 (it is now labeled INV_ ERR on the schematic) and enters the GF1 board at pin 4 of CN6153. It then passes through the GF1 board and exits at CN6154 to be sent to the AU board CN001 and on to the FB board.

The remaining lines on CN6153 are for control and supplying B+ for the DF1 board. They are:

Backlight Control – Goes high (3.3V) to turn the inverter on.

Dimmer – Determines the brightness of the backlights (1.4V dark to 3.0V full brightness).

REG12V – B+ for the inverter control circuits.

46/52” Backlight Protect

The 46 and 52-inch panels differ from the 40-inch models in that 2 inverter circuits are required to drive the backlight lamps. Referring to Figure 5-4, an overall block diagram of the backlight drive and protect circuits for a 46-inch panel is illustrated. The 52-inch panel layout is virtually the same except that 2 balancers are used on the left and right side of the panel.

The DF2 and DF3 boards supply a differential AC voltage to each end of the lamps. This model uses 24 fluorescent lamps. Due to the higher number of lamps, a balancer circuit must be located on both sides of the panel. The DF2 board supplies lamp power to every other lamp end via a transformer primary winding on the left-side balancer in the same manner as the 40-inch panel described previously. Opposite phased AC is also applied directly to the ends of each lamp not connected to a sampling transformer.

The DF3 board performs the same function on the right-side balancer providing lamp voltage to every other lamp via a transformer primary winding and providing an opposite phased AC return for the other lamps. The DF2 and DF3 boards work in unison to provide a differential AC voltage of approximately 640VRMS for a potential of 1280 volts on the lamps.

The use of 2 inverter boards presents an interesting situation if only one or the other fails. Referring to Figure 5-5, each end of the AC line providing power to the backlights is sampled via a capacitor and then rectified. As long as AC is present from both lines they should cancel each other out and the voltage exiting the dual diode array will be kept at zero volts. If the inverter fails, the protect line will rise due to a pull-up resistor (not shown) and the line will go high. This will cause comparator IC6703 to change its output from the normally high (12VDC) state to go low and the unit will shut down with a 6X diagnostics indication. On the schematic, this line is labeled CONN_ERR.

Note that the CONN_ERR lines of the DF2 and DF3 boards connect together at the same point before the comparator IC6703. Referring back to Figure 5-4, the DF2 board contains the oscillator and drivers for the inverter switching transistors used on the DF2 and DF3 boards. If a failure occurs on the DF3 board, the DF2 board will still run and keep the inverter error line in its normal state. The unit will not detect an inverter error but the backlights will only receive high voltage at one end. A substantial drop in current will occur on all backlights and the balancer detect circuits will activate, thus, shutting the unit down with a 13X diagnostics. The symptom would be backlighting occurring at turn-on but the right side of the panel will be lit brighter than the left side for about 4 seconds. If the inverter switching circuit on the DF2 board fails, but the oscillator/drive circuit continues to operate, the DF3 board will run and keep the inverter error line normal. In this case the panel will light for about 4 seconds with the left side brighter than the right before shutting down with a 13X error. If the oscillator/drive circuit fails on the DF2 board, both inverters will fail to output high voltage and the unit will shut down with a 6X inverter error.

Note the over-current protect circuit consisting of resistors to ground. Normally there should be very little voltage across these resistors. Once the voltage across the resistors exceeds 0.6 volts the inverter oscillator will be stopped and a 6X backlight error will be generated.

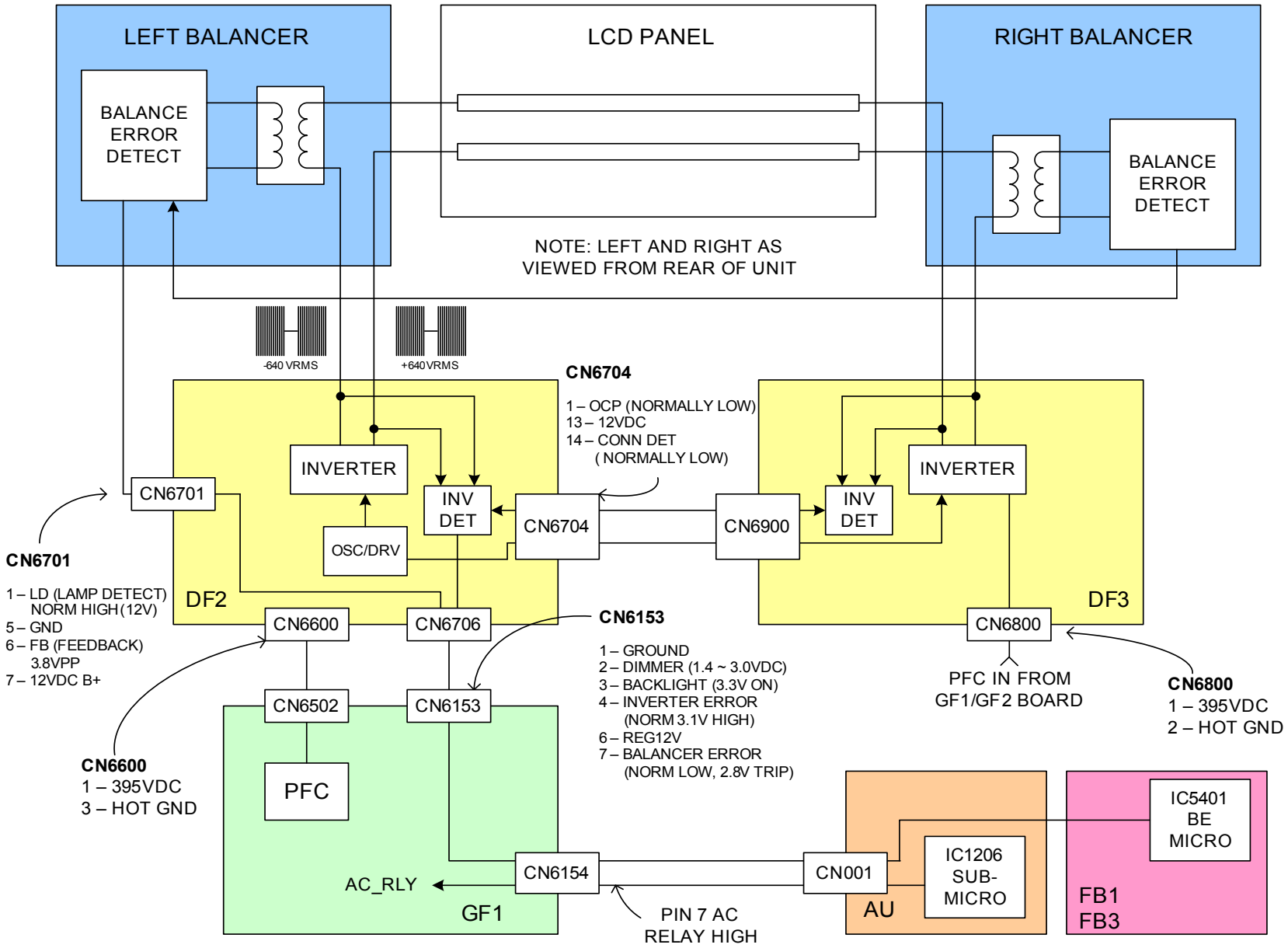


FIGURE 5-4
46” BACKLIGHT CONTROL

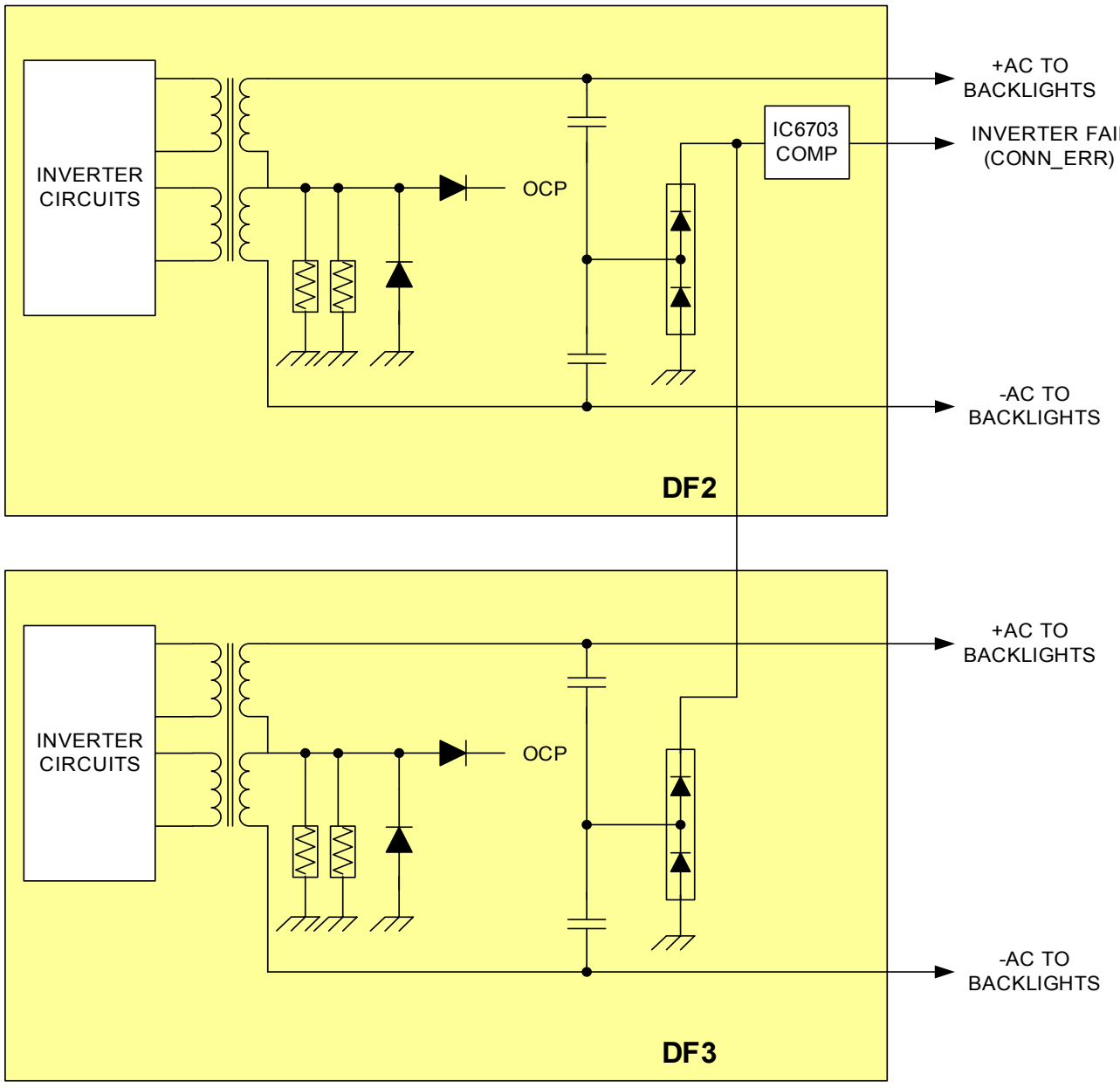


FIGURE 5-5
INVERTER DETECT AND PROTECT

Troubleshooting Backlight (Inverter) Errors

Known as “backlight protection”, the unit will shut down and blink the timer LED in groups of 6 whenever the following conditions occur:

1. The PFC 395V fails to exit the GF1/GF2 board to power the inverter. If 2 inverters are used, the PFC voltage must fail to reach both boards to generate a backlight error (6X). If only one loses the voltage, a balancer error (13X) will occur

2. If the DF1 board inverter fails. On units using dual inverters, both inverters must fail to output high voltage. As long as PFC 395V is present, the oscillator on the DF2 (46”) or DF4 (52”) must fail and cause both boards to stop outputting high voltage. It is, of course, possible that both boards could suffer a complete failure.

3. Excessive current is drawn by either inverter. There is an over-current protection circuit on both boards and failure on either one will cause a shutdown.

4. Failure of the backlight “on” command. If the sub-micro IC1205 on the AU board fails to get the necessary high (3.3VDC) to the DF2 board. Without this command, neither inverter will start.

5. The 3.8VPP feedback signal is lost from the balancers. This will cause the inverter(s) to generate excessive high voltage and the oscillator will be stopped by the OVP circuit.

The first item to check when a backlight inverter error occurs is to see if the backlights light up within 4 seconds after the unit is turned on. If the one or both of the inverters is functioning, the backlights will be seen for about 3 or 4 seconds. This at least tells you the backlights are being told to turn on and that at least one or both may be generating high voltage. If the unit does not ever turn on the backlights before shutdown, suspect a failed inverter (for single inverter units), loss of B+ from the power supply, or a loss of the “backlight on” command from the systems microprocessor. Use the troubleshooting flowcharts at the end of this chapter to assist in locating the cause as there is one that is specific to the single inverter units with the other covering the dual inverter models.

Balancer Errors

The current detect circuits on the balancer boards monitors each lamp for adequate current draw. Once a lamp weakens with age or becomes defective inadequate or no current will be detected. The unit will shut down and the timer LED will blink in groups of 13. The basic function is to monitor the backlight lamps but lamp current issues should not be common until the unit is nearing the life expectancy of the lamps. Units that are rather new that experience balancer protect shutdown will usually be caused by a premature failure of a lamp, a failure on either balancer board, or if only one of the inverters in a dual inverter circuit fails completely.

As mentioned previously, if a complete failure of one of the inverters occurs, the other inverter will prevent an inverter failure command from occurring. This will cause all of the lamps to suddenly reduce current draw because of the loss of high voltage on one side of the entire bank of lamps. The balancer current monitoring circuits will detect inadequate current from all of the lamps and shut the unit down as a 13X balancer failure.

SERVICE TIP: A balancer failure must allow the backlights to be turned on for a brief period. An inverter failure in which no high voltage is sent to any lamps will always override a 13X balancer error with a 6X backlight failure. A good way to tell if one of the inverters has failed is to closely watch the screen as the backlights turn on. You must observe if the backlighting is even from left to right. If one side appears darker than the other, this is a clear indication that one of the inverters is the cause. The side that is darkest is the side that the failed inverter resides. This only works for units that have a left and right inverter.

Units with a single inverter will light the screen evenly from left to right indicating the inverter is functioning. The next item to look for is whether you can detect of one of the backlight lamps is not lighting. This is not easy but can be sometimes detected with low ambient lighting conditions. Sometimes you will have to install a new balancer and hope it solves the problem. If it does not, there probably is a single lamp that is not drawing enough current and the LCD panel will need to be replaced.

WARNING! When removing the balancers for replacement only remove the screws for the cover and any screws securing the board to the panel. ***DO NOT remove the screws securing the assembly containing the lamp sockets***. The ends of the backlight lamps are secured by a clamp-type connector and the lamps ***will break*** if you attempt to pull it out. Always pull the balancer away from the socket assembly in a horizontal direction. This is illustrated in Figure 5-6.

Diagnostics History

Certain protect events are monitored by the Sub-Micro on the AU board. Those that are monitored are stored into NVM for retrieval. Each time a monitored protect event occurs a failure will register in the right column. Each diagnostic event will register a “0” if none has occurred. Each time a failure event occurs, it will be recorded. Up to 99 failures can be stored. This feature is especially useful when attempting to diagnose intermittent problems.

The diagnostics history page is retrieved by turning the unit off and pressing the following buttons on the remote commander in sequence: “DISPLAY”, “5”, “VOL-”, and “POWER”. The unit will turn on and you may have to wait several seconds for the display to appear once the backlights have turned on. This feature is illustrated in Figure 5-7.

The left column indicates the number of blinks that occur from the timer LED located on the lower front panel. The description of the failure is located to the right of this column. Most are self-explanatory and coincide with the protect table in Table 5-1. A few are not so obvious.

DTT_ERR: Digital Terrestrial Tuner. This is the EMMA IC2000 decoder located on the FB1/FB3 board. If the IC fails to communicate with the Sub-Micro (systems micro) this error will occur.

TVM_WDT: Sub-Micro IC1205 located on the AU board. Watchdog timer for the systems micro. Whenever a buffer overflow occurs, an event will register. It is not unusual to see events registered with a normally operating unit.

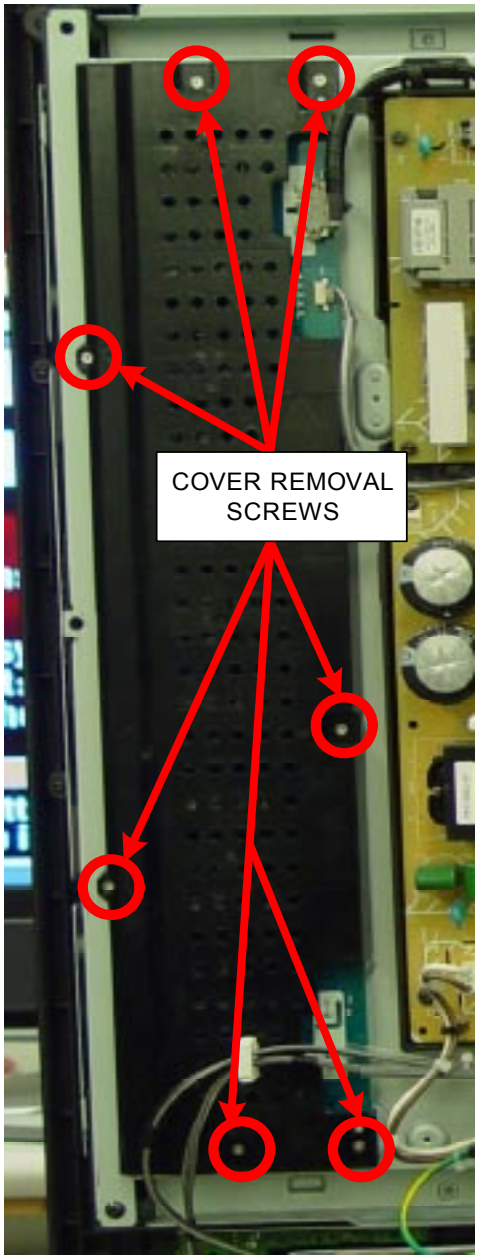
BEM_WDT: Same function as the previous WDT but for the BE (Back-End) Microprocessor located on the FB1/FB3 board.

The three columns of dashes in the center of the page were intended to provide a time of when the last 3 protect events occurred. As of the writing of this manual, this feature is disabled in the software and will not register any information into these columns.

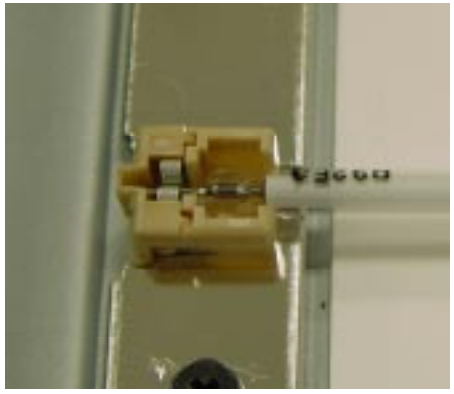
Clearing the Diagnostics History

Once the diagnostics page has been viewed for a history of protect events (and there are any present) the failure counts must be cleared to be useful at a later time. This is accomplished by pressing the “8” followed by the “0” key on the remote (not “8”, “ENTER” as in past models).

NOTE: Whenever the failure count is reset in this manner, the panel operation hours will be reset to zero. The total hours of operation will be unaffected.



DO NOT REMOVE THESE SCREWS. THEY SECURE THE LAMP SOCKETS TO THE PANEL. IF THEY ARE REMOVED, DAMAGE TO THE BACKLIGHT LAMPS WILL OCCUR IF THE BALANCER BOARD IS MOVED.



