MITSUBISHI ELECTRIC
DIGITAL TELEVISIONS

TECHNICAL TRAINING
2011
2012

Technical Training Manual Including…

Down-to-1

High Speed Troubleshooting

V46
L75-A94

V45C	**V45**	**V45CA**
WD-73C11	WD-73640	WD-73CA1
V45+	**V45++**	**V45CB**
WD-73740	WD-73840	WD-82CB1
WD-82740	WD-82840	
	WD-92840	

MITSUBISHI ELECTRIC
2011-2012
Technical Training Manual

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Introduction

LASERVUE™

DLP® HOME CINEMA

This training manual will cover Mitsubishi's 2011-2012 TV Product Line shown below broken down by category, chassis, display technology and light source.

Product Category	Chassis	Display Technology	Light Source
LASERVUE	V46	Rear Projection DLP	RGB Lasers
DLP Home Cinema	V45	Rear Projection DLP	High Pressure Discharge Lamp

The full TV Product Line is shown below by size, sub-chassis and model.

LASERVUE

SIZE	V46
75"	L75-A94

DLP Home Cinema

SIZE	V45C	V45	V45CA	V45+	V45++	V45CB
73"	WD-73C11	WD-73640	WD-73CA1	WD-73740	WD-73840	WD-82CB1
82"				WD-82740	WD-82840	
92"					WD-92840	

Introduction

This Introduction will discuss some of the newest features and technologies. The remainder of the manual is divided into 2 sections to cover the **LASERVUE** and DLP Home Cinema product categories separately. While this manual can be used as a service aid, always refer to the Service Manual for complete service information and safety instructions.

FEATURES and TECHNOLOGIES

A matrix of many of the features included in the 2011-2012 product line follows. Also, several of the newest

TECHNOLOGIES

Mitsubishi's 2011-2012 TV product line includes several technologies either new to the market place or introduced in the recent past. These technologies include:

- 3D with built in IR synchronization emitters.
- Stream TV™ Internet Media
- Wireless Internet Ready and Built-in Wireless Internet
- Bluetooth® A2DP Audio Streaming
- iPhone® Remote Control App

In addition, Mitsubishi's Reliability and Service Technologies have evolved yet again. These technologies will be discussed further.

3D

2011-2012 Mitsubishi TVs will support the mandatory HDMI 1.4a 3D signals intended for the United States. However, there may be some 3D sources that are not compatible with the TVs. Specifically, the TVs will support the 3D signals known as:

- Frame Packing 1080p/24Hz and 720p/60Hz (primarily from Blu-ray players and gaming consoles).
- Side-by-Side in 1080i/60Hz, 1080p/24Hz/30Hz/60Hz and 720p/60Hz.
- Top/Bottom in 1080p/24Hz and 720p/60Hz.
- Checkerboard 1080p/60Hz.

In all cases:

(1) 3D sources must connect to the TV using the HDMI inputs or via StreamTV™ Internet Media.
(2) Active Shutter 3D glasses are required in order to view 3D content. They must be synchronized using either IR or DLP-Link. IR synchronization must use either the TV's internal IR emitter or an external IR emitter connected to the rear of the TV.

Stream TV™ Internet Media

Introduced last year, internet media capabilities have been expanded to many more models this year by including an Ethernet port and wireless ready or wireless internet connections. This permits instant access to an extensive library of high quality entertainment and social media content. StreamTV provides consumers with over 100 different applications.

Internet services provided by VUDU™ Apps let you access many popular on-line applications. In addition to free content, VUDU's movie service lets you buy and rent movies through the TV. Visit VUDU.com to learn more about available movie titles, prices, and services offered. For a list of recommended routers and switches, see the Support > FAQ section at VUDU.com.

Requirements for StreamTV internet media:

- Broadband internet service (at least 2 Mbps for SD, • 4 Mbps for HD, and 8 Mbps for 1080p HDX)
- Internet connection (wired or wireless).
- Computer access to the VUDU.com website (required for initial account activation).
- A credit card for rental and purchase transactions from VUDU's movie service.

Wired Internet, Wireless Internet Ready and Built-in Wireless Internet

These technologies are exactly what they say they are. Requirements are as follows:

Wired: Category-5 (CAT-5) Ethernet cable connected from the LAN Port of the TV from either a router or modem providing high speed internet service.

Wireless Ready: *Azurewave AW-NU231* USB wireless adapter plugged into the TV's USB port. Note: At this time, these are the only wireless adaptors available on the market that can be used. More options may be available in the future.

Wireless and Built-in Wireless: IEEE 802.11n compliant wireless network router providing high-speed internet service.

Bluetooth® A2DP Audio Streaming

The Bluetooth specification for basic audio provides a frequency response designed for voice communication. Bluetooth's Advanced Audio Distribution Profile, or A2DP, allows high-fidelity stereo audio to be streamed from the customer's Bluetooth device to the TV. A A2DP enabled Bluetooth device (phone, media player, etc.) is required.

iPhone® Remote Control App

Owners of Apple's iPhone or iPod Touch devices can obtain an optional App (application) that will give the device remote control capabilities. They can then control their TV over the wireless internet connection.

From a Service Technician's Point of View…

New technologies always present a challenge to the service technician. The customer expects the technology to work to whatever expectation he has in mind. And if it doesn't, he expects the service technician to wave his "magic wand" and make it all better. In most cases, problems are not due to a failure. The customer simply does not understand the feature's use, capabilities, requirements or set-up. Since the Service Technician's primary job is to *repair failures*, the customer problems have to be eliminated first. When receiving a customer complaint about a new technology, the best ***first course of action*** is to point the customer to Mitsubishi's Operational Assistance department at **800-332-2119**.

ISF© ccc and Advanced Picture adjustments for 2011 TVs:

These models all have two Advance Picture mode memories available for each input. Each of these memories can be individually adjusted to calibrate the pictures. To calibrate precisely, training and specialized equipment is required. Both Advanced Modes are set as close as is practical to the REC 709 in a mass production environment. Just turning the mode on will display a picture very close to this standard.

There are multiple ways to use the two mode memories for each input. For instance one memory can adjusted for daytime/brighter environments and one memory for nighttime/darker environments. Another alternative is one memory can be adjusted for 3D pictures and the other memory adjusted for 2D pictures.

The Diamond Series 840 models and LaserVue model L75-A94 are ISFccc and the adjustments can be locked to prevent unauthorized changes.

To Active an Advanced Adjustment Mode:

1. Press **MENU** to display the ***Main TV Menu***.
   a. The ***PICTURE*** category is automatically highlighted.

   (Figure 1)

2. Use the ► key to highlight the ***Advanced Picture*** icon and then press **ENTER** to enter the sub-menu.

   (Figure 2)

3. While the ***Picture Mode*** option is highlighted press **ENTER** to activate the mode.
   a. The name will change from **- -** to ***ADV 1***.
   b. Press **ENTER** a second time to activate ***ADV 2***.

   (Figure 3)

   c. For specialized Daytime and Night time picture modes use ***ADV 1*** for Day and ***ADV 2*** for Night.

   OR

   d. For specialized 3D and 2D picture modes, use ***ADV 1*** for 3D and use ***ADV 2*** for 2D.

Figure 1

Figure 2

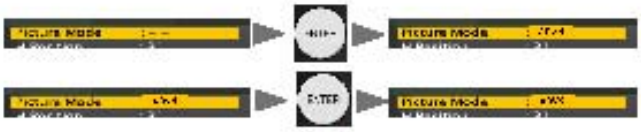


Figure 3

When adjusting for 3D make sure a 3D signal is being used and the 3D mode in the TV is set to Automatic or the correct manual mode

Reliability and Serviceability Technologies—*Simplified!*

If one word could be used to describe the reliability and serviceability technologies in Mitsubishi's 2011-2012 TV products, it would be ***simplified***.

LASERVUE

The second generation V42 chassis is a complete redesign of the V40. It is, well... *simplified*. How?

- The Screen is stationary. No motors. No moving parts. No shipping screws.
- The Fiber Optic Cables have been eliminated. No optical connectors.
- The Mirror is flat.

DLP Home Cinema

- The Chassis is held in the cabinet by only 4 screws. And, disassembly is simplified by a reduction in the number of screws necessary to remove the PWB-MAIN. Comparing the base models V43 to V41 shows a screw reduction of more than 42%. The high end models screw reduction is more than 32%. And the V41 seemed simple!
- The Optical Engine assembly has been redesigned to a more compact design and is held in the cabinet by only 3 screws.
- The PWB-BALLAST is held in place by a single clip.
- The screw on DVI Cable has been replaced by a finger locking LVDS Ribbon Cable.

DLP Home Cinema

- The Self Diagnostics feature is self activated when the set is in the shut down condition. No procedure necessary to obtain an Error Code.
- The Error Code read-out is now color coded. It's now simplified to the point where a customer can read the Error Code.
- Software updates can be performed on-line automatically (Internet Media models).
- Bluetooth circuit is on a separate PWB to simplify troubleshooting.

Chapter 1

LASERVUE™

SIZE	V46
75”	L75-A94

SAFETY

Like the first generation V40 **LASERVUE** chassis, the V46 chassis includes laser technologies that have safety requirements that are separate and different than those in other TVs. Prior to servicing this type product, it is important to read and understand all safety requirements. The V40 Technical Training Manual includes a section on the *Fundamentals of Laser and Laser Safety*. It is available for download from new.3diamonds.com. In addition, the laser safety requirements specific to the V46 chassis are repeated from the Service Manual here. Refer to the Service Manual for all other safety instructions.

SAFETY PRECAUTIONS

NOTICE: Observe all cautions and safety related notes located inside the receiver cabinet and on the receiver chassis.

WARNING:

1. Operation of this receiver with the covers removed presents both a shock hazard and a hazard from laser radiation. Work on the receiver should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage and laser based equipment.
2. When service is required, observe the original lead dress. Where a short-circuit has occurred, replace those components that indicate evidence of overheating.

CAUTION:

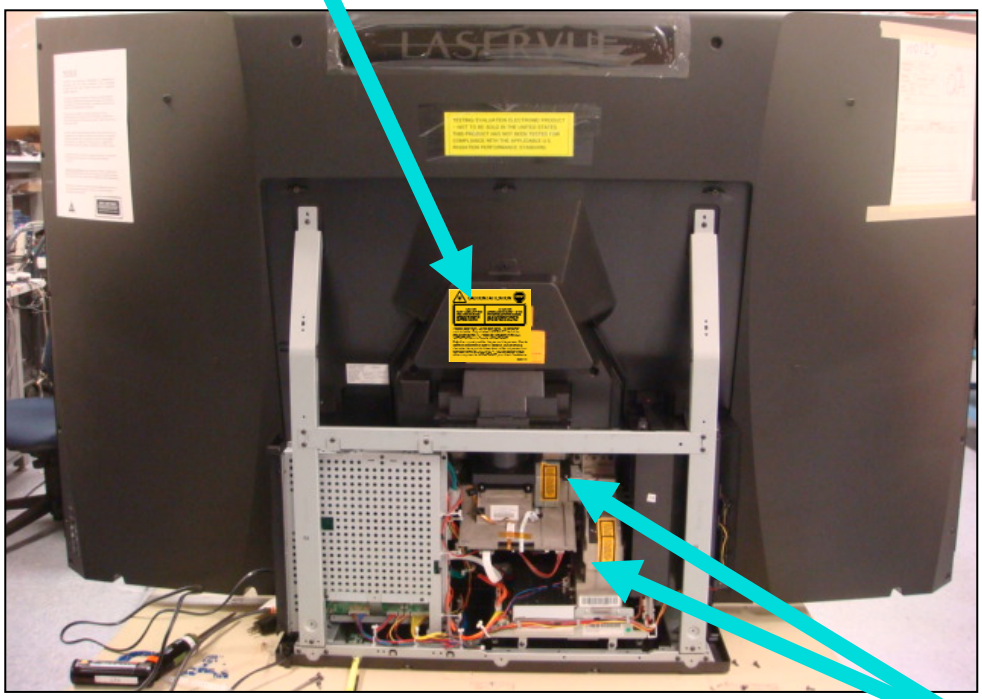
This TV is a CLASS 1 laser product. This TV poses no risk to eyes or skin during normal use. An exposure hazard may exist only if the protective housing is removed.

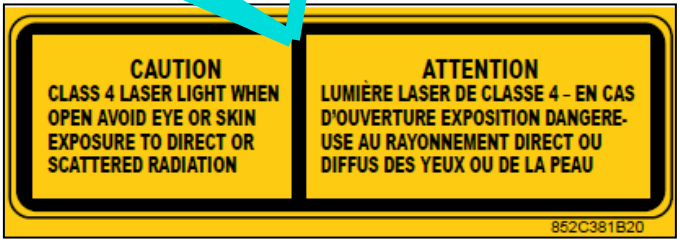
This TV contains a CLASS 4 laser device, which by itself may be hazardous. However, this TV incorporates a protective housing, optics and electronics such that there should be no exposure to unsafe levels of laser light during normal operation and proper service.

This TV is in compliance with the requirements of IEC 60825-1 Ed. 2(2007).

Caution: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. Use external or remote controls to operate the product. Connection to signal sources and power are accomplished through the external connectors.

1. The following precautions must be taken to avoid exposure to hazardous laser radiation during service.
   Prior to removing items marked with either of the two labels shown below, AC power must be removed. AC power must not be re-applied until the cover(s) are replaced back into their original position and all screws are in place. The specific Class 4 areas in the V46 chassis include the Screen Assembly, the Light Source Unit and the Optical Engine, indicated below.





DISASSEMBLY & PARTS REPLACEMENT

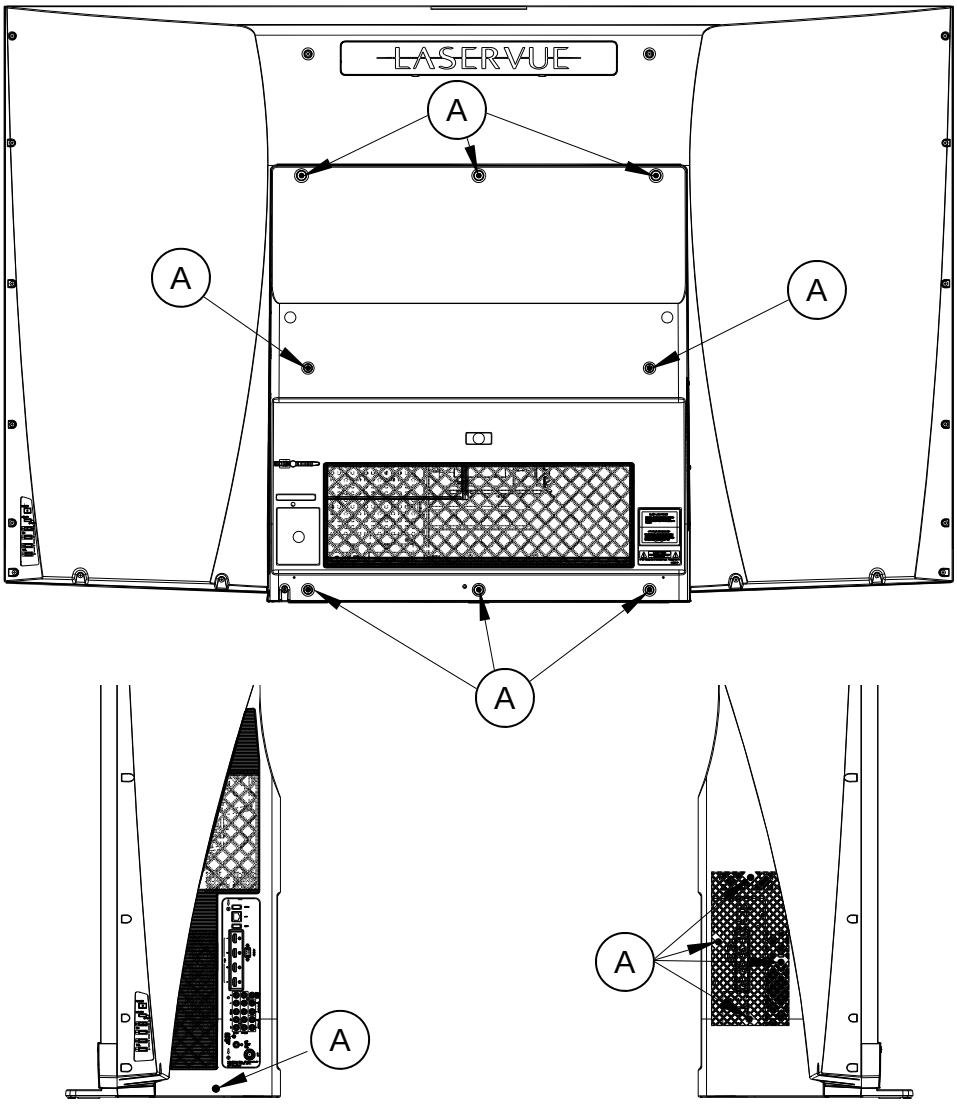
CAUTION: Prior to disassembly, remove AC power. Do not re-apply AC power until the set has been fully re-assembled and inspected for safety as described on page 12.

IMPORTANT NOTES:

1. Disassembly beyond what is shown in this manual is not recommended.
2. The following assemblies are replacement items that **should not be disassembled:**
   - **Electrical Chassis—**Replacement is supplied complete with PWBs. However PWBs can be replaced individually.
   - **Light Source Unit—**Replacement is supplied complete with fans and ducts. However Exhaust Fans can be replaced individually.
   - **Optical Engine—**Replacement is supplied complete with the DMD fan. However the DMD Fan can be replaced individually.
3. Do not allow the rear of the screen to come into contact with any other surface including cleaning cloths or fingers. Remove dust or other debris by blowing with a dry air source.

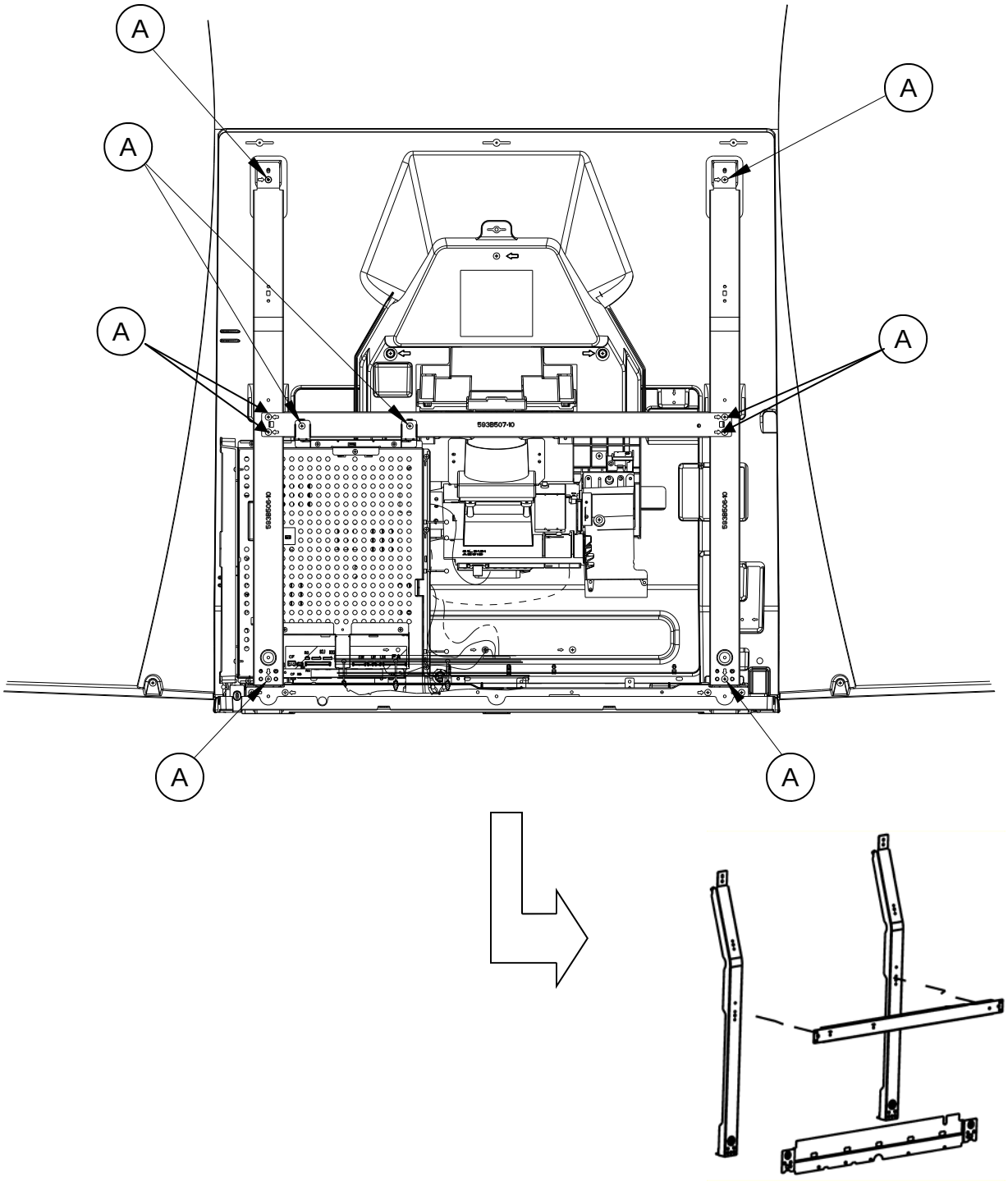
Back Cover Removal

1. Remove screws (A) from the back cover (Star Head/TORX® T20).
2. Remove the back cover from the TV.



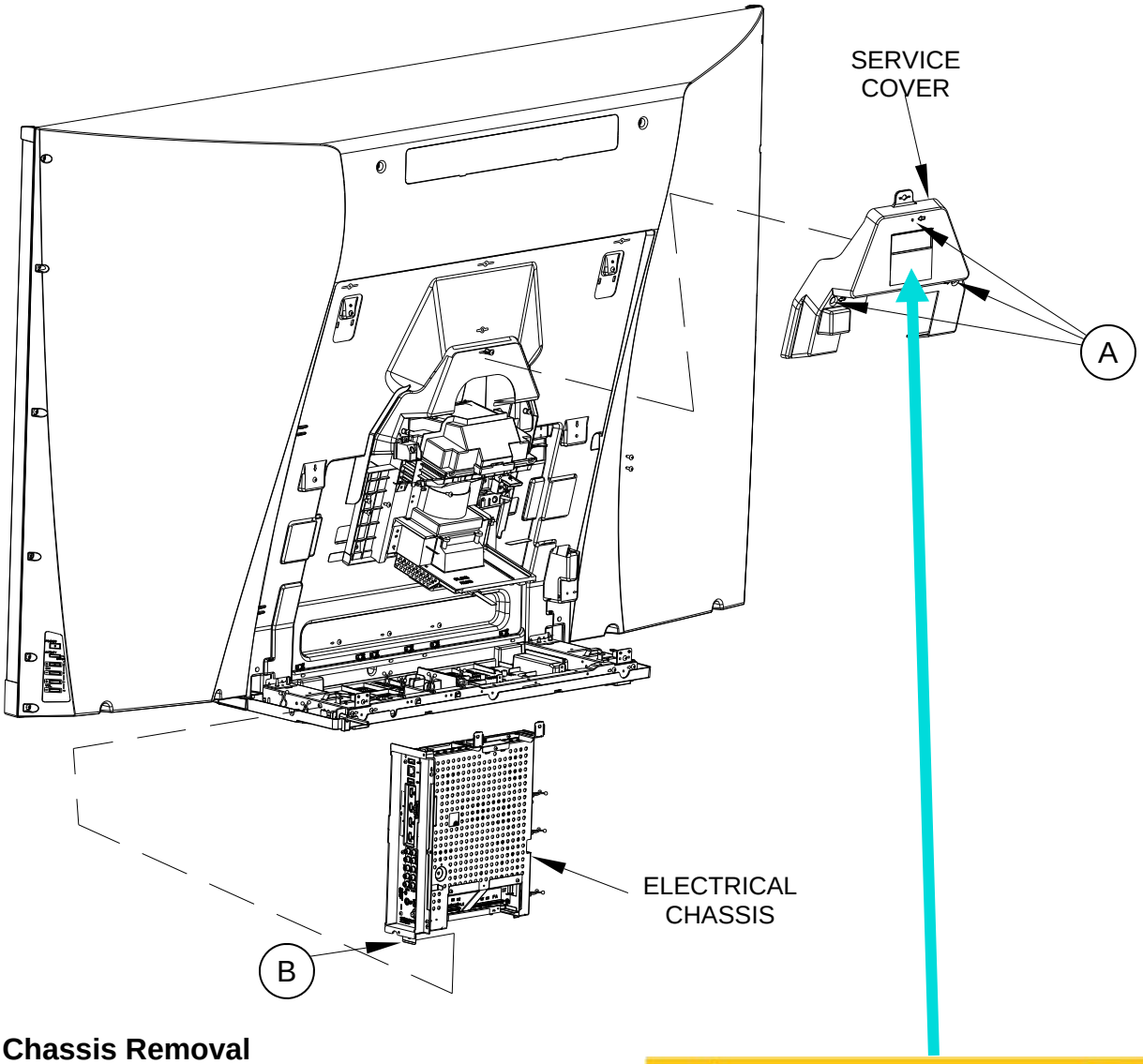
Rear Cabinet Frame Removal

1. Remove screws (A) from the Rear Cabinet Frame.
2. Remove the Rear Cabinet Support Frame from the TV.



Service Cover Removal (For Light Source Unit and Optical Engine Replacement)

1. Remove screws (A) indicated on the Service Cover by the arrows ⇨
2. Remove the Service Cover in the direction indicated.



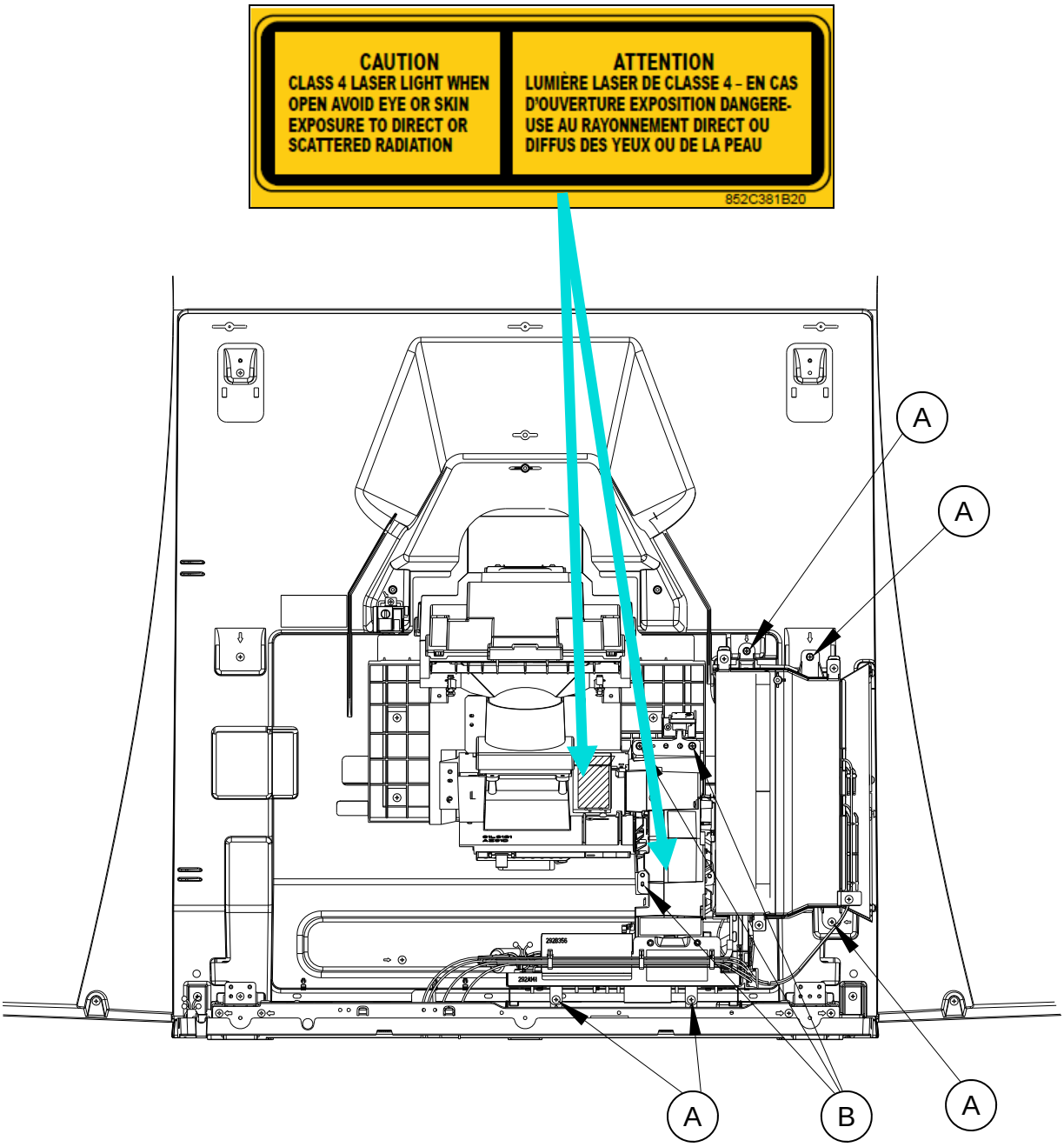
Electrical Chassis Removal

1. Disconnect all cables connecting to the chassis.
2. Remove screw (B).
3. Slide the chassis up and out of the cabinet.

Note: After replacing either the Electrical Chassis or PWB-MAIN, see Data Transfer section and perform the following procedures:

1. Restore Engine Data From Backup
2. Restore Geometry Data From Backup.
3. Restore ISF Settings From Backup (Only if backup USB memory device is available).

