

# COURSE OVERVIEW

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# HD-ILA OVERVIEW



- D-ILA rear projection
- Available sizes 52-70 inch
- Multi-Brand Remote
- Customer Replaceable Lamp
- ATSC/QAM tuner (Most Models)
- HDMI inputs

### **Available Features**

- Cable-Card Ready
- 1080P capable
- Slim Versions (58 and 65 inch)

- This slide shows JVC's HD-52G786 model. This Model uses a 1280 x 720-pixel, 0.7-inch micro display device in a three-chip design.
- The life of the D-ILA Chip is infinite (70,000 to 100,000 hours).
- The lamp is the consumable item. According to the manufacturer, the lamp goes up to 4000 hours under normal operating conditions and with average use. The average U.S. household watches 4 to 6 hours of television per day. Taking a mean time manufacturer stated longevity of 4000 hours of usage, times our average 5 hours per day, we come up with over 2 years of usage.
- The lamp use time is monitored. When the lamp has reached it's useful life, a message will appear on screen to the customer indicating the lamp needs to replacement.
- When JVC originally released their HD-ILA models, only (4) models were available. Currently over 18 models are available: The main differences of all the models is the size of the picture, available in sizes 70, 61, 56 and 52". Some models, also have an Iris Feature, Cable Card Slots, 1080P capability or Grey Cabinets. Most general features are the Same.
- All JVC HD-ILA models also come with a Multi Brand (code activated) remote control to allow the operation of other brand DVD, VCR and Cable Box units.
- All JVC HD-ILA models have multiple input capabilities, spanning composite video, Y/C Video, Component Video (Y,Pb,Pr), and the digital input format, HDMI (High Definition Multimedia Interface).
- Most JVC units will include an ATSC/QAM tuner that will allow reception of Over-The-Air and Cable HD programming. Cable Card Ready models are also available.
- (2) Slim HD-ILA models are available in 58" (10.7 inch cabinet depth) and 65" models. The main feature of these mode

HD-ILA OVERVIEW ADDITIONAL FEATURES 1/3

#### 5 Point Color Management



GREEN: Tones down yellows to give greens pure, natural look.

- **(ELLOW:** Softens yellows, so they look silky and smooth.
- **RED**: samples reds and magentas and tones down blues within these ranges to make these colors look as vivid as possible.
- **BLUE**: samples blue areas of images and tones down the greens to avoid green color influence on blues.

FLESHTONES: Samples flesh tones, so they appear warm and natural.



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Up-scales SD sources and HD sources and displays at 720p or 1080p.

**<u>5 Point Color Management</u>** - This process samples (4) colors to provide crisp, bright images.

GREEN: In order for greens to be their purest and to look natural, yellows often need to be toned down.

YELLOW: CMS softens yellows so that they look silky and smooth without giving skin tones a darkened.

**RED**: In order for reds and magentas to appear as vivid as possible, CMS samples these areas and tones down blues within that range.

BLUE: CMS samples blue areas of images and tones down the greens to avoid being influenced by greens.

FLESHTONES: Samples flesh tones so they appear warm and natural.

#### **GENESSA with D.I.S.T.**

It is difficult to make the oldest and the poorest quality sources appear glorious on big screen HDTV's.

•The GENESSA Chip detects and up-scales all SD sources (480i and 480p) and all HD sources (720p or 1080i) and displays at 720p or 1080p. This customized upscaling insures that no matter what the original video source, the images will look as sharp, bright and smooth.

D.I.S.T. combines image preprocessing, noise reducing and color management technologies into one communication unit within the GENESSA chip.

•GENESSA is the industries first CPU dedicated to such image processing and its accelerated 32bit picture processing provides fast sampling and more efficient communication between the technologies that comprise the D.I.S.T. engine.

Because all of our core technologies are able to work together and faster, JVC TVs yield incredibly fast calculations that translate to a smoother picture and a better resolution image.

### HD-ILA OVERVIEW ADDITIONAL FEATURES 2/3



#### D6500K Theatre Pro





Simulates original movie coloring and warmth

### D6500K Theatre Pro

When films are converted to DVD, or other video sources; the color temperature standard they use for the conversion equipment is D6500K.

This is the equivalent or average color temperature of natural daylight.

In transition to DVD, this color temperature can be lost, but D6500K calibrating circuit can bring the original warm look and feel back to any video source.

#### **Optical Iris**

By using an Optical Iris the TV can regulate the amount of light from the Lamp to provide the best picture.

This creates the benefits of :

- Improved Contrast Ratio
- Improved Black Level
- More accurate gradation of shades in shadow areas/dark scenes
- Optimization of picture for wide range of room lighting conditions

### HD-ILA OVERVIEW ADDITIONAL FEATURES 3/3

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#### Advanced Hyper Surround Plus

Creates the impression of a 3D sound field with advanced vocal processing using only the TV speakers .

#### <u>MaxxBass®</u>

Creates the sensation of low frequencies by generating a series of harmonics designed to simulate the auditory experience.

Bass that normally could not be reproduced by the speakers can be heard and enjoyed.

MaxxBass works by determining the frequency crossover point, then separating the low bass frequencies which can't be reproduced by the speaker.

The low frequencies are analyzed to create a complex set of harmonics which can be reproduced by the speaker. These harmonics are added back to the rest of the audio, replacing the original low frequency energy.

# HD-ILA OVERVIEW



#### HD-52G786 Version "AA"

#### HD-52G786 Version "QA"

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- Prior to service, it is always wise to verify the Model and Version to ensure that the correct Service manuals and Schematics are being used.
- The pictures show the HD-52G786 Versions "AA" and "QA".
- One of the differences in the (2) models is the Main Drive PWBs used in the TV. There are other differences between the models that were not explained.
- Version differences may include PWB, Part or Circuit Design differences.
- The Model Number listed at the top of the model label will always be the same for all versions.
- To find the Model Version it is necessary to look to the right of the Serial Number. This may vary at times, but will always be shown in the Service.

# HD-ILA OVERVIEW

**General Precautions** 

**Transporting** Do not transport the unit face down or face up

Always hold/transport the unit in the up-right (vertical) position

Mounting Do not enclose without sufficient ventilation space (Refer to the User's Manual)

Using	Do not unplug immediately after power off. Allow 90 seconds cooling time
	Do not use <32 degree and >120 degree Fahrenheit

Lamp	Do not replace the lamp immediately after use	
	The Lamp must be recycled	

Although you can refer to the user's manual for transportation and ventilation information, we will cover these precautions here.

- Due to the fragile nature of the projection television devices, transporting the device in any other position but upright could cause damage to the screen, mirror and internal optics unit, and place undue stress on the mounted circuit boards. Always transport the unit in an upright (vertical) position
- As mentioned before, ventilation is an important consideration. Operating the unit without proper ventilation will have harmful effects either immediately or in the future. Improper ventilation will most certainly shorten lamp life, as well as cause phantom shutdown issues.
- After power down, the unit has a 90 second cool-down cycle. Unnecessarily unplugging the unit without allowing cooling time could result in shortened lamp life.
- The operating environment should allow for use of these units within the 32 degree to 120 degree Fahrenheit range. This caution, along with proper ventilation will contribute to proper operation and longer life of the product.
- There is a risk of burns from the Lamp if it is handled immediately after the TVs use. Always allow proper cool down of the lamp prior to replacement. Replaced lamps should be properly disposed of. Please refer to the User Manual for further details.

#### **HDMI** Input

### The Digital Input is not compatible with a PCs Output



Refer to the TVs Instruction manual for more detailed information.

http://www.hdmi.org/faq/faq.asp

- The Digital Input is NOT able to interface with PC Output signals.
- HDMI (High Definition Multimedia Interface) is the first industry supported, uncompressed, all digital audio/video interface.
- HDMI provides the interface between any High Definition audio/video source; such as a set-top box, DVD player, A/V receiver or an A/V Monitor (such as a digital television).
- HDMI has the capacity to support existing high-definition video formats from 720i to 1080p.
- It also has the flexibility to support enhanced definition formats such as 480p, as well as standard definition formats such as NTSC or PAL.
- The Digital Input allows connection of DVI devices using the CEA-861 profile for DTV's. HDMI DTV's will display
  video received from existing DVI-equipped products, and DVI-equipped TVs will display video from HDMI sources.
- If the Set Top Box has the 24 pin DVI output port for HDCP signals, the **optional** HDMI-DVI conversion cable (JVC Part Number A-HDFDVM) is available from our on-line web site (www.jvc.com) or from the parts department.
- Please be advised that if 480p signals (640x480 or 720x480) are displayed on the screen, the horizontal position may be slightly shifted. If this is the case, please access the "DIGITAL-IN" menu and select the appropriate "SIZE". If "Auto" is selected this will be done automatically.
- "DIGITAL-IN AUDIO" can be selected for Digital (HDMI) or Analog (DVI) input. If "Auto" is selected, this will be done automatically.
- If in the process of repair, the HDMI module may be locked into non-operation (Green or Black screen). It can be reset using option 2 of the TV Service Menu and completing the re-initialization procedure outlined in the Service Manual.
- Refer to the TVs Instruction manual for more detailed information.