VIEW OF OTHER SIDE OF BALANCER SOCKETS SECURING BACKLIGHT LAMP

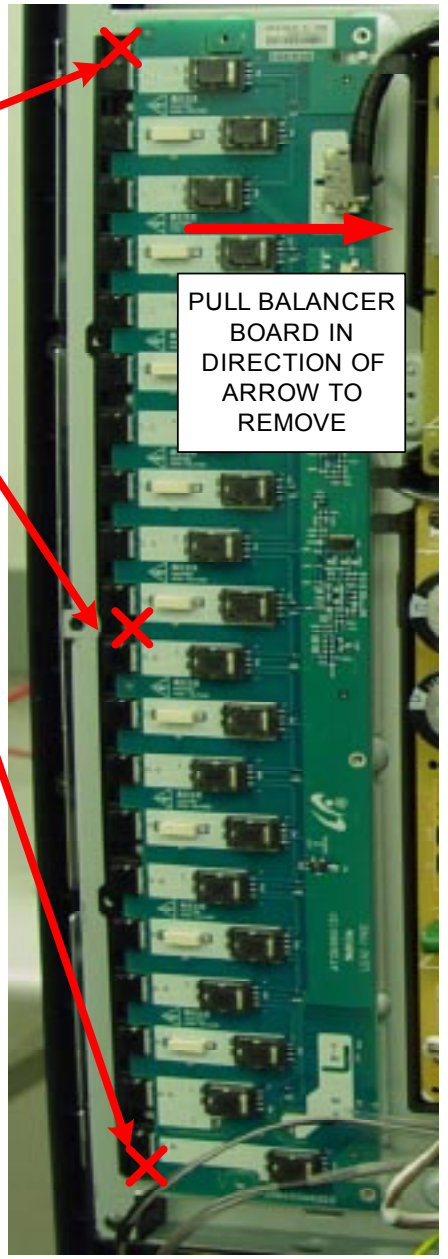


FIGURE 5-6
BALANCER BOARD REMOVAL WARNING

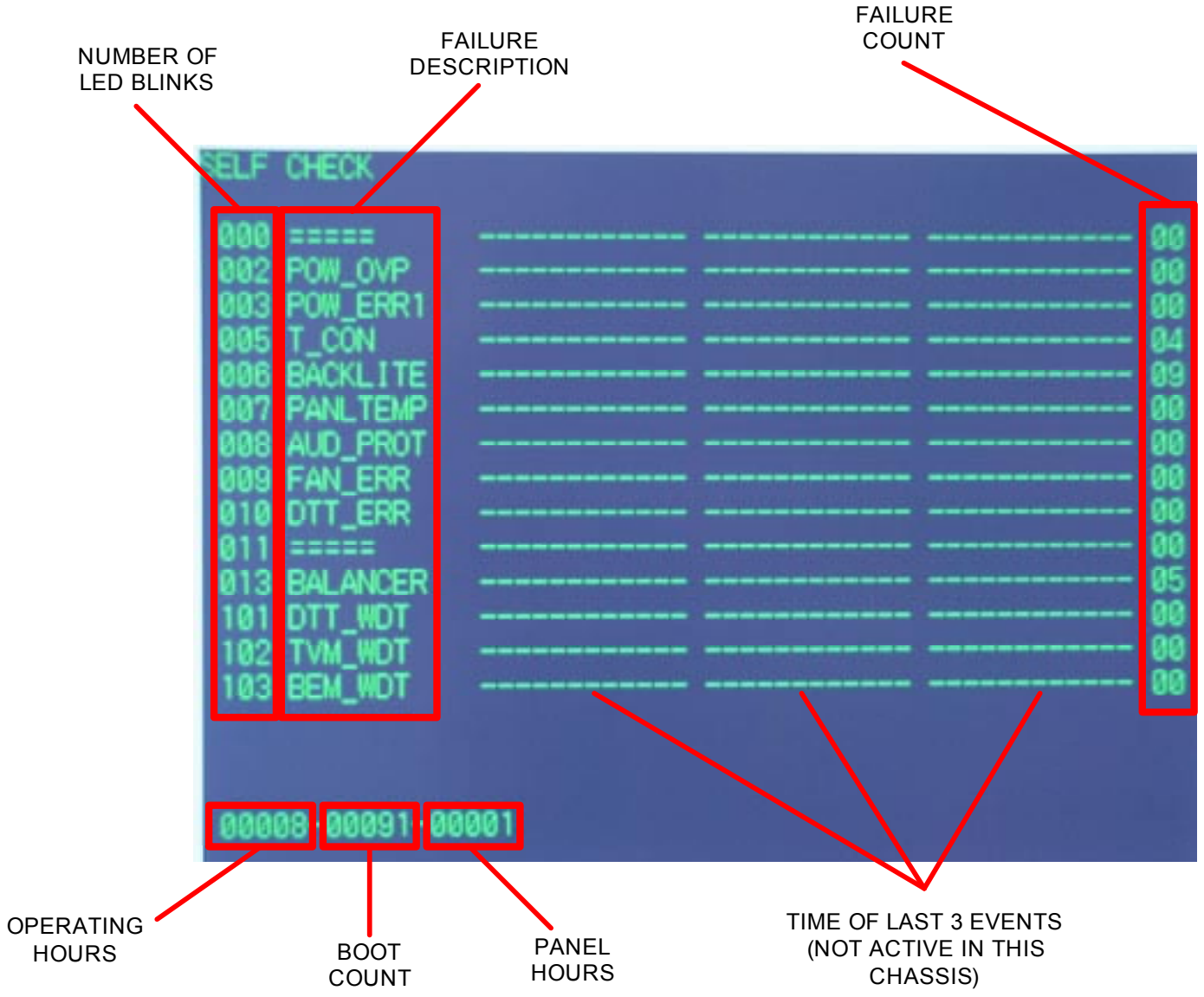
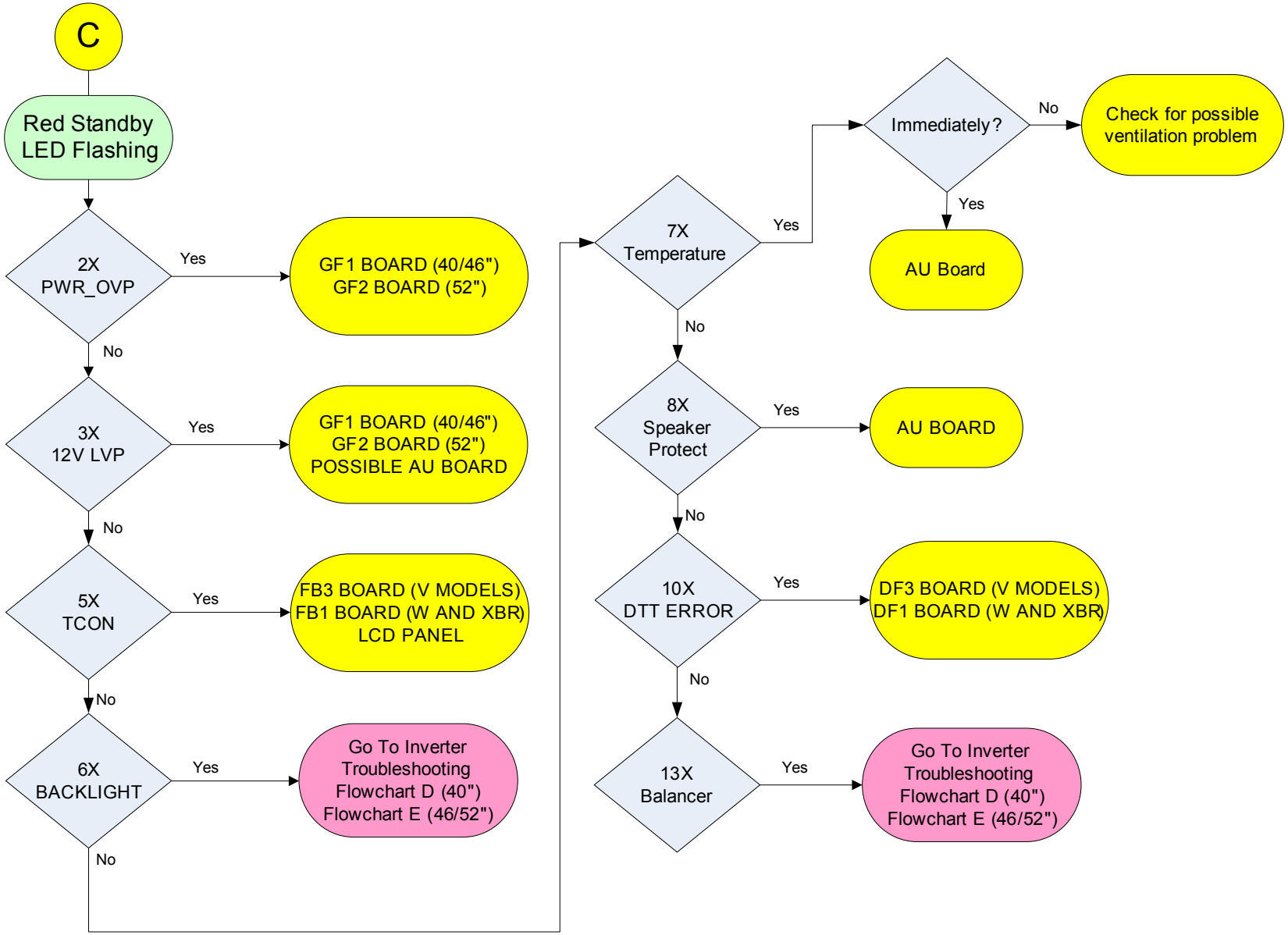
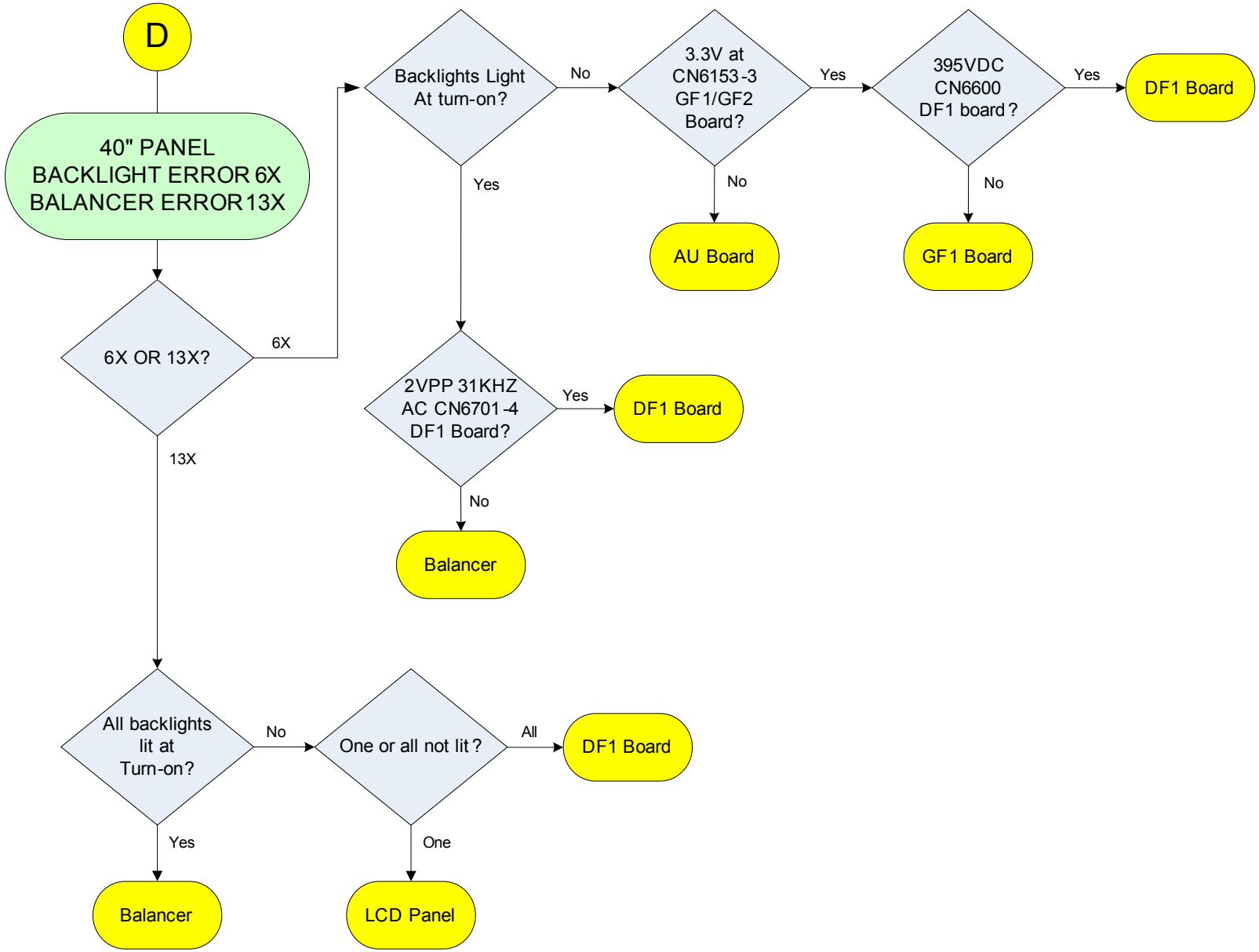


FIGURE 5-7
SELF DIAGNOSTICS DISPLAY

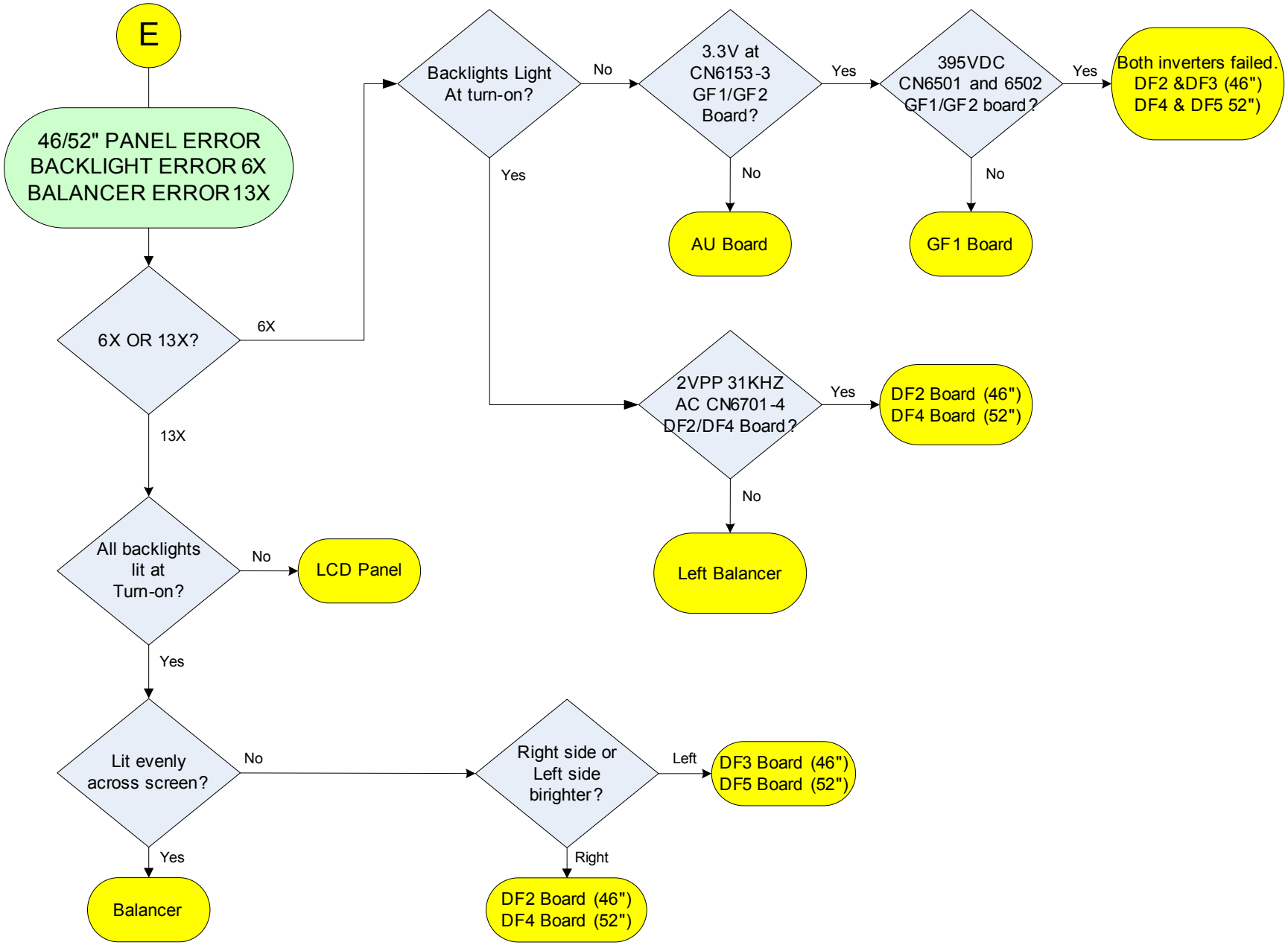
Protect Mode Flowchart C



40” Model Panel Error Flowchart D



46/52” Model Panel Error Flowchart E



Chapter 6 - Disassembly

Overview

Removal of the LCD panel in the FIX-2 chassis lineup is relatively straightforward. All of the major circuit boards (video process, A/V switch, power supply, tuner and backlight inverters are mounted on sub-chassis assemblies to isolate them from the rear of the LCD panel. Only the balancers are mounted directly to the panel but they must also be removed to transfer to the replacement panel. The remaining small circuit boards are attached to the bezel and, in most cases can be left intact.

This chapter contains illustrations to aid in the proper removal of components to clear the LCD panel for removal from the bezel assembly. Once all of the required connectors are loose and the proper mounting screws removed, the cluster of circuit boards and sub-chassis assemblies can be carefully piled on top of each other and transferred to another location while the remaining hardware is removed from the rear of the panel. This generally involves adapter brackets to mount the panel to the bezel and to secure the wall-mount brackets. There a couple of important points that should be noted when replacing the LCD panel.

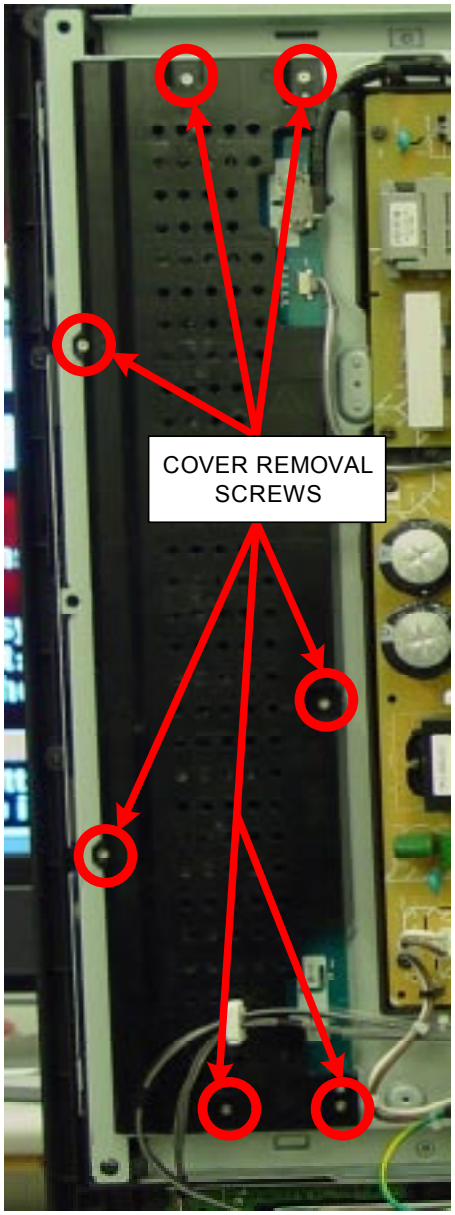
Dress all wires back to their original location: The routing of all wires and harnesses is critical to minimize EMI. The greatest value of the illustrations in this chapter is to show you how these wires were routed and secured prior to the disassembly.