IMPORTANT REPLACEMENT NOTE: If the customer has subscribed to VUDU (Internet program provider), the customer must be instructed to contact VUDU to re-activate their account after a replacement CHASSIS or PWB-MAIN has been installed. The original part **cannot** be installed in another TV. It must be returned to Mitsubishi per policy.



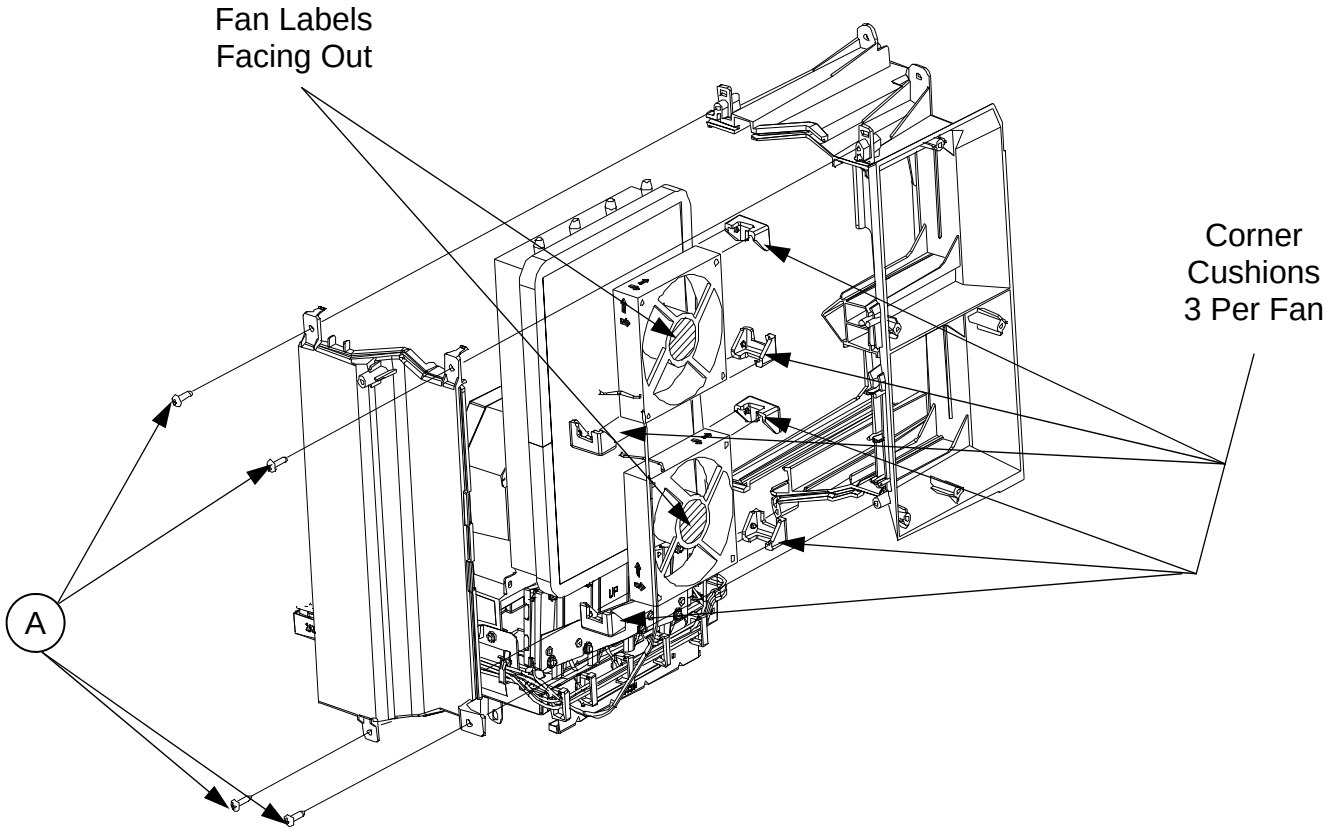
Light Source Unit Removal

NOTE: The Light Source Unit is supplied complete with fans and ducts. However the Exhaust Fans can be replaced individually.

1. Disconnect all cables connecting to the Light Source Unit.
2. Remove Screws (A) and (B).
3. Remove the Light Source Unit from the cabinet.

Light Source Unit Replacement

1. After a new Light Source Unit is installed, perform the “Select Calibration Table” procedure as described in the Service Adjustments section.



Light Source Exhaust Fan Removal

NOTE: Disassemble Duct Assembly for Fan replacement only. Otherwise order the complete Light Source Unit.

1. Remove Screws (A).
2. Separate the Front and Rear Air Ducts.

IMPORTANT: Do not disassemble the Light Source Unit any further.

Optical Engine Removal

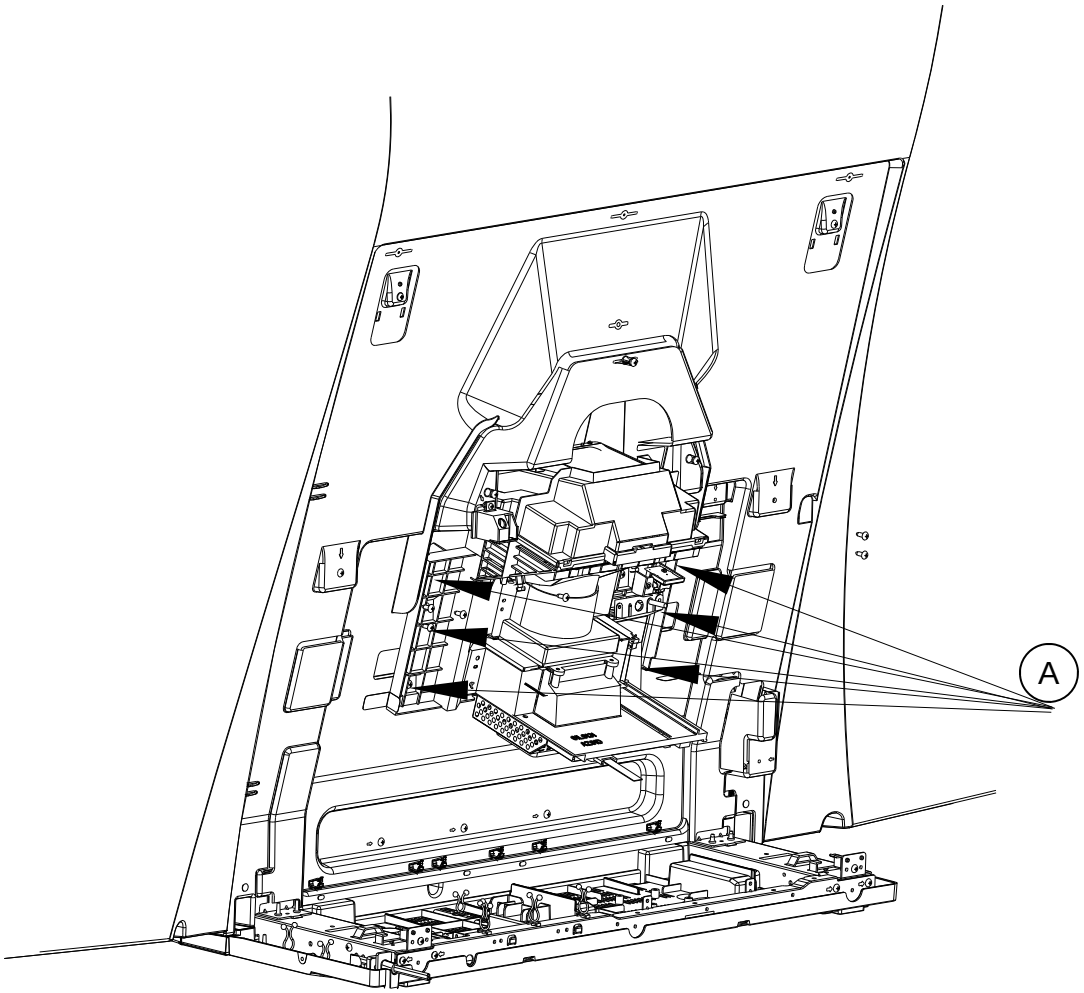
1. Remove Screws (A).
2. Remove the Optical Engine from the cabinet.

IMPORTANT: Do not disassemble the Optical Engine further than DMD Fan replacement.

Optical Engine Replacement

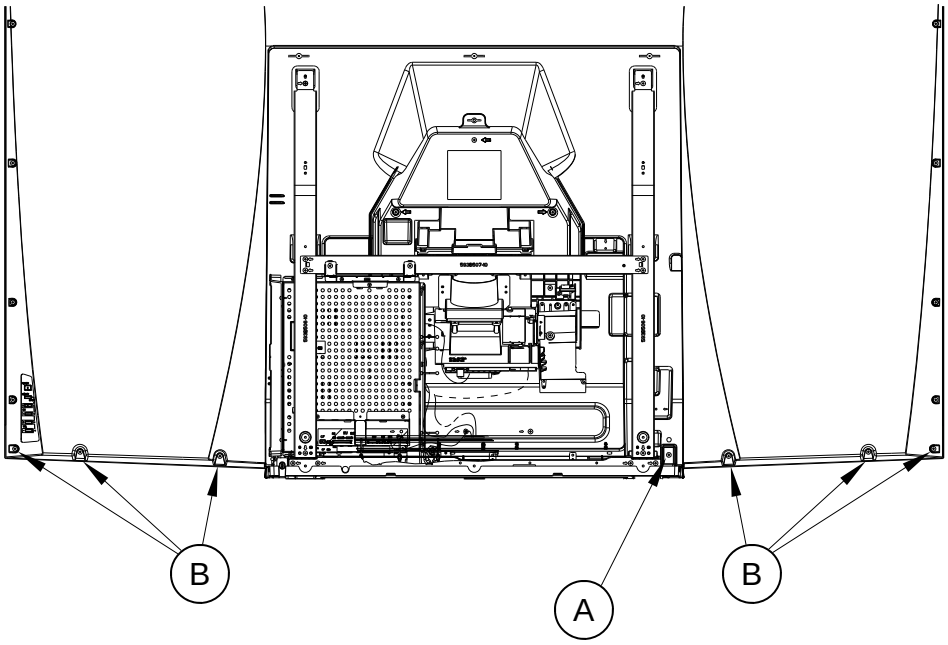
After a new Optical Engine is installed, perform the following procedures:

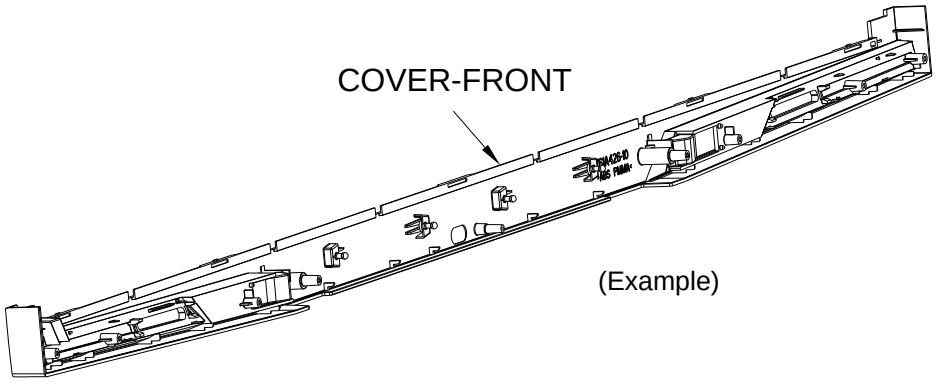
1. TSP Alignment as described in the Service Adjustments section.
2. “Save Engine and Geometry Setting to Backup” procedure as described in the Data Transfer section of the Service Adjustments.



COVER-FRONT Removal

1. Remove Back Cover and remove Screw (A).
2. Remove Screws (B).
3. Pull COVER-FRONT away from the front of the cabinet.





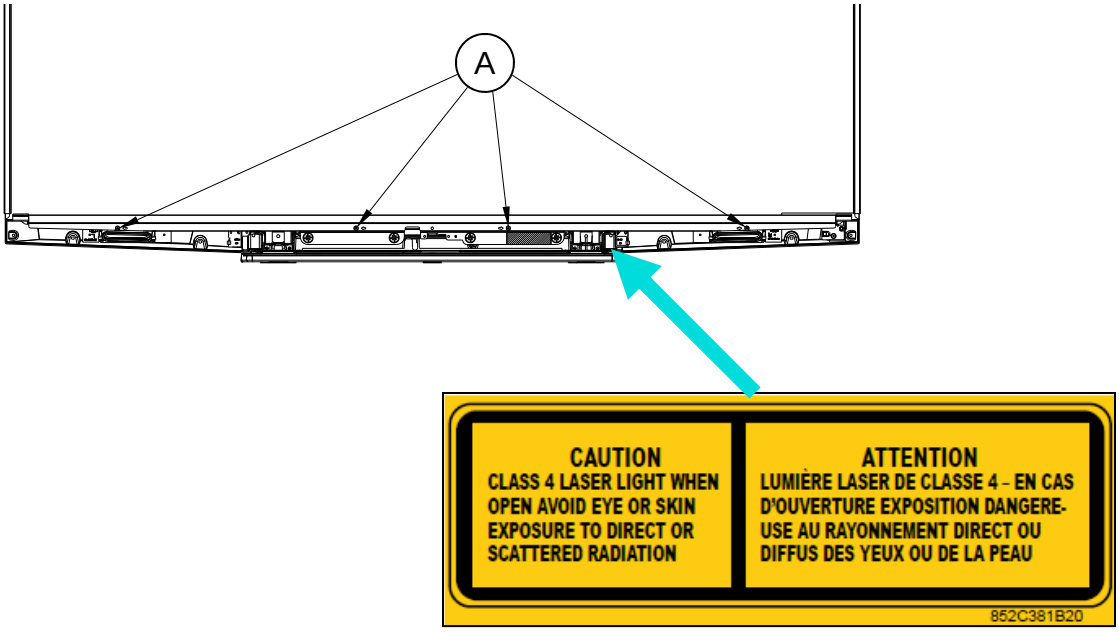
Screen Assembly Removal -

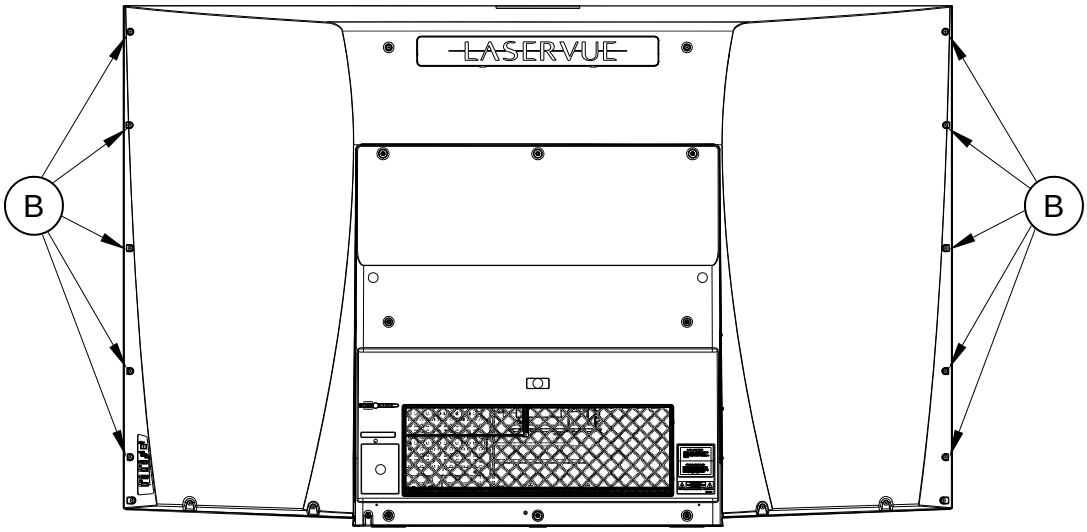
Note: The Screen Assembly and screens are not considered to be field replaceable items.

1. Remove the COVER-FRONT.
2. Remove Screws (A) from the bottom front.
3. Remove Screws (B) from the rear sides.
4. Remove the Screen Assembly from the cabinet.

IMPORTANT: Do not allow the rear of the screen to come into contact with any other surface including cleaning cloths or fingers. Remove dust or other debris by blowing with a dry air source.

IMPORTANT: Do not disassemble the Screen Assembly.





SERVICE PROCEDURES

REMOTE CONTROL USE FOR SERVICE

Many service functions and adjustments are accessed using the Remote Control. See below.

OPTION MENU

OPTION MENU

1. Press the <MENU> button on the remote control.
2. Press the buttons <2-4-7-0>. The screen will display the Option Menu.

Option Menu
<MENU><2-4-7-0>

Initialize	
Deactivate VUDU	
Power Restore	OFF
Production Mode	OFF
Digital Signal Strength	<1~9>
DM Software	Vxx xxx.xx
TV MAC Address	xx:xx:xx:xx:xx:xx
Wireless LAN Device	ON
Total hours of use	xxx
Light Sensor	xxx
APC Ratio	xxx,xxx,xxx
DAC Ratio	xxx,xxx,xxx
LM ONTIME [m]	xxx
Laser ONTIME R [m]	xxx
Laser ONTIME G [m]	xxx
Laser ONTIME B [m]	xxx
TEMP [C]	xx.xx
Peltier DAC [%]	xx.xx

SERVICE LEVEL INITIALIZATION

Service Level Initialization is used to restore all customer menu, video and audio settings to the original factory default condition.

1. Enter the Option Menu <MENU><2-4-7-0>
2. Select **"Initialize"** and <ENTER>.

DEACTIVATE VUDU

This feature will deactivate the customer's VUDU on-line subscription. It should be used before TV ownership is changed. NOTE: This feature is independent of the **Initialize** function.

1. Enter the Option Menu <MENU><2-4-7-0>.
2. Select **"Deactivate VUDU"** and <ENTER>.
3. The "Vudu Reset" text will momentarily turn red.
4. Press <EXIT> to quit.
5. The TV will register as deactivated the next time it is connected to the internet.

DIGITAL SIGNAL STRENGTH

1. Tune to a Digital Channel.
2. From the Option Menu, scroll down and highlight “Digital Signal Strength.”
3. Press <ENTER>. The screen will display the Digital Signal Strength Menu.

Digital Signal Strength Menu

"Digital Signal Strength" <ENTER>

	Tuner
Frequency(MHz)	749
Signal Level	<1~9>
Modulation	8VSB Air
Carrier Lock	Locked
SNR	29.09
Correctable errors	0
Un Correctable errors	0

SNR Recommended Levels:

8VSB = 16 to 33
64 QAM = 22 to 35
256 QAM = 27 to 38

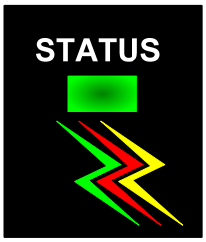
RESET / INITIALIZATION

SERVICE TIP:
Many symptoms that are customer generated, intermittent or cannot be verified can be resolved by using the various Reset and Initialization options. Before visiting the customer's home ask the customer to 1st perform a System Reset by pressing the <POWER> button on the side panel and holding it for 8 seconds. If this does not resolve the issue, they can perform an A/V Reset by pressing the side panel <INPUT> + <VOL ◄> buttons at the same time and holding for 10 seconds. Then, if necessary, perform a user level Initialization by pressing <MENU><1-2-3> <ENTER> with the remote. The customer should be made aware when settings and/or options will be reset. For more information, see the chart.

Reset Name	When to use	How to use	Resulting Action
Remote Control Reset	Returns the remote control to normal operation.	1) Press and hold <POWER> until it flashes twice then release. 2) Enter <0-0-0-0-0>. The <POWER> button will flash twice	The remote control is reset.
A/V Memory Reset, by individual input	When the audio or video performance or settings for a single input seem to be incorrect.	<MENU> "Audio/Video" → "AV Reset" <ENTER>	All Audio and Video settings for the individual input are reset except for the *Listen To, Language, Balance and Closed Caption settings.*
A/V Reset, all inputs	When the audio or video performance or settings for more than one input seem to incorrect.	While viewing the TV, press the side panel buttons <INPUT> + <VOL ◄ > at the same time and hold for 10 sec.	All Audio and Video settings are reset to the factory default settings. No other menu options are changed.
System Reset	To reset the TV when it does not turn on or off, does not respond to the remote control, side panel buttons or has other unusual symptoms.	Press and hold the side panel <POWER**>** button for 8 seconds.	TV Micro Re-boots. Note: The changes made during the current TV-On period may be lost. All other previous user settings are not lost.
Initialize - User Level	To reset all customer settings except V-Chip	Press <MENU><1-2-3><ENTER>	All customer menu options and A/V settings except V-Chip, locked ISF & Vudu subscription are reset to factory default.
Initialize - Service Level	To reset all customer settings	**<**MENU><2-4-7-0> Select "INITIALIZE" <ENTER>	All customer menu options and A/V settings except Vudu subscription are reset to factory default.
Deactivate Vudu	To deactivate the customer's on-line Vudu subscription when TV ownership is changed.	**<**MENU><2-4-7-0> Select "Deactivate VUDU" <ENTER>	Vudu subscription is deactivated.
V-Chip Password Bypass	If V-Chip password is not known	Press <LAST>+<9> at the same time.	Password will be bypassed. If in the V-Chip menu, enter a new password.
Unlock Side Panel	To unlock the side panel if it has been locked in the V-Chip Menu.	Press and hold the side panel <INPUT**>** button for 10 seconds.	Side Panel becomes operational. Other V-Chip settings not changed. Note: Cannot be performed while in the Low Power mode and the set is Off.

LED INDICATIONS AND SELF DIAGNOSTICS

The front panel Power LED provides an indication of the set's operation and the possible cause of a malfunction.



NORMAL INDICATIONS

STATUS LED Indication	Condition
Off	Off (Standby)
Green	Power On
Slow Blinking Green	Power Off with Timer Set. Power On normally
Fast Blinking Green 1 to 3 minutes after Power Restored from AC interrupt, Power On, System Reset or Software update.	Boot-up. Wait for blinking to stop to Power On.

ABNORMAL INDICATIONS

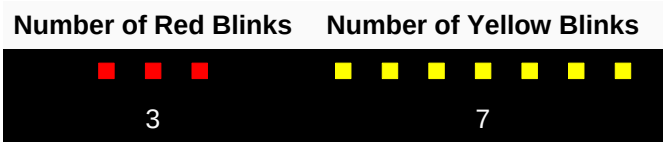
STATUS LED Indication	Condition
Blinking Red then Blinking Yellow	Circuit Failure (See Self Diagnostics)

SELF DIAGNOSTICS

A blinking red and yellow Status LED will indicate an Error Code that can help determine the cause of a circuit failure.

- The number of Red blinks indicates the value of the MSD (tens digit) of the Error Code.
- The number of Yellow blinks indicates the value of the LSD (ones digit) of the Error Code.

Example: If the Error Code is "37", the LED will continuously blink Red three times, followed by blinking Yellow seven times.



Error Code: 37

See the following page for a list of Error Codes.

To perform a System Reset, press and hold the Power button for 10 seconds. Or, unplug the set for 10 seconds then restore power.

ERROR CODES

Error Codes, descriptions and corrective actions for the error are listed below:

Error Code	Description	Corrective Actions
12	No serious error since last main power on or last micro initialization.	
13	Cover-4 (Laser Unit) is open.	Contact MDEA Technical Support 1-800-552-8324
15	Strobe signal abnormal detection	Check JV-J6C00 circuitry or its Lead Wire / Check if Flat cable is damaged / Replace Engine or Chassis
17	Engine I2C bus communication error is detected	Check JV-J6C00 circuitry or its Lead Wire / Check if Flat cable is damaged / Replace Engine or Chassis
18	ASIC-ready from engine is not detected.	Check PE–PE circuitry or its lead wire / Check JV-J6C00 circuitry or its Lead Wire / Check if Flat cable is damaged / Replace Engine or Chassis
23	Cover-1 (Back Cover) is open.	Contact MDEA Technical Support 1-800-552-8324
25	Abnormal High ambient temperature	Check and Clean Air Vents / Replace PWB-TEMP2 if defective
26	Laser FAN1 or 2 stop	Check LDX or LDY circuitry & wiring / Replace Laser Unit Fans if defective
29	Communication error between Laser micro and temp sensor (ambient, peltier, heat pipe) Communication error between Laser micro and EEPROM Communication error between Laser micro and LASER module thermistor.	Check communication as follows: Ambient temp sensor : Check LE-ST2 circuitry & wiring / Replace PWB-TEMP2 Peltier temp sensor : Check ST-ST1 circuitry & wiring / Replace PWB-TEMP1 EEPROM : Check FA-FA circuitry & wiring / Replace Laser Units LASER module thermistor : Check FB-FB circuitry & wiring / Replace Laser Unit
33	Cover-2 (Front Cover) is open.	Contact MDEA Technical Support 1-800-552-8324
37	DMD-FAN stops.	Check JM circuitry & wiring / Replace DMD FAN if defective / Replace Engine.
38*	Laser unit temperature is abnormally high.	Check and Clean Air Path / Replace Laser Unit
39	Abnormal low ambient temperature	Allow TV to warm to room temperature / Replace PWB-TEMP2 if defective
45	Diffuser motor stops.	Check JS circuitry / Replace Engine
46	Peltier temperature is abnormally high.	Check and Clean Air Path / Check FA-FA circuitry & wiring (PEL_EN) / Replace Laser Unit
48	P-ON short	Replace Chassis
49*	Laser abnormal brightness (more than limit)	Replace Laser Unit
56	FPGA communication error with laser micro FPGA configuration failure	Check JV-J6C00 circuitry or its Lead Wire / Check if Flat cable is damaged / Replace Laser Unit or Chassis
57	Communication error between TV micro and Laser micro	Replace Chassis
66*	Laser abnormal brightness (less than limit)	Check FB-FB connector or its Lead Wire / Replace Laser Unit
67	Peltier control abnormal	Check FA-FA circuitry & wiring (PEL_EN) / Replace Laser Unit
68	Cover-3 (Service Cover above Engine) open.	Contact MDEA Technical Support 1-800-552-8324

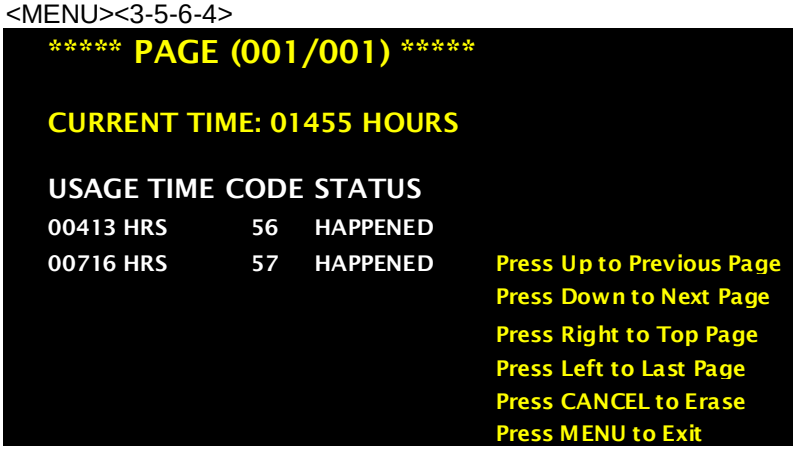
* After 3 occurrences, the TV will be locked out and will not respond to Power On commands. After repair, use the following procedure to unlock the TV.