# INPUT/OUTPUT

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#### PC Input/OpticalOutput



#### PC Input

- Only the resolutions shown are supported by the PC Input.
- Even with the 60Hz resolutions, problems may occur depending on the quality of the computers Synchronous Signal.
- When an Invalid signal is input to the PC input, "Invalid Signal" may appear on the screen.
- Apple McIntosh computers are not supported by the PC input.

#### **Optical Output**

- Only the TVs ATSC/QAM tuner audio may be output using the Optical Output.
- It is necessary to select PCM or Dolby Digital, depending on the capabilities of the Audio Receiver.

LAMP Part # **TS-CL110UAA** 



	<b>N</b> a La re		
▼ NEXT PAGE			
\$SELECT ← OPERATE MENU EXIT			

*Note*: You should reset Lamp Timer only after replacing the lamp.

#### EPA regulations require proper disposal of used lamps.

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- When lamp replacement is needed, a message will appear on-screen to notify the customer. This message will appear each time the set is powered on until the lamp is replaced. The Lamp part number is TS-CL110UAA.
- The lamp is replaceable by the customer. Instructions for replacement are outlined in the Customer User's Manual.
- There are (2) mounting positions for the lamp. Some units have Side Mounted Lamps, while other have Front Mounted Lamps

#### It is extremely important to give the lamp sufficient time to cool before replacement. Failure to do so may result in severe personal injury and damage to or breakage of the lamp itself.

When the lamp is replaced, it is necessary to reset the Lamp Timer so that accurate monitoring of lamp life can be accomplished.

#### Lamp Timer Reset should <u>only</u> be performed after replacing the lamp.

 Instructions for proper packing, return and disposal of the lap are contained in the new lamp carton.

EPA regulations require proper disposal of used lamps.

# FRONT LED INDICATIONS

There are two LED indicators, the Power LED and the Lamp LED



Condition	Power LED (BLUE)	Lamp LED (ORANGE)	
Power ON	Turns ON		
Lamp Start		Flashes for approx. 1 minute at 2 second intervals	
Lamp Cooling		Flashes for approx. 90 seconds at 3 second intervals	
TV Circuit Failure	Flashes		
DD Circuit Failure		Flashes at 0.5 Seconds intervals	
Emergency (Temperature, Fan Lock)	Flashes alterna	ately at 0.5 second intervals	
Lamp Emergency (Lamp Failure, Lamp Door Open)	Flashes alternately at 0.1 second intervals		

- There are (2) LEDs on the front of the unit beneath the screen; a Power LED (colored Blue) and a Lamp LED (colored Orange).
- As well as Power Up indications, these LEDs indicate possible troubles in the TV's operation.
- Failures in the TV will cause the Blue "POWER" LED, Orange "LAMP" LED or both to flash; indicating the affected Circuits.
- The Service Manual's "Troubleshooting" Section provides information regarding the LED Flash sequence indications.
- At Turn-ON, the Power LED will light and the Lamp LED will flash slowly (every 3 seconds). The Lamp LED will continue to flash for about one minute and then extinguish.

#### The TV cannot be shut OFF until the one minute interval is complete.

When the set is powered OFF, the Power LED will extinguish and the Lamp LED will flash (every 3 seconds) for 90 seconds to indicate the TV's "Cool-down" cycle. The TV's (3) fans will also operate during the "Cool-down" cycle until the "Cool-down" cycle is completed.

Re-application of power is not possible until the 90 second interval is complete.

- Emergency conditions will cause the Power and Lamp LEDs to alternately flash.
- The 0.1 second alternate flash interval is difficult to determine, but <u>will appear</u> as if the Power and Lamp LEDs are flashing Simultaneously.
- The 0.5 second alternate flash will appear as if the Power and Lamp LEDs are truly alternating and is easier to determine.



- The Picture shows the comparison of an Electrical Amplifier to a Light Amplifier.
- In an Electrical Amplifier, the amp is powered by an Electrical Source. A low power electrical signal is applied, amplified and outputted.
- In a Light Amplifier, the amp is powered by a High Intensity Light Source. A low power light signal is applied, amplified and outputted.

 The Light Amplifier or Light Valve (LV) was invented by Hughes Technology, a former subsidiary of JVC.

 The operation of a Light Amplifier or Light Valve can be compared a conventional amplifier.

In a conventional amplifier powered by a DC supply, an applied low amplitude signal controls the flow of current within the device. The resultant output of the power device is directly proportional to the control signal and the amount of supplied power.

 Similarly, in the Light Amplifier a low power light source (such as a CRT) is used as the low level input signal. A high power light source provides the power for the amplification of the Low Level Signals. This results in a High Intensity Light output.

This is the basic idea behind JVC HD-ILA Televisions.

# HD-ILA TECHNOLOGY

LIGHT VALVE ELEMENTS



- 1. Fiber optic Glass Plates
- 2. Transparent Conductive Electrodes
- 3. Cadmium Sulfide Photo Conductor
- 4. Light Blocking Layer
- 5. Dielectric Mirror
- 6. Liquid Crystal Alignment Films
- 7. Liquid Crystal

In an ILA device, applying a charge to the Electrodes (2) changes the light's polarization angle when it passes through the Liquid Crystal (7).

### Two advantages over LCD

1.Driver is behind the scene2.Crystals are vertically aligned



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The light-valve's control element is a liquid crystal layer (7). The liquid crystal molecules of the ILA device is Vertically Aligned as opposed to Horizontally, as in an LCD. This perpendicular alignment is unique to this "Homeotropic Liquid Crystal Light Valve" (LCLV).

Sandwiched between two transparent indium-tin oxide electrodes (2) is a layer of cadmium sulfide photoconductor material (3), a cadmium telluride light blocking layer (4) to prevent damage to the transparent conductive electrodes, a dielectric mirror (5), and a 6-micron-thick liquid crystal layer (7).

#### **General explanation of Operation**

•As the diagram indicates, a bias voltage connects the transparent electrodes (2). This is a 60 Hz square wave which has the effect of switching the charge on each of the electrodes for each frame of information. This is used as the biasing method rather than a DC level, thus preventing fatigue of the liquid crystal material caused by it's being energized in one mode only. The light-blocking layer and the dielectric mirror are thin and have high dielectric constants, so the AC field is primarily across the photoconductor and the liquid crystal layer.

•The light source (indicated by the incoming red arrow) enters through the Fiber Optic Glass Plate and passes through the Transparent Conductive Electrode, through the Liquid Crystal Layer and to the Dielectric Mirror. Depending on the amount and placement of the charge to the Cadmium Sulfide Photoconductor (pixel) material; the Liquid Crystal material in area (7) is rearranged so as to polarize the light to the reflective layer. The difference between a standard LCD and the Light Valve Liquid Crystal material is that instead of blocking light from passing through the LCD pixel, the Light Valve Liquid Crystal material has the characteristic of passing POLARIZED light energy. The light reflects from the dielectric mirror (shown as the exiting red arrow) as P and S polarized light.

•Charge or impetus for modifying the position of the Liquid Crystal material can be applied by a low power source such as a "CRT Beam modulated with video" or a "CMOS" device that causes the same type of changes to the Liquid Crystal material with "inputted video".

# HD-ILA TECHNOLOGY

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**Optical/Drive Assembly Components** 



- In order to limit the frequency spectrum to visible light wavelengths, a UV/IR Filter is used to block Ultraviolet and Infrared light from the Lamp.
- In this image the light then enters a Polarizer that provides a consistent output of P and S light components.
- The filtered light then enters an Integrator (a.k.a. fly-eye lens). This lens is made up of small squares on a piece of glass that divide the light into multiple identical sources.
- The Integrator provides even distribution of the light and allows for a uniform brightness of the projected image.
- A Collimator Lens System is used to recombine or "focus" the light waves and project them into a M.PBS.
- The M.PBS (Pre PBS) is used to provide a better P-S light component ratio prior to the light entering the PBS.
- The Polarized Beam Splitter (PBS) prism is set up to pass or deflect specifically polarized light and pass the light to the DILA devices where the image is created.
- This image will pass out of the OP Output lens to the Screen.