Proper removal of balancer boards: Figure 6-1 illustrates a warning when removing the balancers. In most cases, removal of the plastic cover from the balancer will release the circuit board. The 46-inch models will have 2 additional screws under the cover that secure the board. The point is to never remove the screws securing the socket assembly that the balancer board plugs into. This socket assembly also contains mounting sockets for the backlight lamps and if it is loosened and moved around breakage of one or more of the backlight lamps is inevitable.

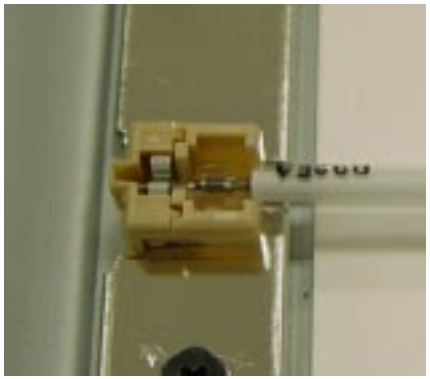
Mounting hardware on the panel: Brackets attached directly to the rear of the LCD panel are secured with 5MM machine screws with an integrated washer. These machine screws are noticeably shorter than the other 5mm machine screws used in the unit. Always install the short screws so as to not penetrate to deeply into the rear of the panel. This is illustrated in Figure 6-2.

Keep all circuit boards and sub-chassis parts together: Figure 6-3 illustrates the “piling” of the boards and sub-chassis parts onto a secure location while the remaining hardware is removed from the old panel and transferred to the new one.

The remaining illustrations point to the proper removal of all necessary connectors and screws to remove the required components. The procedures are separated based on the size of the panel being removed.



DO NOT REMOVE THESE SCREWS. THEY SECURE THE LAMP SOCKETS TO THE PANEL. IF THEY ARE REMOVED, DAMAGE TO THE BACKLIGHT LAMPS WILL OCCUR IF THE BALANCER BOARD IS MOVED.



VIEW OF OTHER SIDE OF BALANCER SOCKETS SECURING BACKLIGHT LAMP

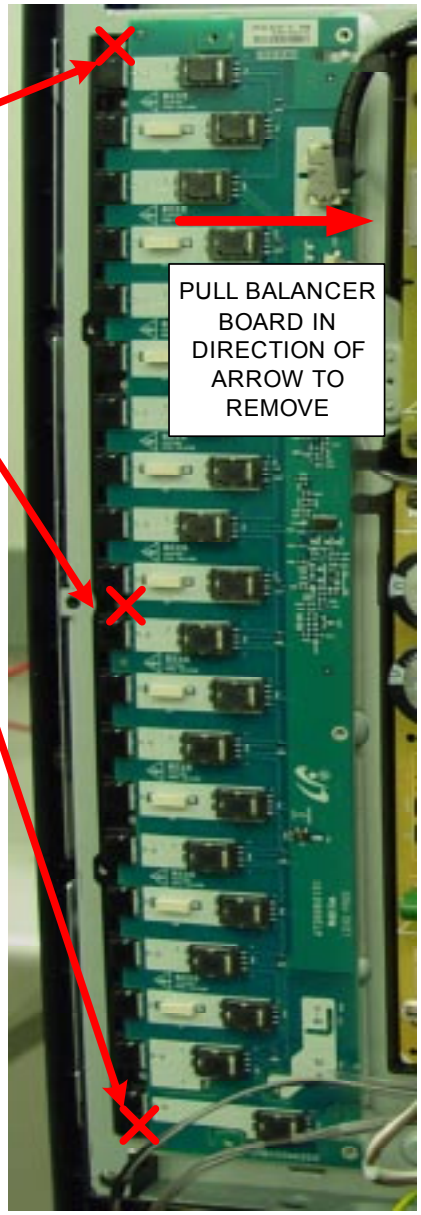


FIGURE 6-1
WARNING ON BALANCER REMOVAL

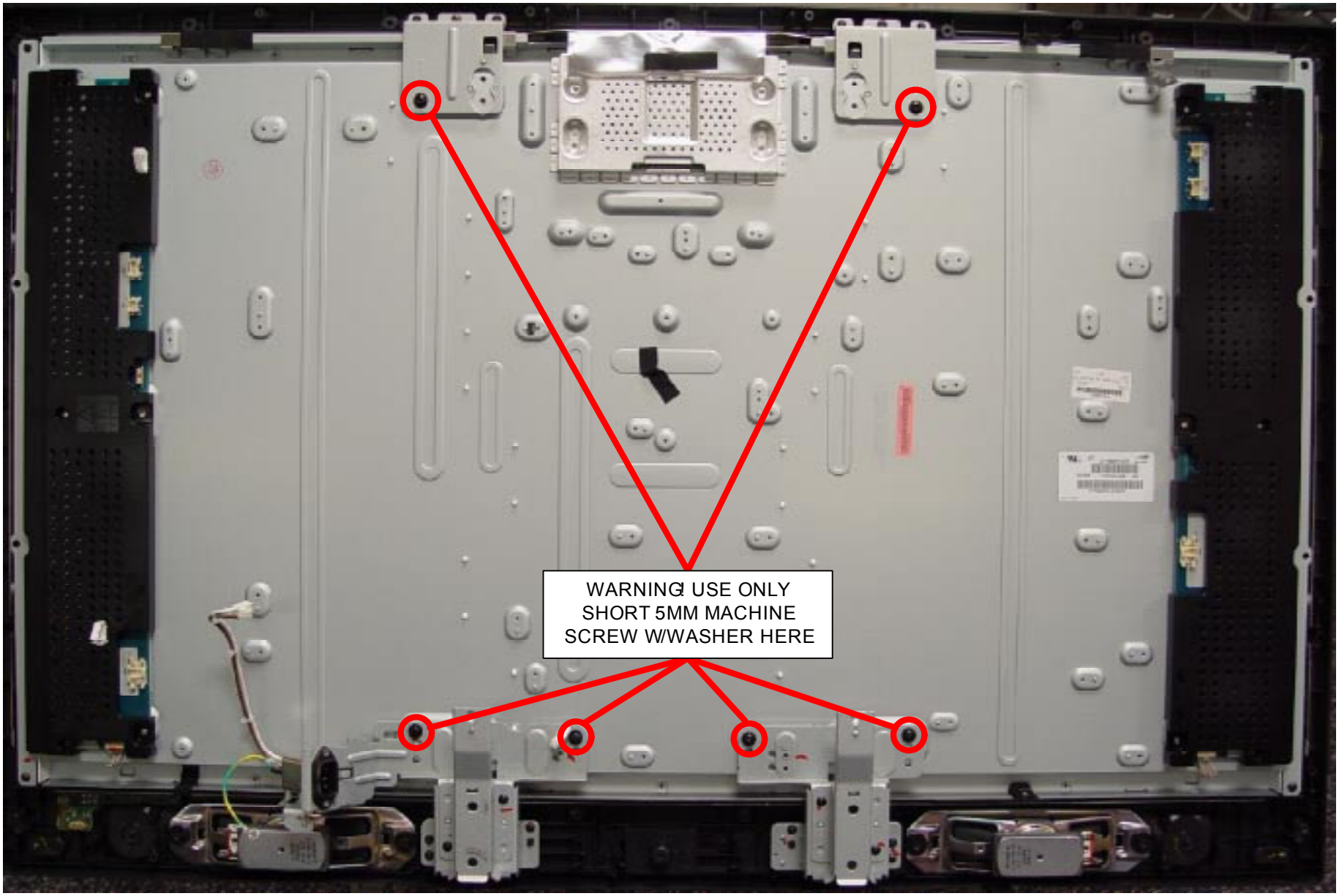


FIGURE 6-2
PANEL BRACKET SCREWS

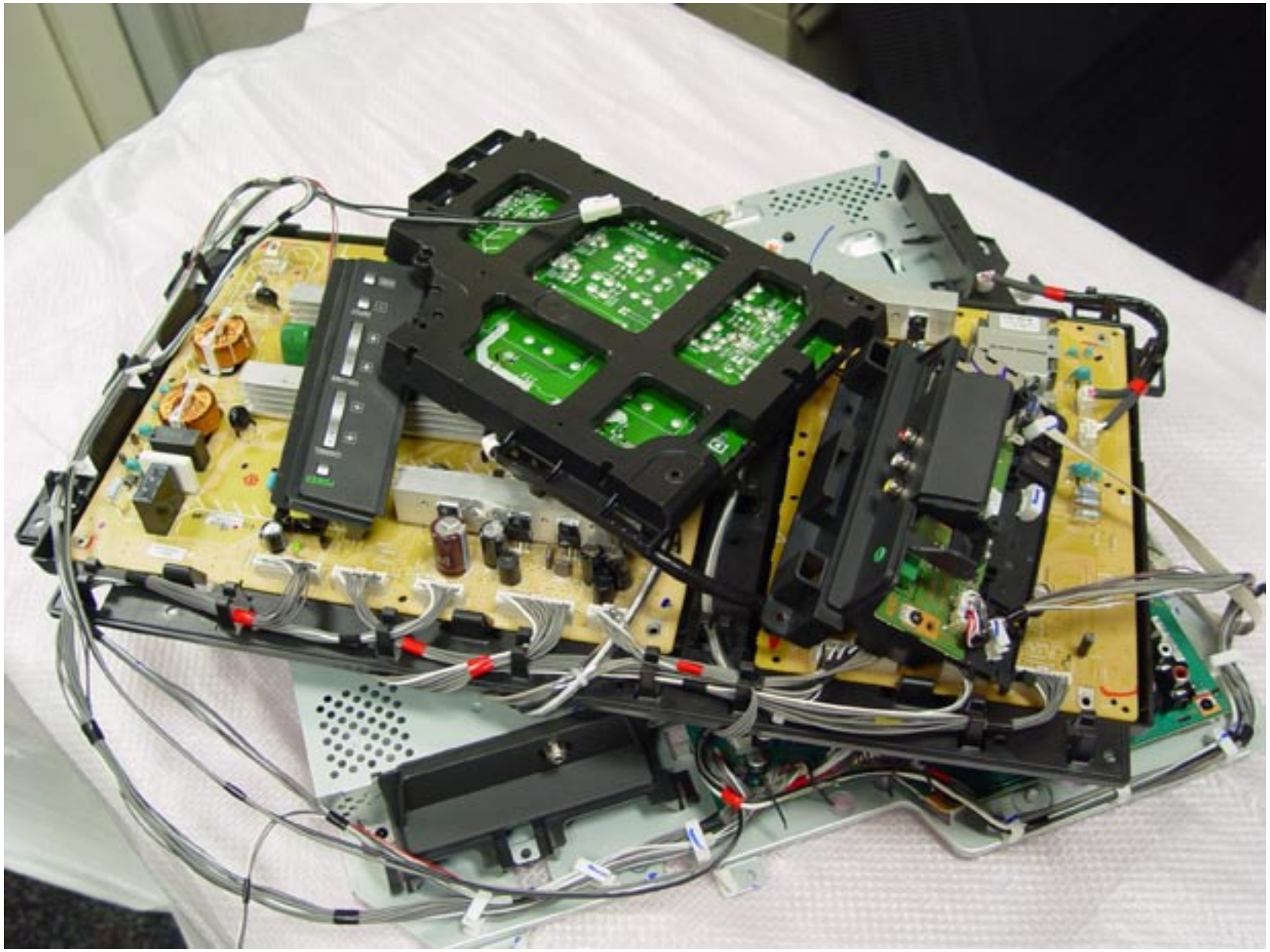


FIGURE 6-3
SUB-CHASSIS AND BOARDS REMOVED

40” LCD Panel Removal

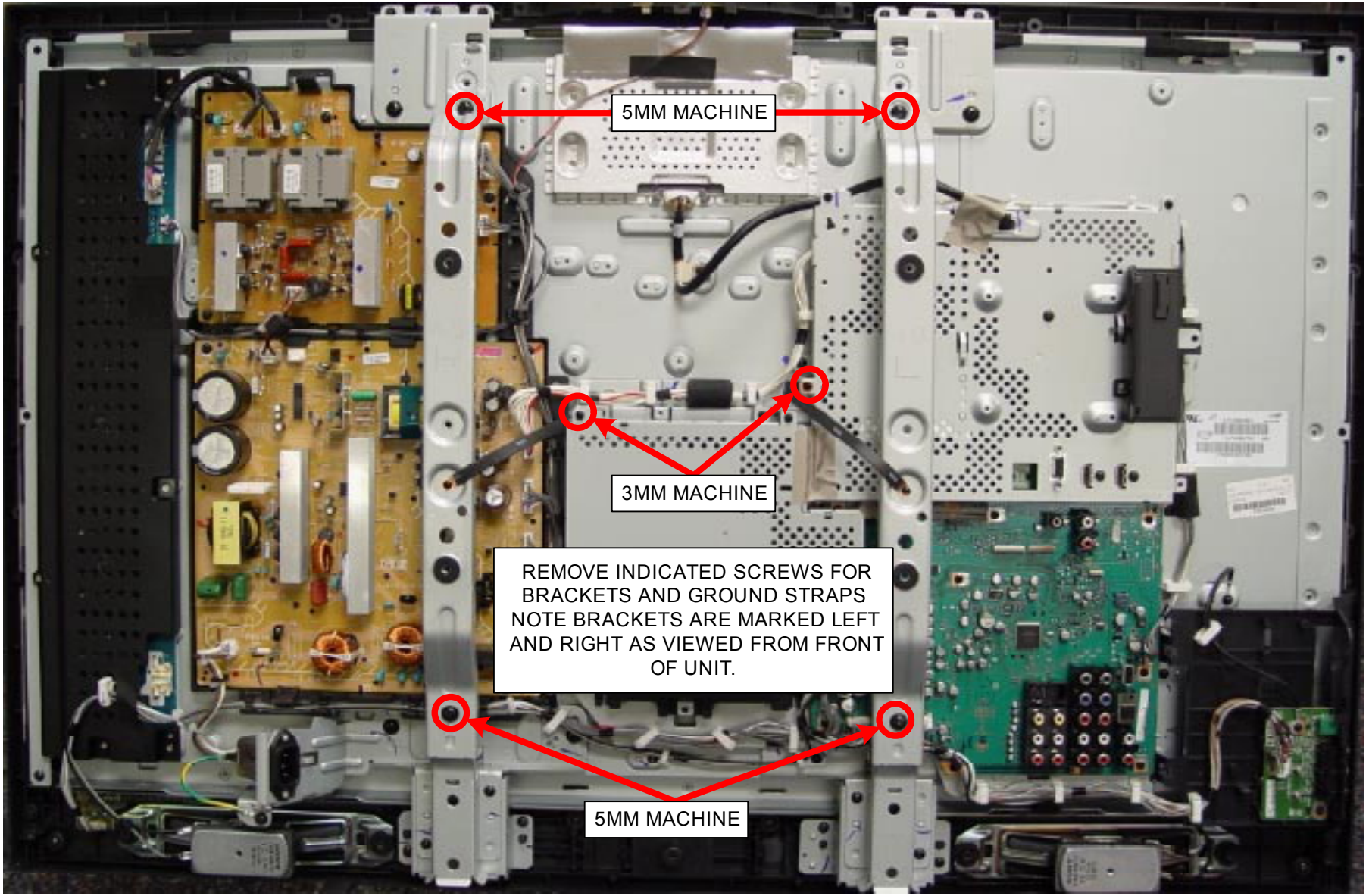


FIGURE 6-4
40” LCD PANEL REMOVAL (STEP 1)

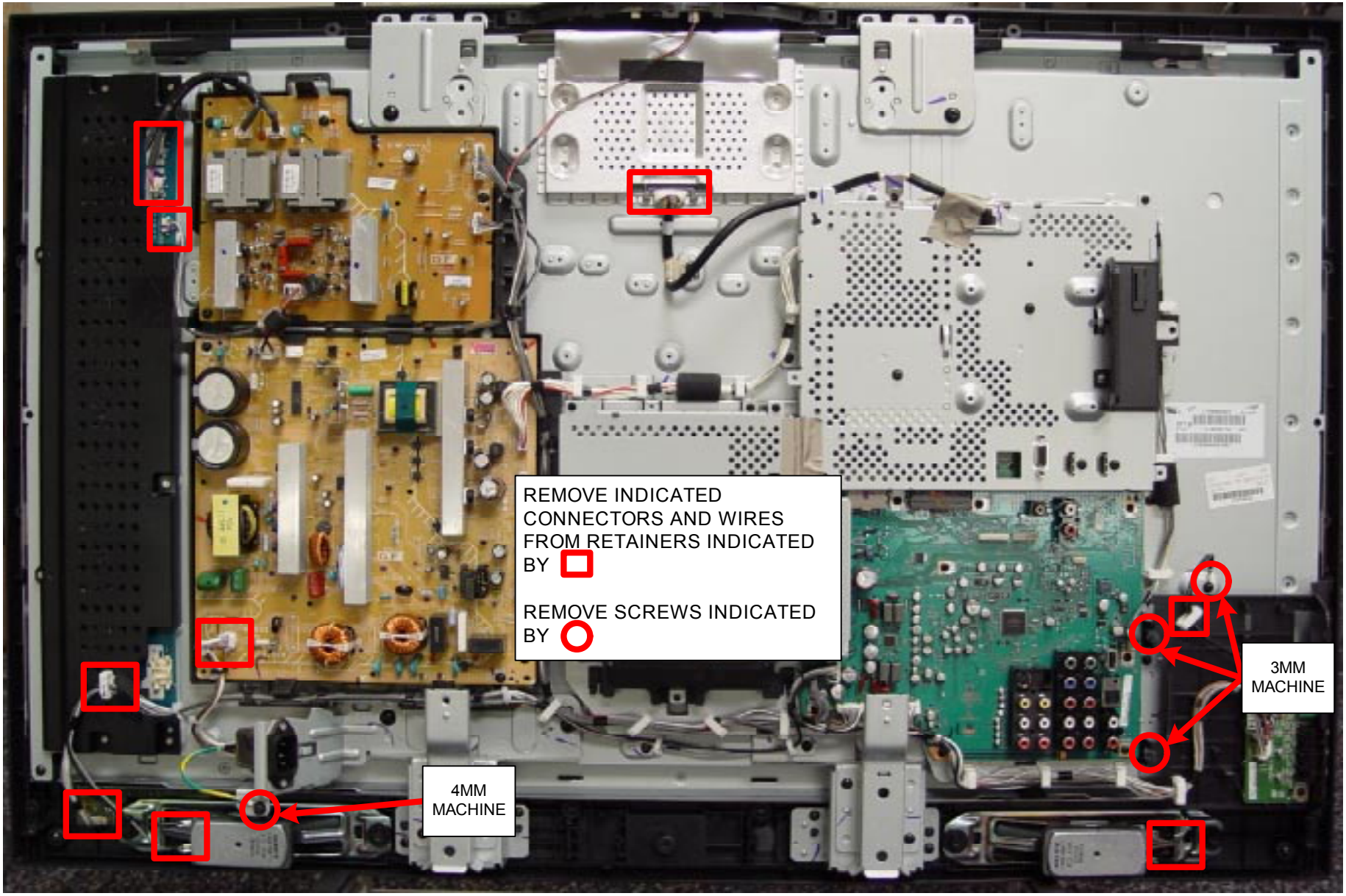


FIGURE 6-5
40” LCD PANEL REMOVAL (STEP 2)