1. Perform a System Reset by removing and re-applying AC.
2. Press and hold the side panel <INPUT> + <VOL ◀> buttons at the same time until the Status LED returns to normal (about 5 seconds).

ERROR CODE LOG

The Error Code Log may be helpful to retrieve the code for an error that occurred in the past.
To access the Error Code Log: Press <MENU> <3-5-6-4>

Error Code Log
<MENU><3-5-6-4>



Error Code Log Definitions

- PAGE - Current page number
- CURRENT TIME - total hours of operational use.
- USAGE TIME - usage hours when the error occurred.
- CODE - the specific Error Code that occurred.
- STATUS: HAPPENED - Indicates an error was recorded.

Press <CANCEL> to erase the Log.

NOTE: The Error Code Log is intended as a reference tool and is not meant to be used as a final determination of a defective part.

SERVICE ADJUSTMENTS

There are 2 Types of Service Adjustments, electrical and mechanical:

Electrical Adjustments

- Horizontal and Vertical Centering Adjustment
- Index Delay Adjustment
- Geometry Alignment
- Data Transfer Functions

Mechanical Adjustment

- Top Mirror Adjustment

ELECTRICAL ADJUSTMENTS

Overview—Specific Adjust Procedures follow

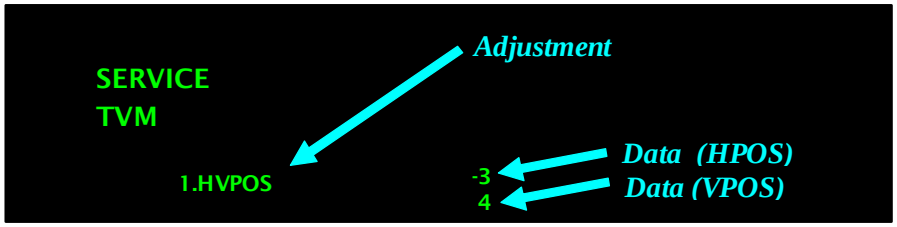
- Service adjustments are performed using the remote control.
- The Service Menu is used for all service adjustments.
- Test Patterns are generated internally.

1. Activating the Service Menu

1. Press the <MENU> button on a remote control. (The "MENU" display will appear.)
2. Press the buttons <2-4-5-7>. (The Service Menu On Screen Display will appear.)

If no display appears, press <EXIT> and repeat steps 1 and 2.

SERVICE MENU <MENU><2-4-5-7>



2. Test Pattern Activation

1. When in the Service Menu, press Play <▷> to activate the internal test patterns (no indication will be displayed initially). Use FWD <▶▶> and RWD <◀◀> to toggle between patterns.
2. Press Play <▷> a second time and use FWD <▶▶> and RWD <◀◀> to access additional patterns.
3. Press Play <▷> again to toggle back to the previous patterns.

3. Adjustment Selection

When in the Service Menu use the <VIDEO> button to toggle to the adjustment desired as indicated by the number and abbreviation displayed on screen, i.e. "1.HVPOS."

4. Adjusting Data

After selecting an adjustment item, use the Navigation <▲▼◀▶> buttons to perform the adjustment.

5. Saving Data

Press <ENTER> to save the adjustment data. The menu display will turn red for approximately one second.
Note: If the circuit adjustment mode is terminated without pressing <ENTER>, changes in adjustment data are not saved.

6. Data Transfer & Geometry Menu

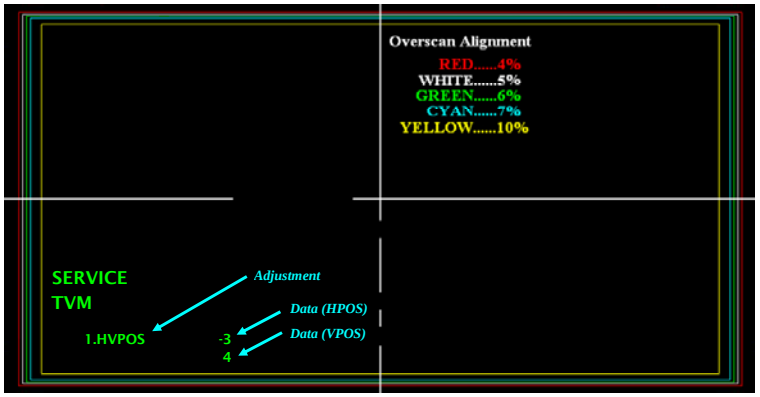
While in the Service Menu, press the <0> button to activate the Data Transfer & Geometry Menu.

7. Exiting the Service Menu

Press <EXIT> to quit.

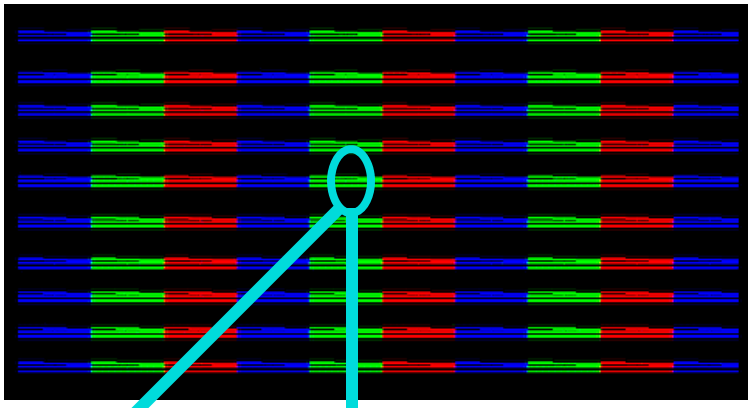
Horizontal and Vertical Position Adjustment

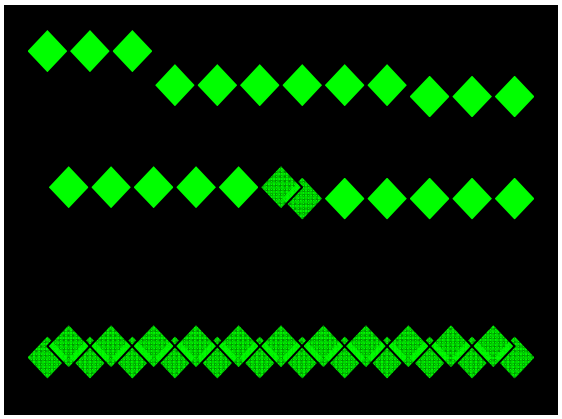
1. Enter the Service Menu <MENU><2-4-5-7> .
2. Select the Geometry Test Pattern shown Play <▷> Rewind <◀◀> x2.
3. If necessary, select the adjustment, “1.HVPOS” <VIDEO>.
4. After selecting the HVPOS adjustment item, use the Navigation <▼▲◀▶> buttons to center the display.
   - If a Up/Down <▼▲> button is pressed, the vertical position and VPOS adjustment data changes.
   - If a Left/Right <◀▶>button is pressed, the horizontal position and HPOS adjustment data changes.
5. Press <ENTER> to save the adjustment data.



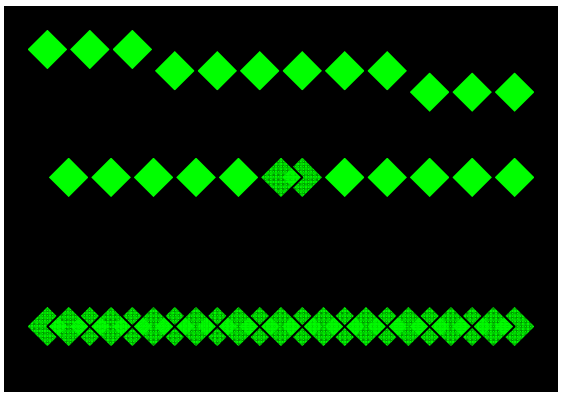
TSP Alignment (after Optical Engine replacement)

1. Enter the Service Menu <MENU-<2-4-5-7>.
2. Select the TSP Test Pattern by pressing PLAY <▷> once, then FAST FORWARD <▶▶> or REWIND <◀◀> until the pattern shown appears.
3. Use the <VIDEO> button to select “2.TSP”.
4. Use the DIRECTION <▼▲> buttons to straighten the horizontal lines, see example.
5. Press <ENTER> to save the adjustment.





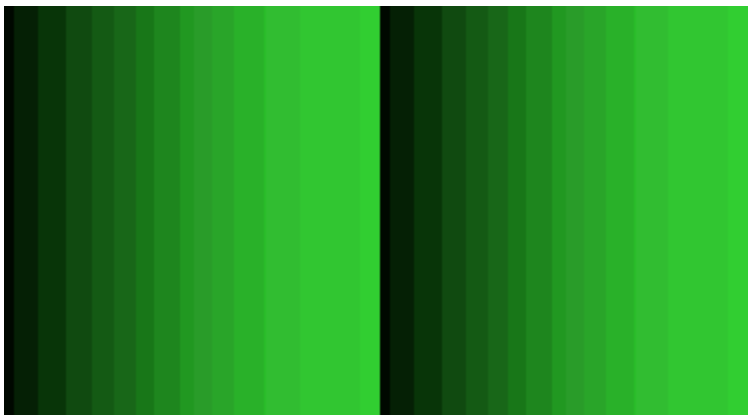
Before Adjustment



After Adjustment

Select Calibration Table (after Light Source Unit replacement)

1. In the Customer's Video Settings Menu select COLOR TEMP: HIGH
2. Enter the Service Menu <MENU-<2-4-5-7>.
3. Use the <VIDEO> button to select the adjustment, "61.BCMH" and note the data value (0, 1, 2, 3 or 4).
4. Select the Green Double Ramp Pattern by pressing PLAY <▷> twice, then FAST FORWARD <▶▶> or REWIND <◀◀> until the pattern below appears.
5. Check the pattern for smoothness of graduation from dark to light and for the presence any vertical contour lines.
6. Use the DIRECTION <▼▲> buttons to alternately change the Data Value of "61.BCMH" to 0, 1, 2, 3 or 4. As necessary, press PLAY <▷> once to observe the Service Menu on screen display and press PLAY <▷> twice to return to the pattern.
7. Select the data value 0, 1, 2, 3 or 4 that gives the best results. No higher data value should be used.
8. Press <ENTER> to save the adjustment.



Before Adjustment

After Adjustment

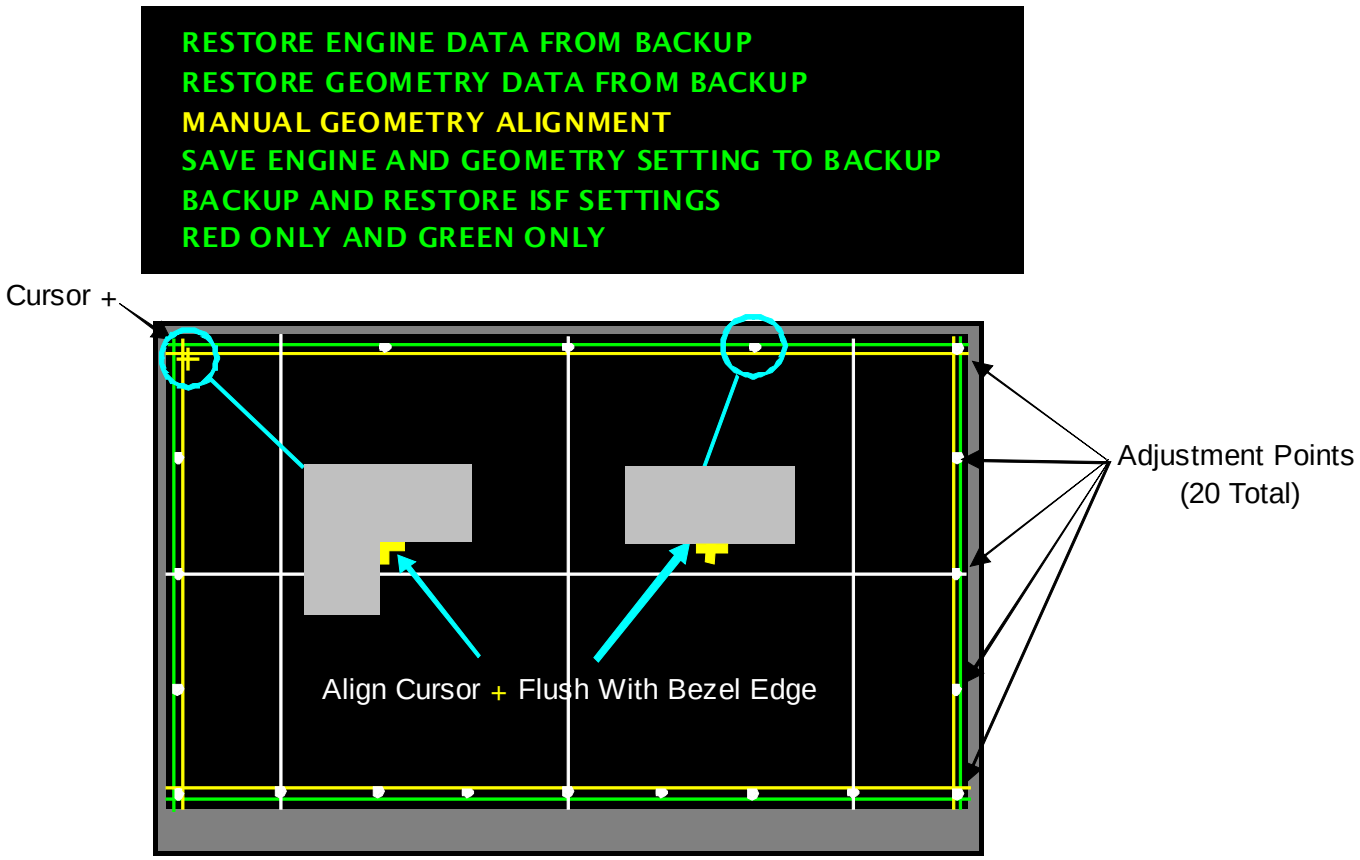
Manual Geometry Alignment

1. Activate the Service Mode <MENU><2-4-5-7>. From the Service Menu, press the <0> button. The Data Transfer & Geometry Menu will appear.
2. Use the <▼▲> buttons to select "MANUAL GEOMETRY ALIGNMENT" and press <ENTER>.
3. The Manual Geometry Alignment Pattern will appear. See below.
4. Prepare for the alignment by resetting the geometry data. Press <1> then <ENTER>. The previous menu will be displayed. Select "MANUAL GEOMETRY ALIGNMENT" and press <ENTER> again to proceed.

Note 1: Upon entering the Manual Geometry Alignment Mode the first time, the geometry may appear distorted because all factory geometry correction is automatically disabled. Press <EXIT> to quit and re-enable the factory geometry correction. Pressing <1> <ENTER> and <EXIT> will cause the TV to operate with out factory geometry correction (distortion will be present).

Note 2: At any time the original factory geometry data can be restored from backup:

- From the Data Transfer & Geometry Menu <MENU><2-4-5-7><0>, select "RESTORE GEOMETRY DATA FROM BACKUP" <ENTER>.

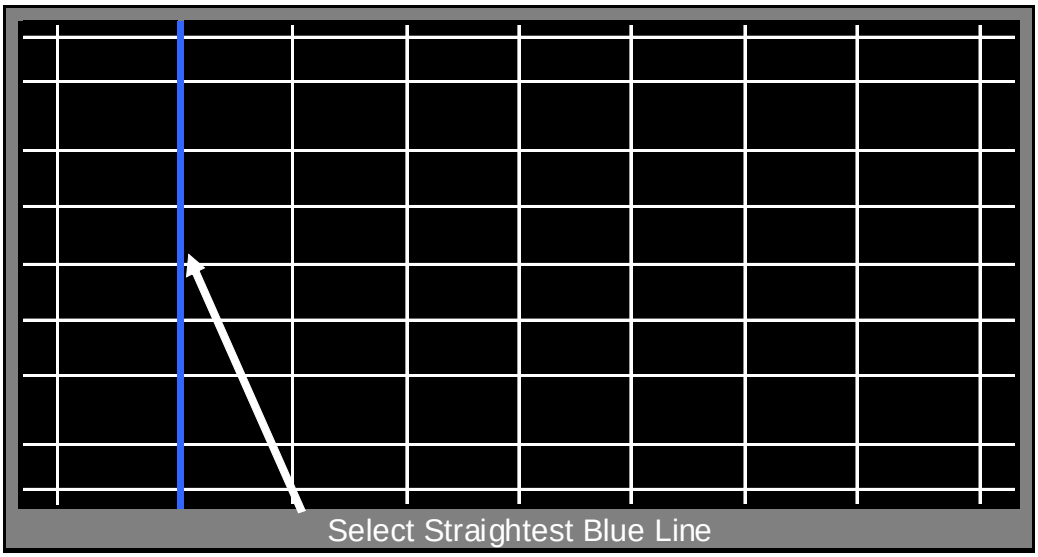


Phase 1 - 20 Point Geometry Alignment

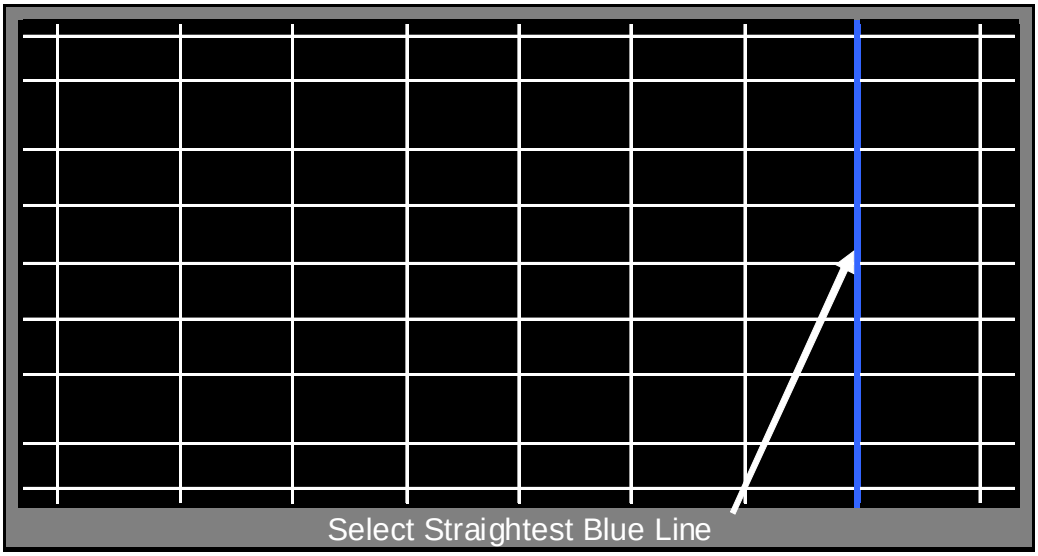
1. 20 Adjustment Points are indicated by white dots around the edge of the raster. The adjustment position is indicated by a **+** cursor.
2. Starting from the upper left corner, use the <◀▼▲▶> buttons to align the **+** at each point in a straight line, flush with the bezel as a reference. See example above.
   Note: Only the cursor will move. The Geometry Pattern will not change.
3. After adjusting each point, use the <▶▶> button to shift the cursor to the next point clockwise and repeat until all 20 points have been adjusted.
4. After all 20 points are adjusted and the cursor is returned to the original starting point, press <ENTER>. Correction will be automatically calculated and saved and the Manual Geometry Alignment will be terminated.
5. Press <ENTER> to re-activate the Manual Geometry Alignment. The geometry pattern will appear with the corrections applied.

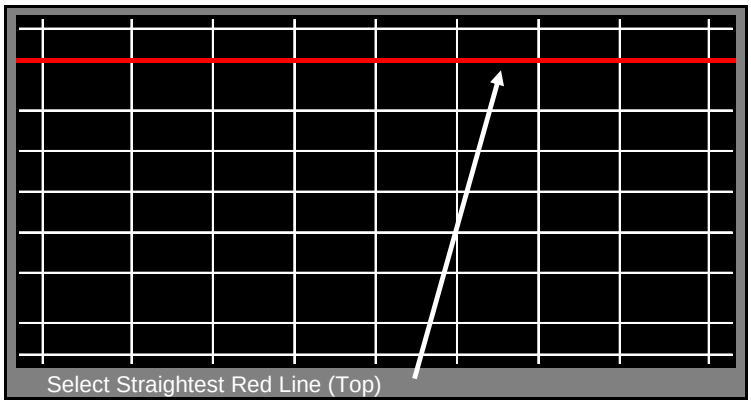
Phase 2 - 4:3 and 16:9 Alignment

1. With the Manual Geometry Alignment activated, press <VIDEO> to enter the Left 4:3 Alignment Mode. The pattern below will be displayed.
   Note: Pressing <VIDEO> will toggle between the Left 4:3, Right 4:3, Top 16:9, Bottom 16:9 and the 20 Point Geometry Alignment modes.
2. In the Left 4:3 Alignment Mode, pressing <◀◀> or <▶▶> will cause the geometry pattern to be displayed with 12 preset amounts of correction. Toggle through them until you find the one with the straightest Blue 4:3 Line. It may help to count the patterns as you cycle through them. When you find the pattern with the straightest Blue 4:3 Line, press <VIDEO>. The pattern will be displayed with a Right Blue 4:3 Line.

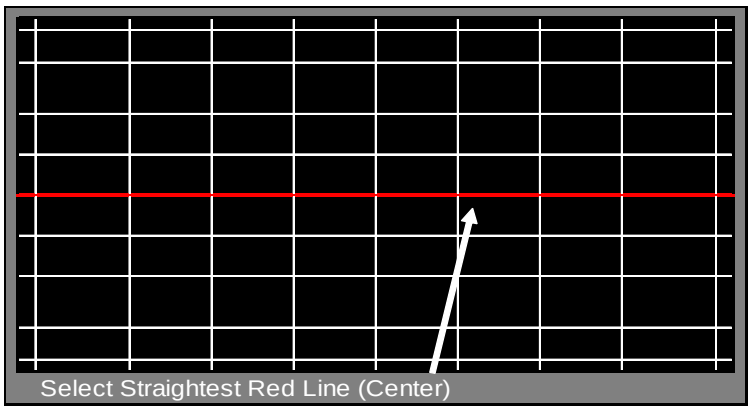


3. In the Right 4:3 Alignment Mode, pressing <◀◀> or <▶▶> will cause the geometry pattern to be displayed with 12 preset amounts of correction. Toggle through them until you find the one with the straightest Blue 4:3 Line. Again, count the patterns as you cycle through them. When you find the pattern with the straightest line, press <VIDEO>. The Top Red Line will be displayed in the pattern.

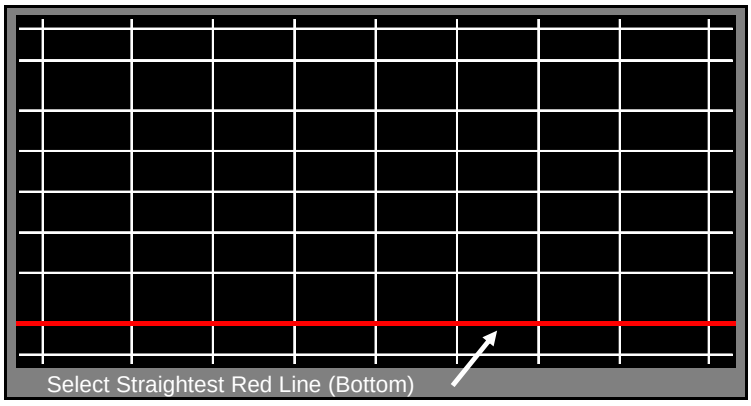




4. In the Top 16:9 Alignment Mode, pressing <◀◀> or <▶▶> will cause the geometry pattern to be displayed with 30 different preset amounts of correction to the Top Red Line. Toggle through them until you find the one with the straightest Red Line. Again, count the patterns as you cycle through them. When you find the pattern with the straightest line, press <VIDEO>. The Center Red Line will be displayed in the pattern.



5. In the Center 16:9 Alignment Mode, pressing <◀◀> or <▶▶> will cause the geometry pattern to be displayed with 30 different preset amounts of correction to the Center Red Line. Toggle through them until you find the one with the straightest Red Line. Again, count the patterns as you cycle through them. When you find the pattern with the straightest line, press <VIDEO>. The Bottom Red Line will be displayed in the pattern.



6. In the Bottom 16:9 Alignment Mode, pressing <◀◀> or <▶▶> will cause the geometry pattern to be displayed with 30 different preset amounts of correction to the Bottom Red Line. Toggle through them until you find the one with the straightest Red Line. When you find the pattern with the straightest line, press <VIDEO>. Press <ENTER> then <EXIT> to exit and save the 4:3 and 16:9 data.
7. Select the Geometry Test Pattern (See HVPOS). If Geometry is acceptable, press <EXIT> to quit.

Data Transfer

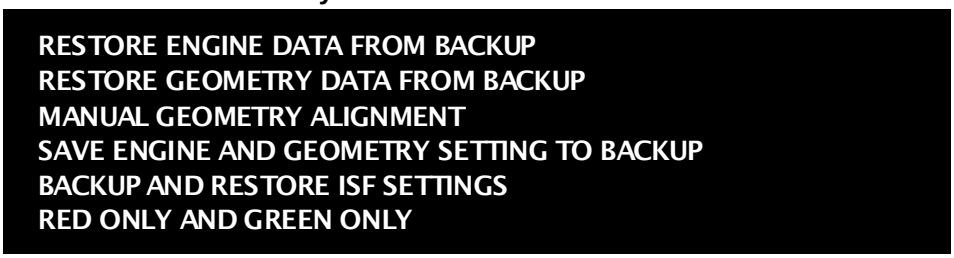
Service Data is duplicated and stored in separate EEPROMs in two locations.

- PWB-MAIN - Working data for TV operation
- OPTICAL ENGINE - Backup data

Procedure:

1. Enter the Service Mode <MENU><2-4-5-7> Select the Data Transfer & Geometry Menu <0>

Data Transfer & Geometry Menu <MENU><2-4-5-7><0>



Warning - Only use "SAVE ENGINE AND GEOMETRY SETTING TO BACKUP" after Optical Engine replacement.

Note: Besides *MANUAL GEOMETRY ALIGNMENT*, six data transfer choices are listed on screen.

- *RESTORE ENGINE DATA FROM BACKUP* - copies backup factory adjustments HVPOS, White Balance and Index Delay from the Optical Engine to the PWB-MAIN.
- *RESTORE GEOMETRY DATA FROM BACKUP* - copies backup factory Geometry Alignment data from the Optical Engine to the PWB-MAIN.
- *SAVE ENGINE AND GEOMETRY SETTING TO BACKUP* - copies all working data from the PWB-MAIN into backup memory on the Optical Engine.
- *BACKUP AND RESTORE ISF SETTINGS* - allows the ISF (ADV) video settings to be backed up and restored using an external USB memory device.
- *RED ONLY AND GREEN ONLY* - displays the video in red or green only.

2. Use the <▼▲> buttons to select the item and press <ENTER>.
3. Follow on-screen instructions if given.
4. Press <EXIT> to quit.

After Optical Engine Replacement:

1. *Save Engine and Geometry Setting to Backup*

After Electrical Chassis (PWB-MAIN) Replacement:

1. *Restore Engine Data From Backup*
2. *Restore Geometry Data From Backup.*
3. *Restore ISF Settings From Backup* (Only if backup USB memory device is available).