- JVC HD-ILA TVs use (3) ILA devices, each dedicated to produce a specific color; Red, Green or Blue.
- In the D-ILA application, the light source is a High Intensity Mercury bulb (TS-CL110UAA) [1 and 2] with a frequency spectrum comparable to that of the sun.
- In order to limit the frequency spectrum to visible light wavelengths, a UV/IR Filter [8] blocks Ultraviolet and Infrared light.
- The filtered light then enters an Integrator [3] and is divided into multiple identical sources.
- If the light was allowed to project directly into the PBS; shading and other Distortions, such as a "Hot Spot", would occur.
- The integrated light then passes through a PCS (Polarized Conversion System) [5] which provides a consistent output of P and S components.
- A Collimator Lens System [11] "focuses" the light waves and projects them into the M. PBS [6].
- The M.PBS [6] provides a specific P-S light output ratio to the PBS prism [9].
- Some models utilize an Iris [7]. The Iris regulates the Light output to produce a darker or brighter display, in turn improving the TVs Contrast Ratio. The Location of the Iris may vary.
- The employment of D-ILA technology with (3) ILA device construction eliminates the need for complex convergence adjustments.

# HD-ILA TECHNOLOGY

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**Polarizing Prism:** Reflects S component and passes P component. **D-ILA:** Depending on the pixel input, rotates the polarizing angle, changing S Component to P Component.

- In this example, the PBS (Polarized Beam Splitter) only allows P components (indicated as the RED arrows) to pass through it.
- The reflected S components (indicated as the BLUE arrows) travel towards the D-ILA chip because the PBS has been set up to deflect this type of polarized light.
- The D-ILA chip is energized with video. Where there is bright video, the returned light's polarity is shifted 90 degrees by the action of the Liquid Crystal material and changes to P component.
- This light is then passed through the Polarized Beam Splitter that has been set up to deflect only S polarized light and pass the P polarized light.
- Light passed through the PBS reaches the screen through the Projection Lens.
- The S polarized light is deflected back into the light source.

### HD-ILA TECHNOLOGY COMPARISON



### DMD

Limited by Mirror. The Smaller the Mirror, the higher the resolution.

### **D-ILA's Benefits**

(1) vertically aligned crystal(2) device driver is placed

behind the scene.

### TFT

JVC

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Horizontally aligned crystal causes light path to be partially blocked by the device driver We will now explore some different methods and technologies used in producing an image and some limitations and advantages.

#### <u>DLP</u>

In a DLP<sup>™</sup> projection system; red, green, and blue light is shone alternately onto the DMD mirrors. The DMD mirrors switch ON and OFF in response to a video or graphics signal. The light they reflect is directed through a lens and onto the screen, creating an image.

DLP technology does have it's limitations. One of them being that it's resolution is limited by the physical size of the moveable mirrors.. Another disadvantage is that the mechanical movement of the mirrors can cause a "rainbow" effect that is displeasing to some.

#### <u>TFT</u>

In TFT or Trans-missive device, the light source shines through the material and is the intensity is modified by the Modulated Liquid Crystal material. Limitations of the TFT devices are the horizontal alignment of the Liquid Crystal material; also since light is sent THROUGH the LCD device, it is partially blocked by the Device Drivers used to activate the material

#### <u>D-ILA</u>

D-ILA modulates the vertical position of Light Polarizing Liquid Crystal material based on an input signal to change the characteristics of light entering and exiting the device. The driving device is placed behind the activated material and is the reflective surface inside the substrate. Resolution can be easily increased by upping the density of the driving pixel elements.

By placing the Light source in front of the Driving Device, D-ILA reduces the screen door effect often seen in LCD. Furthermore, since it does not utilize mirrors, it completely eliminates the displeasing affects that may be experienced in DLP sets.

## SERVICE INFORMATION

Service Policy

### **Repair method**

Basic Policy: ~Repair at the customer's site~

**1. PWBs**: mainly component repair except the following:

PWB Replacement

- Main Drive PWB
- Digital Signal PWB
- Digital Tuner Module (ATSC tuner)
- Lamp Ballast PWB

#### 2. Available Optical Parts:

- Optical/Drive Assembly
- OP Output Lens
- 3. Other PWBs: may be available through core program for a limited time.

#### 4. Lamp replacement

- Customer replaceable (refer to Lamp Replacement).
- ✤ P/N:TS-CL110U

**NOTE:** Failure to return CORE CHARGED PWB/ASSY's with the completed paperwork will result in a charge to your account.

We will now touch upon the service policies for the repair of the JVC Consumer HD-ILA products......

- With the Troubleshooting Charts and techniques designed for quick trouble discovery and resolution, which will be shown later, the incidence of shop repair should remain at absolute minimum.
- The basic method of repair is the same as that of the CRT rear projection sets, that is, these units are intended to have the repairs done at the customer's location.
- The printed circuit boards are designated as COMPONENT LEVEL REPAIR with the exception of the following pieces: Main Drive PWB, Digital Signal PWB, Digital Tuner Module and the Lamp Ballast PWB
- Ensure all protective covers are removed from ordered Parts prior to use. In the case of OP/ Drive Assembly, there are air port covers and a lens cover that is easily overlooked and must be removed.
- Printed PWBs, designated as component level repair, and other PWBs may be available for a short time or through a core return program.
- Lamps are Customer Replaceable items and the customer should always be encouraged to replace his own lamp when necessary.
- If replacement is indicated through conversation with the customer, you should refer them to the User Manual for instructions on performing this task.
- <u>Core charged PWBs are your responsibility to return!</u> Each new board will come packed with a return shipping label and failure description paperwork.

#### All Core parts must be Properly Packaged for Shipping, and returned with the Completed Paperwork to receive credit.

#### SOLDERING NOTE

This product has been manufactured with the EPA requirements of LEAD FREE solder. This is evidenced by the markings "PbF" placed on the board with silk-screen lettering. "Pb" is the symbol for the element LEAD, and the "F" stands for FREE. LEAD FREE solder has a different appearance than that of LEADED SOLDER: It has a duller, granular appearance. This type of solder also has a higher melting temperature and does not have the same flow characteristics as LEADED SOLDER. For these reasons, more care should be taken when removing and replacing components or damage to the circuit from excessive heat may occur. Components should be replaced using LEAD FREE (Pb) type solder only. The circuit boards are "HOLE THROUGH" boards: When replacing and removing components, make sure that the solder is flowing on BOTH SIDES of the board
# SERVICE INFORMATION

#### **Optical/Drive Assembly**



- OP/Drive Assy includes: OP Block (3 DILA PBS unit), Main Drive PWB (including memory), and OP Output Lens
- Main Drive PWB and OP Output Lens may be ordered individually
- OP/Drive Assy replacement only requires OP Output Lens focus adjustment

• Shown here is a photo of an Optical/Drive assembly that has been removed from the OP Engine.

The OP/Drive Assembly includes and is shipped with the OP Output lens (Red), OP Unit (Yellow) and the Main Drive/Digital Drive PWB (Green).

• The Main Drive PWB and OP Lens may be order and replaced individually if needed; but If replacement of the OP Block is required, it is necessary to order the entire OP/Drive Assembly

• The Main Drive/Digital Drive PWB is shown without it's metal shielding cover.

• The Main Drive (DD) PWB should be referred to as the "Main Drive PWB". Ensure you do not confuse this with the Digital Signal PWB which houses the HDMI, etc. circuitry.

 The OP unit contains the D-ILA device with it's (4) Polarized Beam Splitter (PBS) units and LCOS assemblies.

• The Main Drive PWB EEPROM's carry adjustment data specific to the OP Engine that allow for the OP's optimum performance. This data must be transferred to the new PWB when the Main Drive PWB is replaced.

If the Main Drive PWB is replaced, the McAllen Magic Writer (MMW) service jig may be used to transfer the EEPROM date from the old PWB to the new PWB.

 Main Drive PWB Replacement and McAllen Magic Writer details are is provided in the HD-ILA Advanced Course and instructions for the MMW may be found on ISee.

• There is a "usage" clock that is part of the OP/Drive assembly. It is not alterable or re-settable.

# SERVICE INFORMATION

### Entering the Service Menu



3. Press [SLEEP TIMER] ONE time

4. While "0" Minutes is displayed, simultaneously press [V.STATUS] and [DISPLAY]

1.	Set [VCR/DVD]	switch to	"VCR"
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2. Set [TV/CATV] switch to "TV" If the switches are in any other position, you will not be able to enter the TV Service Menu



SERVICE MENU	
1. ADJUST 2. SELF-CHECK 3. I2C STOP	

- 5. Service Menu appears on the Screen.
- 6. Press the appropriate number on the Remote to select the Item

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 As with other JVC Models, entry into the TV Service Menu is accomplished in this manner.

 Before attempting to enter the TV Service Menu, check the (2) switches at the top left of the remote control unit. Be sure they are both in their leftmost position indicating "TV" and "VCR".

 If the switches are in any other position, you will not be able to enter the Technician Service Mode because the infrared codes will not be properly recognized by the Microprocessor. [SLEEP TIMER] button will function, but [VIDEO STATUS] and [DISPLAY] buttons commands will not be recognized.

 After depressing the [SLEEP TIMER] button and before the "SLEEP TIMER 0 MIN" display times out, simultaneously depress the [VIDEO STATUS] and [DISPLAY] buttons.

If this was done correctly, the Service Menu will be displayed.