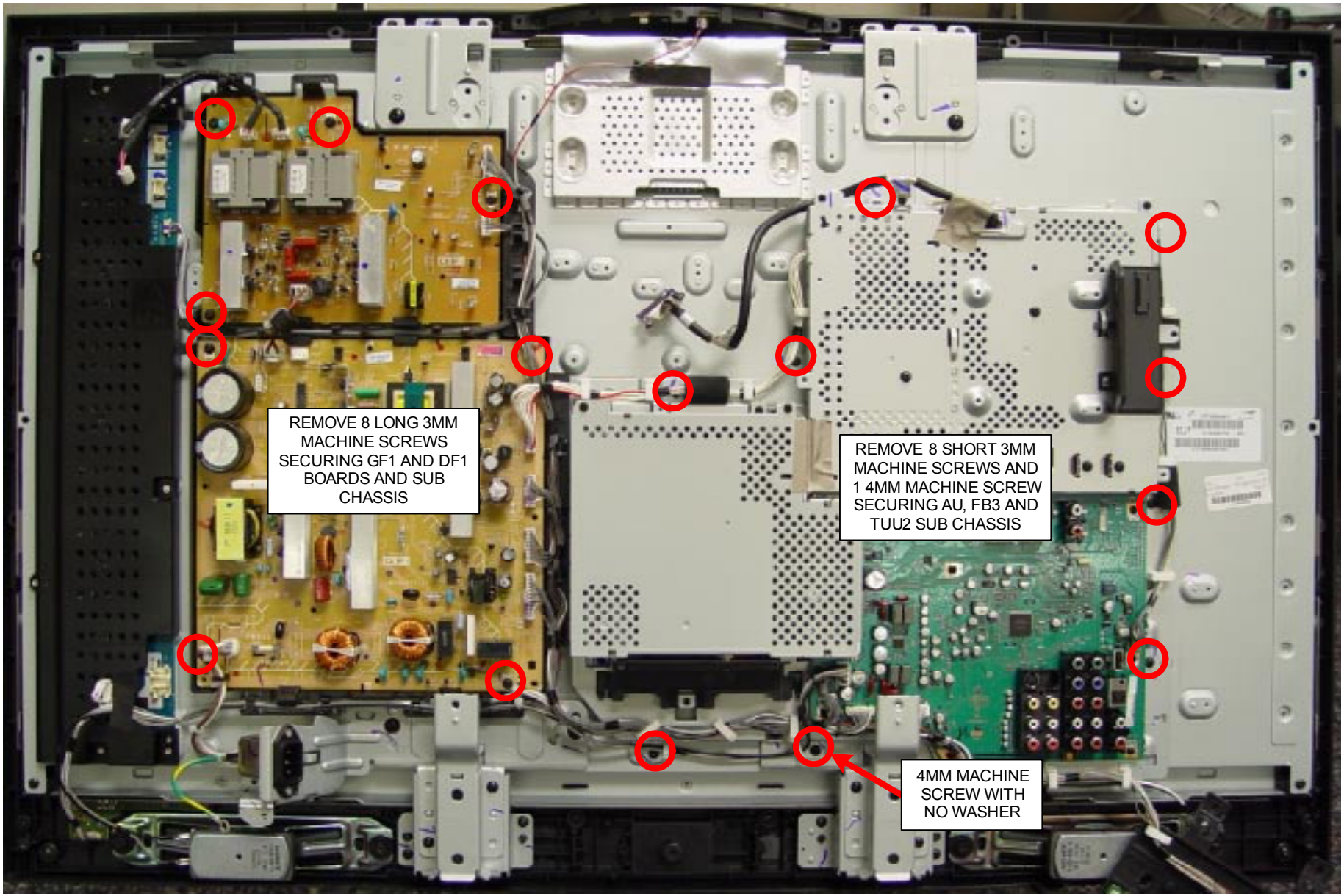


FIGURE 6-6
40” LCD PANEL REMOVAL (STEP 3)

46” LCD Panel Removal

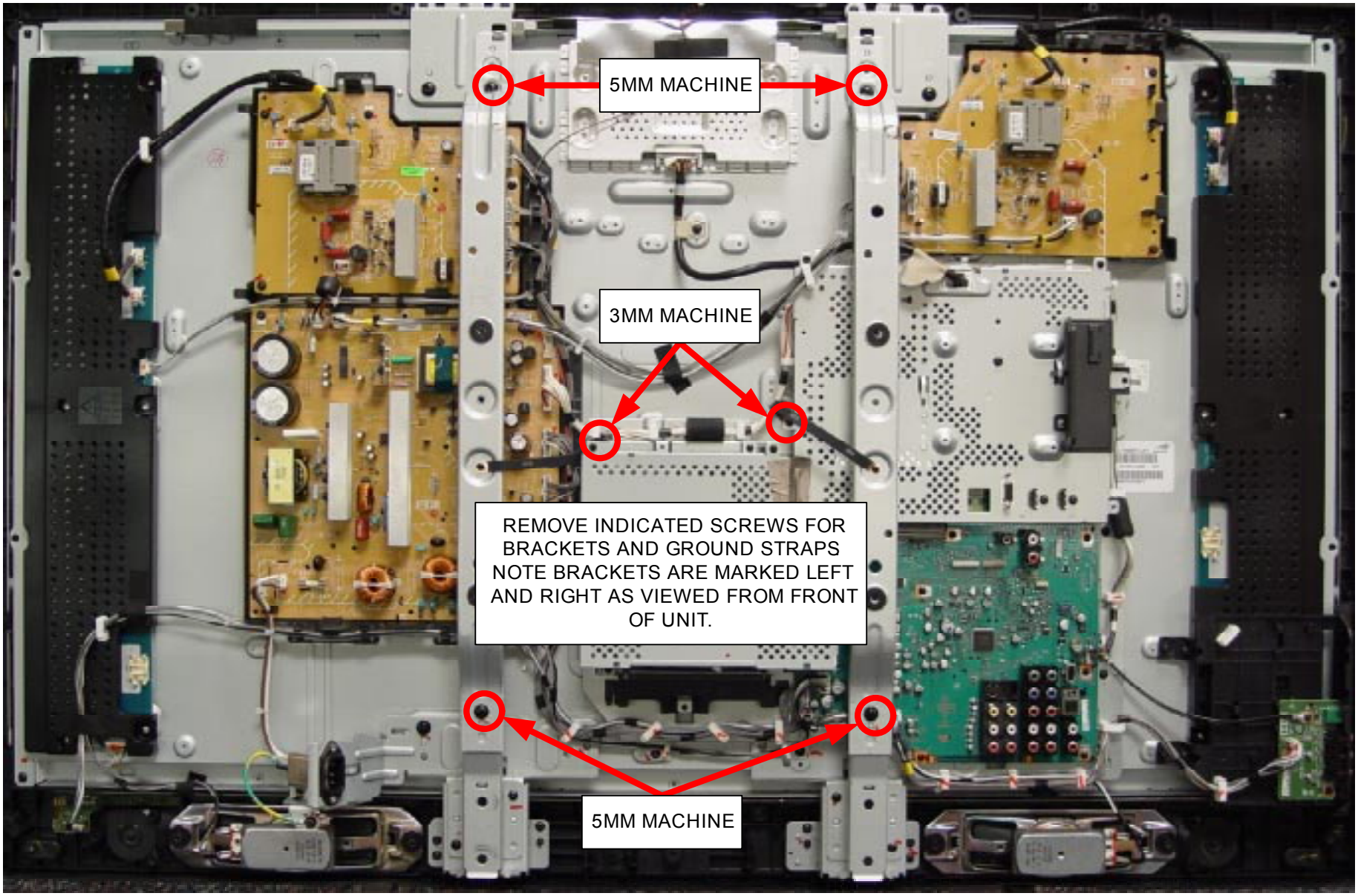


FIGURE 6-7
46” LCD PANEL REMOVAL (STEP 1)

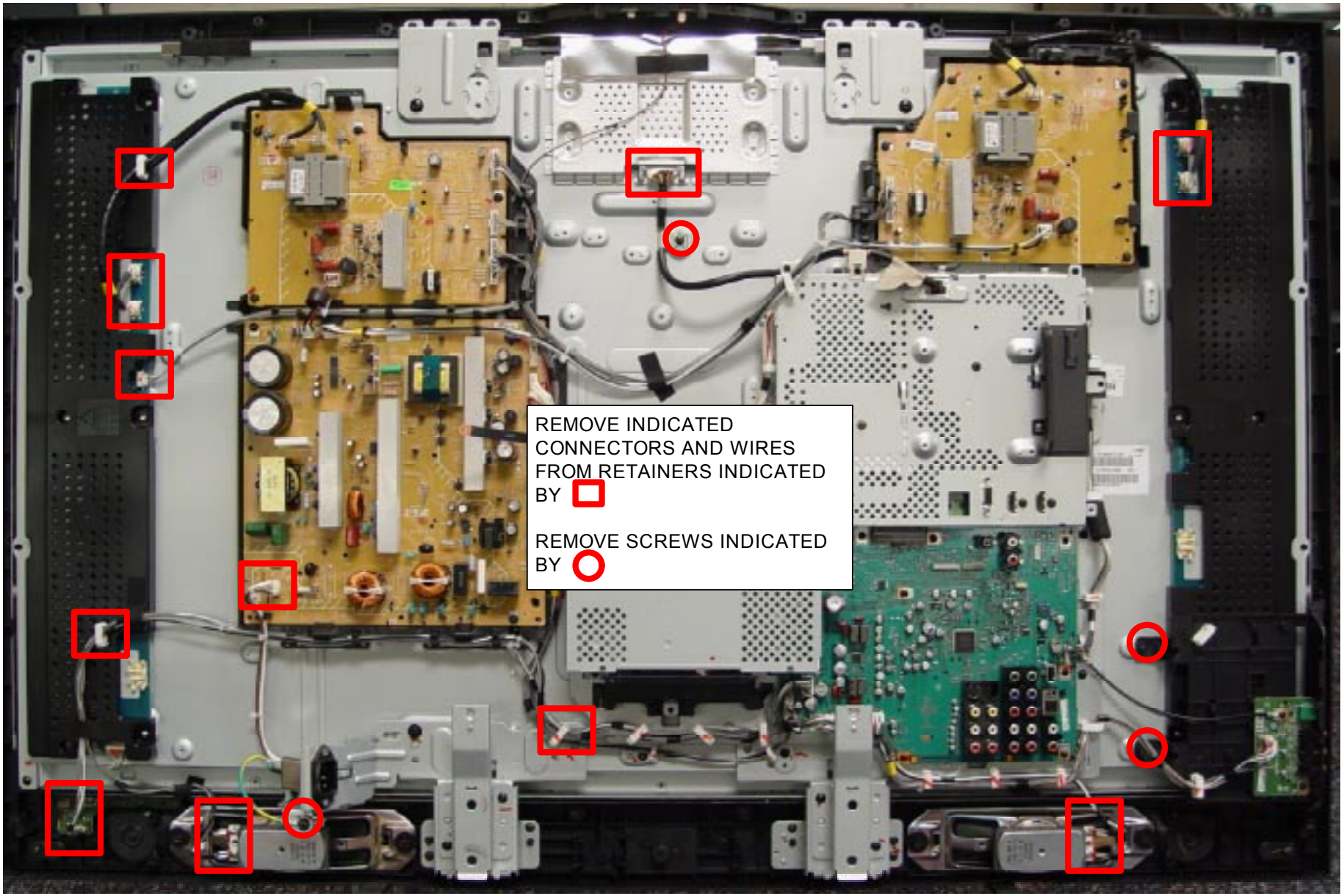


FIGURE 6-8
46” LCD PANEL REMOVAL (STEP 2)

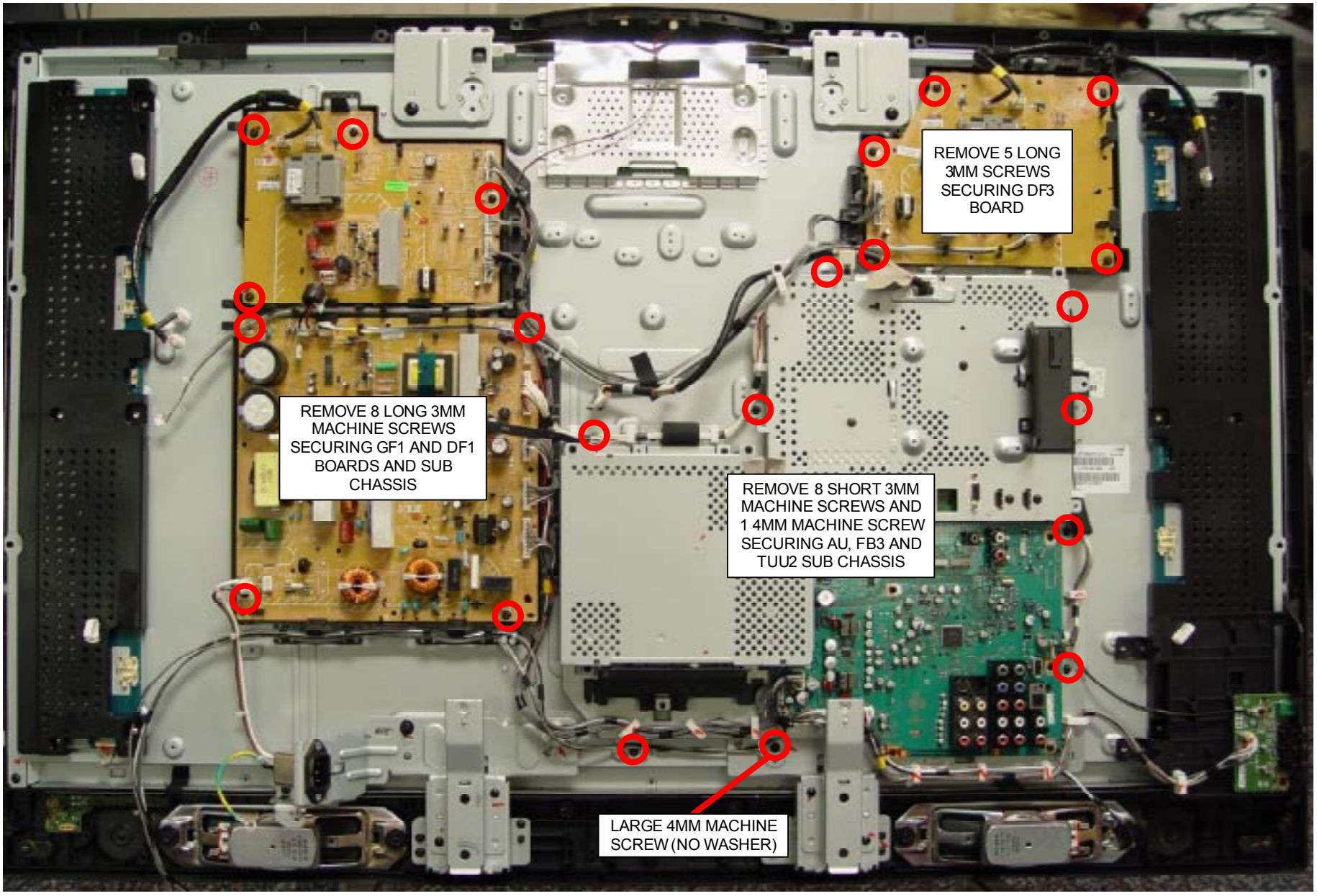


FIGURE 6-9
46” LCD PANEL REMOVAL (STEP 3)

52” LCD Panel Removal

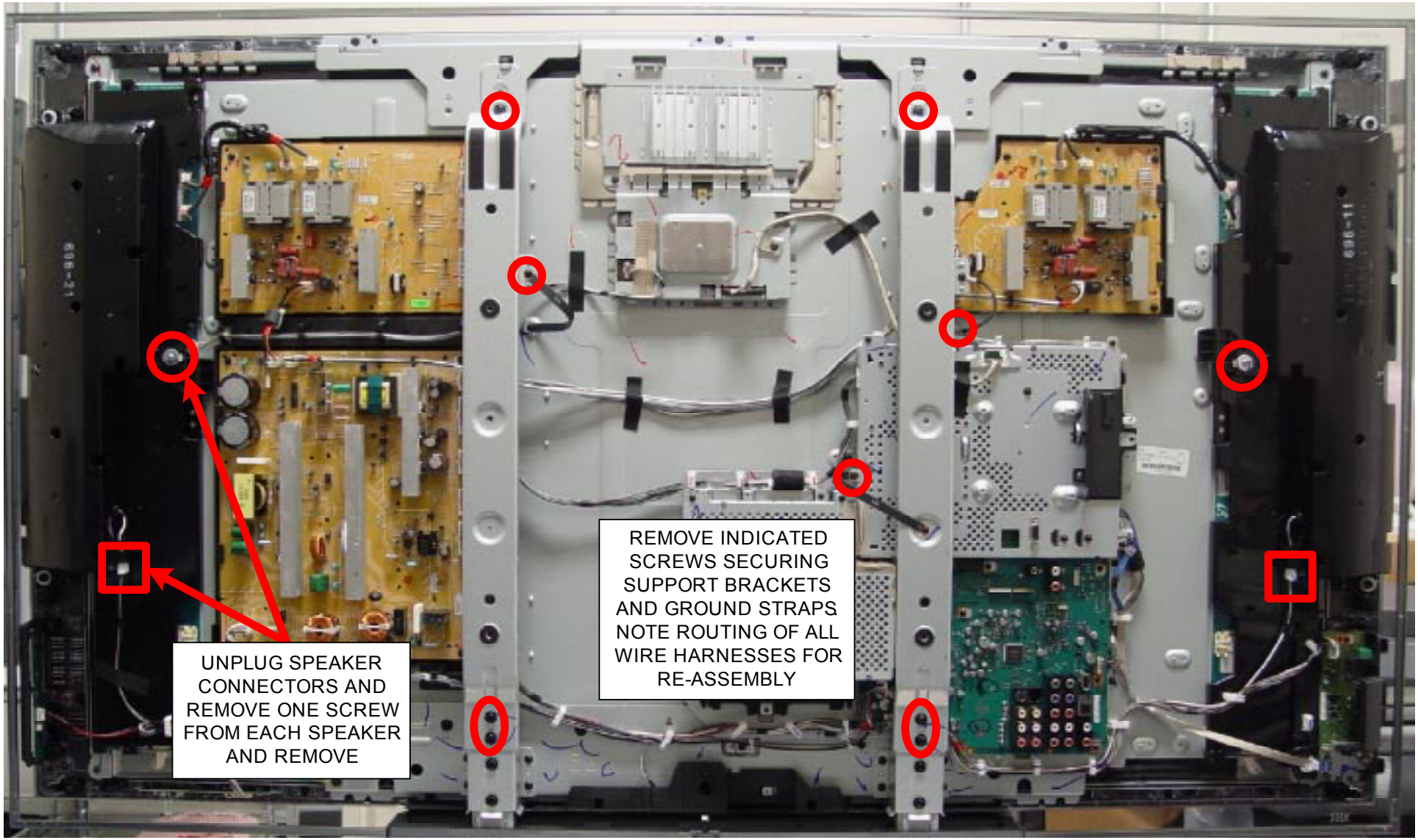


FIGURE 6-10
52” LCD PANEL REMOVAL (STEP 1)