MECHANICAL ADJUSTMENTS

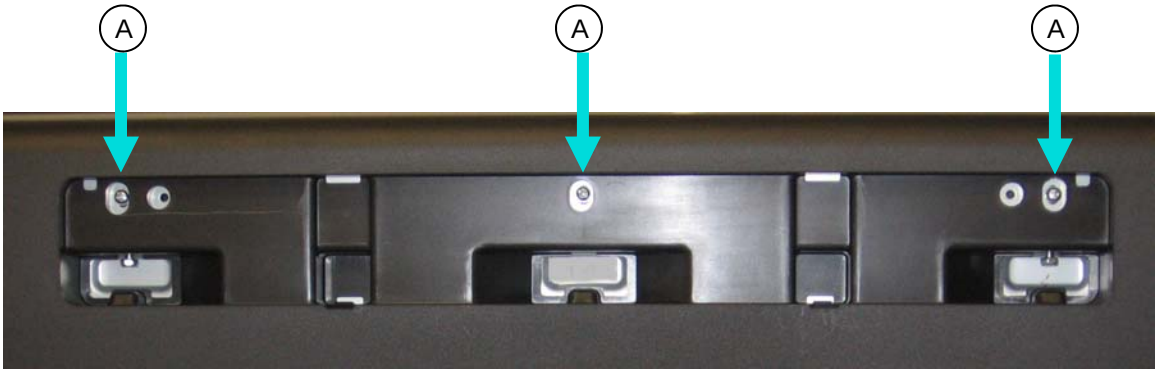
Top Mirror Adjustment

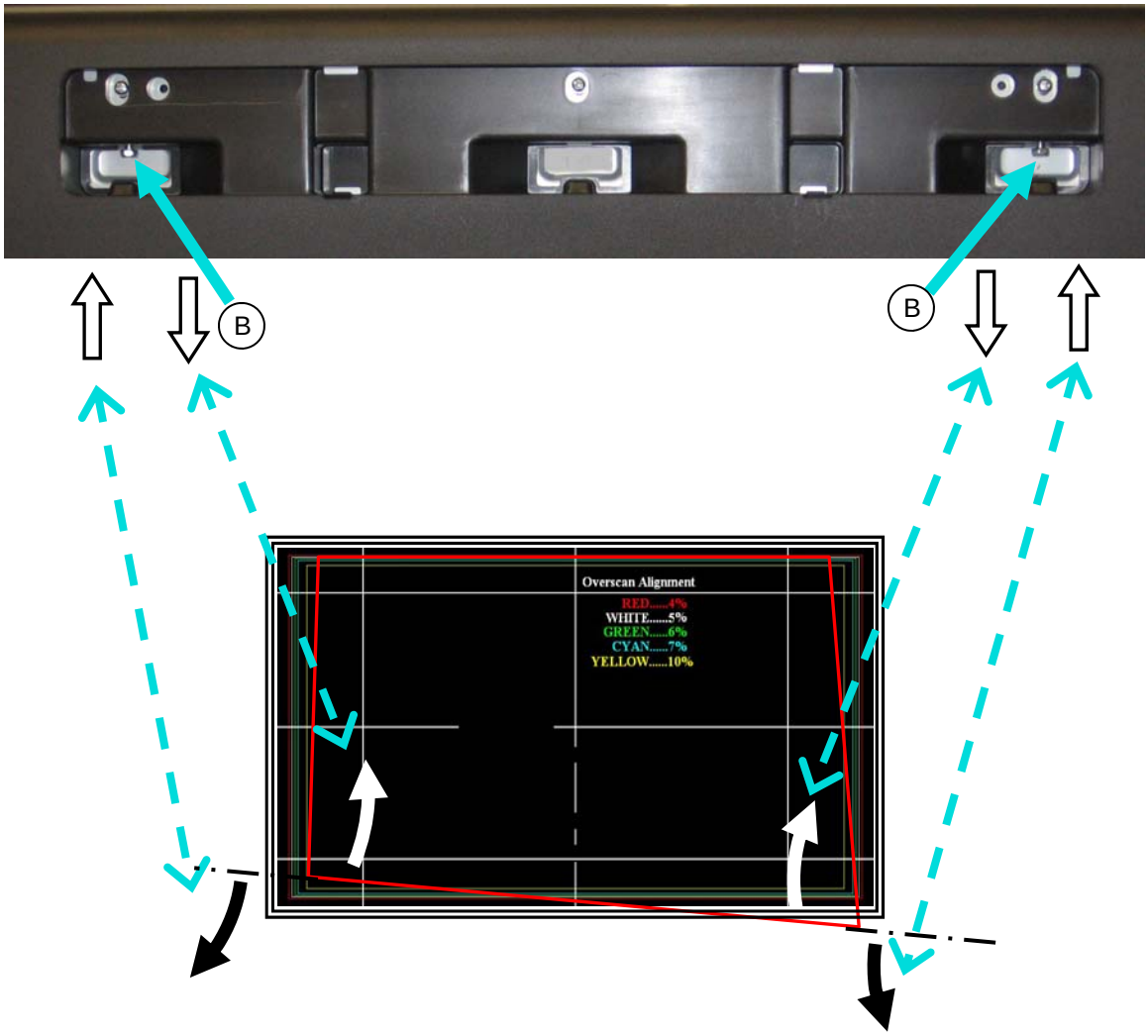
Note: After Top Mirror Adjustment, perform the Manual Geometry Alignment procedure.

1. Activate the Service Menu <MENU><2-4-5-7>. From the Service Menu, press PLAY <▷> to activate the internal test patterns (no indication will be given), then use <◀◀> or <▶▶> to select the Geometry Test Pattern (see Horizontal and Vertical Position Adjustment).
2. Press the <0> button. The Data Selection Menu will appear.
3. Use the <▼▲> buttons to select "MANUAL GEOMETRY ALIGNMENT" and press <ENTER>. The Manual Geometry Alignment Pattern will appear.
4. Perform a reset - Press <1> <ENTER>. This will null all correction data, exit the Manual Geometry Alignment and return to the Geometry Test Pattern. Use the Geometry Test Pattern for the remainder of the Top Mirror Adjustment procedure.
5. To remove the Top Mirror Adjustment Cover from the rear of the TV, gently release the points indicated.

Release Points for
Top Mirror Adjustment Cover

6. Loosen the 3 locking screws (A).





7. Rotate the Mirror Adjustment Screws (B) in the direction indicated so the geometry is as square as possible in relation to the bottom edge of the bezel.
8. After adjustment, tighten the 3 Mirror Locking Screws and replace the Top Mirror Adjustment Cover.
9. Perform the Manual Geometry Alignment procedure.

Down to 1 TROUBLESHOOTING

The Down to 1 strategy is to have set troubleshooting methods that will best ensure an accurate diagnosis as quickly as possible. The following troubleshooting methods will help the service technician gain the Down to 1 advantage.

USER LEVEL RESETS AND INITIALIZATION

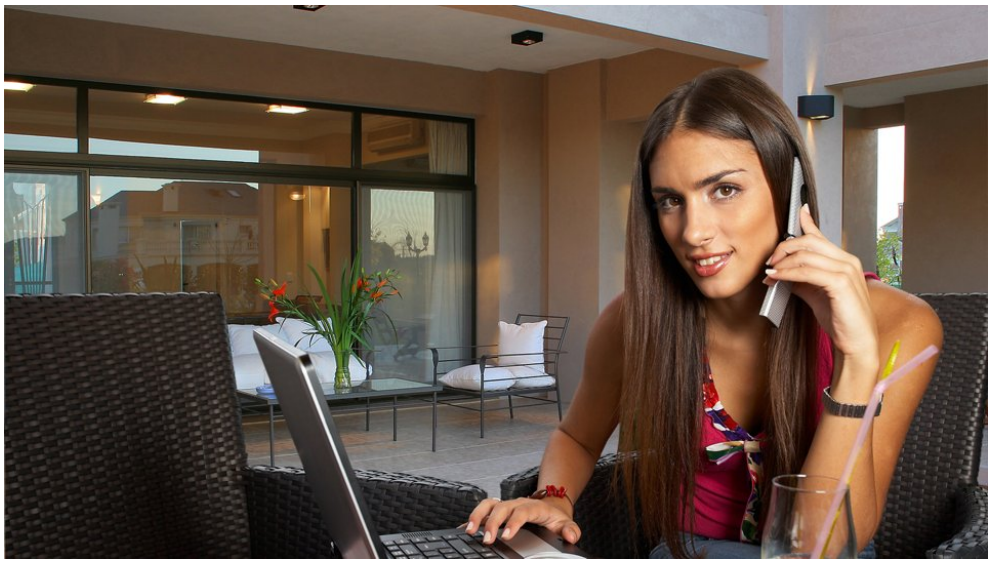
As in previous models, many symptoms (customer generated or intermittent) may be resolved by performing a reset or initialization. Many of these functions are available to the customer. Asking the user to perform these resets may eliminate the need for a service call. If the exact nature of a symptom is unknown, it's best to have the customer perform the procedures in a specific order to minimize the number of settings that will be affected. The procedures, order and method are:

1. **System Reset** - Press and hold the <POWER> button for 8 seconds. Or remove and re-apply power.
2. **A/V Reset by Input** - Select the Input to be reset. Press remote <MENU> Select "Audio/Video" Select "AV Reset " <ENTER>
3. **A/V Reset all Inputs** - Press side panel <INPUT> and <VOL ◀> buttons at the same time and hold for 10 seconds.
4. **Initialize (User Level)** - Press remote <MENU><1-2-3><ENTER>.

If a user level reset does not correct the problem, it may be necessary to perform a Service Level Initialization from the Option Menu as part of a service call.

PICTURE PERFORMANCE COMPLAINTS

Like many Mitsubishi models, the V46 chassis has a "Test Picture" that can be accessed from the customer menu. Press <MENU> select "Global" then "Test Picture." A photograph of the "Lady" will be displayed. If a TV picture performance problem exists, it should be evident. Otherwise, the test picture will have demonstrated that the set is capable of a quality display and the problem is likely due to a signal source or other external cause.



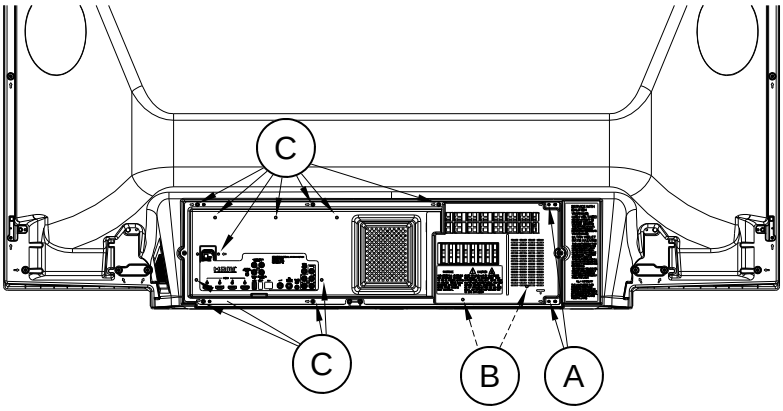
Chapter 2
DLP® HOME CINEMA

DLP Home Cinema

SIZE	V45C	V45	V45CA	V45+	V45++	V45CB
73”	WD-73C11	WD-73640	WD-73CA1	WD-73740	WD-73840	WD-82CB1
82”				WD-82740	WD-82840	
92”					WD-92840	

DISASSEMBLY & PARTS REPLACEMENT

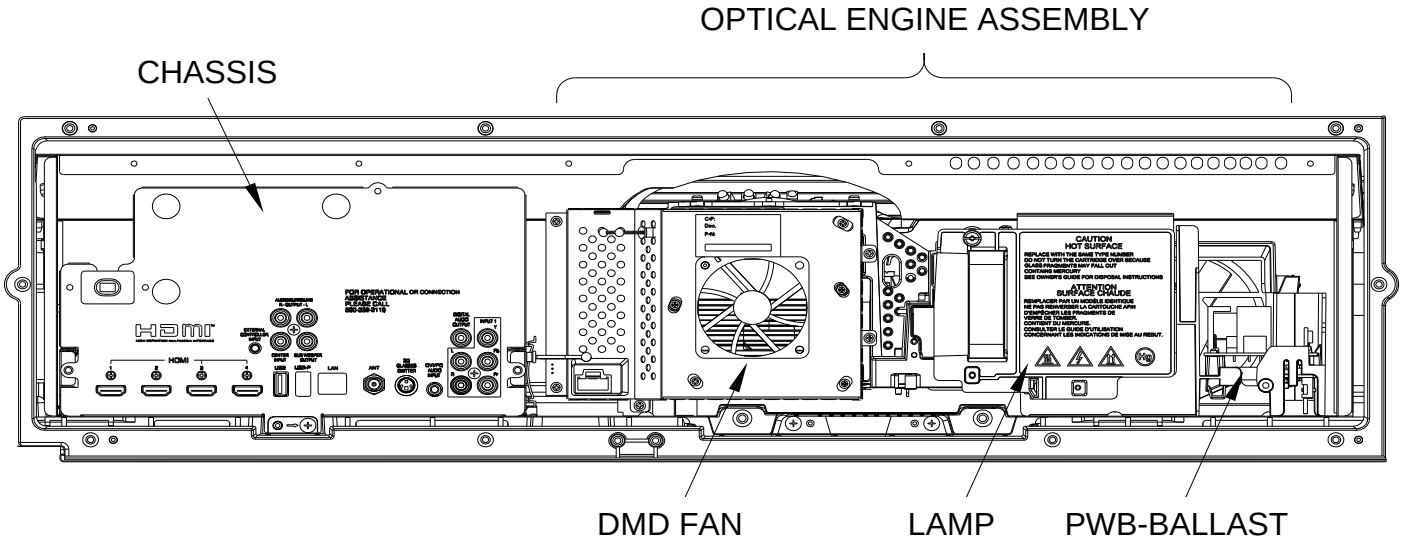
BACK COVER REMOVAL



Back Cover Removal

1. Remove screws (A) and remove the Lamp Cover.
2. Remove screws (B) from behind the Lamp Cover.
3. Remove Screws (C).
4. Remove the back cover from the TV.

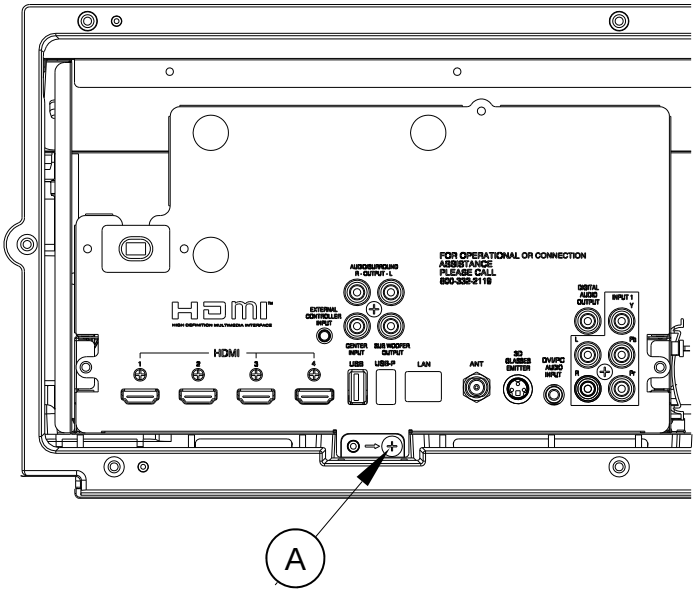
ASSEMBLY LOCATIONS



CHASSIS - REMOVAL & DISASSEMBLY

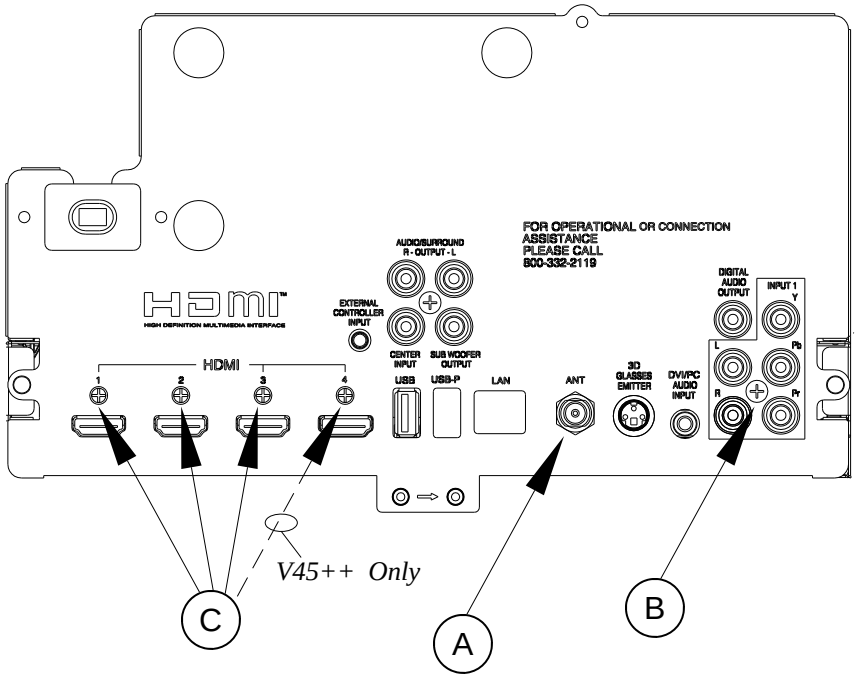
Chassis Removal

1. Remove screws (A).
2. Slide the chassis back and disconnect all cables.
3. Remove the chassis from the cabinet.



Rear Terminal Cover Removal (To Replace PWB-MAIN)

1. Remove nut (A) from the ANT input.
2. Remove screws (B) and (C).
3. Disconnect the connectors to the PWB-SOUND (V45++).
4. Remove the Terminal Cover from the chassis.

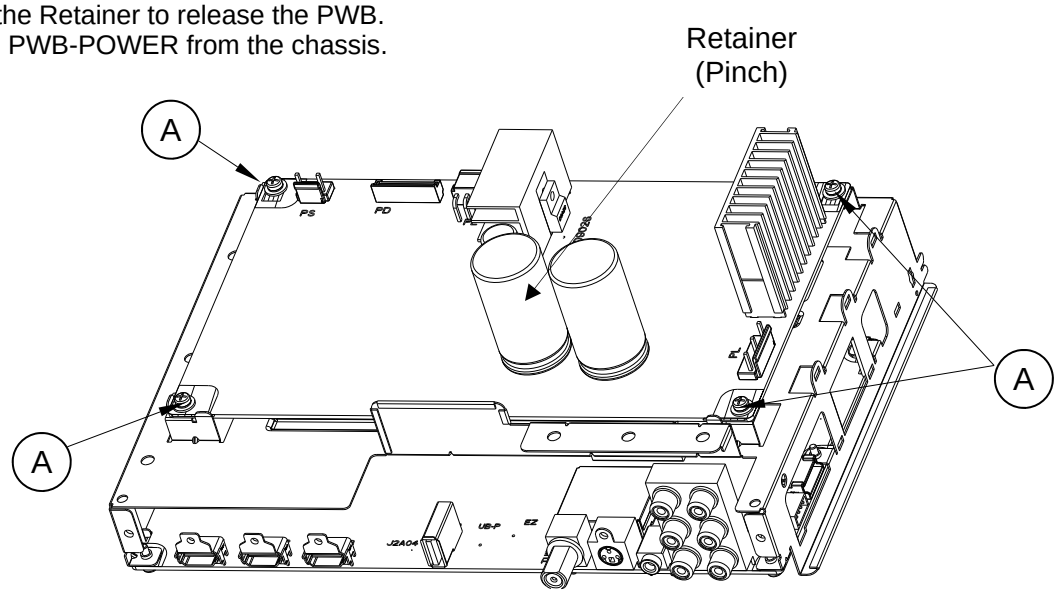


PWB-SOUND CONNECTORS (ON REAR)

V45++ Only

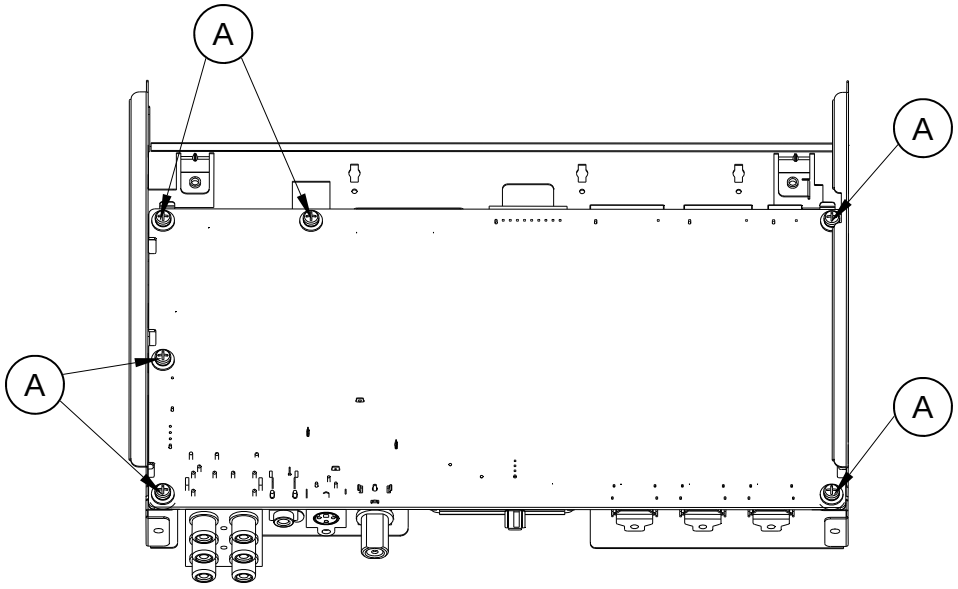
PWB-POWER Removal

1. Disconnect all cables from the PWB-POWER.
2. Remove screws (A).
3. Pinch the Retainer to release the PWB.
4. Lift the PWB-POWER from the chassis.



PWB-MAIN Removal

1. Disconnect all cables to PWB-MAIN.
2. Remove screws (A) from the bottom of the PWB-MAIN.
3. Lift the PWB-MAIN from the chassis.



After PWB-MAIN Replacement

See Data Transfer in Service Procedures section.

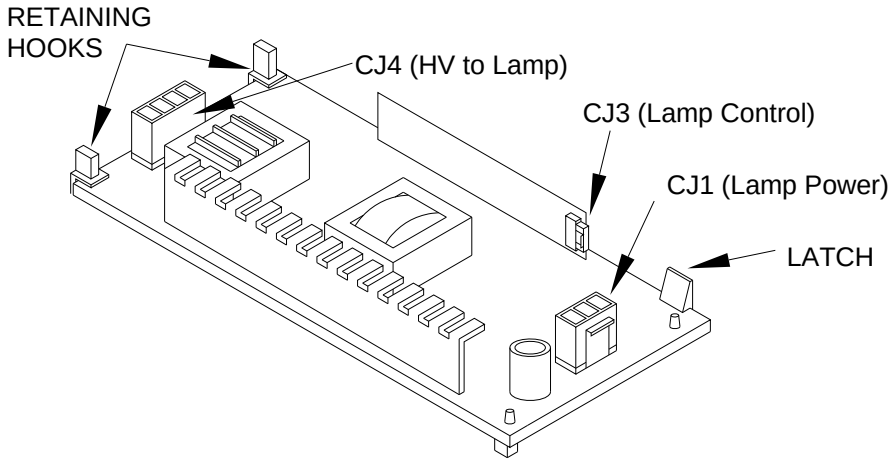
1. **V45C, V45 & V45CA:** Perform “Restore Engine Data From Backup.”
2. **V45+, V45++ & V45CB:** Perform “Restore Engine Data From Backup” and “Restore Geometry Data From Backup.”

V45+, V45++, V45CB IMPORTANT REPLACEMENT NOTE: If the customer has subscribed to VUDU (Internet program provider), the customer must be instructed to contact VUDU to re-activate their account after the replacement PWB has been installed. The original PWB **cannot** be installed in another TV. It must be returned to Mitsubishi per policy.

PWB-BALLAST REMOVAL

Note: To remove the PWB-BALLAST, it is not necessary to remove the Engine or Lamp Cartridge.

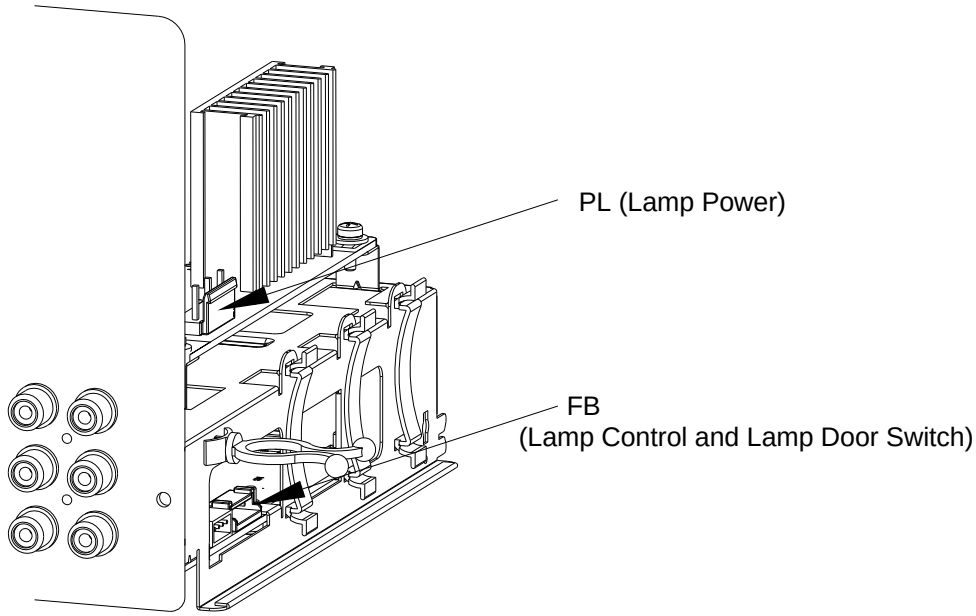
1. Release the Latch to lift the PWB-BALLAST up from the mounting bracket.
2. Slide the PWB-BALLAST out of the Engine Assembly.
3. Disconnect the electrical locking connectors indicated.
4. To reinstall, first connect the connectors. Then slide the PWB under the Retaining Hooks. Then press the rear edge of the PWB down onto the guide pins to engage the latch.



OPTICAL ENGINE ASSEMBLY - REMOVAL & DISASSEMBLY

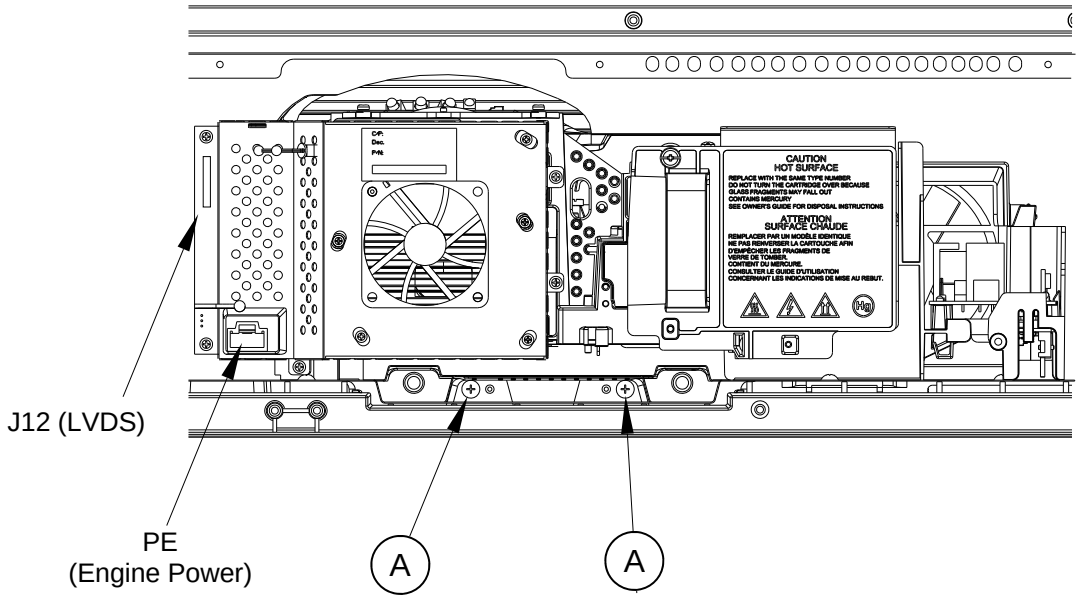
OPTICAL ENGINE ASSEMBLY REMOVAL

1. Disconnect the PL connector from the side of the PWB-POWER.
2. Disconnect the FB connector from the side of the PWB-MAIN.
3. Loosen the wiring harnesses from the looms.