# DISASSEMBLY

# JVC





# **OP Engine Removal**

- Be careful not to scratch the lens, when removing the Main Unit assembly.
- Cover the Optical Engine cooling vents when kept outside the cabinet.
- Use the Service Jig when operating the Main Unit outside the cabinet ("Z" models).

 The disassembly of the various HD-ILA modes only varies slightly. Always refer to the Service Manual for the specific model you are servicing.

• If disassembly is required, it should be done in the cleanest environment possible. Dirt and dust in the re-circulating cooling system will cause problems with picture quality.

• During Disassembly take note of the screws types used for each hole. Insertion of the incorrect screw type during Reassembly will cause damage that may not be correctable.

• Speaker replacement and focus adjustments are accomplished through the front of the cabinet after the grill is removed.

• Care should be exercised not to damage the PWB containing the [ON/OFF] button and both the Power and the Lamp LEDs. It is possible to damage this PWB or it's connector through handling.

• If the lamp cover plate is removed and an attempt to power the unit is tried, LED error flashing will occur and the unit will not power up. The lamp cover plate contains the activator pin for the LAMP INTERLOCK.

• The screen assembly should not be removed without due consideration of the environmental conditions. If the screen assembly must be removed, it is recommended that the intake and exhaust vents from the cabinet area to the MAIN CHASSIS be covered.

• The mirror in this unit is a front coated, sometimes called "FIRST SURFACE" mirror; As opposed to a conventional mirror with a back surface coating. This prevents refraction errors and unwanted reflections when projecting the picture to the front screen. Cleaning of this mirror should not be necessary.

• The mirror surface is highly susceptible to dust, dirt, and fingerprints. DO NOT TOUCH THE SURFACE OF THIS MIRROR. If mirror replacement is required, extreme care in handling this glass, by it's edges only, should be exercised.

• HD-ILA screens consists of two pieces: The front piece has a glare proof coating on the front. Use of harsh cleaning liquids for cleaning is not recommended. Behind, and fused to this piece is the LENTICULAR lens positioned so that the ribbed striping faces the rear of the unit. The second piece of the front screen assembly is the FRESNEL lens. It is a fine, circular ground lens, with the ground surface facing the front. When assembled with the front piece, the Fresnel contacts the LENTICULAR lens.

• Both the Fresnel and Lenticular lens are supplied as (1) unit, taped together. Care should be used when replacing this screen assembly, so that no foreign material enters between the (2) lenses during installation.

# DISASSEMBLY OP Engine Removal \*Cautions\*



Only Handle OP Engine by Metal Tabs

To prevent damage, do not power on "Z" Chassis models without the Service Jig

JVC



Part No.	Description
SRP0L105A-M2	LED PCB
WJJ0486-001A	7-pin cable assembly

- The OP Engine is dust sensitive!
- Do not scratch the lens, when removing the Main Unit assembly
- Chassis is to be handled by it's metal tabs only.
- <u>Do not power on "Z" Chassis models without the service jig</u>. Neglecting this could cause memory data loss that can result in poor video quality.
- Always allow the TV to complete its "Cool Down" (approximately 90 seconds) prior to unplugging the AC power.

Always keep in mind that the unit is sensitive to the introduction of dust and dirt.

Coffee Filters secured with a rubber band may be used to cover air ports and prevent introduction of debris and dust into the OP Engine.

When handling the chassis, use the tabs located at each side of the bottom of the chassis (shown in the picture). To prevent damage, this is the only recommended method of handling.

 <u>DO NOT</u> plug in or power on the removed "Z" chassis (i.e. HD-52Z585) without FIRST connecting the service jig. Failure to do so will result in memory data loss that will result in poor video quality.

 The service jig is a Front LED PWB (SRPOL105A-M2) and Connecting Cable(WJJ0486-001A). *Refer to* TT-04072301-T(R3) for further details.

 <u>DO NOT unplug the unit</u> from the AC line voltage source prior to it completing its Cool Down Process. Lamps that are not allowed the Cool Down period will have a decreased lifespan.

# DISASSEMBLY

**Chassis Layout** 



- 1. Rear Jack PWB
- 2. Receiver PWB
- 3. Analog PWB
- 4. Digital PWB

- 5. Digital (ATSC) Tuner
- 6. Main Drive PWB
- 7. Power PWB
- 8. Regulator PWB

9. Fan Control PWB

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- 10. Temp. Sensor
- 11. Remote sensor
- 12. SD Card PWB

• For servicing the unit, refer to the Technical Service Manual for specific model details.

 It is important that this procedure be followed to the letter. Overlooking steps can cause damage to the optics and chassis.

- Every screw and part removed must go back as it was originally installed to ensure correct operation of the unit after re-assembly.
- The entire chassis is removed through the rear opening of the cabinet.
- All PWBs can be found on the left side of the OP Engine.
- The Main Drive PWB is mounted on top of the OP Unit with the Polarized Beam Splitter at it's center.
- At the right end of the chassis are the lamp assembly, ballast board and Fan Control PWB.

 Extreme care should be taken to protect the lens assembly and prevent objects from falling into the internal air recirculation ducts. The ducts face up and dust and debris can easily be introduced.

Coffee Filters may be used to prevent introduction of debris and dust into the OP Engine.

• There are three fans on this chassis, one for Ballast cooling, one for lamp cooling, and one for optical unit air circulation.



 To aid in your troubleshooting, a UNIT INITIALIZATION flow chart has been developed. This can be used to analyze and determine the cause of various failures.

 Under normal and trouble free conditions; at "Turn ON" the Blue Power LED turns ON and the Orange Lamp LED flashes slowly, for one minute at a two second intervals, while the lamp is going through it's warm-up cycle.

Power down of the TV is not possible until the Lamp warm-up cycle is completed.

• When the TV is normally powered off; the Blue Power LED will remain lit and the Orange Lamp LED will flash for one minute at three second intervals. After one minute, all lamps will extinguish and the power down and cooling sequence is completed.

It is not possible to power the TV back on while the Power Down process is in effect.

• AC power Voltage is delivered through the LAMP THERMOSTAT. During operation, if the temperature exceeds 175 degrees Fahrenheit, the thermostat will open and the set will shut down. The thermostat will not close again until the temperature lowers to 160 degrees Fahrenheit.

Until the temperature cools to 160 degrees Fahrenheit, re-application of power is not possible.

Since there is no AC going to the TV Circuits when the Thermostat OPENS, No LED Error Flash will be seen. Also, The TV will not respond to Power ON commands.

• When "P\_ON" signal is sensed by the Micro Processor, you will hear relay clicks. If the unit is operating correctly, the relay clicks will occur within less than one second of each other.

Chassis CPU to Main Drive CPU communications begin and the Exhaust Temperature Check is done.
During unit operation, if the temperature of the exhaust air exceeds 123 degrees Fahrenheit, the unit will shut down and the TEMPERATURE EMERGENCY flash will occur. If the unit shows this warning and the unit is on the bench for checking, it is most likely that the EXHAUST TEMPERATURE SENSOR is defective.

• After the CPU completes the Exhaust Temperature check, the LAMP DOOR INTERLOCK is checked. During operation, if the Lamp Door Interlock is opened, a Lamp Emergency error flash will be observed.

• To reset this condition and after the bulb has had sufficient time to cool, the AC power plug must be removed and reinserted at the AC outlet for reset.

• The 0.1 second alternate flash interval is difficult to determine, but <u>will appear</u> as if the Power and Lamp LEDs are flashing Simultaneously. The 0.5 second alternate flash will appear as if the Power and Lamp LEDs are <u>truly</u> alternating and is easier to determine. **This can be checked with a scope at the connector if necessary.** 

• The next check point is FAN LOCK FAILURE. If a defective fan is detected (usually non-operating), 30 seconds after failure, the set is powered down and the unit will indicate a Temperature Emergency Flash.

• The cooling fans have two speeds of operation. The speed of the fans will increase when the temperature of the unit exceeds 95 degrees Fahrenheit and will revert to slower speed after a temperature of less than 85 degrees Fahrenheit is achieved.

• At turn ON, if these conditions are satisfied, the CPU will issue the LAMP\_ON signal and the lamp should ignite. If the lamp fails to ignite when the Ballast PWB is given the LAMP-ON signal, the CPU repeats the LAMP\_ON command.

• The CPU will issue (3) LAMP\_ON commands in the following fashion: LAMP\_ON signal for 4 seconds, and wait for 6 seconds. If the lamp fails to ignite after these attempts, the unit will shut down and the Lamp Emergency error flash.

If the lamp fails to ignite, you may be able to hear an arcing sound from the lamp area during the ignition attempts. This is a good indication that the lamp itself is defective and should be replaced.

• If Failures of the TV or DD Circuits are detected at any time during the power On process, the TV or DD Circuit Failure LED indications shown in the chart will occur.

**BLOCK DIAGRAMS** 

Power



When Measuring Voltages, ensure that the appropriate Ground Reference is being used (HOT GROUND or CHASSIS GROUND).