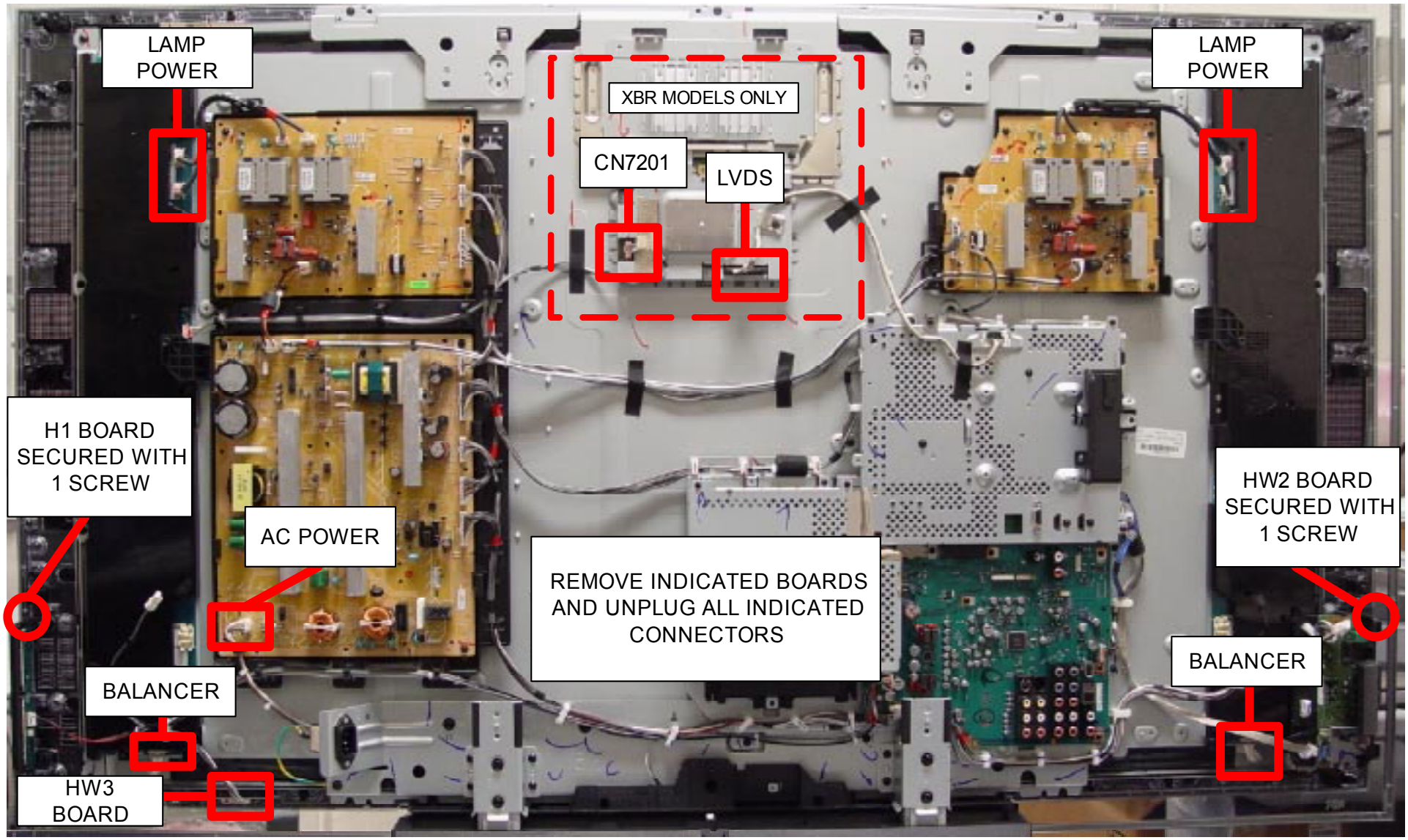


FIGURE 6-11
52” LCD PANEL REMOVAL (STEP 2)

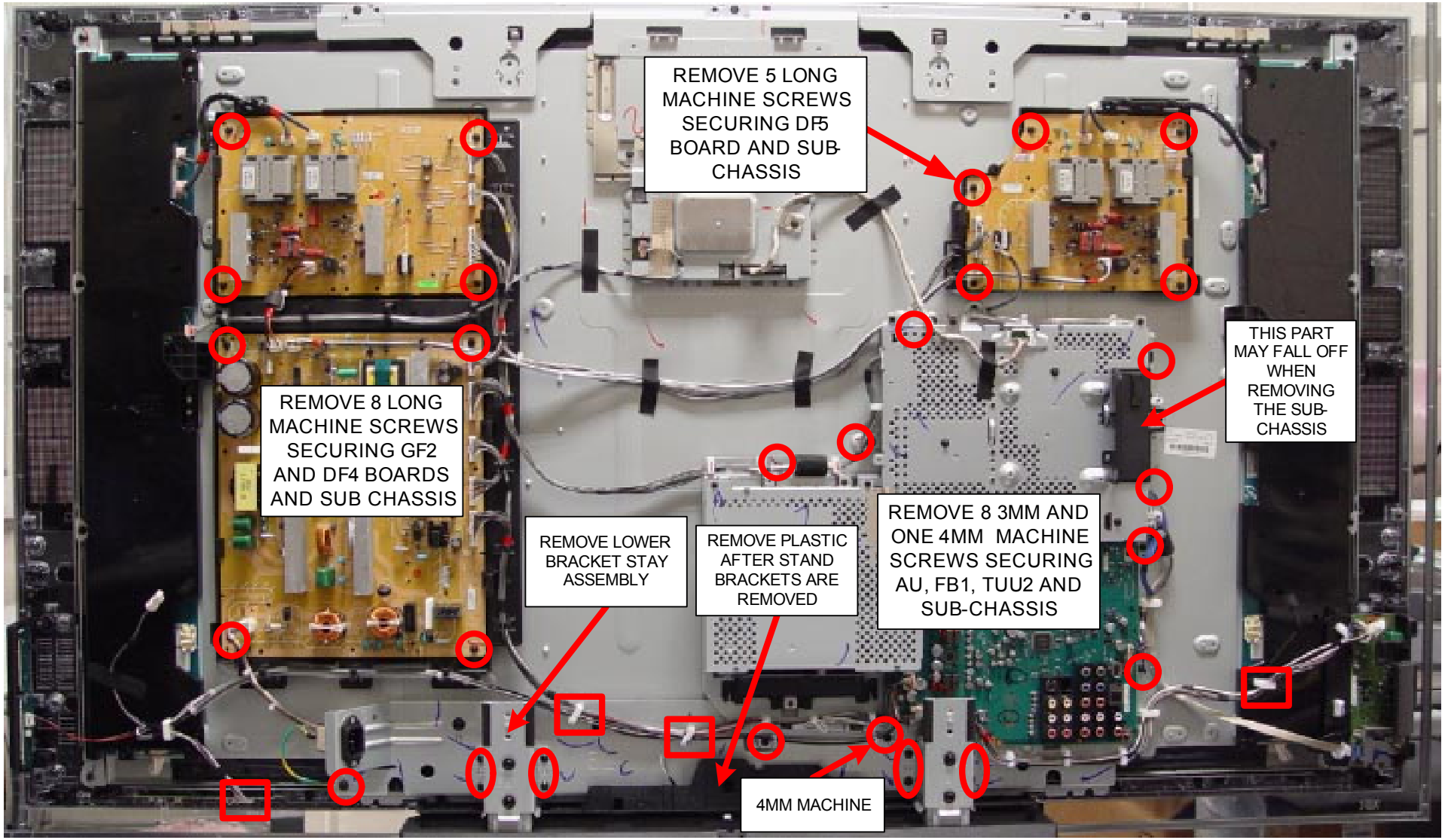
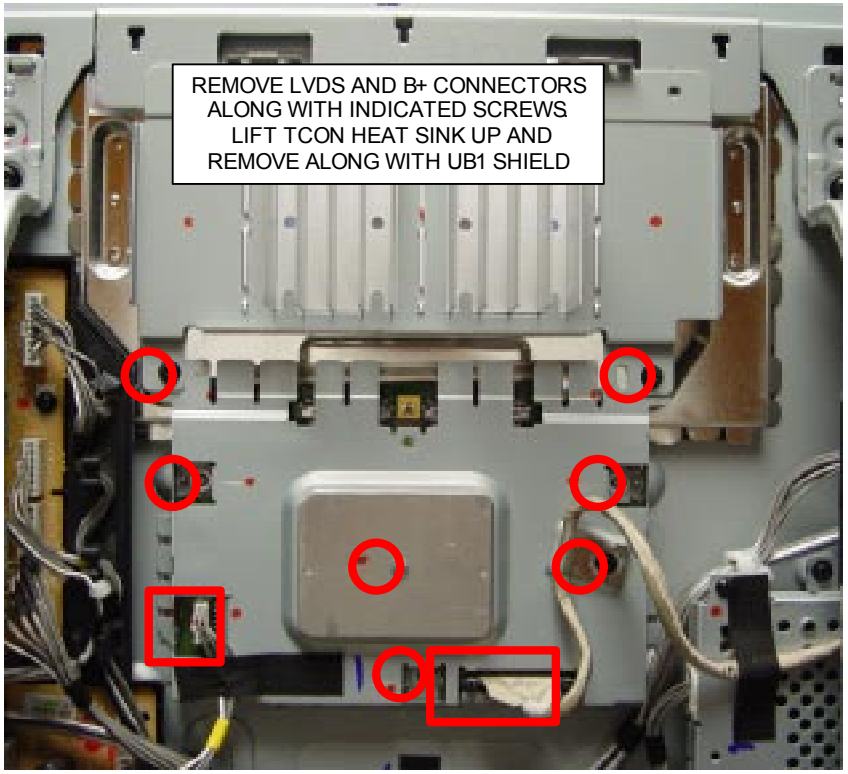
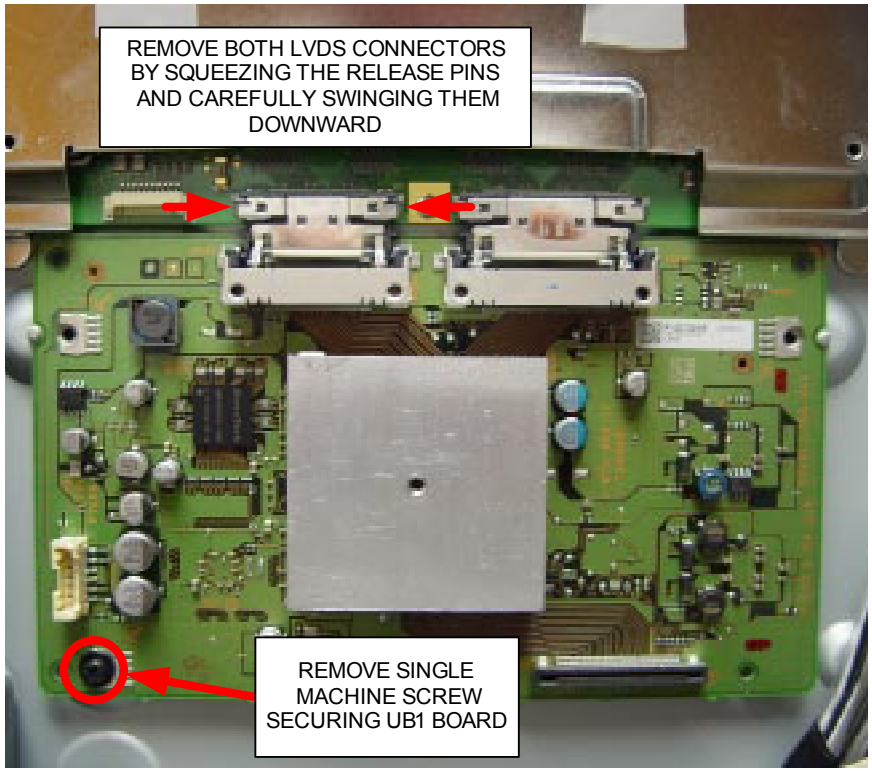


FIGURE 6-12
52” LCD PANEL REMOVAL (STEP 3)

UB1 Board Removal For XBR Models



UB1 BOARD REMOVAL (STEP 1)



UB1 BOARD REMOVAL (STEP 2)

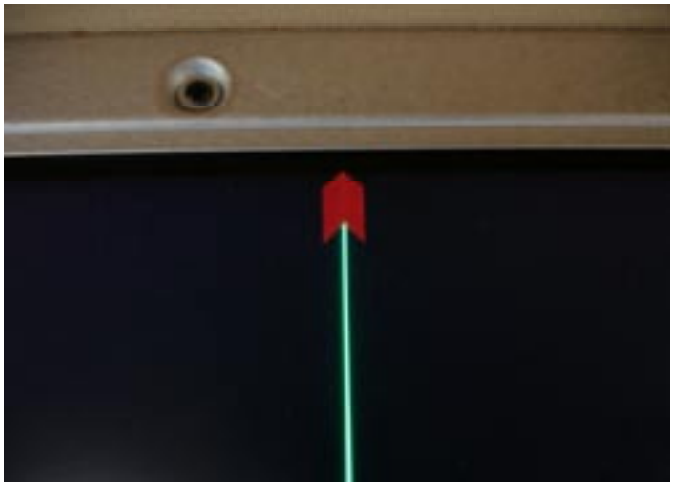
FIGURE 6-13
UB1 BOARD REMOVAL

Appendix

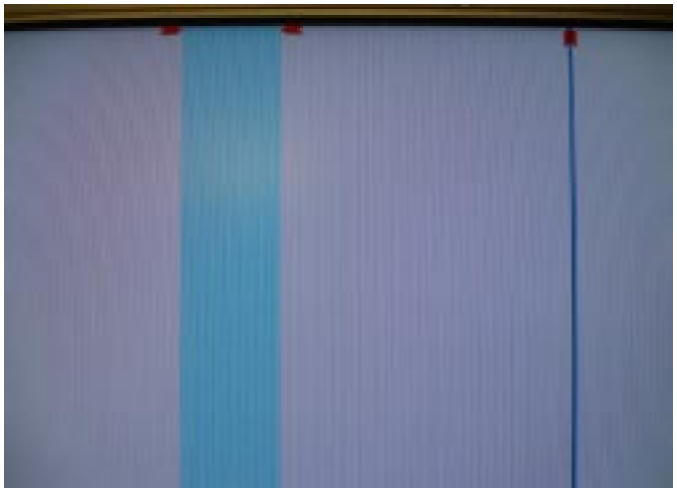
LCD Panel Failures

Failures occurring on the LCD panel are usually easy to distinguish. Other than backlight failures or physical breakage the panel will display something on the screen. The flexible cables to control the rows and columns of pixels are bonded to the panel. If one or more of these bonds fails, the symptom is a single or multiple vertical or horizontal line(s) across the screen. The line may not extend the entire length but the point is that it is stationary. The video process circuits are not capable of distorting or dropping out individual lines. Figure 7-1 illustrates some examples of actual tab bond failures.

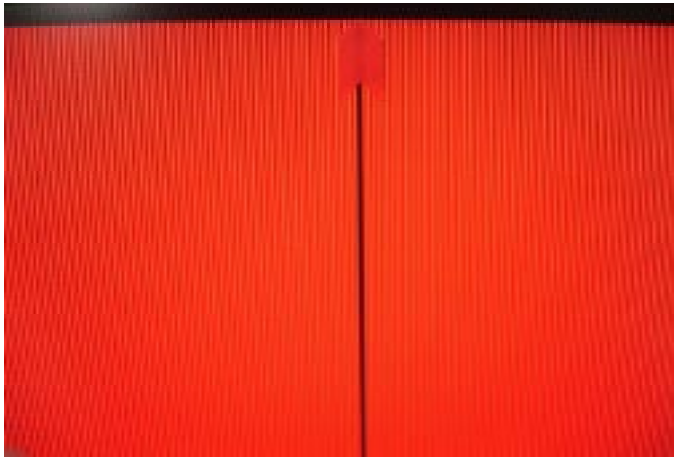
Another failure that is panel related is a problem on the TCON board which is considered part of the panel. This board simply takes the digital RGB video information from the video process circuits and generates the necessary timing control to allocate the video data to the proper pixel. Once again, the distortions produced by a failure in the TCON circuit will be fixed and stable on the screen. The distortion may be symmetrical or may produce color blotches similar to what is experienced when a CRT display is affected by a magnetic field. Figure 7-2 illustrates some actual failures located on the TCON board.



UPPER TAB BOND FAILURE



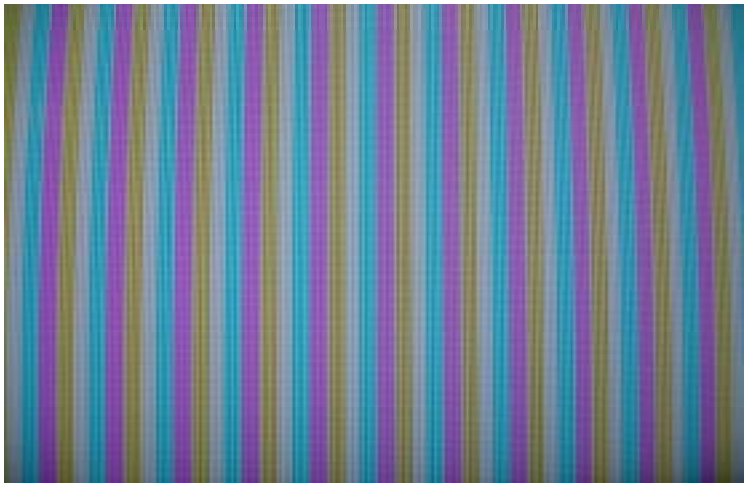
MULTIPLE TAB BOND FAILURE



UPPER TAB BOND FAILURE

SIDE TAB BOND FAILURE

FIGURE 7-1
EXAMPLES OF LCD PANEL FAILURES



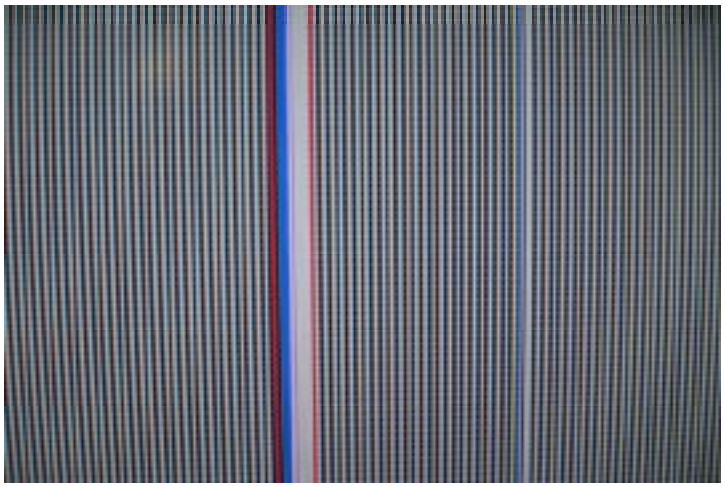


FIGURE 7-2
EXAMPLES OF LCD TCON FAILURES

Service Mode

Entering the service mode on the FIX-2 chassis is performed by pressing “DISPLAY”, “5”, “VOL+” and “POWER” in sequence on the remote commander while the unit is turned off. The service mode provides an interface with the various microprocessors within the unit by displaying adjustment graphics. When this feature is first entered, access to the adjustment data for the EMMA ATSC decoder IC is displayed. The “JUMP” key on the remote will move to each microprocessor in the unit.