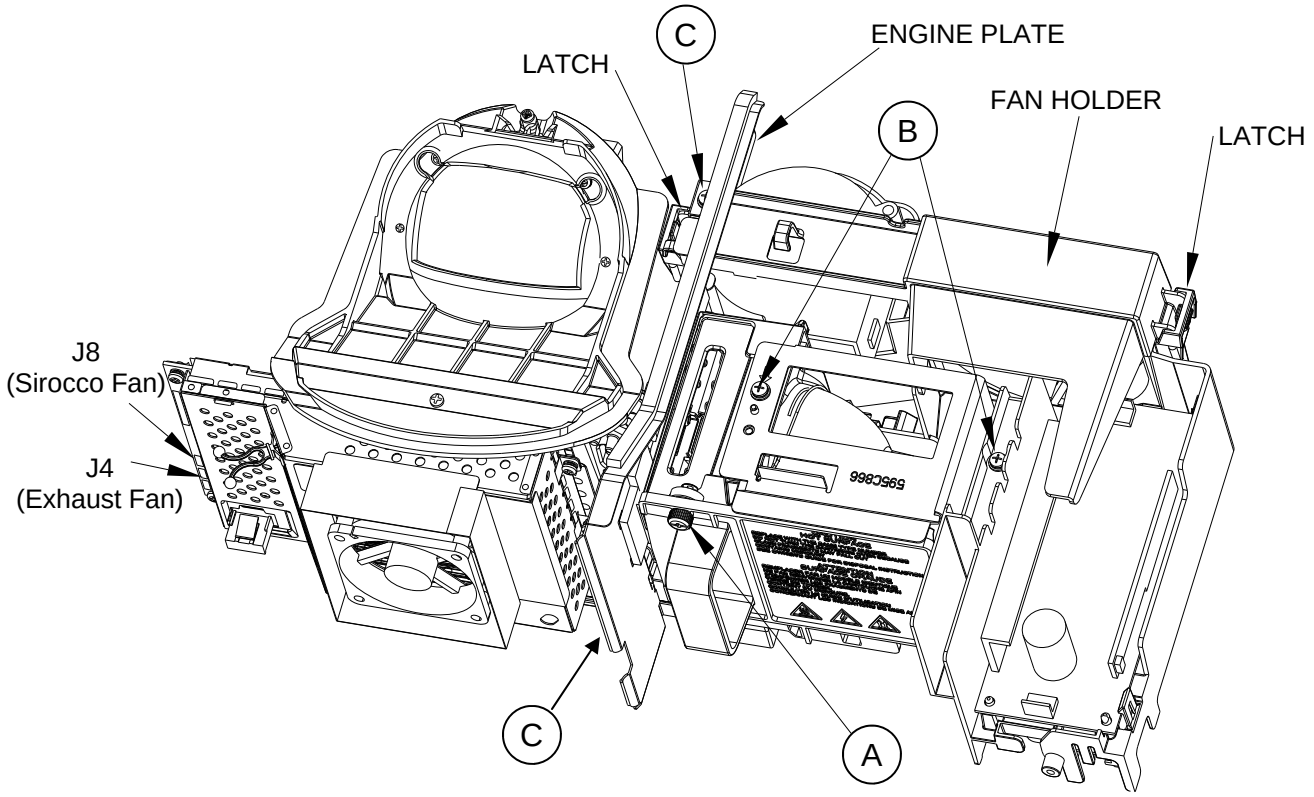
OPTICAL ENGINE ASSEMBLY REMOVAL (Continued)

1. Disconnect the PE and J12 connectors from the Engine.
2. Remove screws (A).
3. Slide the Engine Assembly back out of the cabinet.



OPTICAL ENGINE ASSEMBLY - Disassembly

1. Loosen screw (A) to remove the Lamp Cartridge.
2. Remove screws (B) and the lamp top cover.
3. Remove screws (C) and the Engine Plate
4. Disconnect the Exhaust and Sirocco Fan Connectors (J4 and J8) from the back of the Engine and loosen the wiring harnesses from the looms.
5. Release the Latches to remove the Fan Holder.

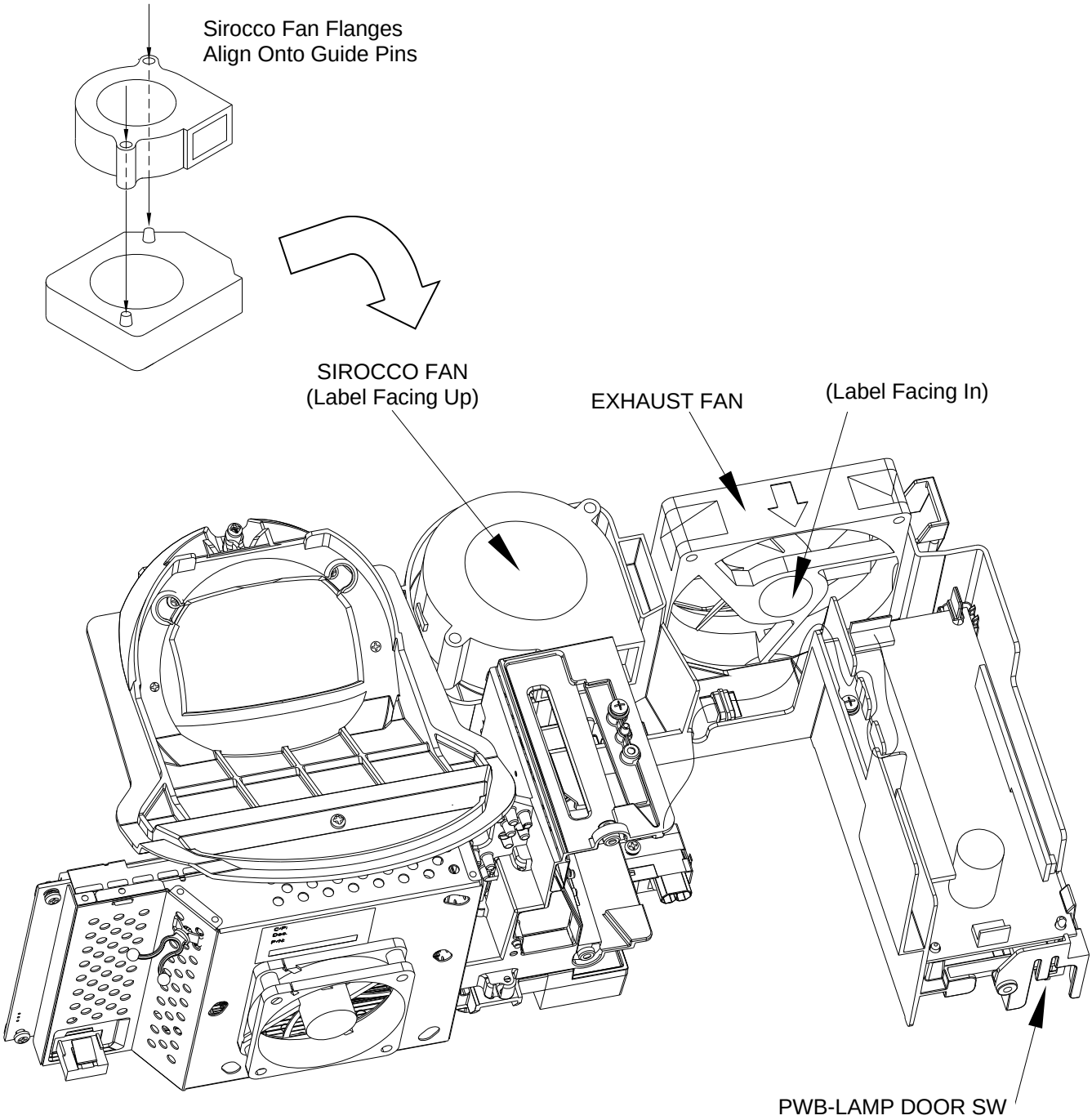


Duct Interior Components

Duct Interior Components are shown below.

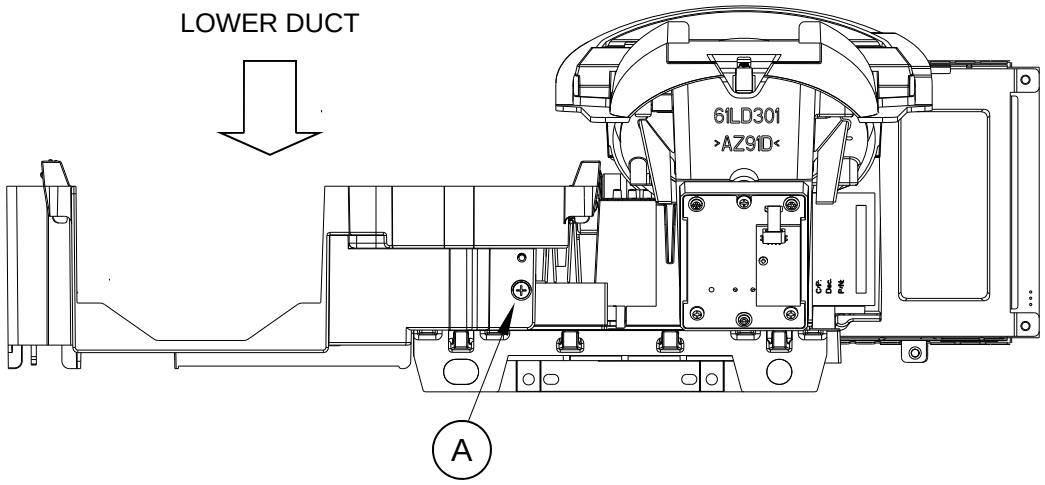
Notes:

- When replacing the Optical Engine, transfer all Duct and Duct Interior Components from the old Engine to the new Engine.
- The Exhaust Fan must be installed so the Label is facing inside the Duct.
- The Sirocco Fan must be installed so the Label is facing up with the Flanges aligned onto the Guide Pins.



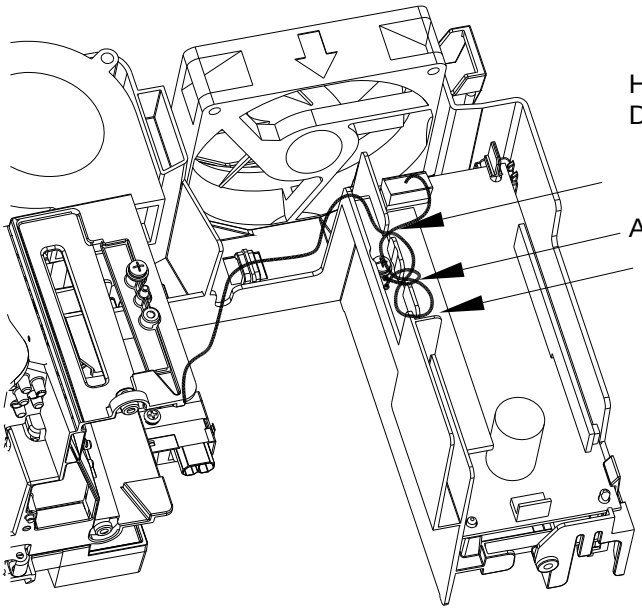
Lower Duct Removal

1. Remove the Lamp Cartridge, Top Cover, Exhaust Fan and Sirocco Fan.
2. Disconnect the HV Lamp Wiring from the Ballast and loosen it from the guides.
3. Remove screw (A) on the rear of the lower duct.
4. Carefully remove the Lower Duct from the Engine.



OPTICAL ENGINE REPLACEMENT

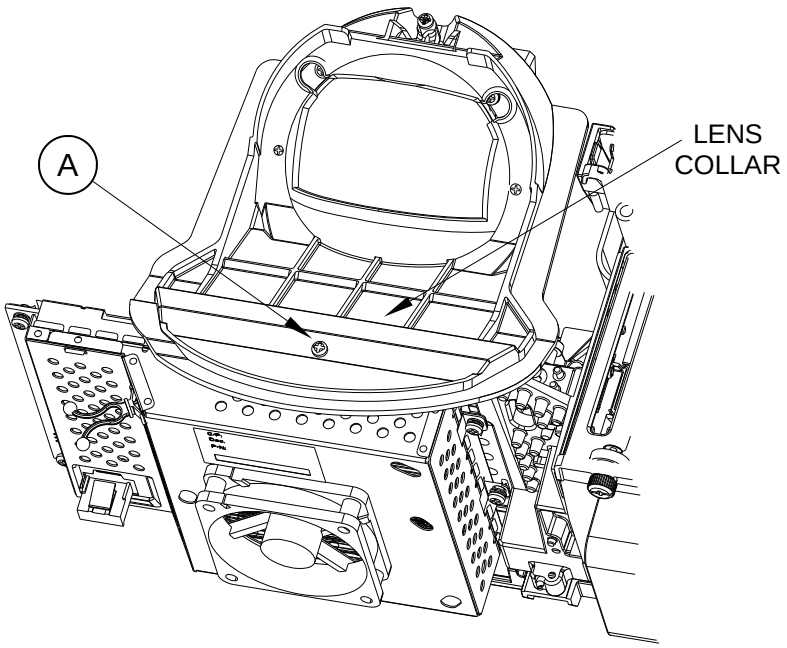
1. Install Lower Duct and components on the new Engine.
2. Connect the HV Lamp Wiring to the Ballast and dress the wiring through the guides as shown.
3. Remove the Protective Lens Cover from the face of the Lens and place it on the old Engine for return.
4. Install the Engine Assembly in the cabinet.
5. After a new Engine is installed, as necessary perform the Horizontal and Vertical Centering Adjustment and Manual Geometry Alignment as described in the Service Adjustments section of the Service Procedures.
6. Perform the following procedures as described in the Data Transfer section of the Service Procedures:
   - "Restore Index Delay"
   - "Save Engine and Geometry Setting to Backup"

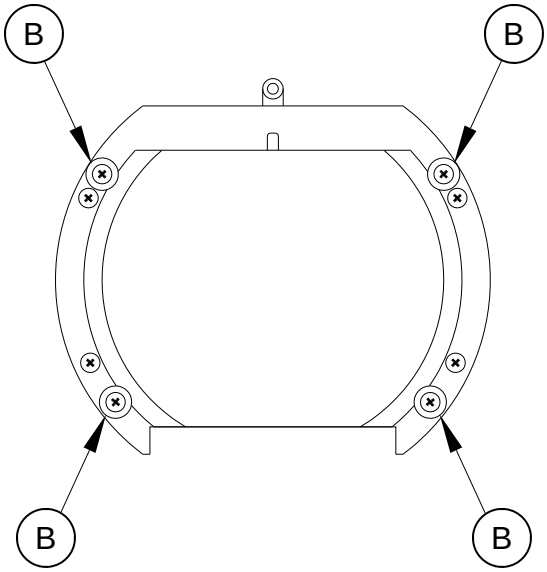


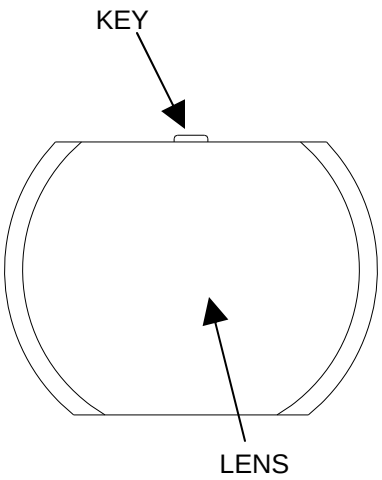
PROJECTION LENS REPLACEMENT

CAUTION: Any dust or fingerprints in the optics can cause abnormalities in the picture.
This procedure should be performed in a dust free environment.
Wear lint free cotton or rubber gloves while performing this procedure.

1. Remove Optical Engine Assembly.
2. Remove screw (A) and remove the Lens Collar.
3. Remove screws (B).
4. Lift out the Projection Lens.
5. Install the replacement lens so the key is oriented towards the top as shown.



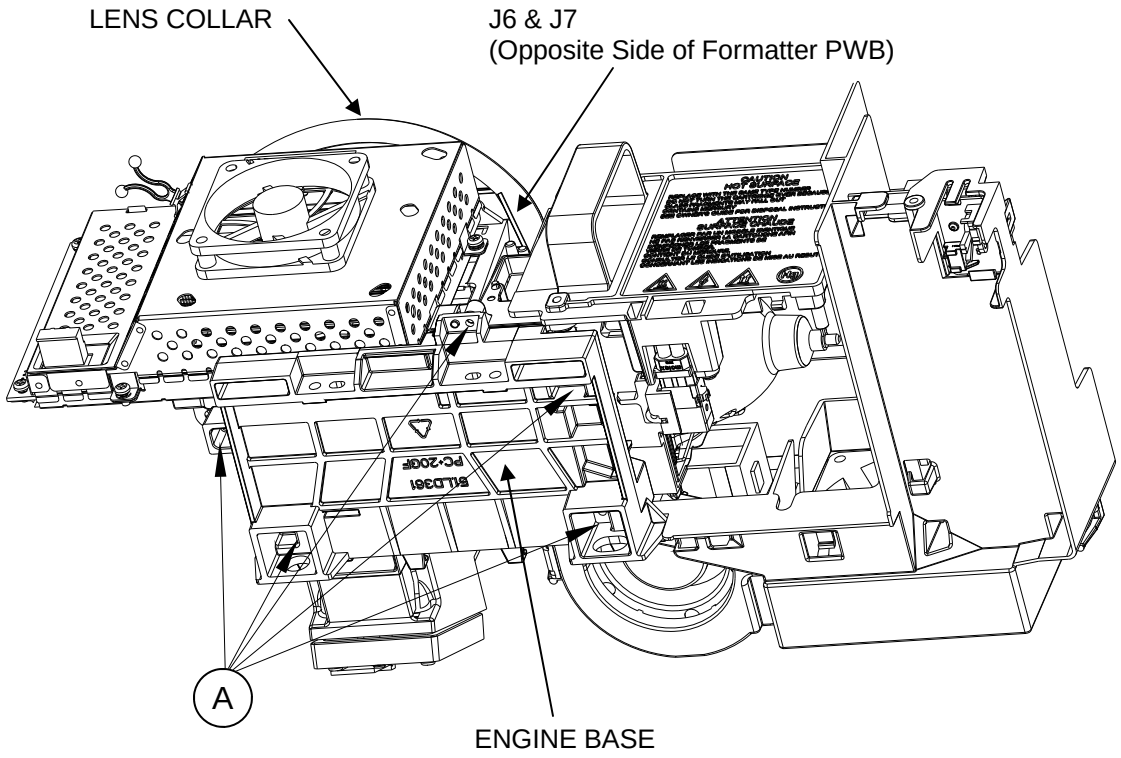




COLOR WHEEL REPLACEMENT

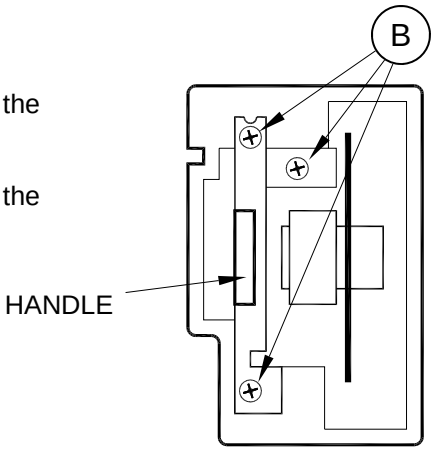
CAUTION: This procedure should be performed in a dust free environment.
Any dust entering into the optical compartment can cause abnormalities in the picture.

1. Remove the Optical Engine Assembly.
2. Remove the Lens Collar and cover the projection lens to protect it from scratches. See previous page.
3. Disconnect the 2 connectors, J6 & J7, from the front side of the Light Engine. Note the orientation of the ribbon cable for re-assembly (Silver Contacts towards the Lens).
4. Access the optical compartment by removing screws (A) and the Engine Base from the bottom of the Optical Engine



5. Remove the 3 screws (B) from the Color Wheel Assembly.
6. Use the metal Handle to lift the Color Wheel from the compartment.
7. For installation, reverse the procedure above.
   CAUTION: Avoid touching or scratching the Color Wheel.
8. After re-assembly, perform the Index Delay Adjustment described in the Service Adjustments section.

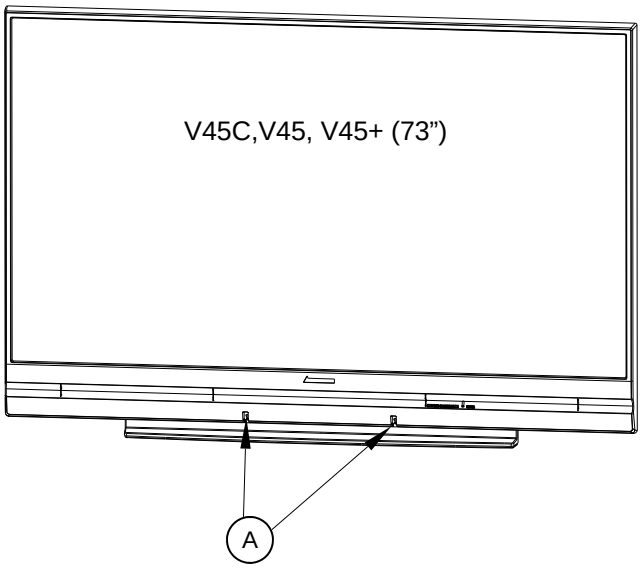
   IMPORTANT: If part return is required, prevent damage by packing the color wheel the same way the replacement part was sent to you.

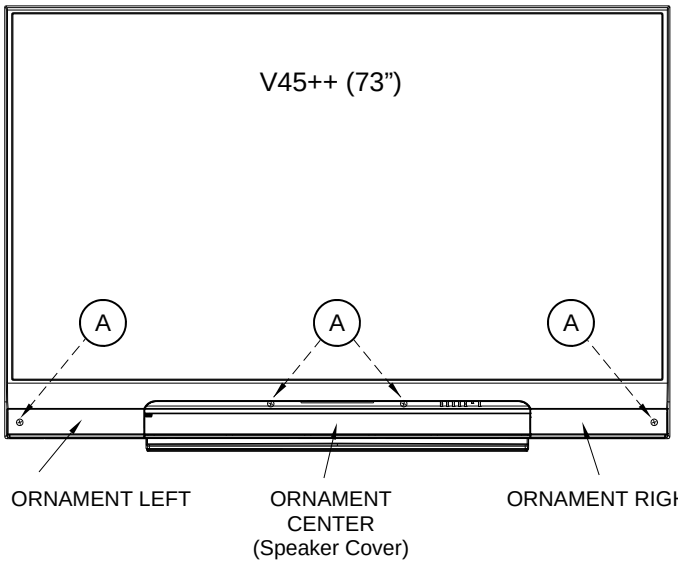


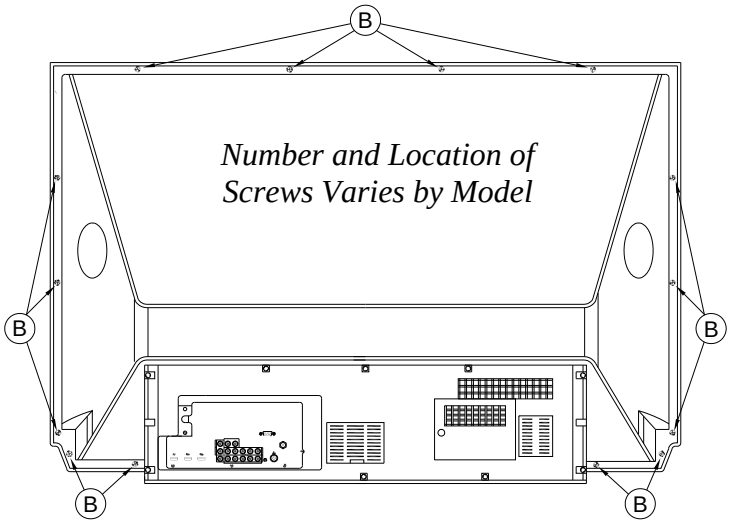
SCREEN REPLACEMENT 73” Models

Screen Assembly Removal and Replacement

1. **V45C, V45, V45+** - Remove the Screw Caps to access screws (A).
2. **V45++** - Remove the ORNAMENT LEFT & RIGHT first by pinching up and pulling away from the bottom. Then remove the ORNAMENT CENTER using the same method.
3. Remove screws (A).
4. Remove screws (B) around the rear edge of the screen bezel.
5. During re-assembly replace screws in their original locations.







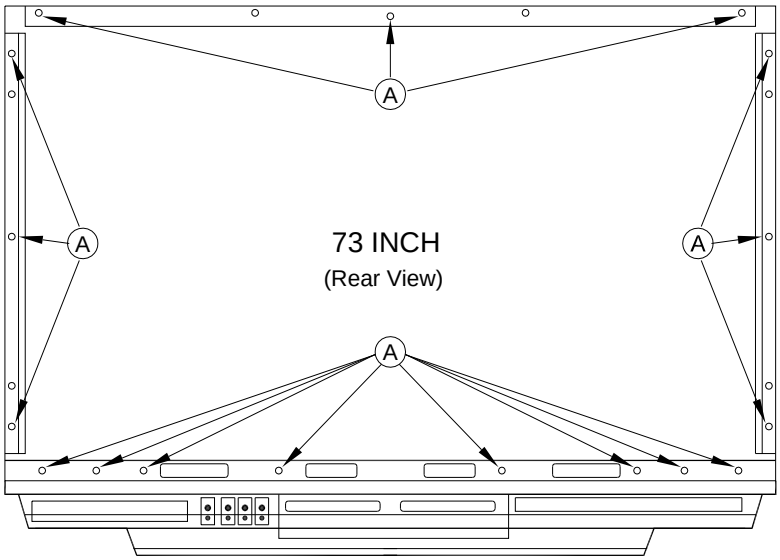
SCREEN REPLACEMENT 73” Models (continued)

Screen Removal From the Bezel-Front

1) Remove screws (A) and remove the top, bottom and side rails.

NOTE: The number and location of screws vary by model.

2) Lift the Fresnel Lens and Lenticular screen from the Bezel-Front.
3) During re-assembly replace screws in their original locations.



Example Diagrams. The number and location of screws varies by model.