In this discussion of the POWER system, we will go over some step by step troubleshooting in an attempt to assist you in more efficient problem discovery and resolution. This chart was made with convenience of measurement in mind. It is a very good troubleshooting tool.

- Starting at the top left of the diagram, the AC power from the wall outlet is applied.
- There is a Thermostat mounted on the lamp. If this switch is open, AC power cannot continue through the circuits.

 After the AC passes through the Thermostat, the next place to check (step 1) is at Diode D9111 on the power supply PWB.

If there is AC present at D9111, check for the presence of the Standby 5 volts (step 2a). The checkpoint for this voltage is on the Power PWBs CN90G PIN 1. This STB5V is used by the Digital Signal PWB. It also goes to the analog board where it is regulated down to 3.3V by IC902 (step 2b). This is output on CN001 pins 28 & 29 to the Digital Signal PWB as the CPU power.

If the STB5V is present, find the MAIN DRIVE PWB. Here, check to see that the Lamp Cover Interlock Switch is closed (step 3). The measurement point is CN306 PIN 2. Proper closure of the switch is indicated by a 0 VDC measurement at this point.

After this condition is verified as correct, check for a HIGH (5v) signal at CN90G, PIN 3 (step 4). This HIGH from the Digital Signal PWB CPU causes closure of RY9021 and allows the AC voltage to progress through a resistor to D9201.

 Measure the voltage at CN90BL (step 5), this should normally be approx. 380VDC, but will vary depending on the Power PWB being used. <u>NOTE NOTE NOTE! THIS IS A VOLTAGE THAT MUST BE CHECKED</u> <u>WITH REFERENCE TO HOT GROUND, NOT CHASSIS GROUND.</u>

• If the Power factor Control Circuit is OFF, CN90BL may read 160VDC. This is not the correct voltage, but will allow for the voltages (measured from the Chassis Ground) that feed 13.5 volts to the Regulator PWB.

 The Regulator PWB will generate 5VDC, 9VDC and SW 12VDC to the Analog PWB and the Digital Signal PWB. Presence of these voltages can be determined by measuring. (step 6)

CN003 PIN1	32VDC This voltage is a loop through voltage used for PLL function of the CPU on the Digital Module. This voltage is also used for TUNER voltage. This location for checking 32VDC at CN003 PIN 1 is a more
	convenient place to check for this voltage.
CN003 PIN10	13.5VDC checkpoint
CN003 PIN4	9VDC checkpoint
CN003 PIN8	5VDC checkpoint
CN00D PIN 2	Switched 12VDC measured on the analog board.

• If the above voltages are missing, move to and check for 13.5VDC at CN90B PIN 4 (step 7a). This is the 13.5 volts that feeds the regulator board. If the 13.5VDC is not present, disconnect the Digital Tuner (ATSC) module CN9601(step 7b). This may help determine if the Digital Tuner is defective, if the 13.5VDC is present after disconnecting the Digital Tuner Module.

 The Audio Circuits are fed by a plus and minus 15VDC. These two voltages can be checked as shown (step 8). The checkpoints are CN90AA PIN 1 And CN90AA PIN5.

 Please notice the dotted line from the IC9501/T9501 block. The 18VDC generated by this block is used to energize RY9201. RY9201 closes and applies the full 380VDC via L9201 and it's associated control circuits to operate the LAMP BALLAST and ignite the LAMP.



- 1. Standby 5V from the Power Supply powers the CPU
- 2. Power ON command received from Remote or Front panel
- 3. CPU turns ON the power. All circuits are powered up
- 4. CPU checks thermal sensor, interlock switch, fan, etc. If OK, then turns on the lamp

- This is the basic block diagram for the Control Path
- As shown, the Standby 5V powers the CPU
- When a Power ON signal is received from a Remote or the Front Panel, the CPU signals the Power PWB to Power ON. This Powers up all circuits.
- The CPU then checks the thermal sensor, interlock Switch, Fan, etc. If these are found to be operational, then the CPU allows the Lamp to power on.



#### LAMP and FAN failures can be checked using this block diagram.

Step 1: Check for the presence of AC voltage at CN90SE. If there is no voltage there, check to see if the Lamp Thermostat is OPEN.

Step 2: Check for Standby 5V at CN90G PIN 1 and an operational HIGH at CN90G PIN3, on the Power PWB.

Step 3: Check for LAMP COVER SWITCH INTERLOCK closure at CN306 PIN 2 on the Main Drive PWB. Proper closure of this switch is indicated by a 0VDC reading.

Step 4: Measure for 13VDC at CN308 PIN 1 and -9VDC at CN308

Step 5: Check the (2) supplies that provide the voltage for LAMP operation. These voltages can be found at CN90BL on the Power PWB. *THESE 2 VOLTAGES ARE MEASURED WITH REFERENCE TO HOT GROUND, NOT CHASSIS GROUND.* 

Step 6: At CN310 PIN 3 of the Main Drive PWB, if a fan failure is detected, the voltage at CN310 PIN 3 will be 5VDC.

Pin 7. This line connects to the Power PWB as CN90DD.



 The Video Block Diagram here shows the inputs, paths and conversion of the video that occurs in the HD-ILA system.

• On the left of this diagram are all the possible Signal Inputs. All video signals, except HDMI and Digital Tuner, are routed through the Analog PWB to the Digital PWB.

• If composite video or YC is selected as the main picture, it is routed to the Digital PWB unchanged for Digital comb filtering and Color Decoding.

• Selected Sub Video is combined, decoded and outputted to the Digital PWB through the component path. Since the component path is the same as sub video path, component video can not be displayed as the sub picture

 As shown here, the Composite Video signal from Analog tuner can be accessed for measurement at CN100T PIN 2.

 Referencing the complete block diagram in the schematic, please note that the side input (VIDEO 4) does not go directly to the Analog PWB. Instead, because of it's physical position, it is routed to the Receiver PWB at CN10FJ. When attempting signal tracing, please keep this in mind.

• The other available inputs are fed in to the Rear Jack PWB as Composite Video, Y/C Video or Component Video. All of these signals pass through the Analog PWB and then to the Digital Signal PWB for further processing.

 Some suggested checkpoints are listed here as a troubleshooting aid to you. For example, the Composite and S-Video input from the Rear Jack PWB can be checked at IC501 of the Analog PWB. Likewise for Component Video (Y, Pb, Pr), it can be traced to and through IC301 and IC801 on the Analog PWB.

 The Analog PWB and IC501 is an excellent place to make input and output measurements for Composite, Y/C Video and Component Video. Since IC501 does the switching job for these audio and video types, verification of audio and video switching can be done here.

- At the Digital PWB, the selected "MAIN" Video, "MAIN" Y/C Video, and "MAIN" Component Video can also be checked on the Digital Signal PWB connector, CN002.
- Before leaving the Digital Signal PWB, all video signals are changed to LVDS (Low Voltage Differential Signaling).
- LVDS conversion is performed so that common mode noise will not have an adverse effect on the final outputted signal.
- The LVDS Signal is sent to the Main Drive PWB where it is changed back to RGB for making the final Display Image.

#### Measurement/Interpretation of LVDS Signal

- The nature of the LVDS is that it looks similar but not exactly like the RF modulated signal observed coming from the heads of a VCR.
- The best way to check for the presence of video in the LVDS signal, while monitoring with a scope, is to interrupt the incoming video. When the incoming video signal is interrupted, there will be a change in the appearance of this modulated signal. That is the best way to detect that the LVDS is passing the video signal.
- The LVDS checkpoint is on the Main Drive PWB CN301.



- As noted here, it may be somewhat difficult, but the selected audio (from any of the AV inputs) can be monitored at CN100T.
- This is ANALOG AUDIO, and looks like an audio waveform would normally look.
- The audio input from the HDMI through to the Digital Signal PWB will look the same, this should be observed at CN002 of the Digital Signal PWB.



- The audio output IC is a Class-D amplifier, that uses Delta modulation to convert the incoming analog signal to PWM.
- Except for the change in pulse width, the PWM can be considered as a digital signal.
- For this reason, the output amplifier has low power loss (> 94% efficiency) and hence no need of a heat sink.

•The circuit at the bottom right of this diagram is for audio muting. At unit turn-on and turn off, it suppresses "popping" and other possible audio disturbances.

The SELECTED audio signal enters IC1140 (MTS, Switching and Tone Control IC) on Pins 33 and 34 as Audio L and Audio R and in on Pin 13 as TV AUDIO.

•The audio is then sent to IC1701 (A.H.S IC). If the Surround Sound effect is not selected, the signal passes through un-modified.

•Out of that IC1701 it travels to IC1641, the BBE chip. The BBE chip is used to alter the incoming sound to lend a more "realistic" acoustical sound as perceived by the program viewer. In this unit, BBE is a customer selectable option.

•The audio signal leaves the BBE chip on Pins 7 and 14 as a "normal" audio waveform.