Once inside a particular microprocessor group there are several categories of adjustments. These categories can be scrolled through by using the “2” key to scroll forward and the “5” key to move backward. Within each category are adjustment items. Once a category has been selected, use the “1” key to scroll forward and the“4” key to move backward. Most items have a data value that can be changed and written to memory. This value is changed by using the “3” key to increase the value or the “6” key to decrease the data value.

Writing Data

If you wish to save a data adjustment item that you have changed, press the “MUTE” button followed by “0” (not “ENTER” as in past models). This will write the value to NVM.

Figure 7-3 illustrates the navigation of the service mode groups. Table 7-1 shows the various remote commands for using the service mode.

OPERATION	COMMAND BUTTONS	SERVICE PAGE DISPLAY
INITIALIZE DATA	"7" "MUTE" "0"	INI- INI-EXE INI-EXE
CUSTOMER SETTINGS RESET	"8" "MUTE" "0"	RST- RST-EXE RST-EXE
READ NVM DATA	"9" "0"	READ READ
WRITE DATA TO NVM	"MUTE" "0"	WRITE WRITE

TEST MODE COMMANDS

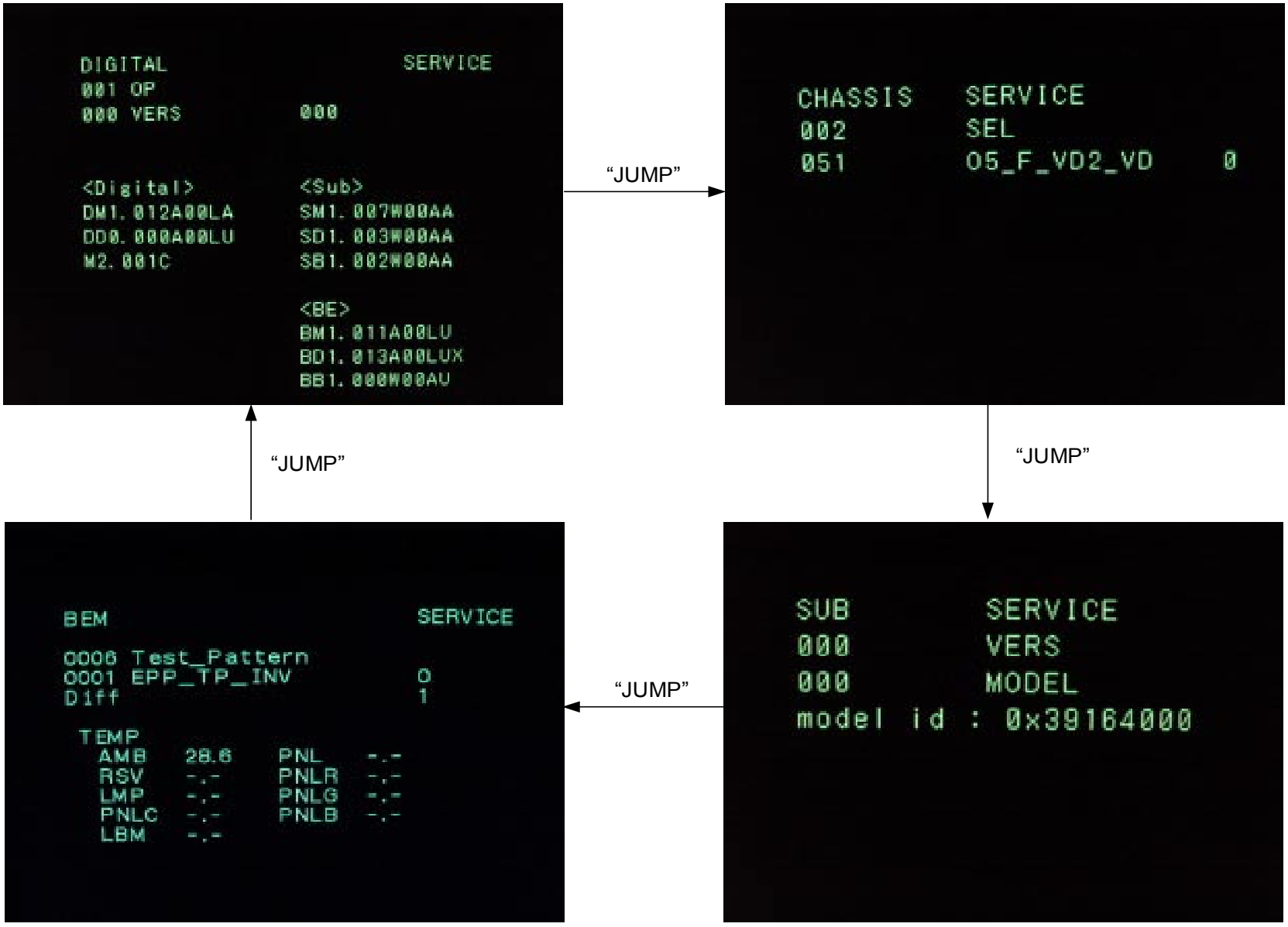


FIGURE 7-3
SERVICE MODE GROUPS

Test Pattern Graphics

There are 2 locations within the FB1/FB3 board that are capable of generating test pattern graphics. Once is located within the EMMA ATSC decoder IC2000 and the other within EPP video processor IC4900. The graphics for the EPP processor are controlled by BEM Micro IC5401. The graphics provide very little troubleshooting information since the mere presence of the green data adjustment graphics is an indicator that the LCD panel is functioning properly. Their only use is to analyze the overall picture for distortion issues if an external pattern generator is not available.

BEM Graphics

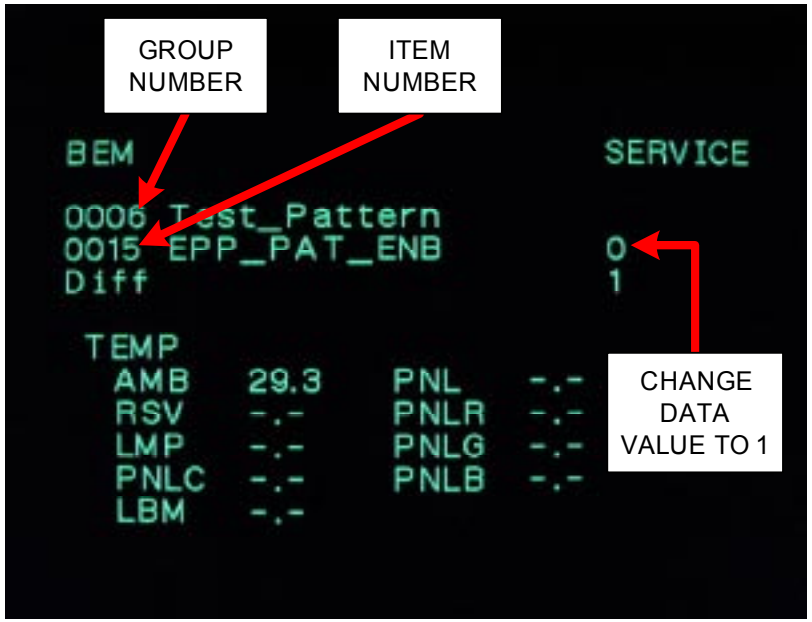
While in the service mode, jump through the various microprocessor groups until you see “BEM” at the top left corner. Use the “2” key to scroll to group number 6. Use the “1” key to scroll to item 15 “EPP_PAT_ENB”. This turns on the test pattern generator and should default to a white field. Scrolling back to item number 3 brings you to “EPP_TP_MODE”. Changing the data will generate 4 different test patterns as illustrated in Figure 7-4.

EMMA Graphics

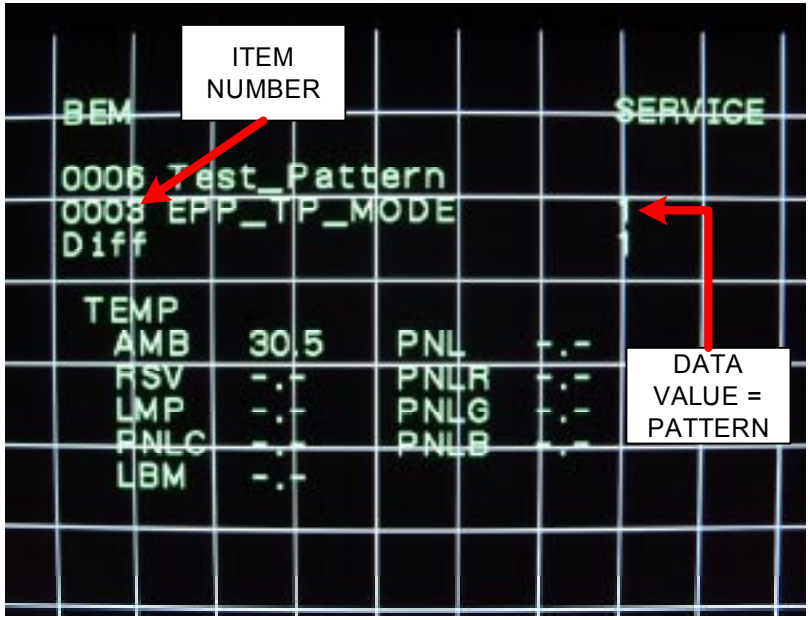
Graphics may also be displayed from the EMMA ATSC decoder. As of this writing there is only one set of color bar graphics loaded into this IC.

At the Digital Service Page select category 2 with the “2” key. Change test patter data to “1”. If the asterisk is not set to video, move it there by pressing the “1” key. Press “ENTER” (not “0”). Select “Color Bar Gfx” by pressing the “4” key if the asterisk is not set there. Note: you must select this graphic set since it is the only one loaded into the IC.

Press ”ENTER” again. You will be prompted to press “ENTER” once again and the graphics should appear. Once you have activated this test pattern you will be locked out from any further remote commands. You must power the unit down to exit. This is illustrated in Figure 7-5

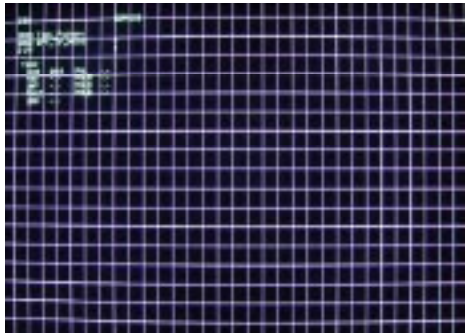


ENABLE THE TEST PATTERNS

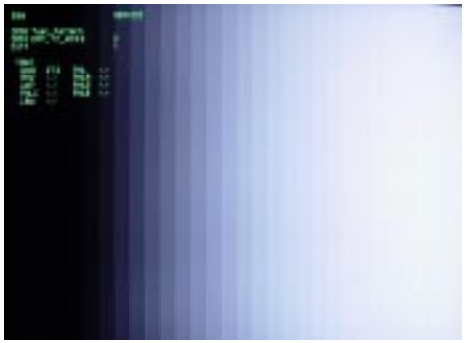


SELECT THE PATTERN TYPE

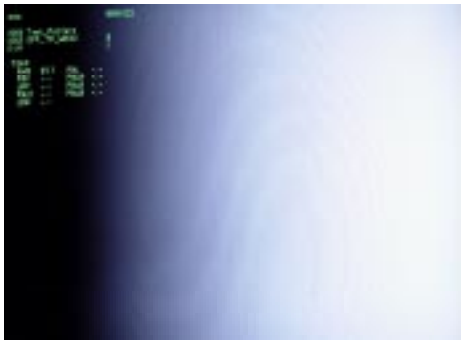
DATA 0 = WHITE FIELD



DATA 1 = CROSSHATCH



DATA 2 = STAIR STEP GRAY



DATA 3 = LINEAR GRAY

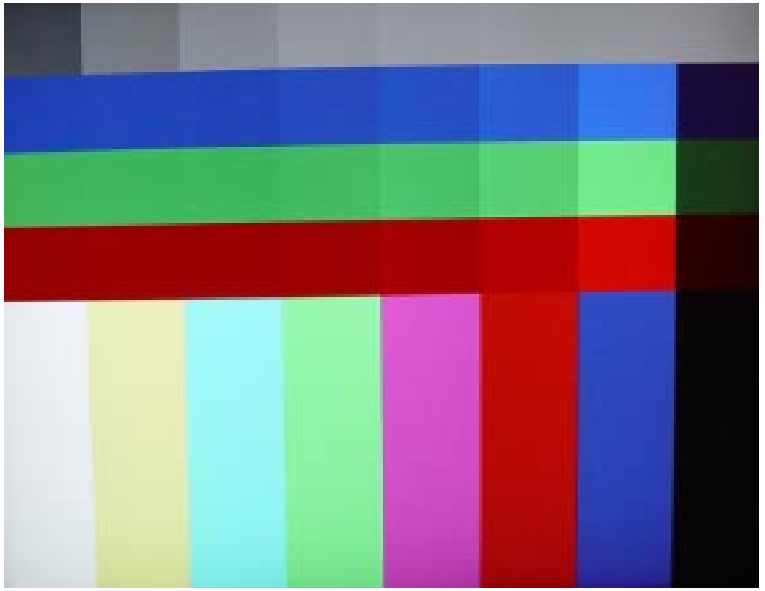
FIGURE 7-4
EPP TEST PATTERNS

SELECT CATEGORY 2
PRESS "0" KEY

SELECT VIDEO BY PRESSING "1"
FOLLOWED BY "ENTER" (NOT ZERO)

SELECT ITEM 4 BY PRESSING "4" KEY
FOLLOWED BY "ENTER"

PRESS "ENTER" AGAIN TO CONFIRM



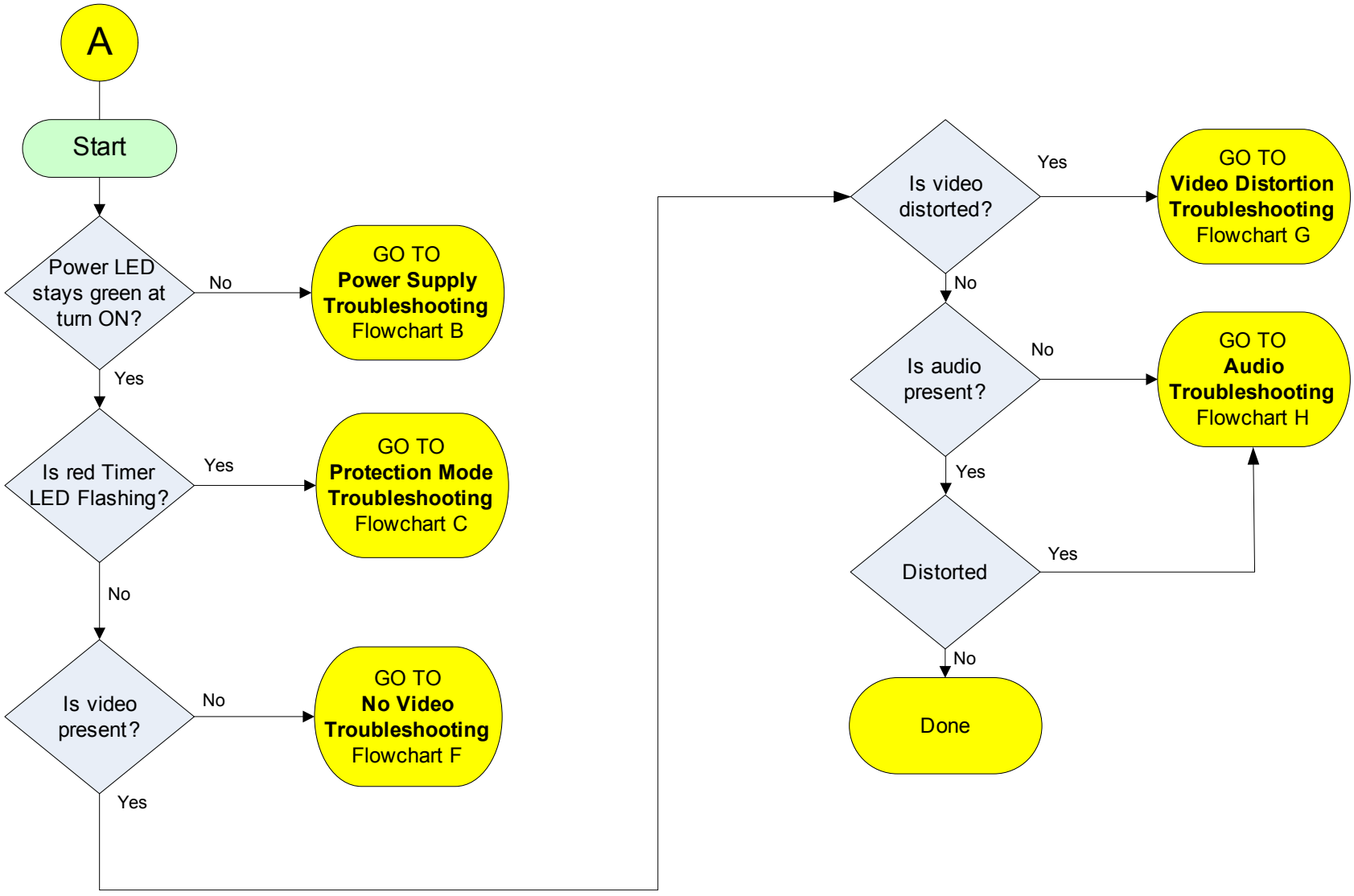
EMMA TEST PATTERN

FIGURE 7-5
EMMA TEST PATTERN

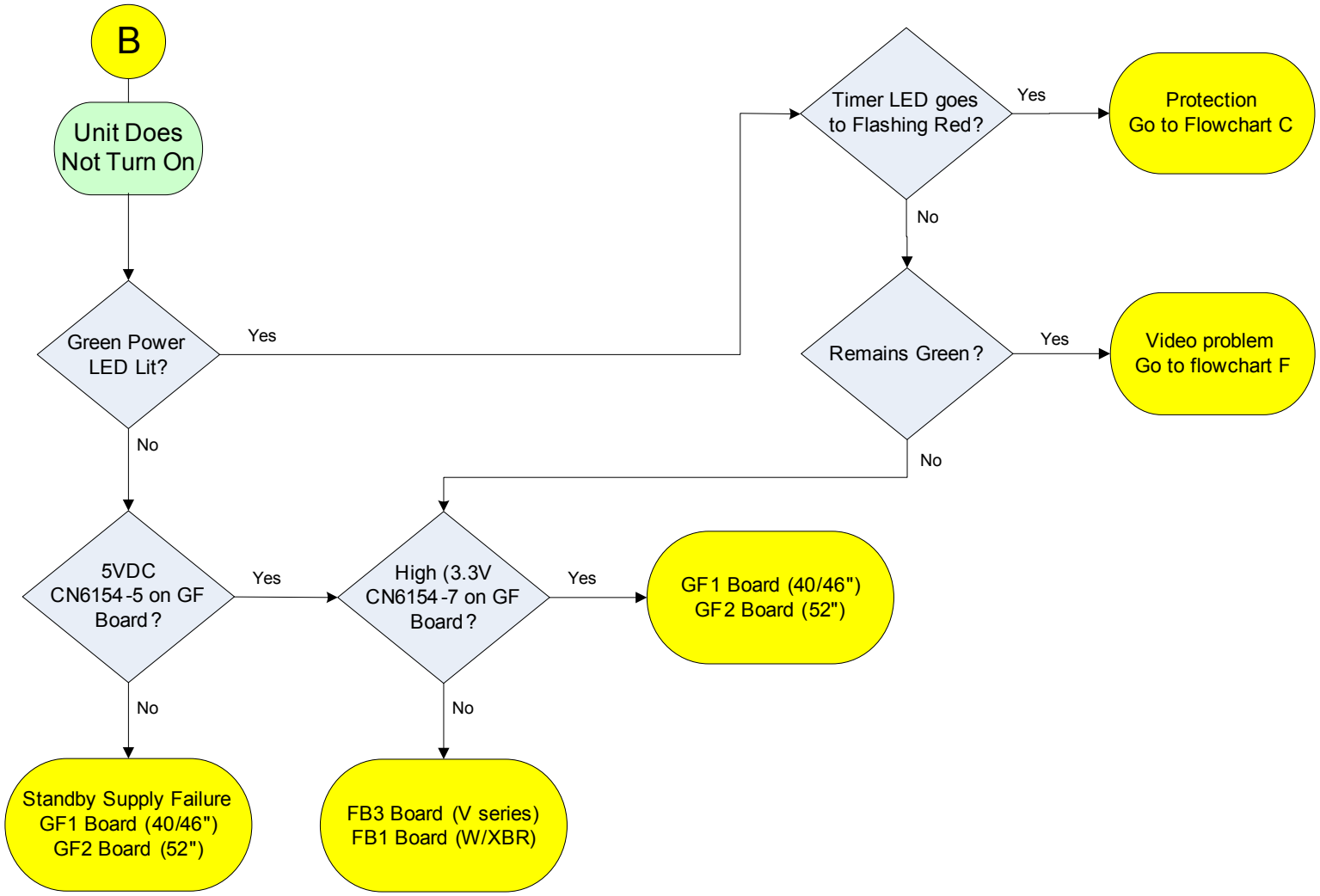
Troubleshooting Flowcharts

All of the troubleshooting flowcharts from A to H used in this manual are located on the following pages.