SCREEN REPLACEMENT 73” Models (continued)

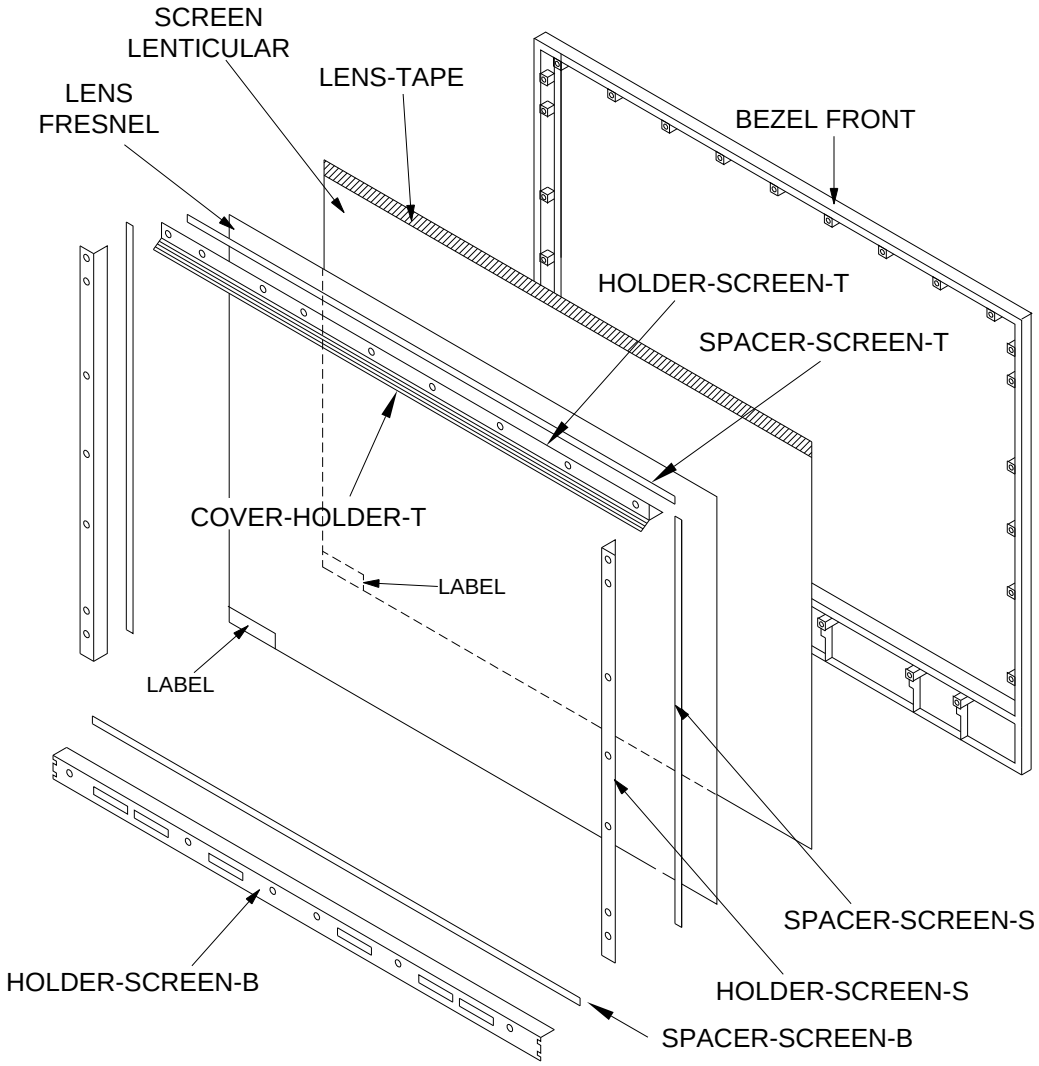
CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

Lenticular Screen and Fresnel Lens Removal

1. After removing the top, bottom and side HOLDER-SCREEN rails and their cushions from the Bezel, lift the screens as a single unit from the frame.
2. Separate the Lenticular Screen and Fresnel Lens.
   Note: When separating the Lenticular Screen from the Fresnel Lens, use caution while prying the Screen and Lens apart. Use a slot type screw driver, and remove the pressure sensitive double sided tape.

Lenticular Screen and Fresnel Lens Replacement

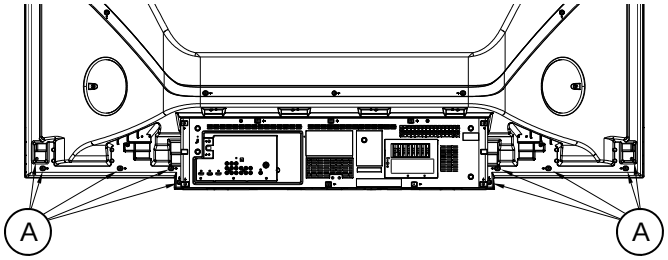
1. Apply LENS-TAPE along the rear top edge of the Lenticular Screen.
2. Place the Fresnel Lens on top of the Lenticular Screen, and apply pressure along the top edge.
3. Place the screens in the screen frame and reinstall the cushions, top, bottom and side rails.
   NOTE: The Lenticular Screen label must face the front and the Fresnel Lens label face the rear.
4. Reverse the Screen Removal Procedure and insert the screens in the Bezel.

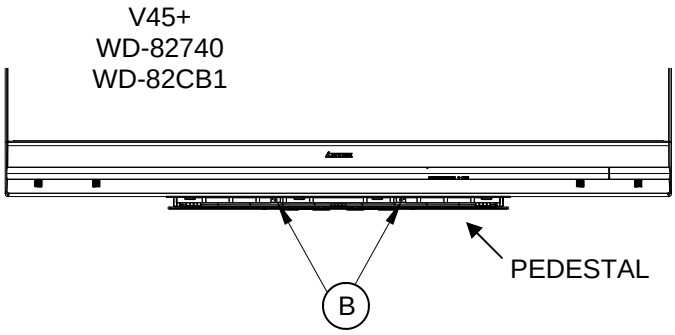


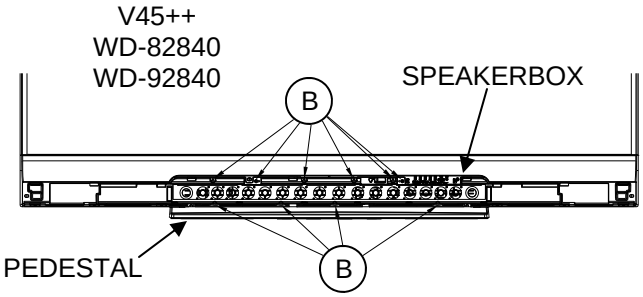
SCREEN REPLACEMENT 82” & 92” Models

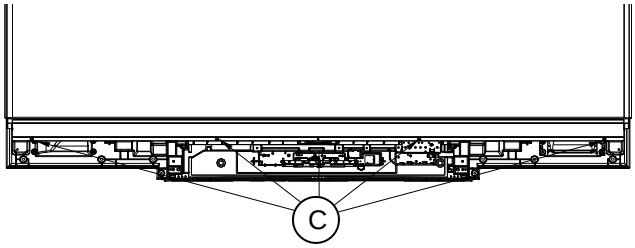
Screen Assembly Removal

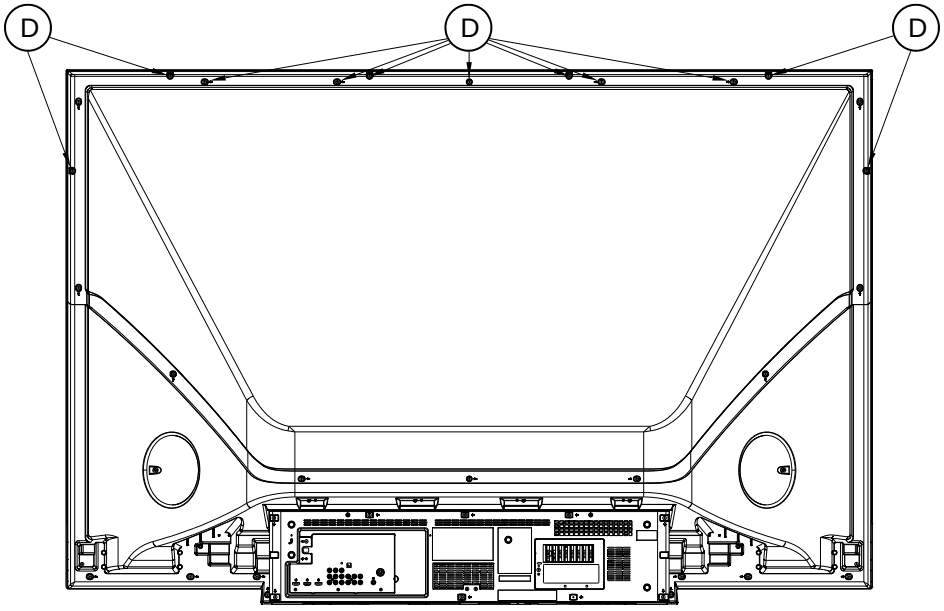
1. Remove screws (A) around the bottom rear edge.
2. (V45+) Remove the Pedestal cover and remove screws (B).
3. (V45++) Pull off ornamental Front Covers and Speaker Grill.
4. Remove the Speaker Box and Pedestal by removing screws (B).
5. Remove screws (C) from the bottom front of the screen assembly.
6. Remove screws (D) from the top rear edge of the cabinet.
   NOTE: Leave one screw secured at the top. Then support the assembly to prevent it from falling while removing the remaining screw.









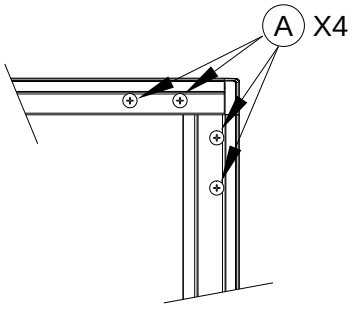


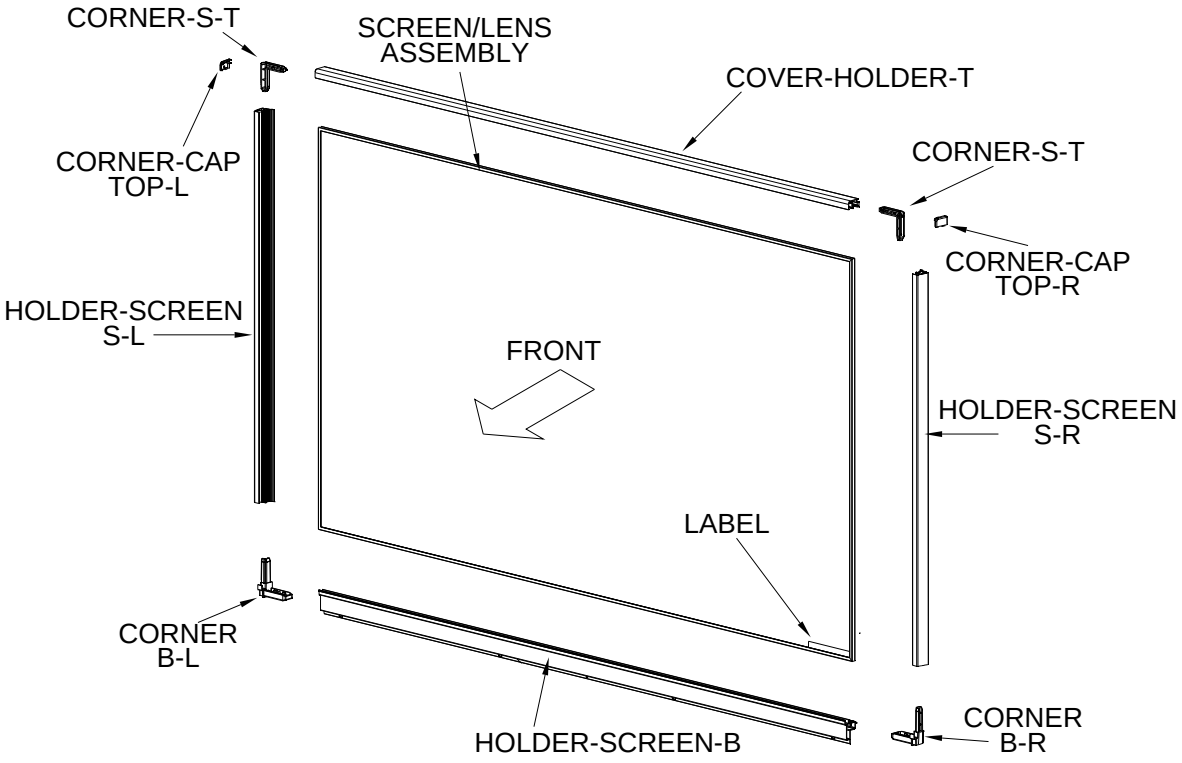
SCREEN REPLACEMENT 82” & 92” Models (continued)

CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

Lenticular Screen and Fresnel Lens Removal

1. Remove four screws (A) in all four corners of the Screen Bezel.
2. Remove the Screen Bezel components from the Screen/Lens Assembly.

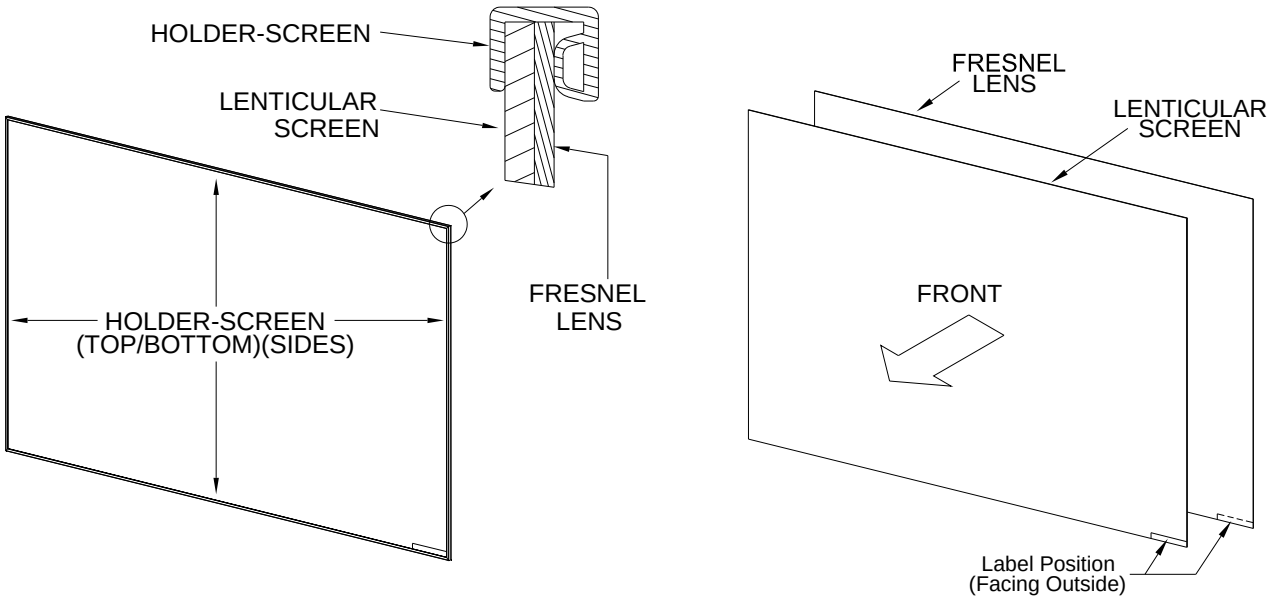




SCREEN REPLACEMENT 82” & 92” Models (continued)

Lenticular Screen and Fresnel Lens Disassembly

1. Remove the HOLDER-SCREEN from the top, bottom and sides.
2. Separate the Lenticular Screen and Fresnel Lens.



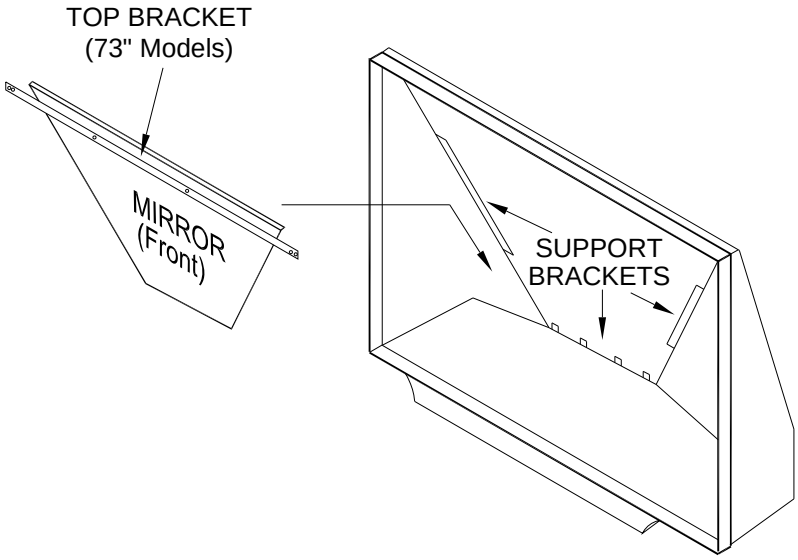
Lenticular Screen and Fresnel Lens Replacement

1. Place the Fresnel Lens on top of the Lenticular Screen with the labels facing outside as shown.
2. Install the HOLDER-SCREEN, top, bottom and sides as shown above.
3. Reverse the disassembly procedure to reassemble and install the screen frame assembly.
   NOTE: The Lenticular Screen must face the front and the Fresnel Lens must face the rear.

MIRROR REPLACEMENT

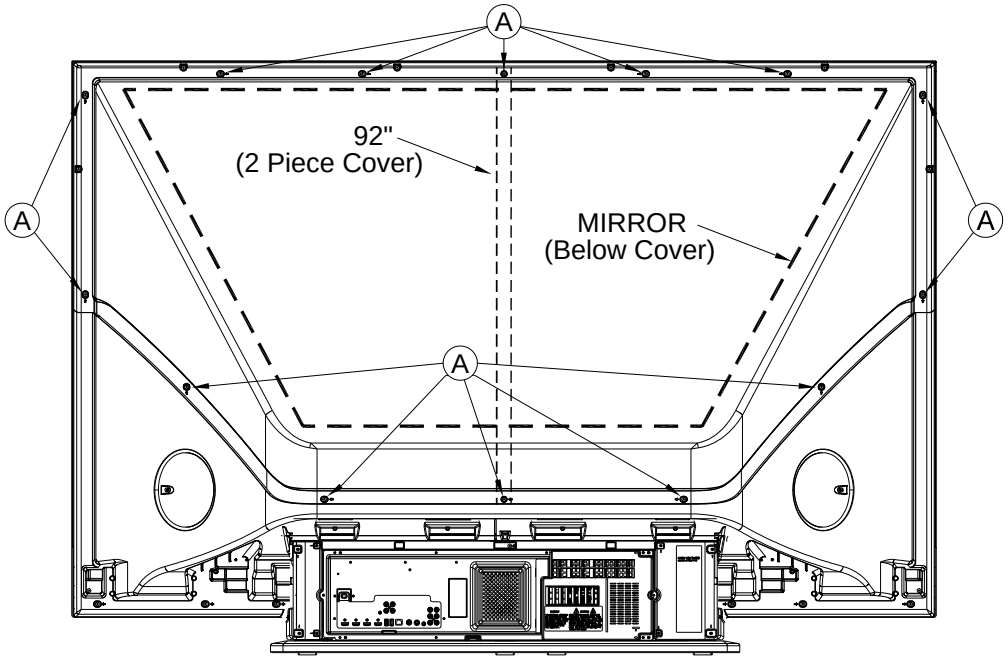
MIRROR REPLACEMENT - 73” Models

1. To access the Mirror for replacement, remove the Screen Assembly (See Screen Assembly Removal).
2. The Mirror slides down into the Left, Right and Bottom Brackets inside the cabinet.
3. Then a Top Bracket is installed.
4. See the Mirror Parts section for instructions on preparing a replacement mirror.



MIRROR REPLACEMENT - 82” & 92” Models

1. To access the Mirror for replacement, remove screws (A) and lift away the Mirror Cover(s). Note: 82” cover is 1 piece, 92” cover is 2 pieces.
2. The Mirror rests in place below the Mirror Cover.
3. See the Mirror Parts section for instructions on preparing a replacement mirror.



SERVICE PROCEDURES

REMOTE CONTROL

NOTE: The Remote Controls differ between Type 1 and the Type 2 models.

TYPE 1

V45C	V45	V45CA
WD-73C11	WD-73640	WD-73CA1

TYPE 2

V45+	V45++	V45CB
WD-73740	WD-73840	WD-82CB1
WD-82740	WD-82840	
	WD-92840	

REMOTE CONTROL USE FOR SERVICE

Many service functions and adjustments are accessed using the Remote Control. The Type 1 remote does not have buttons such as PLAY, FWD and RVW that are associated with operating connected devices. Service Procedures are described assuming a Type 1 remote is being used. However, if a Type 2 remote is being used, buttons can optionally be substituted as follows:

Type 1
V45C / V45 / V45CA

TYPE1	TYPE 2
<2>	<2> or <PLAY>
<CH-UP>	<CH-UP> or <FWD>
<CH-DOWN>	<CH-DOWN> or <RVW>

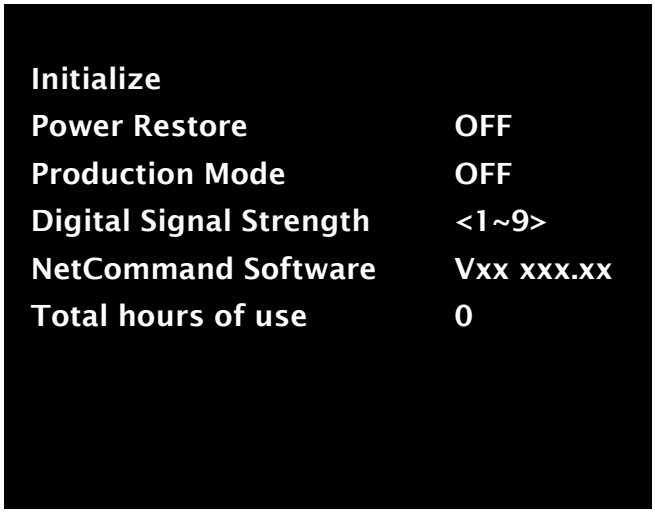
Type 2
V45+ / V45++ / V45CB

OPTION MENU

OPTION MENU

1. Press the <**MENU**> button on the remote control.
2. Press the buttons <**2-4-7-0**>. The screen will display the Option Menu.

Option Menu
<**MENU**><**2-4-7-0**>

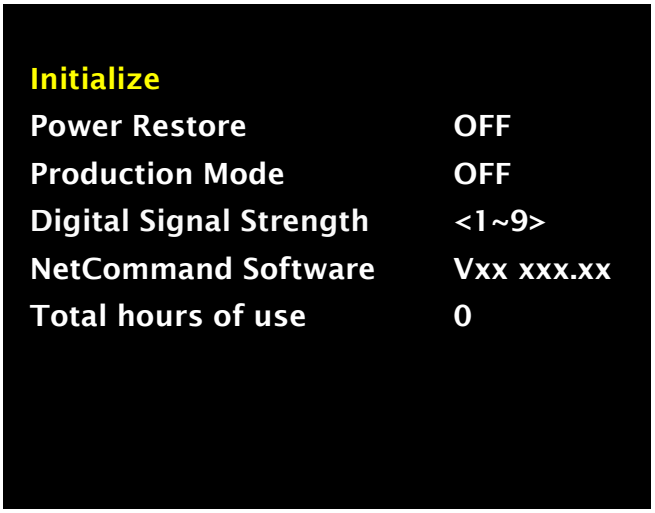


SERVICE LEVEL INITIALIZATION

Service Level Initialization is used to restore all customer menu, video and audio settings to the original factory default condition.

1. Enter the Option Menu <**MENU**><**2-4-7-0**>
2. Select “Initialize” and <**ENTER**>.

Option Menu
<**MENU**><**2-4-7-0**>



DIGITAL SIGNAL INFORMATION

Information on the currently selected digital channel can be displayed on screen.

1. Enter the Option / Service Menu <**MENU**><**2-4-7-0**>.

Option Menu

<**MENU**><**2-4-7-0**>

Initialize	
Power Restore	OFF
Production Mode	OFF
Digital Signal Strength	<1~9>
NetCommand Software	Vxx xxx.xx
Total hours of use	0

1. Select “Digital Signal Strength” and <**ENTER**>.

Digital Signal Information

“Digital Signal Strength” <**ENTER**>

	Tuner
Frequency(MHz)	749
Signal Level	<1~9>
Modulation	8VSB Air
Carrier Lock	Locked
SNR	29.09
Correctable errors	0
Un Correctable errors	0

SERVICE ADJUSTMENTS

Service Adjustments include Adjustment Procedures and Data Transfer Functions.

Electrical Adjustments (there are no mechanical adjustments)

- Horizontal and Vertical Centering Adjustment
- Index Delay Adjustment
- Geometry Alignment
- Data Transfer Functions

Test Equipment and Test Patterns

- Remote Control
- Internally generated Test Patterns
- No external test equipment or pattern generators are required.

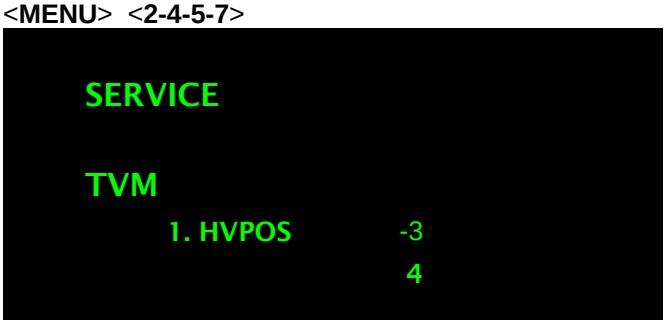
SERVICE MENU

The Service Menu is used for all service adjustments.
Service adjustments can only be performed using the remote control.

1. Activating the Service Menu

1. Press the <**MENU**> button on a remote control. (The Customer Menu will appear.)
2. Press the buttons <**2-4-5-7**>. (The Service Menu will appear.)

Service Menu
<**MENU**> <**2-4-5-7**>



2. Test Pattern Activation

When in the Service Menu, press the <**2**> or <▷> key on the remote to activate the internal test patterns (no indication will be displayed initially). Use <**CH-UP/CH-DOWN**> or <◀◀ / ▶▶> to toggle between patterns. Press <**2**> or <▷> a second time and use <**CHAN-UP/CHAN-DOWN**> or <◀◀ / ▶▶> to access additional patterns. Press <**2**> or <▷> again to toggle back to the previous patterns.

3. Adjustment Overview—Specific adjustment procedures follow.

1. When in the Service Menu use the <**VIDEO**> button to toggle to adjustment desired indicated by the number and abbreviation displayed on screen.
2. For Geometry, from the Service Menu press <**0**> and select “Manual Geometry Alignment” <**ENTER**>.

4. Adjusting Data

After selecting an adjustment item, use the Navigation arrows or other buttons indicated in the adjustment procedure to perform the adjustment.

5. Saving Data

Press <**ENTER**> to save the adjustment data. The menu display will turn red for approximately one second.
Note: If the circuit adjustment mode is terminated without pressing <**ENTER**>, changes in adjustment data are not saved.

6. Exiting the Service Menu

Press <**EXIT**> to quit.

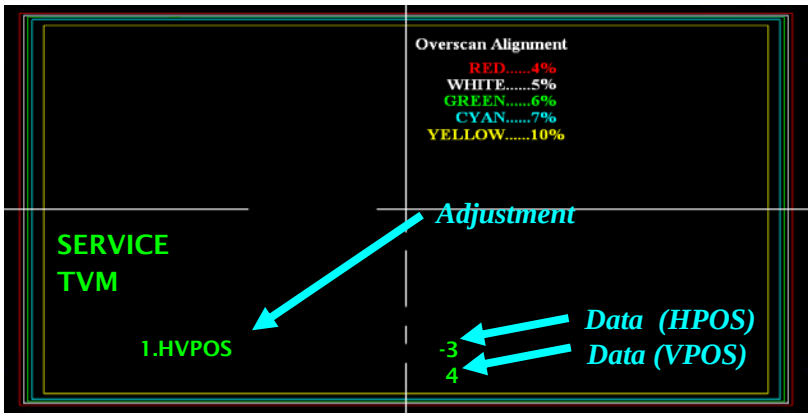
ADJUSTMENT PROCEDURES

Horizontal and Vertical Position Adjustment

1. Enter the Service Menu <**MENU**><**2-4-5-7**>.
2. Select the Geometry Test Pattern shown <**2**> <**CH-DOWN**>or <◀◀ > x2.
3. If necessary, use the <**VIDEO**> button to select the adjustment, “1.HVPOS”.