•From this point on, the audio signal as we know it changes. For purposes of explanation, only the right channel of audio will be covered. The other channel functions exactly the same.

•The audio output IC1661 is operated as a class "D" amplifier. There is no heat sink needed on this IC because of it's Class D operating characteristics and use of PWM (Pulse Width Modulation).

•The amplifier circuit is a self oscillating circuit operating at 240Khz. The output is fed back to the comparator and is converted to a triangular waveform by the RC network in the feedback loop. The incoming audio is compared internally with the triangle waveform and the output is the resulting PWM signal.

•The audio enters IC1621 on Pin 5. The output wave-shapes of this IC are shown at Pin 7 of IC1621. With no signal input, the output is a 240Khz square wave. The input signal at Pin 5 will modulate this wave-shape, thus converting the input signal to a PWM signal. On the resulting PWM signal from IC1621 Pin 7, frequency changes of the input signal (Deviation of Modulation) and amplitude changes (Depth of Modulation) are expressed in the output waveform.

# TROUBLESHOOTING SETUP POWER PWB



- Remove the (6) screws that secure the Power PWB to the frame.
- Carefully remove the wire harness from the holders.
- Position the PWB as shown, ensuring that the PWB Components won't touch the metal chassis during troubleshooting

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 Access to the Power PWB for troubleshooting can be gained by removing it from it's frame and laying it down as shown.

Remove the (6) screws that secure the Power PWB to the frame.

 Carefully remove the wire harness from the holders, allowing the board to move freely.

 Pay attention to locations of wires, as these should be placed in the same location upon reassembly of unit.

 Ensuring that the PWB Components won't touch the metal chassis during the positioning of the PWB for troubleshooting.

#### CAUTION

 During Troubleshooting be careful as not to short the HOT and COLD grounds together.

The white solid line on the PWB identifies the HOT and COLD sections.

 Unless using an isolated supply, <u>do not</u> connect the measurement instruments ground to the HOT ground. Failure to follow these directions could result in damage to equipment or physical injury.

# TROUBLESHOOTING SETUP ANALOG & REGULATOR PWB



Remove the Power PWB, Power PWB Bracket and AV Board.

Remove the Digital Signal PWB/Digital Tuner Module and place it on top of the OP Engine as shown in the picture. JVC

- Access to the Regulator and Analog PWB for troubleshooting can be gained by the following.
- Remove the Power PWB. The Power PWBs bracket should be completely removed to prevent possible damage to components.
- Remove the AV Board along with the SD Card PWB. It will be necessary to disconnect the connector from the SD Card to the Digital Tuner Module.
- Remove the Digital Signal PWB/Digital Tuner Module securing screw located on the OP Chassis Base behind the (2) PWBs.
- By sliding the PWBs forward, it is possible to remove the (2) PWBs from the OP Chassis Base.
- Lay them on the top of the OP Engine as shown in the picture.
- It will be necessary to remove the screw that secures the LVDS cable to allow free movement of the Digital Signal PWB/Digital Tuner Module.
- The Power PWB can be reconnected to Power ON TV. Connect the PWB connectors and lay on its side as previously shown.
- Complete Removal of the Power PWB bracket during troubleshooting is best to prevent shorting during troubleshooting.

#### CAUTION

Placing the Digital Signal PWB/Digital Tuner Module as shown can scratch the Lens. Cover the Lens to avoid scratching.

### TROUBLESHOOTING SETUP RECEIVER

Caution: Cover the vents to prevent dust/debris from entering the OP



- Remove the Power PWB, Power PWB Bracket and AV Board.
- Remove one screw and detach the Digital PWBs from the chassis
- Remove one screw and detach the Receiver Board and Analog Board together.

Access to the Receiver PWB for troubleshooting can be gained by the following.

• Remove the Power PWB. The Power PWBs bracket should be completely removed to prevent possible damage to components.

 Remove the AV Board along with the SD Card PWB. It will be necessary to disconnect the connector from the SD Card to the Digital Tuner Module.

• Remove the Digital Signal PWB/Digital Tuner Module securing screw located on the OP Chassis Base behind the (2) PWBs. By sliding the PWBs forward, it is possible to remove the (2) PWBs from the OP Chassis Base.

 It may be necessary to remove the screw that secures the LVDS cable to allow free movement of the Digital Signal PWB/Digital Tuner Module.

• Remove the Receiver PWB securing screw located on the OP Chassis Base behind the Receiver PWB .

 By sliding the unit forward, it is possible to remove the Receiver, Analog and Regulator PWBs from the OP Chassis Base.

- Place the PWBs as shown, this will allow you to troubleshoot the Receiver PWB.
- The PWBs can be reconnected to Power ON TV.

Complete Removal of the Power PWB bracket during troubleshooting is best to prevent shorting during troubleshooting.

#### CAUTION

Cover the vents to prevent dust/debris from entering into the OP. Coffee Filters are perfect for preventing the introduction of debris and dust into the OP Engine. Allow room for air Flow if you intend to Power ON the OP Engine.

# TROUBLESHOOTING SETUP

#### Additional Info







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Carefully Remove metallic Tape on LVDS cable This should be reinstalled during assembly of OP Engine



 The Receiver PWB and Digital PWBs are secured to the OP Chassis base with a single screw.

 After removal of the Screw it is necessary to slide the brackets holding these PWBs forward to detach the claw that holds them to the OP Chassis Base

There are several Clip connectors connecting the PWBs of the OP Engine

 Always ensure the Flat Cable is properly inserted into these connectors. Failure to do so will result in malfunction or non-operation of the TV

 It is not necessary to remove the Antenna inputs located on the AV Board. It is only necessary to remove the screws that secure the A/V inputs to the AV Board to remove it.

 During removal of the LVDS cable it may become necessary to remove the Metallic Tape that secures the LVDS cable to the Main Drive PWB.

Carefully remove the tape to and reapply during final assembly of the OP Engine

# PART REPLACEMENT OP/DRIVE ASSEMBLY

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> The OP/Drive Assembly is shipped using this cabinet.

> Use the same cabinet to return the defective unit.
- Remove OP/Drive Assembly from shipping container prior to installation.
- Keep this container to use for return of the defective unit
- The defective part must be properly packaged to prevent shipping damage.
- Core Parts must be returned intact to receive credit.

## PART REPLACEMENT



1. Disconnect all connectors from the Main Drive PWB

**OP/Drive Assembly** 





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2. Remove IR and Fan Control PWBs



3. Remove Duct PCS



4. Remove (14) OP Assembly Screws

ALWAYS BE SURE COVER THE INTAKE AND EXHAUST AIR VENTS FOR THE RE-CIRCULATING SYSTEM!



To remove the OP/Drive Assembly it is necessary to perform these procedures.

> When not performing repair work, reattach the cap on the lens

> to preventing dust from covering or scratching of the Lens.

> When installing the OP/Drive Assembly into the OP Engine, make sure the front of the lens side is in contact with the cushion on the body side.

> Do not leave the OP/Drive Assembly removed for long without properly covering vents to ensure dust does not enter the OP Engine or OP/Drive Assembly

Coffee Filters may be used to prevent introduction of debris and dust into the OP Engine.

The entire Fan Housing does not need to be removed to replace the OP block.

Begin disassembly by removing the all connectors attached to the Main Drive PWB.

Next, It is necessary to remove the IR and Fan Control PWBs. These will need to be reinstalled with the new OP/Drive Assembly.

Remove the Duct PCS covering the Lamp. It may be necessary to remove the lamp as well.

•Finally, remove the (14) screws securing the OP/Drive Assembly to the OP Chassis Base. The locations of these screws was shown on the "OP/Drive Assembly Screw Locations" slide.

Reinstall the new OP/Drive Assembly in the reverse order, ensuring the proper screws are used in the correct location.

Properly test an calibrate the unit upon installation.

Refer to the Service Manual for details of removal and adjustment.

## PART REPLACEMENT OP LENS



- 1. Remove all screws attaching the Lens to the OP.
- 2. Remove the Lens from the OP.
- 3. Replace the Lens and adjust the focus as required.



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 It may be necessary to replace the OP Lens if it has become scratched or damaged beyond repair. The OP Lens may be replaced separately from the OP Engine.

• <u>The use of gloves is highly recommended</u> to prevent fingerprints and grease from getting onto the lens. Take care to <u>ensure that minimal dust/dirt is allowed to enter the OP Engine during lens replacement.</u> Contaminants on the Lens or inside the OP engine may become visible in the TV image.

Remove the screws attaching the OP Lens to the OP Engine.

• Remove the old Lens from the OP Engine.

• <u>CAUTION: Take note of any shims that may have been used with the OP Lens during removal. These need to be reinstalled with the replacement lens.</u> Failure to replace shims may result in a image that does not project to the proper Center location of the screen.

 Install the new OP Lens ensuring that any shims used on the previous lens are reinstalled in the correct position with the new lens.