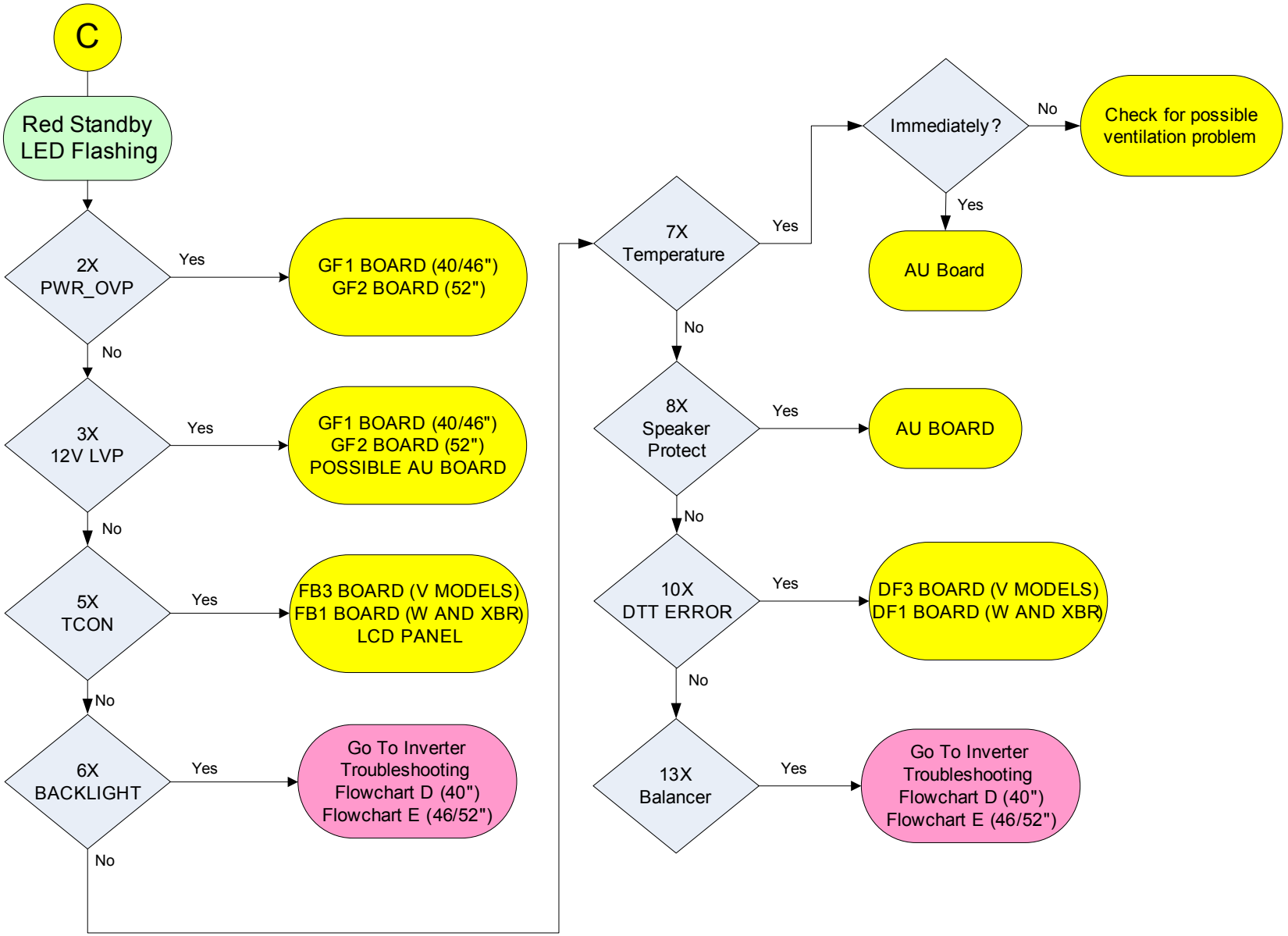
Intial Contact Flowchart A



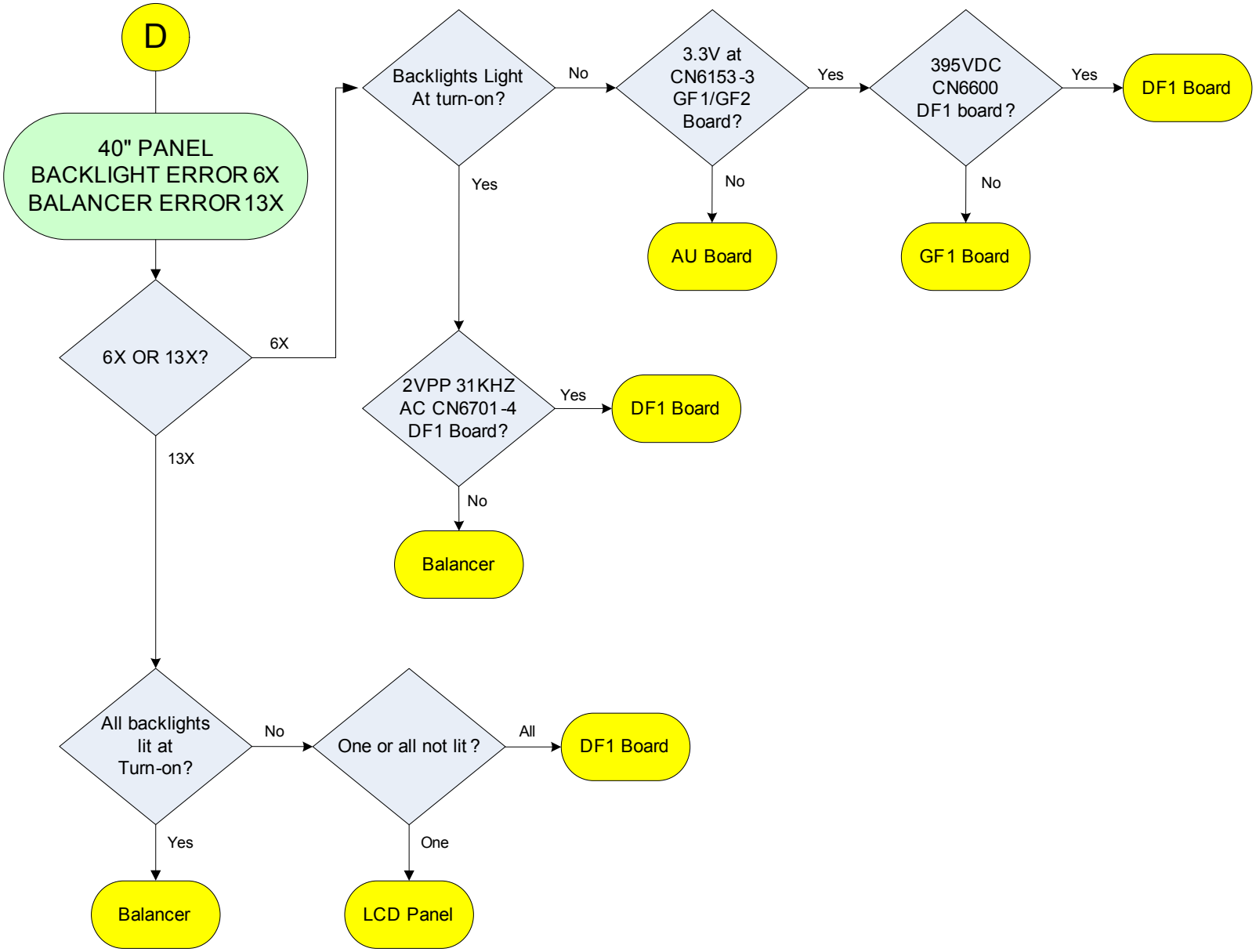
No Power Flowchart B



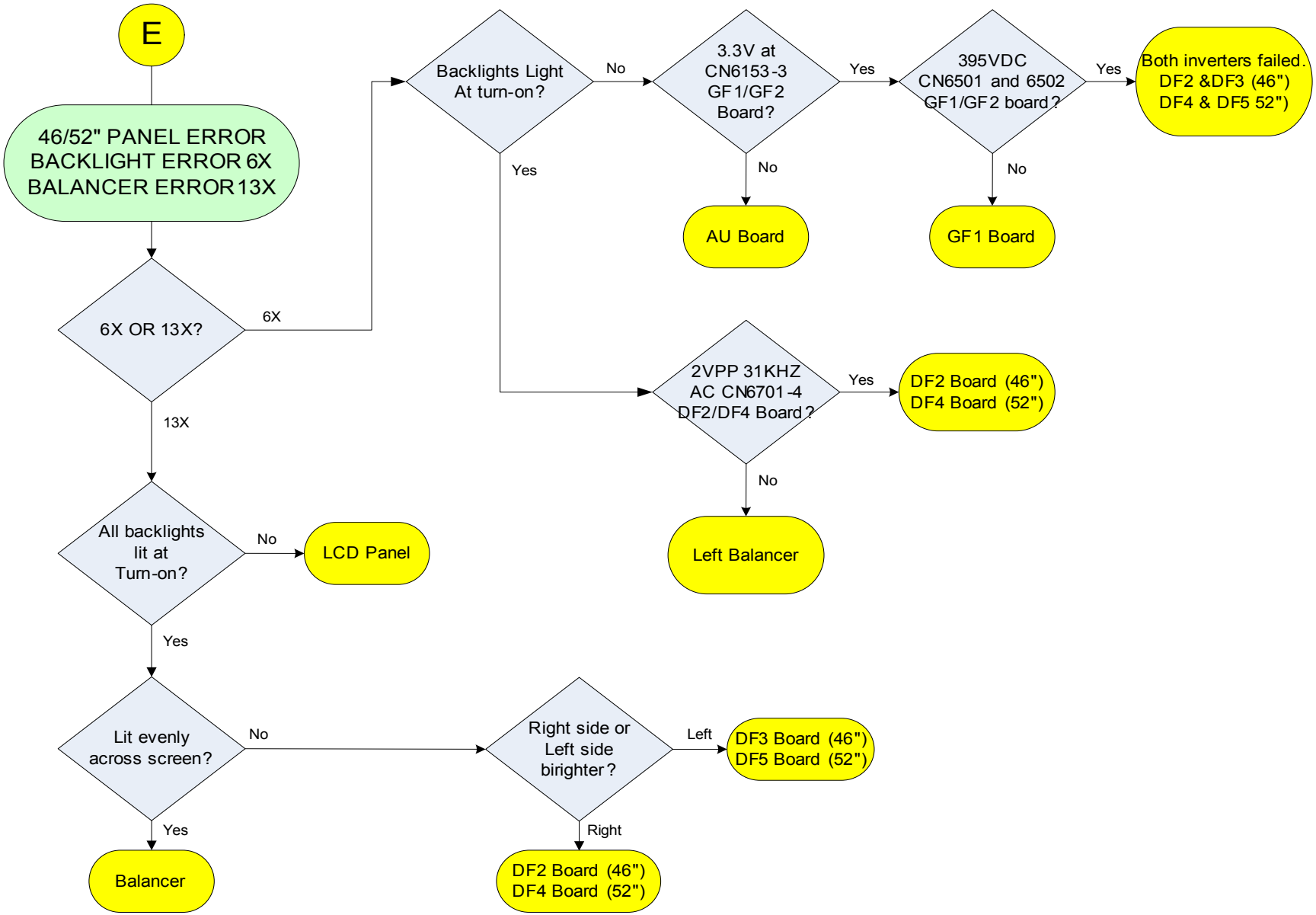
Protect Mode Flowchart C



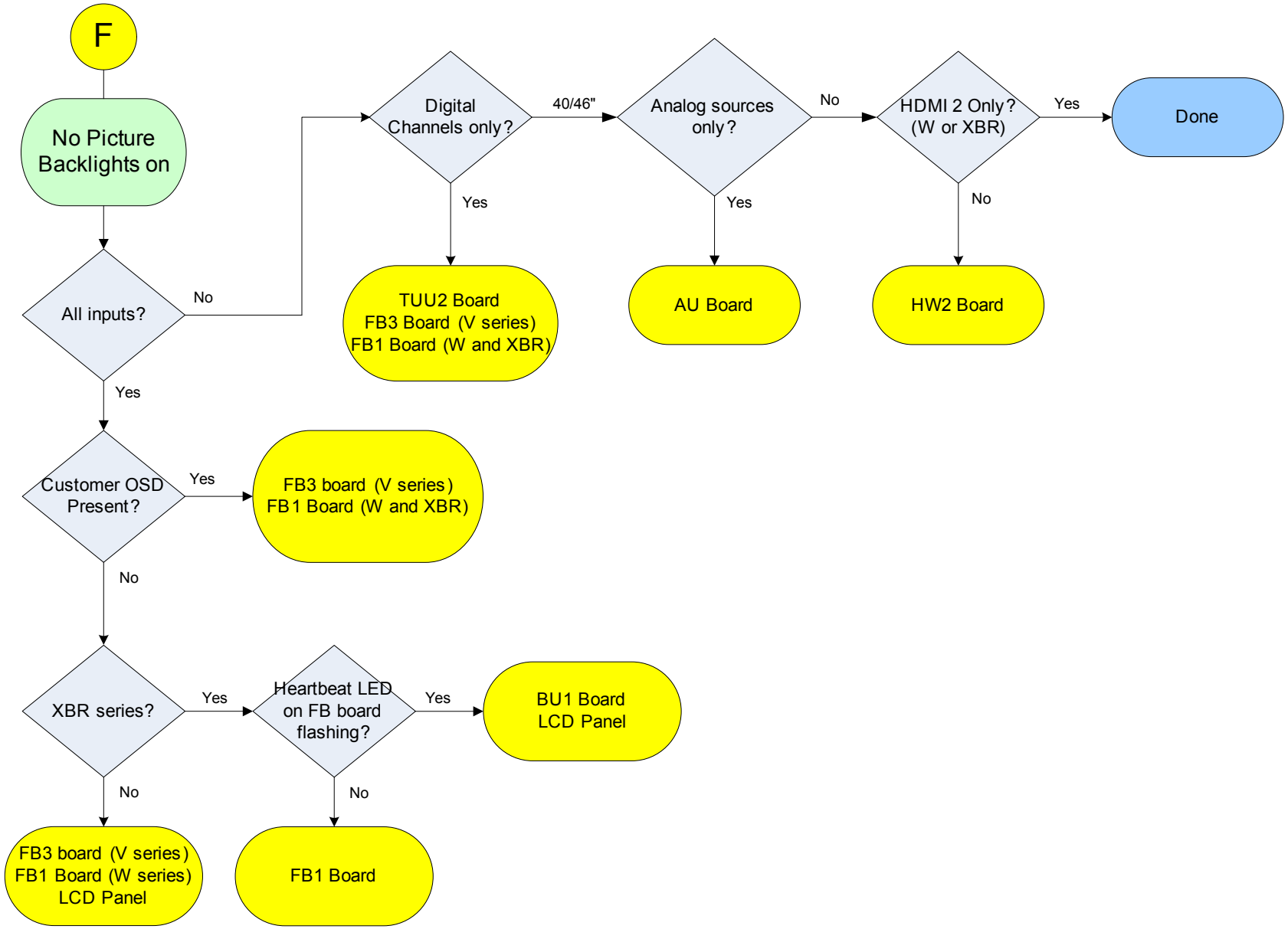
40" Panel Error Flowchart D



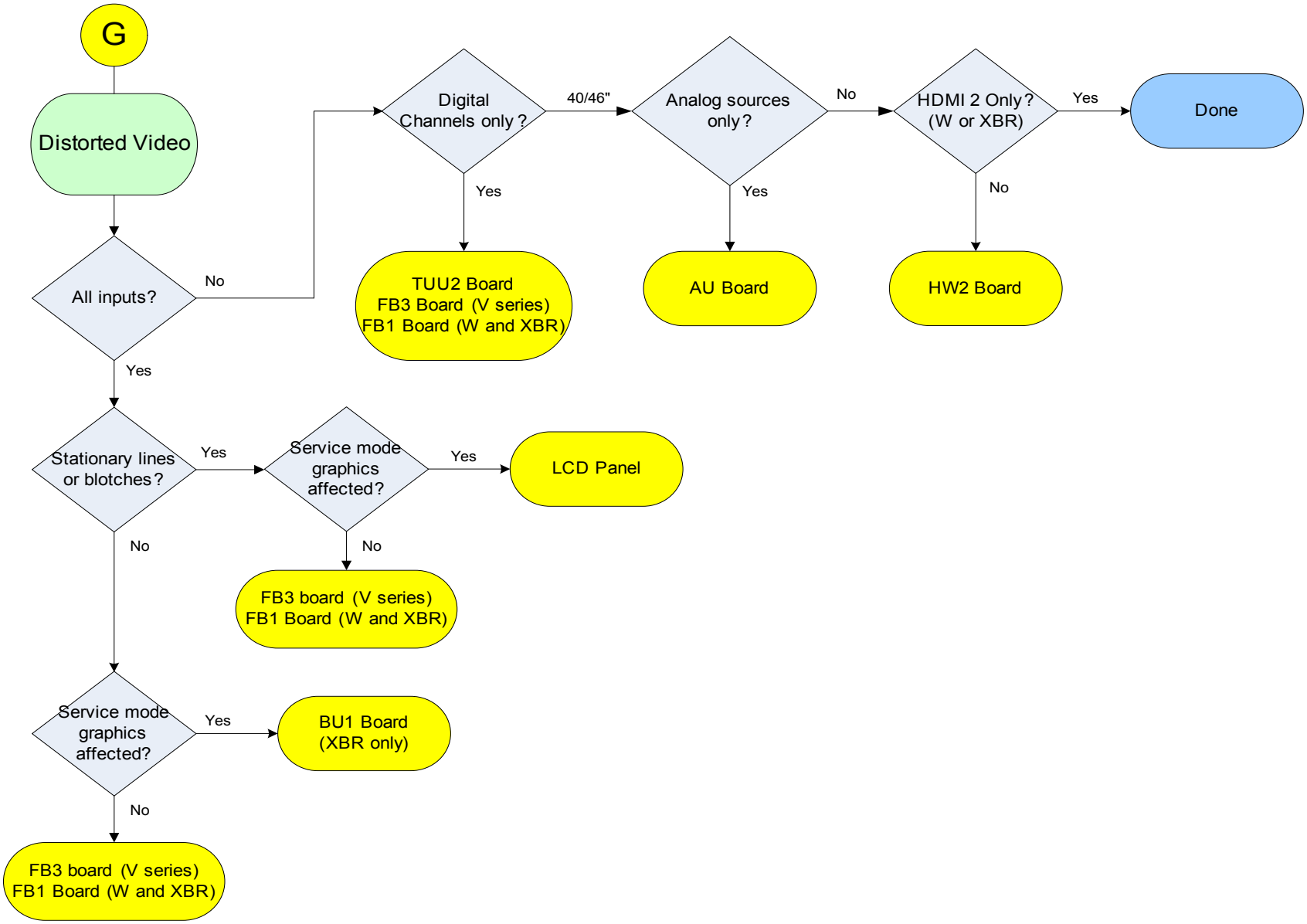
46/50" Panel Error Flowchart E



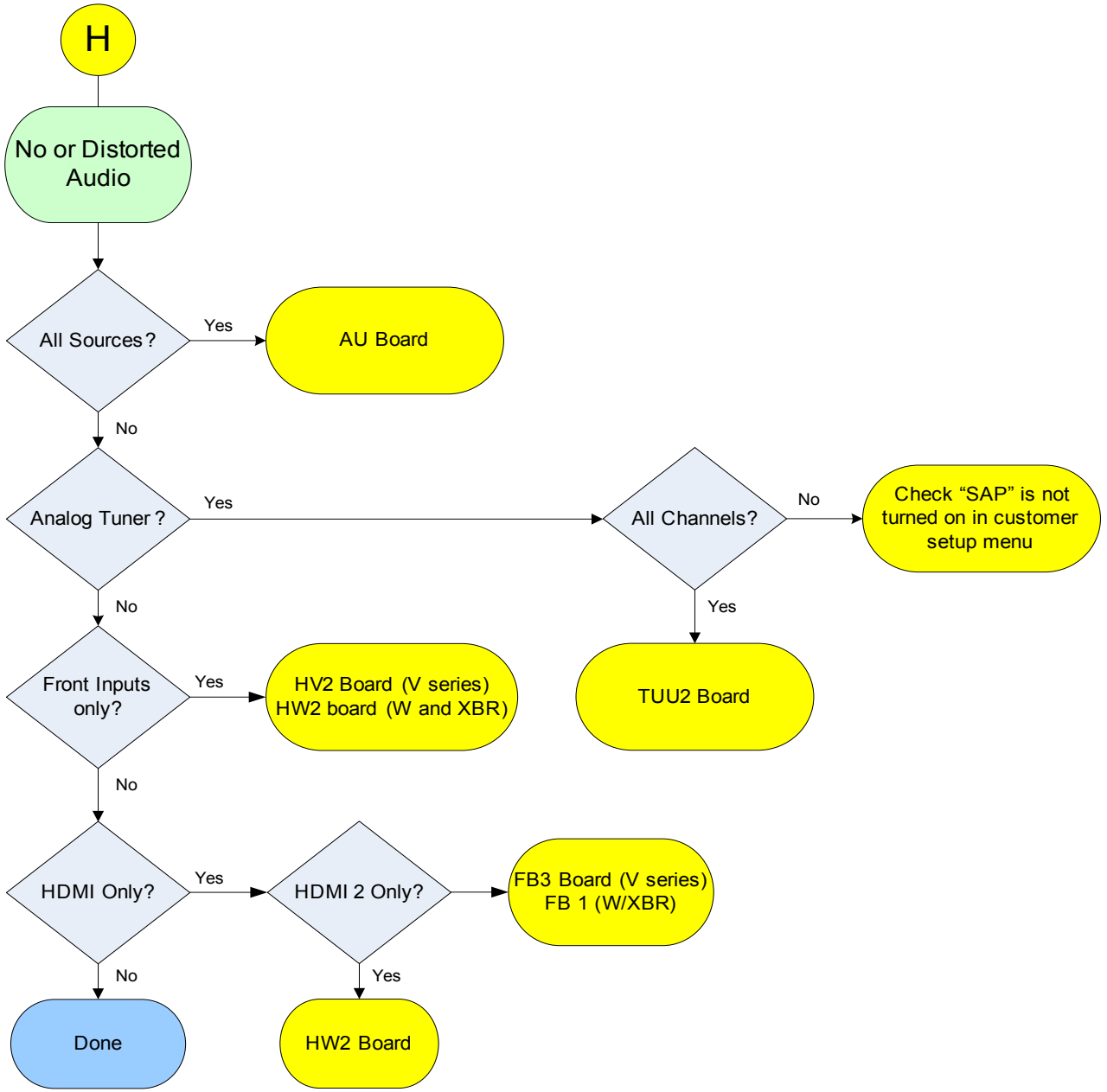
No Video Flowchart F



Distorted Video Flowchart G



Audio Mode Flowchart H



Triage Worksheets

The following pages contain worksheets to assist technical and non-technical persons in questioning the customer regarding a potential failure before visiting the home. Once a valid failure is suspected, use the sheet to determine which part(s) should be ordered and brought to the location to attempt the repair. Order only those parts marked by a red dot. Do not order LCD panel assemblies for a first visit unless instructed to do so by our technical support staff. In many cases, the LCD panel is not economical to install to complete a repair. Each triage sheet is specific to a panel size and model number.

Sony KDL40V3000/40VL130 Technical Triage Summary Sheet

1. Confirm the symptom from the customer.
2. Select that symptom from the chart.
3. Bring all the boards listed for that symptom.
4. Follow the troubleshooting charts in the technical guides to isolate the board.
5. Chart Color Code

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

BLACK TEXT: Board and Part # that may correct the symptom

7) The Troubleshooting Flowchart required to determine the actual defective part is listed for each column in the last row of each table.

CHASSIS: FIX2

LAST UPDATED: 1/30/08

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted				Audio	
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Video 2 0nly	Tuner Only	No video all Inputs	No Audio	Part #
AU BOARD		▲				●					▲			●	A-1433-191-A
DF1 BOARD				●				▲							A-1256-156-A
FB3 BOARD				▲	●		●		▲	●			●		A-1262-639-A
GF1 BOARD	●	●		●					●						A-1256-154-A
HV2 BOARD											●				A-1256-640-A
TUU2 BOARD												●			A-1269-502-A
LVDS CABLE										▲			▲		1-834-310-11
INVERTER BOARD (BALANCER)								●							1-789-838-11
LCD Panel			●					▲		▲			▲		1-802-488-12
Flowchart Reference	C	C	C	C/D	C	C	C	C/D	B	G	F/G	F/G	F/G	H	
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL							

**ONLY IF TEMPERATURE ERROR OCCURS IMMEDIATELY

Sony KDL40W3000 Technical Triage Summary Sheet

1. Confirm the symptom from the customer.
2. Select that symptom from the chart.
3. Bring all the boards listed for that symptom.
4. Follow the troubleshooting charts in the technical guides to isolate the board.
5. Chart Color Code

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

BLACK TEXT: Board and Part # that may correct the symptom

7) The Troubleshooting Flowchart required to determine the actual defective part is listed for each column in the last row of each table.

CHASSIS: FIX2

LAST UPDATED: 1/30/08

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted				Audio	
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Tuner Only	Video 2 0nly	No video all Inputs	No Audio	Part #
AU BOARD		▲				●						▲		●	A-1362-635-A
DF1 BOARD				●				▲							A-1256-156-A
FB1 BOARD				▲	●		●		▲	●			●		A-1362-638-A
GF1 BOARD	●	●		●					●						A-1256-154-A
HW2 BOARD												●			A-1361-955-A
TUU2 BOARD											●				A-1269-502-A
LVDS CABLE										▲			▲		1-834-308-11
INVERTER BOARD (BALANCER)								●							1-789-838-11
LCD Panel			●					▲		▲			▲		1-802-488-12
Flowchart Reference	C	C	C	C/D	C	C	C	C/D	B	G	F/G	F/G	F/G	H	
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL							

**ONLY IF TEMPERATURE ERROR OCCURS IMMEDIATELY

Sony KDL40XBR4/XBR5 Technical Triage Summary Sheet

1. **Confirm the symptom from the customer.**
2. **Select that symptom from the chart.**
3. **Bring all the boards listed for that symptom.**
4. **Follow the troubleshooting charts in the technical guides to isolate the board.**
5. **Chart Color Code**

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

BLACK TEXT: Board and Part # that may correct the symptom

DATE LAST MODIFIED 1/30/08

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted					Part #	
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Tuner Only	Video 2 0nly	No video all Inputs	No Audio		
AU BOARD		▲				●						▲		●	A-1362-637-A A-1433-189-A	XBR4 XBR5
DF1 BOARD				●											A-1256-156-A	
FB1 BOARD				▲	●		●		▲	●			●		A-1362-640-A A-1418-997-A	S/N 8,000,001 TO 8,199,199 AND 8,500,001 TO 8,599,999 S/N 8,200,001 TO 8,499,999 AND 8,600,001 AND UP
GF1 BOARD	●	●		●					●						A-1256-154-A	
HW2 BOARD												●			A-1361-955-A	
TUU2 BOARD											●				A-1269-502-A	
UB1 BOARD															A-1257-224-A	
LVDS CABLE										▲			▲		1-834-416-11	
INVERTER BOARD (BALANCER)								●							1-789-838-11	
LCD Panel			●					▲		▲					1-802-489-13 1-802-489-31	S/N 8,000,001 TO 8,199,199 AND 8,500,001 TO 8,599,999 S/N 8,200,001 TO 8,499,999 AND 8,600,001 AND UP
Flowchart Reference	C	C	C	C/D	C	C	C	C/D	B	G	F/G	F/G	F/G	H		
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL								

****ONLY IF TEMPERATURE ERROR OCCURS IMMEDIATELY**

Sony KDL46V3000/46VL130 Technical Triage Summary Sheet

1. Confirm the symptom from the customer.
2. Select that symptom from the chart.
3. Bring all the boards listed for that symptom.
4. Follow the troubleshooting charts in the technical guides to isolate the board.
5. Chart Color Code

CHASSIS: FIX2

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

LAST UPDATED: 1/30/08

BLACK TEXT: Board and Part # that may correct the symptom

7) The Troubleshooting Flowchart required to determine the actual defective part is listed for each column in the last row of each table.

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted				Audio		
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Tuner Only	Video 2 0nly	No video all Inputs	No Audio	Part #	
AU BOARD		▲				●						▲		●	A-1433-191-A	
DF2 BOARD				●				▲							A-1253-585-A	
DF3 BOARD				●				▲							A-1253-586-A	
FB3 BOARD				▲	●		●		▲	●			●		A-1262-639-A A-1419-006-A	S/N 8,000,001 TO 8,099,999 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600,001 AND UP
GF1 BOARD	●	●		●					●						A-1256-154-A	
HV2 BOARD												●			A-1256-640-A	
TUU2 BOARD											●				A-1269-502-A	
LVDS CABLE										▲			▲		1-834-310-11	
INVERTER BOARD LEFT (BALANCER)				▲				●							1-789-839-11	
INVERTER BOARD RIGHT (BALANCER)				▲				●							1-789-840-11	
LCD Panel			●					▲		▲			▲		1-802-486-12 1-802-605-11	S/N 8,000,001 TO 8,099,999 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600,001 AND UP
Flowchart Reference	C	C	C	C/E	C	C	C	C/E	B	G	F/G	F/G	F/G	H		
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL								