Vertical & Horizontal Position Adjustment

<**MENU**><**2-4-5-7**> <**2**> <**CH-DOWN**> or <◀◀ > x2



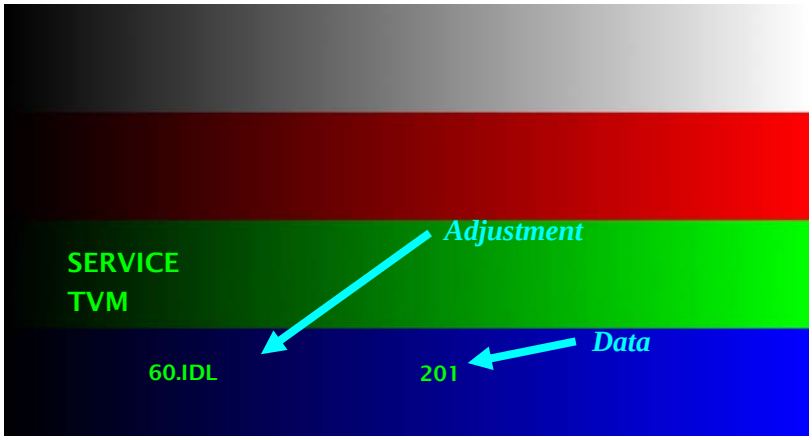
4. After selecting the HVPOS adjustment item, use the Navigation <▼▲◀▶> buttons to center the display.
5. Press <**ENTER**> to save the adjustment data. The on-screen display will flash red while the data is saved.

Index Delay Adjustment (Perform after color wheel replacement)

1. Enter the Service Menu <**MENU**><**2-4-5-7**>.
2. Select the Ramp Pattern shown below <**2**> <**CH-DOWN**> or <◀◀ > x3.
3. Use the <**VIDEO**> button to select the adjustment, “60.IDL”.

Index Delay Adjustment

<**MENU**><**2-4-5-7**> <**2**> <**CH-DOWN**> or <◀◀ > x3 <**VIDEO**>



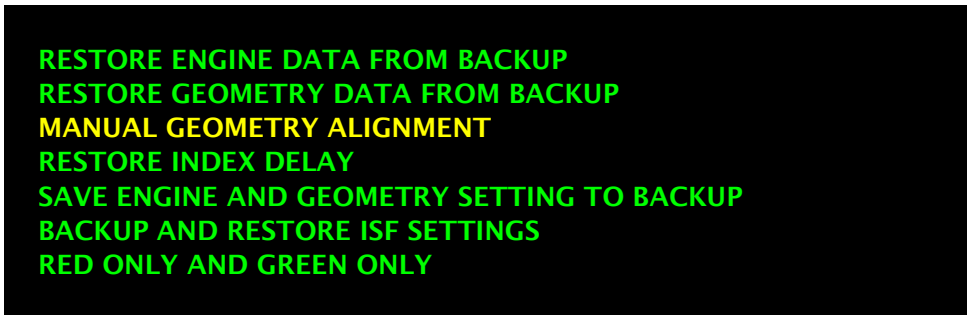
4. After selecting the IDL adjustment item, use the Navigation <▼▲> buttons to adjust the ramp pattern color bars for the smoothest transition from dark to bright.
5. Press <**ENTER**> to save the adjustment data. The on-screen display will turn red while the data is saved.

Manual Geometry Alignment

1. Entering the Manual Geometry Alignment Mode

1. Activate the Service Mode <**MENU**><**2-4-5-7**>.
2. From the Service Menu, press the <**0**> button. The Data Transfer & Geometry Menu will appear.

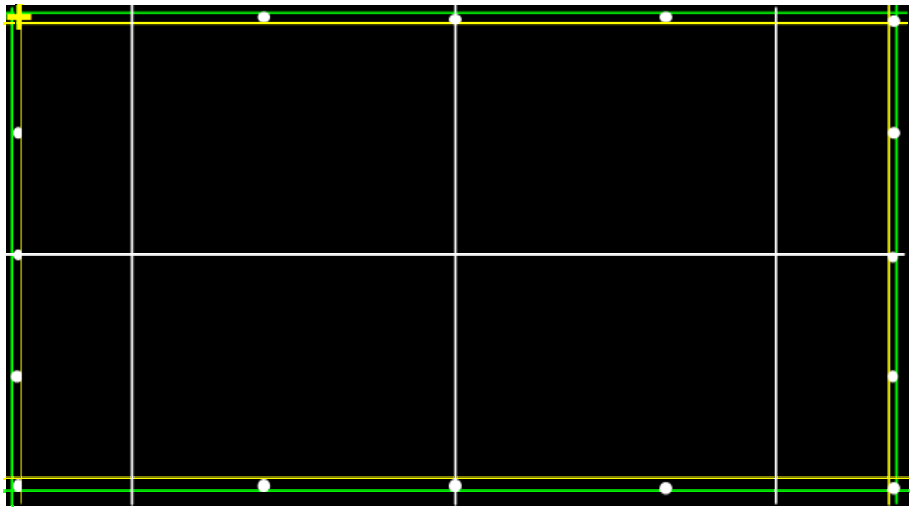
Type 2 Data Transfer & Geometry Menu <MENU><2-4-5-7><0>



3. Use the <▼▲> buttons to select “MANUAL GEOMETRY ALIGNMENT” <**ENTER**>. The Manual Geometry Alignment Pattern will appear.

Manual Geometry Alignment

<**MENU**><**2-4-5-7**><**0**> “MANUAL GEOMETRY ALIGNMENT”<**ENTER**>

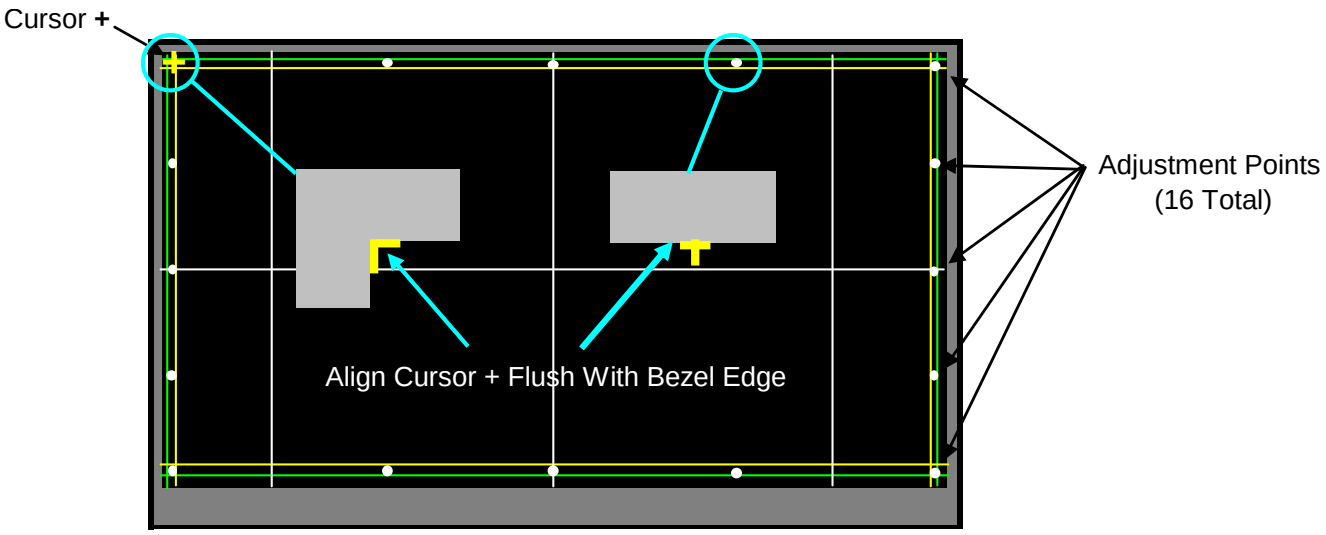


2. Manual Geometry Alignment

Note: Upon entering the Manual Geometry Alignment Mode the first time, the geometry may appear distorted because all factory geometry correction is automatically disabled. Press <**EXIT**> to quit and re-enable the factory geometry correction. Pressing <**1**> <**ENTER**> and <**EXIT**> will cause the TV to operate with out factory geometry correction (distortion will be present).

Note: At any time the original factory geometry data can be restored from backup:

- From the Data Transfer & Geometry Menu <**MENU**><**2-4-5-7**><**0**>, select "RESTORE GEOMETRY DATA FROM BACKUP" <**ENTER**>.



Phase 1 - 16 Point Geometry Alignment

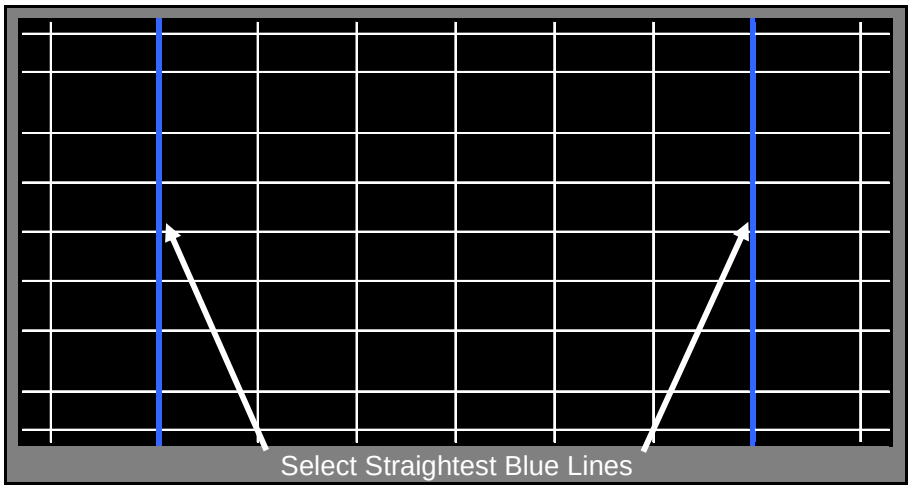
1. 16 Adjustment Points are indicated by white dots around the edge of the raster. The adjustment position is indicated by a **+** cursor.
2. Starting from the upper left corner, use the <◀▼▲▶> buttons to align the **+** at each point in a straight line, flush with the bezel as a reference. See example above.
   Note: Only the cursor will move. The Geometry Pattern will not change.
3. After adjusting each point, use the <**CH-UP**> or <⏭> button to shift the cursor to the next point clockwise and repeat until all 16 points have been adjusted.
4. After all 16 points are adjusted and the cursor is returned to the original starting point, press <**ENTER**> then <**EXIT**>. Correction will be automatically calculated and saved and the Manual Geometry Alignment will be terminated.
5. Re-activate the Manual Geometry Alignment. The geometry pattern will appear with the corrections applied. If Geometry is acceptable, press <**EXIT**> to quit. To touchup the raster geometry, proceed to Phase 2.

Phase 2 - Geometry Touch-up Alignment

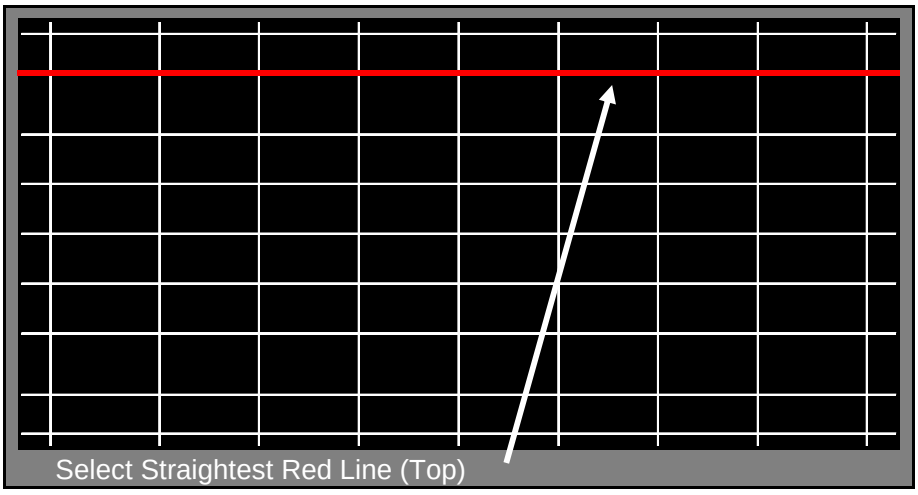
1. If additional correction is necessary after performing the Manual Geometry Alignment, re-enter the Manual Geometry Alignment mode.
2. Use the <**CH-UP/CH-DOWN**> or <⏮/⏭> buttons to shift the cursor to the point needing correction.
3. Use the <◀▼▲▶> buttons to indicate the direction and amount of correction necessary at the particular point. Note: Only the cursor will move. The Geometry Pattern will not change.
4. Press the <**INFO**> button to apply the correction. The Geometry Pattern will now show the correction.
5. Repeat steps 2, 3 and 4 as needed.
6. Press <**ENTER**> then <**EXIT**> to save your changes. The Manual Geometry Alignment will be terminated.
7. To proceed to Phase 3, re-activate the Manual Geometry Alignment.

Phase 3 - 4:3 and 16:9 Alignment

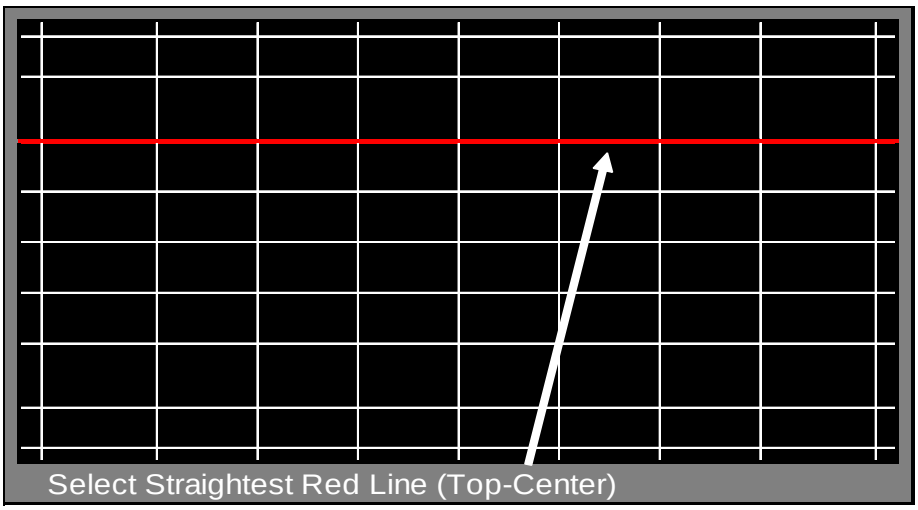
1. With the Manual Geometry Alignment activated, press <VIDEO> to enter the 4:3 Alignment Mode. The pattern below will be displayed.
   Note: Pressing <VIDEO> will toggle between the 4:3,16:9 (top, top-center, center & bottom) and 16 Point Geometry Alignment modes.
2. In the 4:3 Alignment Mode, pressing <CH-UP/CH-DOWN> or <◀◀/▶▶> will cause the geometry pattern to be displayed with 11 preset amounts of correction. Toggle through them until you find the one with the straightest Blue 4:3 Lines. It may help to count the patterns as you cycle through them. When you find the pattern with the straightest Blue 4:3 Lines, press <VIDEO>. The Top 16:9 Alignment Mode will then be activated as indicated by the Top Red 16:9 Line displayed in the pattern.

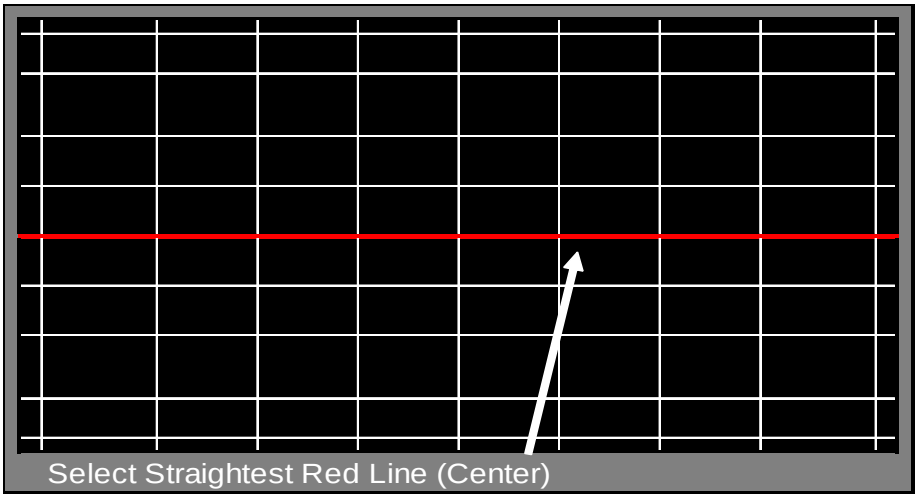


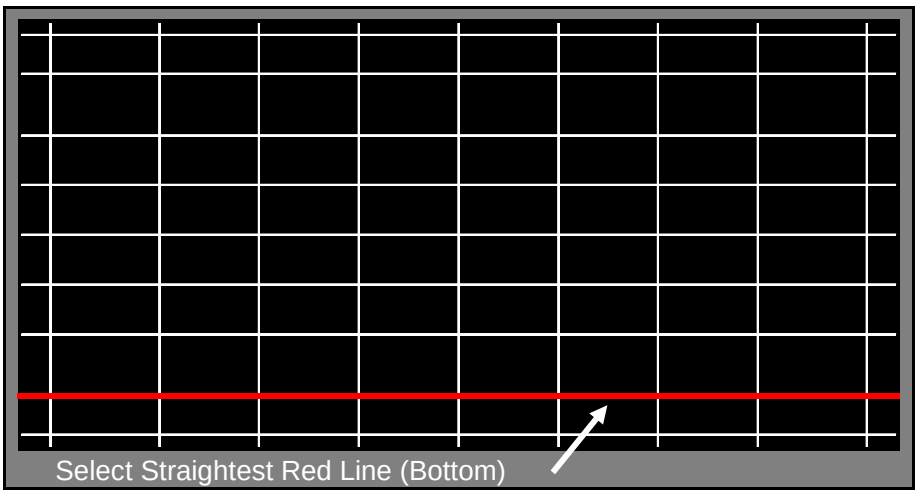
3. In the 16:9 Alignment Mode, pressing <CH-UP/CH-DOWN> or <◀◀/▶▶> will cause the geometry pattern to be displayed with 15 different preset amounts of correction to the Red Line. Toggle through them until you find the one with the straightest Red Line. Again, count the patterns as you cycle through them. When you find the pattern with the straightest line, press <VIDEO>. The Top-Center Red Line will be displayed in the pattern.



4. Repeat the process of pressing <CH-UP/CH-DOWN> or <◀◀ / ▶▶> to display the 15 different preset amounts of correction to the Top-Center Red Line. When you find the pattern with the straightest line, press <VIDEO> to proceed to the Center Red Line. Repeat the process for the Center Line, followed by the Bottom Line. Press <ENTER> then <EXIT> to exit and save the 4:3 and 16:9 data.
5. Select the Geometry Test Pattern (See HVPOS). If Geometry is acceptable, press <EXIT> to quit.







DATA TRANSFER FUNCTIONS

Data Transfer

Service Data is duplicated and stored in separate EEPROMs in two locations.

- **PWB-MAIN** - Working Service Data for TV operation
- **OPTICAL ENGINE** - Backup Service Data

The Optical Engine also includes data for the Index Delay setting for color wheel timing determined at the factory.
The PWB-MAIN also includes User and/or ISF settings. The User/ISF data is not backed up on the Engine. However if used, it can be backed up onto a USB flash drive.

Data Transfer Procedures should be followed…

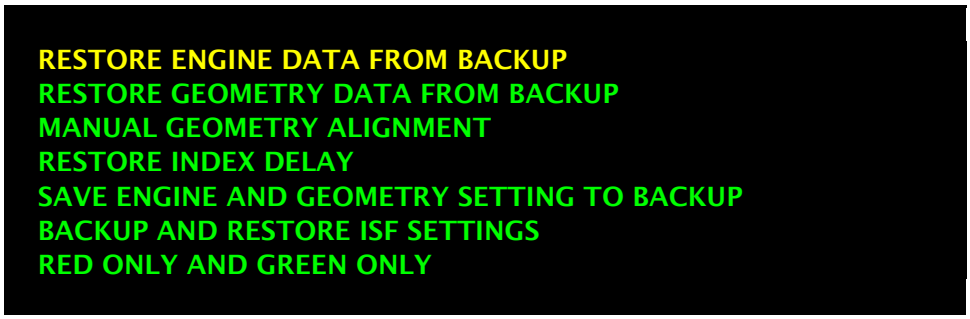
- **After PWB-MAIN Replacement:**
  1. Restore Engine Data From Backup.
  2. Restore Geometry Data From Backup.
  3. Restore ISF Settings From Flash Drive*. (Only if backup USB flash drive is available).*

- **After OPTICAL ENGINE Replacement:**
  1. Restore Index Delay.
  2. Save Engine and Geometry Setting to Backup *(After performing any necessary H&V Position and Geometry Adjustments).*

Data Transfer Procedure:

1. Enter the Service Mode <**MENU**><**2-4-5-7**> Select the Data Transfer & Geometry Menu <**0**>

Data Transfer & Geometry Menu <MENU><2-4-5-7><0>



Warning: Only use "SAVE ENGINE AND GEOMETRY SETTING TO BACKUP" after Optical Engine Replacement.

Note: Besides *MANUAL GEOMETRY ALIGNMENT*, six data transfer choices are listed on screen.

- *RESTORE ENGINE DATA FROM BACKUP* - copies backup factory adjustments HVPOS, White Balance and Index Delay from the Optical Engine to the PWB-MAIN.
- *RESTORE GEOMETRY DATA FROM BACKUP* - copies backup factory Geometry Alignment data from the Optical Engine to the PWB-MAIN.
- *RESTORE INDEX DELAY* - copies factory Index Delay Adjustment data from the Optical Engine to the PWB-MAIN.
- *SAVE ENGINE AND GEOMETRY SETTING TO BACKUP* - copies all working data from the PWB-MAIN into backup memory on the Optical Engine.
- *BACKUP AND RESTORE ISF SETTINGS* - allows the ISF (ADV) video settings to be backed up and restored using an external USB flash drive.
- *RED ONLY AND GREEN ONLY* - displays the video in red or green only during ISF Calibration.

2. Use the <▼▲> buttons to select the item and press <**ENTER**>.
3. Follow on-screen instructions if given.
4. Press <**EXIT**> to quit.

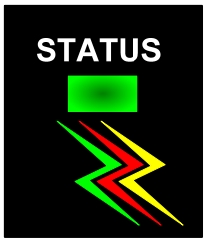
RESET / INITIALIZATION

SERVICE TIP:
Many symptoms that are customer generated, intermittent or cannot be verified can be resolved by using the various Reset and Initialization options. Before visiting the customer's home ask the customer to 1st perform a System Reset. If this does not resolve the issue, they can perform an A/V Reset. Then, if necessary, perform a user level Initialization. The customer should be made aware when settings and/or options will be reset. For more information, see the chart below.

Reset Name	When to use	How to use	Resulting Action
Remote Control Reset **TYPE 1 Only**	Returns the remote control to normal operation.	1) Press and hold the <POWER> button until it flashes twice then release the button. 2) Enter the code <0-0-0-0-0>. The <POWER> button will flash twice	The remote control is reset.
Remote Control TV Layer Reset **TYPE 2 Only**	Returns the remote control TV layer to normal operation.	1) Select the remote control TV mode. 2) Press and hold the <POWER> button until it flashes twice then release the button. 3) Enter the code <0-0-9-3-5>. The <POWER> button will flash twice	The remote control TV layer is reset.
Remote Control TV Volume/ Mute functions	Returns the volume and mute functions of the remote control to TV volume and mute for TV, Cable/Sat, VCR and DVD layers after the Audio Lock for AV Receiver feature has been used.	1) Select the remote control TV mode. 2) Press and hold the <POWER**>** button until it flashes twice then release the button. 3) Enter the code <9-9-3>< VOL △ >. The <POWER> button will flash four times.	The remote will now operate the TV's volume and mute when the slide switch is in the TV, CABLE/SAT, VCR or DVD positions.
A/V Memory Reset, by individual input	When the audio or video performance or settings for a single input seem to be incorrect.	<MENU> "Audio/Video" → "AV Reset" <ENTER>	All Audio and Video settings for the individual input are reset except for the *Listen To, Language, Balance and Closed Caption settings.*
A/V Reset, all inputs	When the audio or video performance or settings for more than one input seem to incorrect.	While viewing the TV, press the front panel buttons <INPUT> + <VOL ◄ > at the same time and hold for 10 sec.	All Audio and Video settings are reset to the factory default settings. No other menu options are changed.
System Reset	To reset the TV when it does not turn on or off, does not respond to the remote control, front panel buttons or has other unusual symptoms.	Press the <POWER**>** button on the front panel and hold it for 8 seconds.	TV Micro Re-boots. Note: The changes made during the current TV-On period may be lost. All other previous user settings are not lost.
Initialize User Level	To reset all customer settings except V-Chip	Press <MENU><1-2-3><ENTER>	All customer menu options and A/V settings except V-Chip & locked ISF are reset to factory default.
Initialize - Service Level	To reset all customer settings	**<**MENU><2-4-7-0> "INITIALIZE" <ENTER>	All customer menu options and A/V settings are reset to factory default.
V-Chip Password Bypass	If V-Chip password is not known	Press <LAST>+<9> at the same time.	Password will be bypassed. If in the V-Chip menu, enter a new password.
Unlock Front Panel	To unlock the front panel if it has been locked in the V-Chip Menu.	Press and hold the front panel <ENTER**>** button for 8 seconds.	Front Panel becomes operational. Other V-Chip settings not changed. Note: Cannot be performed while in the Low Power mode and the set is Off.

LED INDICATIONS AND SELF DIAGNOSTICS

The front panel Status LED provides an indication of the set's operation and the possible cause of a malfunction.



NORMAL INDICATIONS

STATUS LED Indication	Condition
Off	Off (Standby)
Green	Power On
Slow Blinking Green	Power Off with Timer Set. Power On normally
Fast Blink Green 80 seconds after Power Off	Power Off Lamp cooling. Wait for blinking to stop to Power On.
Fast Blinking Green 1 to 3 minutes after Power Restored from AC interrupt, Power On, System Reset or Software update.	Boot-up. Wait for blinking to stop to Power On.

ABNORMAL INDICATIONS

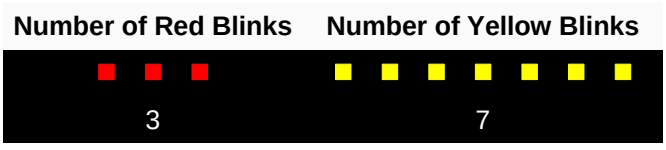
STATUS LED Indication	Condition
Steady Red	Lamp Failure (See Error Code 66)
Steady Yellow	DMD Temperature Excessive
Blinking Yellow	Lamp Cover Open (See Error Code 32)
Blinking Red then Blinking Yellow	Circuit Failure (See Self Diagnostics)

SELF DIAGNOSTICS

A blinking red and yellow Status LED will indicate an Error Code that can help determine the cause of a circuit failure.

- The number of Red blinks indicates the value of the MSD (tens digit) of the Error Code.
- The number of Yellow blinks indicates the value of the LSD (ones digit) of the Error Code.

Example: If the Error Code is "37", the LED will continuously blink Red three times, followed by blinking Yellow seven times.



Error Code: 37

See the following page for a list of Error Codes.

To perform a System Reset, press and hold the Power button for 10 seconds. Or, unplug the set for 10 seconds then restore power.

ERROR CODES

Error Codes, descriptions and the most likely cause of failure are listed below:

ERROR CODES

Code	Description	Most Likely Cause
17	I2C Communication loss between TV Micro and Engine	Loss of 12V from PWB-POWER to Engine / Check PE & PE2 circuitry Engine Failure, PWB-MAIN Failure
18	Engine will not accept data (ASIC-READY signal from Engine is not detected)	LDVS circuitry Engine Failure
32*	Lamp Cover is open.	Check CD connector
34**	Lamp turns Off while the TV is playing. Lamp Failure Lamp Enable signal from engine is lost.	Lamp Cartridge Failure
36	Exhaust Fan rotation not detected	Check Exhaust Fan / Check J4 circuitry
37	Engine (DMD) fan rotation not detected	Check DMD Fan / Check J5 circuitry
42	Sirocco fan (Lamp fan) rotation not detected	Check Sirocco Fan / Check J8 circuitry
44	LVDS cable between PWB-MAIN and Engine not detected	Check LVDS Cable & circuitry
48	PON-SHORT 3.3V or 5V switched supply short	PWB-MAIN Failure
57	Ballast communication problem (ballast to chassis)	Loss of 340V from PWB-POWER to Ballast / Check PL & CJ1 circuitry Loss of communications between PWB-MAIN and Ballast / Check FB & CJ3 circuitry Ballast Failure
16	LAMP-EN Detection	Check Color Wheel / Check J6 & J7 circuitry / Engine Failure
66**	Lamp did not turn on at P-ON sequence (No Lamp inserted) (Disconnected cable between ballast and lamp) (Lamp-Enable goes to PWB-MAIN but not to Ballast)	Check CJ4 circuitry No Lamp Inserted. HV connection or lead wire to lamp. Lamp Cartridge Failure

* Error Code 32 is indicated by a flashing Yellow Status LED. The code is stored in the Error code Log. See below.