• <u>Inspect the new lens for Dust/Dirt prior to installation</u>. Failure to do so may require disassembly of unit for cleaning. If it becomes necessary to clean the lens, gently wipe with a dust free cloth or use compressed air to blow away dust particles. If the lens is very dirty, wipe it with a damp cloth dipped in a diluted kitchen cleaner (neutrality detergent); then wipe immediately after with clean, dry cloth. Never use the organic solvent such as the alcohol or benzene.

The Lens focus <u>MUST</u> be adjusted after installation of the new lens. <u>This should be done with the OP engine inside the TV chassis.</u>

## FINAL ASSEMBLY CHECKLIST

- 1. Assemble the unit completely including the back cover.
- 2. Power up the unit and receive a white pattern.
- 3. Observe the front screen and confirm the absence of dust.
- 4. If dust is present, remove the front screen assembly and remove the dust.
- 5. Reset the HDMI input: Enter the "Service Menu". Select "2.SELF CHECK". Using the remote, power off the unit. Wait until the unit cools. Remove the AC cord.
- 6. If the HDMI input is not reset by step 5, reset using the JVC jig remote.
- 7. Reconnect AC cord and power on.
- 8. Confirm the unit's operation.

Caution: If the Lamp Door Interlock switch is not closed, the TV will not operate.

Assemble unit by following the disassembly steps in reverse. Always refer to the Service Manual for the specific model you are servicing.

•During assembly take note of the screws types used for each hole. Insertion of the incorrect screw type during Reassembly will cause damage that may not be correctable.

Ensure all connectors are secure prior to placing the OP Engine into the TV cabinet. Failure to do so may cause future failure and require disassembly of the TV.

•With the TV assembled, receive a white pattern and inspect the image for the presence of dust, dirt or debris present in the viewed image. Remove any that is found.

•<u>The HDMI module will need to be reset after service</u>. Enter the service menu and select "2", the Self Check option. Power off the unit using the Remote. Allow the unit to complete its Cool Down cycle, then unplug the AC Power. Reconnect the AC Power and power on unit. Confirm HDMI input operation.

# FINAL ASSEMBLY

1. Physically place (1) finger on each screw and connector, checking presence and connectivity



2. Ensure all ducts are uncovered for final testing



3. Depress and hold Lamp Cover Switch

It is necessary to utilize the Test Jig with "Z" Model chassis to prevent data loss.



4. Apply Power and use paper to view TV menu

## JVC

 Before Powering ON the TV to perform final testing, check to ensure all screws and connectors are in place and properly inserted.

 Do this by touching each screw and connector to verify that they are present and properly inserted in place.

If the ducts were covered during troubleshooting, uncover them ensuring that no dust/debris will enter the port prior to insertion into the TV cabinet.

• If the OP Engine will not be inserted into the TV, reinstall duct covers prior to storage.

It is necessary to close the Lamp Door switch to Power ON the TV, this can be held in place using tape while troubleshooting the OP Engine.

 If working on a "Z" model chassis, ensure that you use the Service JIG when Powering ON the TV.

Power on the OP Engine. A sheet of paper can be used to view the image from the OP Engine while it is outside the TV Chassis by placing it over the OP Output Lens.

 Press the [Menu] button, if the User Menu can be seen you can assume the OP Engine is functioning properly.

- It may be best to test for Video Input depending on the original TV failure symptom.
- After Installation into TV Chassis, you <u>MUST</u> reset the HDMI Input.

## FINAL ASSEMBLY FOCUS ADJUSTMENT

#### Required after OP Engine, OP/Drive Assembly or OP Output Lens Replacement



1. Remove Speaker grills and front panel (refer to Television Service manual).

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- 2. Loosen the Focus lock screw using a 2.5mm Hex wrench.
- 3. Power on the unit and press [MENU] to display the Menu Bar.
- 4. Closely observe the green bar so that you can see the LCD pixels.
- 5. Adjust the focus to until the pixels are displayed clearly.
- 6. Tighten the lock screw.





- Center Cover and Foam Air Blocking Pad removal not shown in the Service Manual.
- These must be removed to access Focus Knob/Ring and Focus Lock Screw

Remove the Center Cover and Foam Air Blocking Pad (if there) to access Focus Adjustment Knob/Ring and Focus Adjustment Screw.

• The Center Cover and Foam Air Blocking Pad are not shown in the Television Service Manual If the OP Engine, OP/Drive Assembly or OP Output Lens has been replaced, the focus must be adjusted.

Remove the speaker grilles from the front of the cabinet. Grasp by pulling it away the front of the unit. (This
may vary slightly between TV models)

• Remove the (4) gold coarse threaded screws that hold the front (center) panel in place and remove it by gently pulling it away from the front of the unit. Care should be taken with this step to avoid damage to the Power Button PWB. The PWB will now be away from the front access area to the lens assembly.

- Remove the Center Cover by removing the (2) black screws and remove the foam pad.
- Instructions for this disassembly procedure are covered in the Service Manual.
- Looking inside the recess, there is a hex locking screw. With a 2.5mm Hex Wrench, loosen this screw.
- Adjust the focus by moving the focus Handle or turning the ring.

 Best focus can be adjusted by displaying and observing the TV User Menu. Adjust the focus control handle for highest definition in the field behind the text. When you achieve best focus, the LCD pixels will become evident. Once this has been done, hold the focus adjustment handle and gently re-tighten the focus handle locking screw.

DO NOT OVERTIGHTEN THE LOCKING SCREW. Snug is good enough.

## FINAL ASSEMBLY

CONVERGENCE/PICTURE CENTERING ADJUSTMENT



- 1. Enter the TV "Service Menu".
- 2. Press [9] to display the "RGB Box Pattern" mode (hidden in menu).

#### **Remote Functions**

[DISPLAY] – selects between Red/Blue colors and Convergence/Centering Screen. [CH +/-] - left/right adjust [Vol +/-] - up/down adjust [BACK] - save and exit.

In this adjustment procedure (shown in Television Service Manual), we are adjusting the convergence of the TV and the position
of the RGB video display for total picture center.

- The convergence adjustment ensures the (3)colors of the ILA devices lay over each other as accurately as possible.
- Turn ON the TV and apply a Crosshatch signal to and select Video 1 input.
- It is always best to wait at least 30 minutes to allow the unit and any test equipment you may be using stabilize.
- With the remote control, press the [SLEEP TIMER] button. While "SLEEP 0 MIN" is displayed and before it times out from the display, simultaneously depress the [VIDEO STATUS] and [DISPLAY] buttons. This will allow you to enter the Service Menu.
- Press [9"] on the remote control. This action will display the RGB BOX pattern similar to the one in this slide.
- The Display shown by Pressing [9] will vary based on the model, also, this option will not appear as one of the choices in the Service menu.
- The [DISPLAY] button is the adjustment mode selection. Pressing this button steps through the "R", "B", and "RGB" modes. In the "R" mode, the red color is able to be moved up, down, left and, right by using the [CH+/-] and [VOL+/-]. The "B" mode works similarly, as does the "RGB".
- With the "RGB" mode, all (3) colors shift at the same time to the same degree, to allow picture centering.
- There is no "G" adjustment possible because that color is considered the standard by which the other convergence adjustments are made.
- While observing the inputted Crosshatch pattern, adjust the screen in the RGB adjust mode so that the circle pattern is centered.
- Your test generator may not have a circle pattern available. Centering of the picture may be a little different in that the squares of the cross hatch can be used by using the above adjustment procedure to place it proportionately on the screen, keeping attention on centering the pattern and having an equal proportions of squares at the sides, top, and bottom.
- To exit this adjustment, merely press the [BACK"] button on the remote control to save the settings and exit the menu. With this adjustment, it is not necessary to save this particular data by pressing the [MUTING] button.

### SLIM HD-ILA OVERVIEW

JVC



The displayed image and operation of the OP in the SLIM HD-ILA is the same as previous HD-ILA models. The only major differences being the Inputs/Remote, Lamp, the (3) mirrors used to create the Slim Function, and the Split Chassis design of this model. All operation of the HD-ILA up to the output from the OP Output lens is approximately the same as previous models.

#### Input/Remote

• The Slim HD-ILA uses a new remote. This remote functions with other JVC models and other model remotes will control the Slim HD-ILA.

• Older Model Remotes can access and control the Service Menu, but these remotes cannot control the User Menu.

• HDMI inputs are now inputs 1 and 2, with all other video sources being the remaining inputs. All inputs can be accessed directly from the Remote Control.

#### **Slim Function**

•The Slim Function is created using (3) mirrors after the OP output Lens.

•The first **Flat Mirror** centers the image to the Curved Mirror.

•The Curved Mirror projects the image to the Back Mirror Mounted in the TV cabinet.

•The Back Mirror Adjusts Tilt and Trapezium of the image and projects it to the Screen.