**ONLY IF TEMPERATURE ERROR OCCURS IMMEDIATELY

Sony KDL46W3000 Technical Triage Summary Sheet

1. Confirm the symptom from the customer.
2. Select that symptom from the chart.
3. Bring all the boards listed for that symptom.
4. Follow the troubleshooting charts in the technical guides to isolate the board.
5. Chart Color Code

CHASSIS: FIX2

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

LAST UPDATED: 1/30/08

BLACK TEXT: Board and Part # that may correct the symptom

7) The Troubleshooting Flowchart required to determine the actual defective part is listed for each column in the last row of each table.

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted				Audio		
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Tuner Only	Video 2 0nly	No video all Inputs	No Audio	Part #	
AU BOARD		▲				●						▲		●	A-1362-635-A	
DF2 BOARD				●				▲							A-1253-585-A	
DF3 BOARD				●				▲							A-1253-586-A	
FB1 BOARD				▲	●		●		▲	●			●		A-1362-638-A A-1419-002-A	S/N 8,000,001 TO 8,099,999 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600,001 AND UP
GF1 BOARD	●	●		●					●						A-1256-154-A	
HW2 BOARD												●			A-1361-955-A	
TUU2 BOARD											●				A-1269-502-A	
LVDS CABLE										▲			▲		1-834-308-11	
INVERTER BOARD LEFT (BALANCER)								●							1-789-839-11	
INVERTER BOARD RIGHT (BALANCER)								●							1-789-840-11	
LCD Panel			●					▲		▲			▲		1-802-486-12 1-802-605-11	S/N 8,000,001 TO 8,099,999 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600,001 AND UP
Flowchart Reference	C	C	C	C/E	C	C	C	C/E	B	G	F/G	F/G	F/G	H		
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL								

**ONLY IF TEMPERATURE ERROR OCCURS IMMEDIATELY

Sony KDL46XBR4/XBR5 Technical Triage Summary Sheet

1. Confirm the symptom from the customer.
2. Select that symptom from the chart.
3. Bring all the boards listed for that symptom.
4. Follow the troubleshooting charts in the technical guides to isolate the board.
5. Chart Color Code

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

BLACK TEXT: Board and Part # that may correct the symptom

DATE LAST MODIFIED 1/30/08

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted						
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Tuner Only	Video 2 0nly	No video all Inputs	No Audio	Part #	
AU BOARD		▲				●						▲		●	A-1362-637-A A-1433-189-A	XBR4 XBR5
DF2 BOARD				●				▲							A-1253-585-A	
DF3 BOARD				●											A-1253-586-A	
FB1 BOARD				▲	●		●		▲	●			●		A-1362-640-A A-1418-997-A	S/N 8,000,001 TO 8,199,199 AND 8,500,001 TO 8,599,999 S/N 8,200,001 TO 8,499,999 AND 8,600,001 AND UP
GF1 BOARD	●	●		●					●						A-1256-154-A	
HW2 BOARD												●			A-1361-955-A	
TUU2 BOARD											●				A-1269-502-A	
UB1 BOARD															A-1257-224-A	
LVDS CABLE										▲			▲		1-834-308-11	
INVERTER BOARD LEFT (BALANCER)															1-789-839-11	
INVERTER BOARD RIGHT (BALANCER)								●							1-789-840-11	
LCD Panel			●					▲		▲					1-802-491-12 1-802-491-31	S/N 8,000,001 TO 8,199,199 AND 8,500,001 TO 8,599,999 S/N 8,200,001 TO 8,499,999 AND 8,600,001 AND UP
Flowchart Reference	C	C	C	C/D	C	C	C	C/D	B	G	F/G	F/G	F/G	H		
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL								

**ONLY IF TEMPERATURE ERROR OCCURS IMMEDIATELY

Sony KDL52W3000/WL130 Technical Triage Summary Sheet

1. Confirm the symptom from the customer.
2. Select that symptom from the chart.
3. Bring all the boards listed for that symptom.
4. Follow the troubleshooting charts in the technical guides to isolate the board.
5. Chart Color Code

CHASSIS: FIX2

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

LAST UPDATED: 1/30/08

BLACK TEXT: Board and Part # that may correct the symptom

7) The Troubleshooting Flowchart required to determine the actual defective part is listed for each column in the last row of each table.

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted				Audio		
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Tuner Only	Video 2 0nly	No video all Inputs	No Audio	Part #	
AU BOARD		▲				●			▲			▲		●	A-1362-635-A	
DF4 BOARD				●				▲							A-1253-587-A	
DF5 BOARD				●				▲							A-1253-588-A	
FB1 BOARD				▲	●		●			●			●		A-1362-638-A A-1419-002-A	S/N 8,000,001 TO 8,099,99 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600.001 AND UP
GF2 BOARD	●	●		●					●						A-1256-162-A	
HW2 BOARD												●			A-1361-955-A	
TUU2 BOARD											●				A-1269-502-A	
LVDS CABLE			▲							▲			▲		1-834-308-11	
INVERTER BOARD (RIGHT UPPER)								●							1-789-841-11	
INVERTER BOARD (RIGHT LOWER)								●							1-789-842-11	
INVERTER BOARD (LEFT UPPER)								●							1-789-843-11	
INVERTER BOARD (LEFT LOWER)								●							1-789-844-11	
LCD Panel			●					▲		▲			▲		1-802-487-12 1-802-593-11	S/N 8,000,001 TO 8,099,99 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600.001 AND UP
Flowchart Reference	C	C	C	C/E	C	C	C	C/E	B	G	F/G	F/G	F/G	H		
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL								

**ONLY IF TEMPERATURE ERROR OCCURS IMMEDIATELY

Sony KDL52XBR4/XBR5 Technical Triage Summary Sheet

1. Confirm the symptom from the customer.
2. Select that symptom from the chart.
3. Bring all the boards listed for that symptom.
4. Follow the troubleshooting charts in the technical guides to isolate the board.
5. Chart Color Code

RED DOT: Most likely defective part

BLUE Triangle: Possible defective part

BLACK TEXT: Board and Part # that may correct the symptom

LAST UPDATED: 1/30/08

Reference	Symptoms - Shutdown. Power LED blinking red diagnostics sequences								No Power	Video - missing or distorted				Audio	Part #	
	2	3	5	6	7**	8	10	13	No Green Power LED (Dead Set)	Stationary colored lines or dots	Tuner Only	Video 2 0nly	No video all Inputs	No Audio		
AU BOARD		▲				●			▲			▲		●	A-1433-188-A A-1433-190-A	XBR4 XBR5
DF4 BOARD				●				▲							A-1253-587-A	
DF5 BOARD				●				▲							A-1253-588-A	
FB1 BOARD				▲	●		●			●			●		A-1362-640-A A-1418-997-A	S/N 8,001,001 TO 8,099,999 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600,001 AND UP
GF2 BOARD	●	●		●					●						A-1256-162-A	
HW2 BOARD												●			A-1361-955-A	
TUU2 BOARD											●				A-1269-502-A	
UB1 BOARD															A-1257-224-A	
LVDS CABLE			▲							▲			▲		1-834-417-11	
INVERTER BOARD (RIGHT UPPER)								●							1-789-841-11	
INVERTER BOARD (RIGHT LOWER)								●							1-789-842-11	
INVERTER BOARD (LEFT UPPER)								●							1-789-843-11	
INVERTER BOARD (LEFT LOWER)								●							1-789-844-11	
LCD Panel			●					▲		▲			▲		1-802-490-12 1-802-490-31	S/N 8,001,001 TO 8,099,999 AND 8,500,001 TO 8,599,999 S/N 8,100,001 TO 8,499,999 AND 8,600,001 AND UP
Flowchart Reference	C	C	C	C/E	C	C	C	C/E	B	G	F/G	F/G	F/G	H		
Problem	POWER	POWER	PANEL	BACK-LIGHT	TEMP	AUDIO	COMM	PANEL								

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