** Error Codes 34 & 66 are indicated by a steady Red Status LED. The code is stored in the Error code Log. See below.

ERROR CODE LOG

The Error Code Log can be used to retrieve the code for an error that occurred in the past.

To access the Error Code Log: Press <**MENU**> <**3-5-6-4**>

Error Code Log Definitions

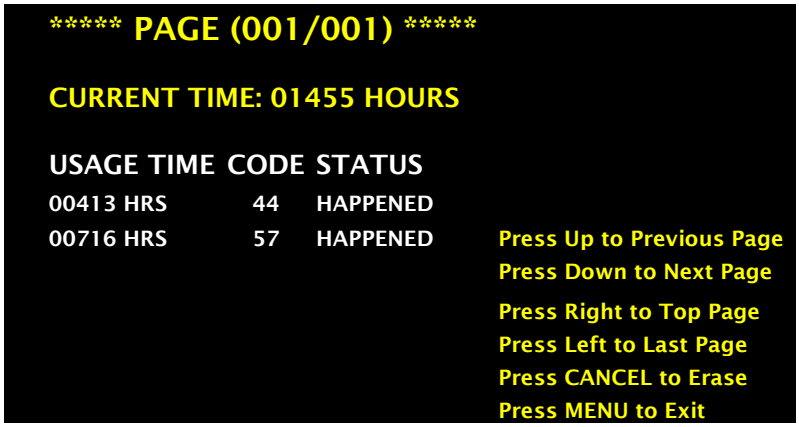
- PAGE - Current page number
- CURRENT TIME - total hours of operational use.
- USAGE TIME - usage hours when the error occurred.
- CODE - the specific Error Code that occurred.
- STATUS: HAPPENED - Indicates an error was recorded.

Press <**CANCEL**> to erase the Log.

NOTE: The Error Code Log is intended as a reference tool and is not meant to be used as a final determination of a defective part.

Error Code Log

<**MENU**><**3-5-6-4**>

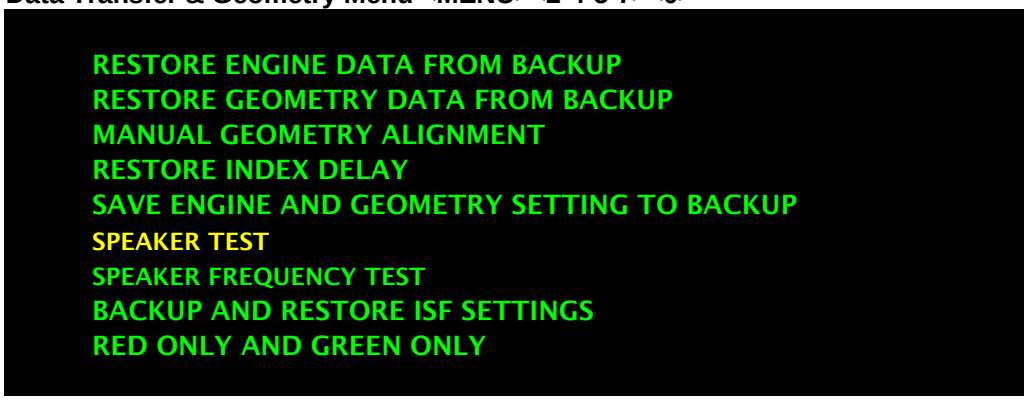


SPEAKER TRANSDUCER AND SPEAKER FREQUENCY TEST (V45++ Only)

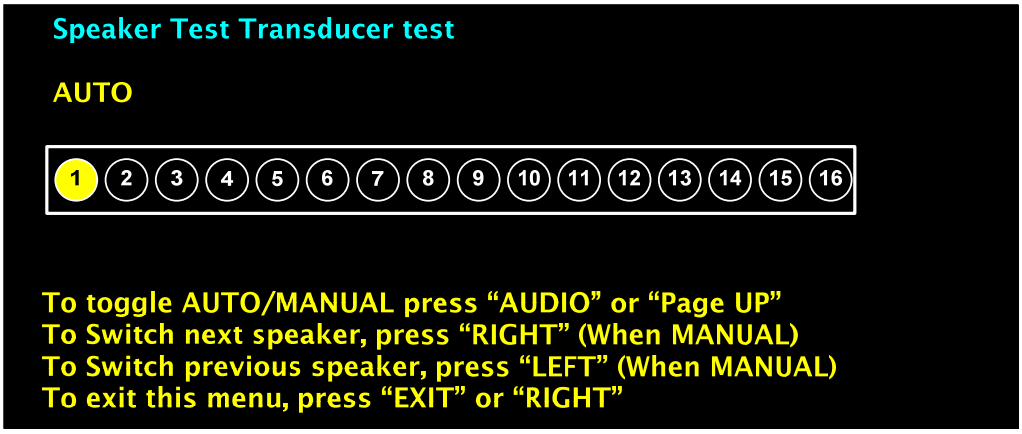
These procedures will test the TV's speakers using an internal tone generator.

1. Press the <**MENU**> button on the remote control. The Customer Menu will appear.
2. Press the <**2-4-5-7**> buttons. The Service Menu will appear.
3. Press the <**0**> button. The Data Transfer & Geometry Menu will appear. See below.

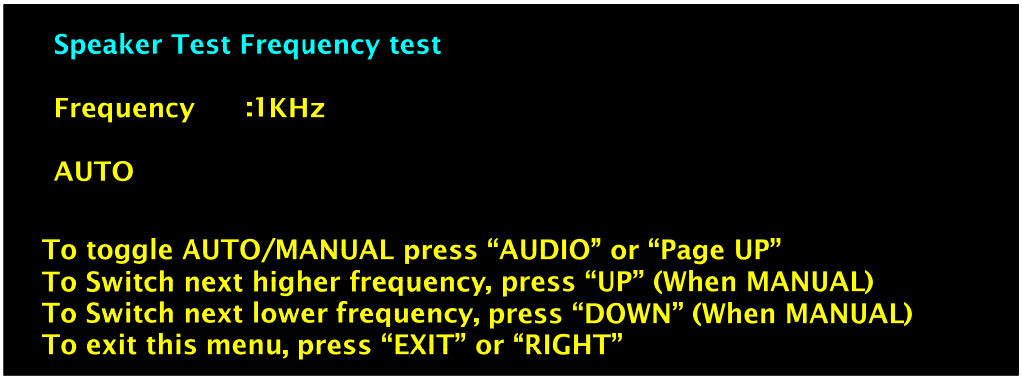
Data Transfer & Geometry Menu <MENU><2-4-5-7><0>



4. Use the <▼▲> buttons to select "SPEAKER TEST" and press <**ENTER**>. The Speaker Test Transducer Test Menu will be displayed. A tone will automatically cycle from one speaker to the next as indicated on screen. Follow the instructions to manually cycle the tone.

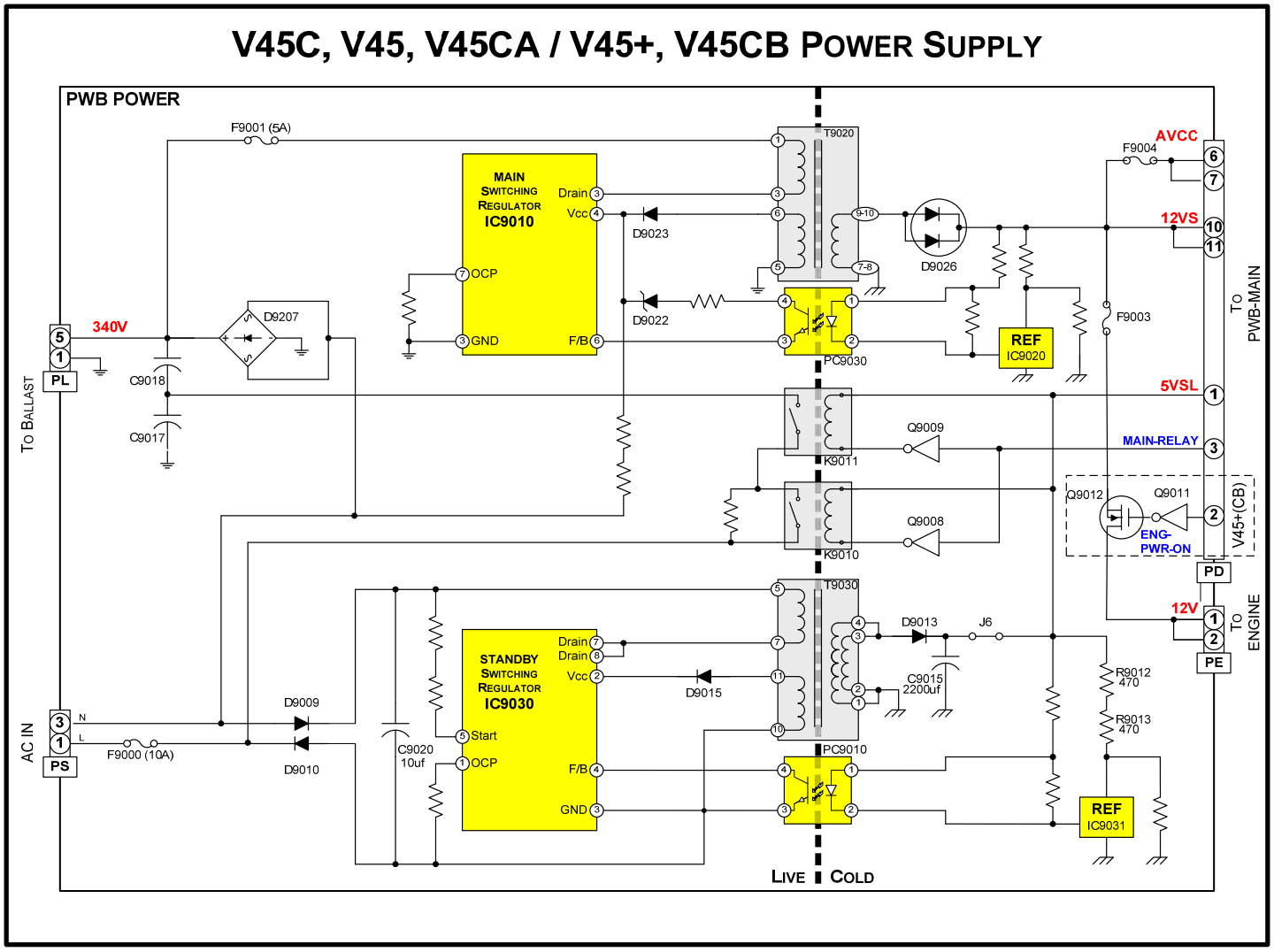


5. From the Data Transfer & Geometry Menu, use the <▼▲> buttons to "SPEAKER FREQUENCY TEST." The Speaker Frequency Test Menu will be displayed. A tone will automatically cycle from one frequency to the next as indicated on screen. Follow the instructions to manually cycle the frequency tone.

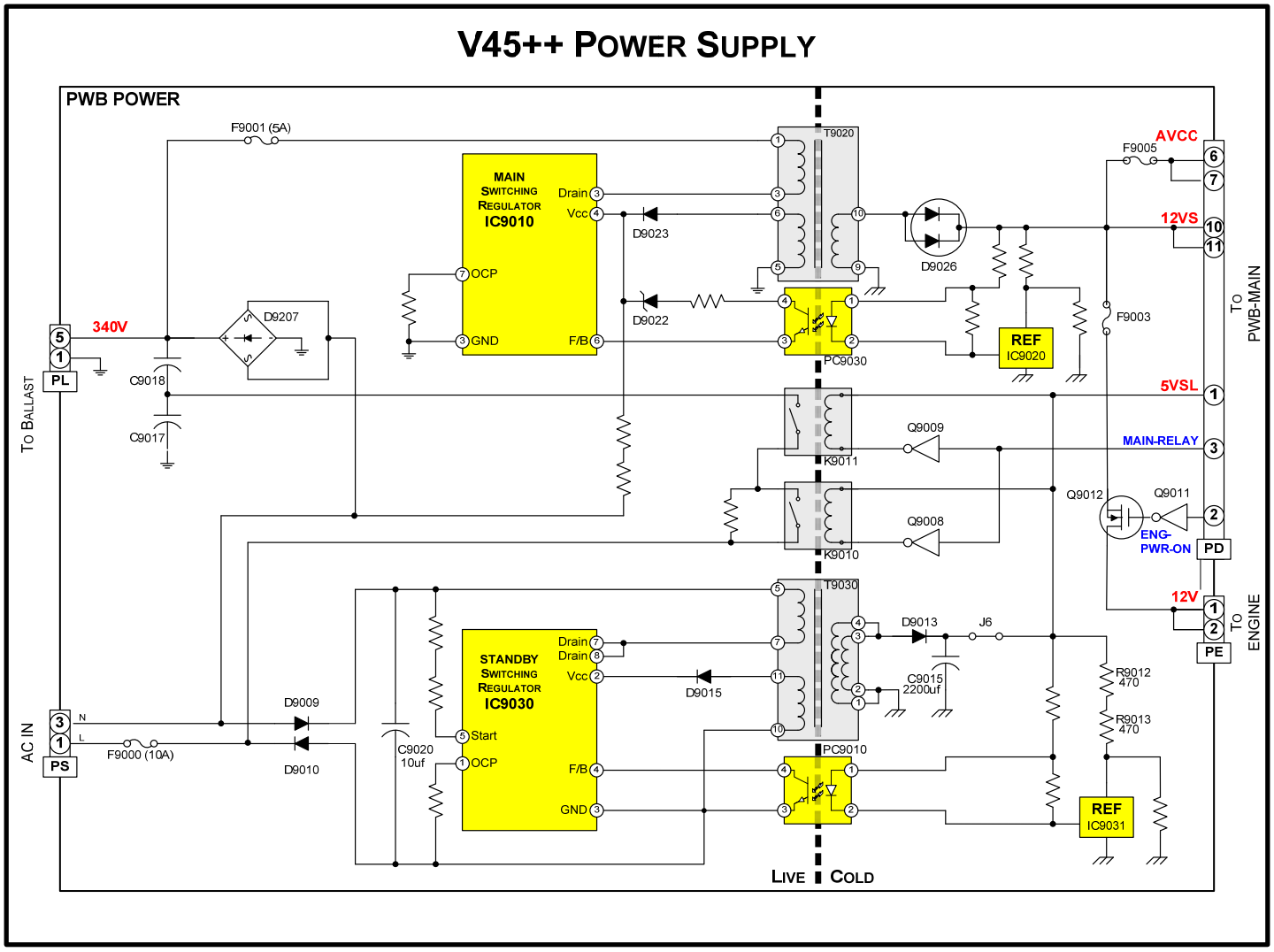


6. Press <**EXIT**> to exit.

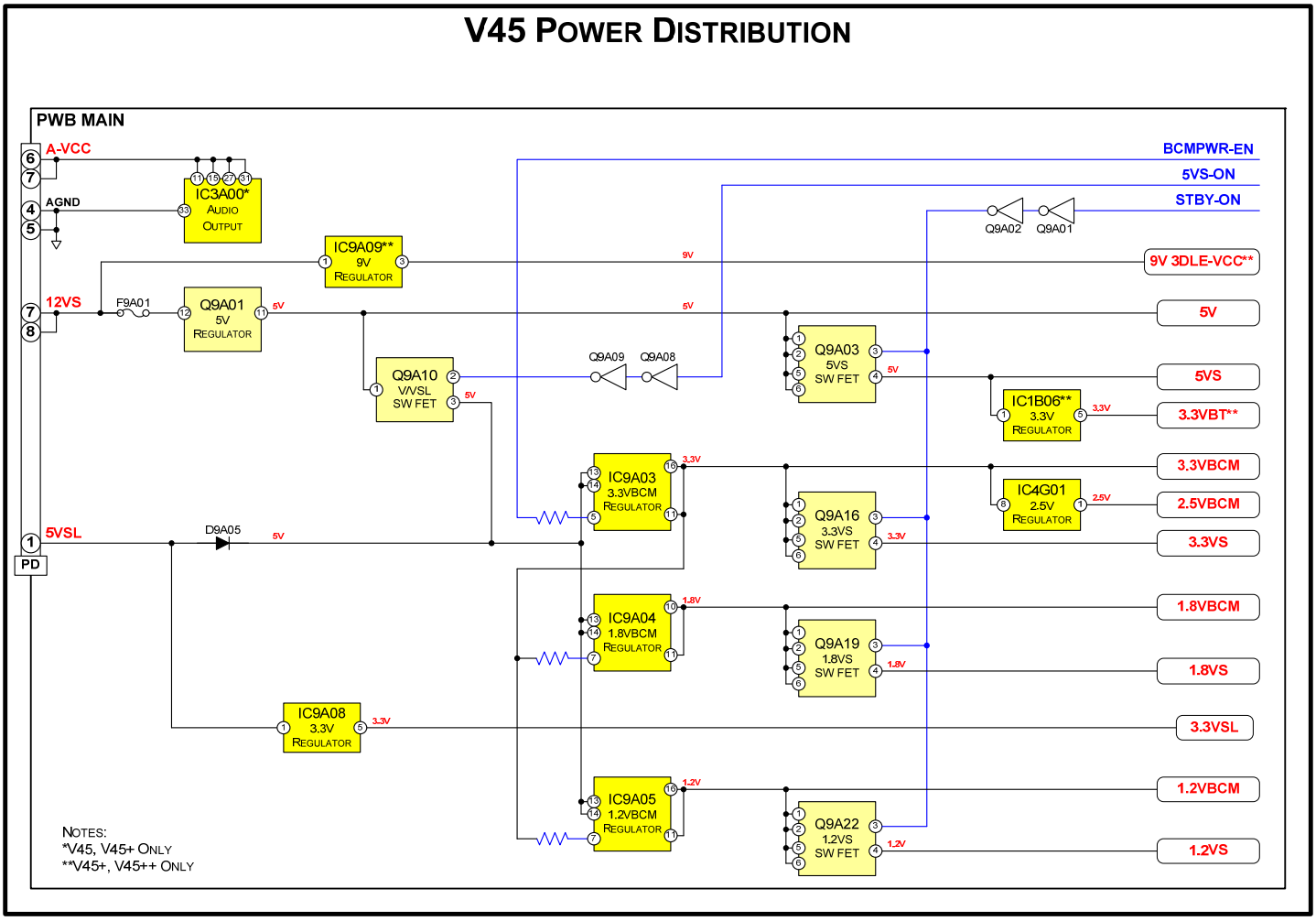
CIRCUIT BLOCK DIAGRAMS

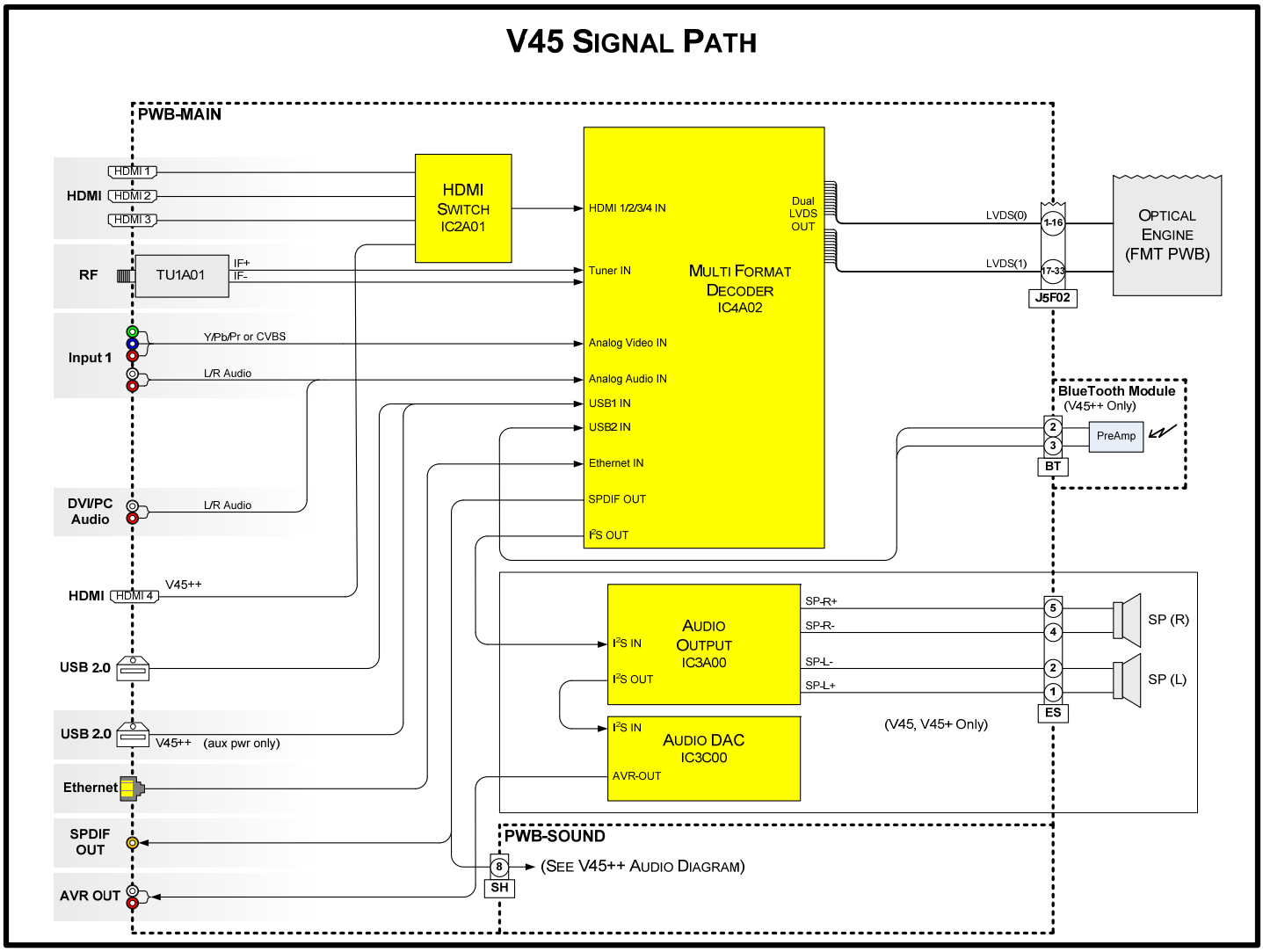


CIRCUIT BLOCK DIAGRAMS



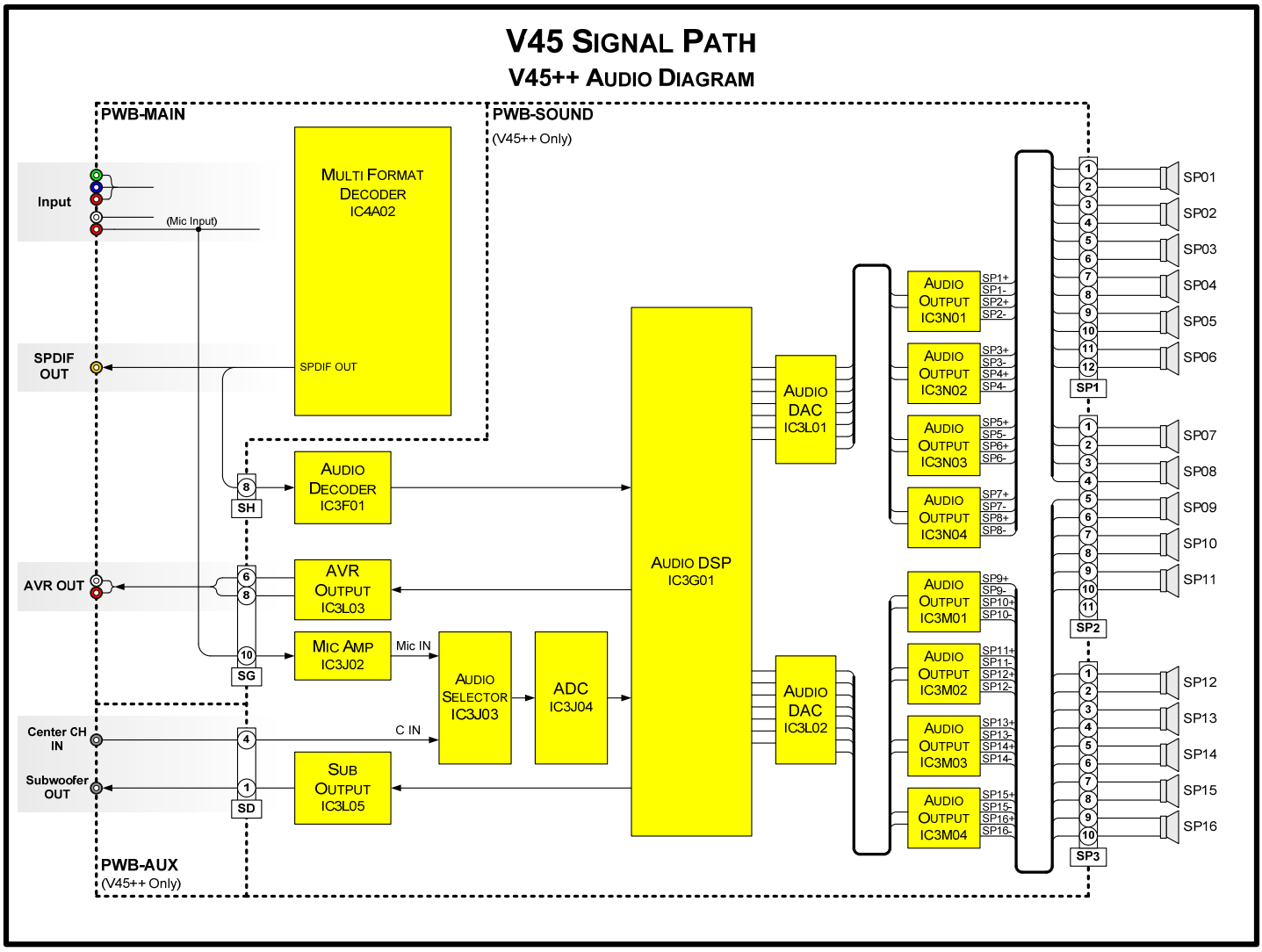
V45 POWER DISTRIBUTION




V45 SIGNAL PATH
PWB-MAIN
HDMI 1
HDMI 2
HDMI 3
HDMI
HDMI SWITCH IC2A01
HDMI 1/2/3/4 IN
Dual LVDS OUT
LVDS(0)
LVDS(1)
1-16
17-33
J5F02
OPTICAL ENGINE (FMT PWB)
RF
TU1A01
IF+
IF-
Tuner IN
MULTI FORMAT DECODER IC4A02
Input 1
Y/Pb/Pr or CVBS
L/R Audio
Analog Video IN
Analog Audio IN
USB1 IN
USB2 IN
Ethernet IN
SPDIF OUT
I²S OUT
BlueTooth Module
(V45++ Only)
PreAmp
BT
DVI/PC Audio
L/R Audio
HDMI
HDMI 4
V45++
USB 2.0
USB 2.0
V45++ (aux pwr only)
Ethernet
SPDIF OUT
AVR OUT
AUDIO OUTPUT IC3A00
I²S IN
I²S OUT
SP-R+
SP-R-
SP-L-
SP-L+
SP (R)
SP (L)
ES
(V45, V45+ Only)
AUDIO DAC IC3C00
I²S IN
AVR-OUT
PWB-SOUND
8
SH
(SEE V45++ AUDIO DIAGRAM)

V45 SIGNAL PATH

V45++ AUDIO DIAGRAM



V45 LAMP CONTROL