•The Flat and Curved Mirror are not Service Adjustable and should not be adjusted. Cleaning of these mirrors should only be done using a combination of compressed air and a vacuum to remove particles.

•The Back Mirror mounted in the TV cabinet is Service Adjustable. Refer to "ENG-07041001-T - TV is displaying poor geometry" and the TVs Service Manual for instructions.

#### **Split Chassis**

•The OP Engine of the SLIM HDILA is composed of (2) separate pieces.

•The AV section processes and produces all audio and video signals. The Audio is output to the TV speakers. The video is converted to an LVDS signal that is sent to the OP Section. The Power supply is also located in this Section

•The OP section has all the Optics components and circuitry. These components provide drive the HD-ILA components and produce the image that is output to the TV Screen. This section includes the different **Lamp (part# PK-CL120U)** and Ballast.

## SLIM HD-ILA OVERVIEW

## JVC



#### **Split Chassis**



Wires must be as shown, with the LVDS Cable on the bottom and Power Wires on Top



- Split Chassis Design
- Connected by LVDS Cable and Power wires.
- Chassis is removed from front

- All (3) brackets must be reinstalled with chassis
- General Operation is the same as previous HD-ILA models
- A/V Section PWBs available

inputs HDMI ATSC A/V Section Tuner Tuner **OP** Section **PWB** PWB 380V to Ballast PWB **AV Section PWB** Power supply Voltages A/V A/V 13.5/-9V to Drive PWB **PWB** Speaker Output Analog **PWB** Video Digital LVDS PWB

•The Block Diagram shows the General A/V and Power signal flow from the AV Section to the OP Section.

 Unlike previous models, the OP Engine is split into (2) separate halves and is accessed from the Front of the TV.

The Pictures show the (2) OP sections, wire routing and TV Cabinet Brackets

•The Body Bracket shown in the middle image supports the upper portion of the TV cabinet. When this is removed the weight of the upper TV Cabinet may make removal of the (2) Sections difficult. Removing this weight by pushing slightly on the Top of the TV may make the Sections removal easier. This may also prevent stripping screws during reassembly/disassembly.

•The Body Bracket should be reinstalled if the TV is to remain stored for an extended period. All brackets Must be reinstalled.

The only connection between the (2) sections is the 380V line that supplies the Ballast Voltage, the 13.5 and -9V supply voltage to the Drive PWBs and the LVDS cable to the Drive PWB.

•When reconnecting these wires, ensure that you connect the 9-pin supplying the 13.5/9V from the Power PWB into CN3002, next to the LVDS Cable Input on the Drive PWB. This may be mistakenly inserted into the 10 pin connector located near it on the Drive CPU PWB.

•All wires must be run as shown in the photo; with the LVDS cable running along the bottom and the Power wires running through the channel along the top of the OP. This is necessary to prevent image distortion and interference.

•All PWBs located in the AV section are available through parts. The OP Section is currently only available as a single part, that will include the OP Assembly, Drive PWBs, Lamp Ballast, OP output lens, and Mirror Assembly.

Replacement of the OP Section requires the same adjustments as previous models. The Focus adjustment requires a 3mm hex wrench and is accessible through a hole below the Ballast PWB.

## Service Bulletin

#### McAllen Magic Writer

#### refer to "TG-07030901-T - McAllen Magic Writer Users Manual"

#### Purpose of the Jig

Digital Upgrades for HDMI compatibility. Refer to TT-06090701-T(R5)

- Main Drive PWB replacement
- ➢EEPROM Read/Write



JVC

#### Included Accessories:

USB Cable

- •Main Drive (DD) interface cable
- •(DILA/LCD ROM interface cable
- AV / CRT interface cable

#### PC Requirements:

- McAllen Magic Writer software (Download from iSee)
- Operating Systems Supported: Windows98 / Win2K / WinXP
- USB input

- The McAllen Magic Writer (MMW) is used for Digital Upgrades for HDMI Compatibility, Main Drive PWB replacement and EEPROM read/Write
- Refer to TT-06090701-T(R5) for HDMI Compatibility instructions.
- Refer to TG-07030901-T for instructions on the use of the MMW Jig
- Prior to using the MMW Jig it is necessary to download the latest version of the MMW Software located on the iSee Database.
- Ensure you have a computer that is compatible with the MMW prior to use.

## Service Bulletin

Cannot receive Digital Channels

#### Affected Models: (also see next page)

Include the following ATSC Tuner module PWB.

P.W.BOARD	Update digital media	
SSD-2201A, SSD-2202A, SSD-2203A, SSD-2204A, SSD-2206A,	SD card	
SSD-2205A,	USB flash drive	

Refer to "SB-07022101-T - Can not receive digital broadcasting"

#### Symptom:

- 1. After "Auto programming", Digital Channels cannot be received.
- 2. After choosing digital channel "xx-0", Digital Channels cannot be received, then the screen becomes black.
- 3. Cannot access "Digital Setup" menu.

#### Cause:

According to the ATSC broadcast rule, channel "xx-0" is assigned for analog signal channels. However, QAM Cable Broadcast does not have this rule. The QAM Cable Broadcast use of channel "XX-0" causes the TVs Digital Tuner to malfunction

#### Solution:

Replace the Digital Tuner and prior to connecting antennae signal or programming channels, upgrade to most recent Software Version available on ISee.

- •QAM is the Digital Transmission standard for Cable stations.
- •ATSC is the Digital Transmission standard for Over-the-Air TV transmission
- Some QAM Cable broadcasts utilize channel "XX-0", which is not considered a useable channel according to the ATSC Standard.
- Reception of this channel may cause a Digital Tuner malfunction.
- This symptom only affects the PWBs listed.
- If the PWB is damaged as a result of this, it is necessary to replace the PWB.

After replacement and prior to connecting the TV to an Antenna/Cable source; it is necessary to install the latest software version to ensure the new PWB is not damaged by the same problem.

The Software is available on iSee.

Refer to SB-07022101-T for instructions.

## Service Bulletin

Setup required after replacing the Digital PWB

#### Symptom:

After replacing the Digital PWB, unit powers up with delayed power indicator.

#### Cause:

Incorrect data in Digital PWB's EEPROM.

### Solution:

change data at address "S039" from "01" to "00".

#### Method for Data re-set:

1.Enter the "Service Menu".

2.Press **[1]** (Adjust).

3.Select data address "S039" by using the [CH +] button.

4.Press **[Vol +/–]** to set the data to "00".

5.To store the data, press the [Mute] button,

6.The On-Screen-Display will blink once.

7.Press the **[Back]** button twice to exit the "Service Menu".



Refer to **SB-06022402-T(R)** - Setup required after replacing the Digital PWB

- Some Digital PWBs have incorrect data stored at address "S039".
- If this PWB is installed in a TV it will cause a "Delayed power indicator"
- This can be corrected by changing the data at address "S039" to "00"
- Refer to for SB-06022402-T(R) details

## Service Bulletin

SLIM HD-ILA has poor geometry



The Back Mirror in some SLIM HD-ILA models may shift if improperly handled causing poor Geometry. The Back Mirror should be adjusted to correct this problems.

 The Back mirrors Adjustment Screws affect the picture as shown in the images. (tilt and trapezium)

•The Locking Mechanism may stick and cause the Back Mirror to bow slightly during adjustment. To prevent this, strongly tap on the 4 corners and center of the back of the TV cabinet periodically during adjustment. This tapping will cause the Back Mirror to fully move into it correct position.

When tightening the lock Screws; always tighten Screw (B), located at the bottom, first. The top (2) screws should be tightened afterward in no particular order.

Refer to ENG-07041001-T for more details.

## Service Bulletin No PlayStation3 HDMI

operation with PS2 Games

#### Symptom:

No PlayStation3 HDMI operation with PlayStation 2 Games. All other media works from PlayStation 3 using HDMI.

#### Cause:

The PlayStation 3 does not properly perform "HDMI Handshake".

#### Solution:

Use Jig to install new software into TV to counteract problem.

Software	Models Included	
AD_UI_FH97_1080p_070222.mot [d0.13]	HD-xxFC97 HD-xxFH97	HD-xxFN97 HD-PxxR2U
AD_UI_FB97_1080p_070222.mot [u0.05]	HD-xxFA97	HD-xxFB97

#### refer to "ENG-07031901-T - No PlayStation3 HDMI operation with PS2 Games"



### JIG (part #CTU96004)

Included Accessories: Interface Cable

#### PC Requirements:

- Flashwriter software (Download from iSee)
- Operating Systems Supported: Windows98 / Win2K / WinXP
- USB input

- Some HD-ILA models would not display Playstation 2 Games when played using a PlayStation 3 Console over HDMI.
- Models with these problems will play all other Media formats and will display the Playstation 3 menu over HDMI
- This is caused by the improper handshake method used by the Playstation 3
- To prevent this, use this Jig to install the software for the model being serviced.
- All software may be downloaded from iSee.
- Refer to ENG-07031901-T for detailed instructions.