PlasmaWall™

PL-50XA

with WideVision™

Xtreme Altitude
Flat Panel Display Monitor
and Digital High Definition™ Controller
with Vivix II™ Technology

RUNCO

THE WORLD'S FINEST HOME THEATER PRODUCTS™

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INTRODUCTION

» Introduction to the Runco PlasmaWall™ PL-50XA (Xtreme Altitude) Flat Panel Display Monitor

Congratulations on your purchase of the Runco PlasmaWall™ PL-50XA. This state-of-the-art High Definition flat-panel plasma display monitor was specifically designed for outstanding performance in high altitude environments. With an altitude rating of over 9000 feet, this new plasma monitor offers Runco picture quality in mountain locations usually off limits to plasma displays. The PL-50XA is actually a two-piece system - the plasma panel and the DHD™ controller with VivixII™ video processing. The digital high definition DHD™ controller is a digital scaler that converts NTSC Video, S-Video or Component video to 720p and has includes 3:2 film detection circuitry. And since the display is the 16:9 aspect ratio, DVD widescreen movies and digital television will look the way they were intended to look - in the widescreen format. The PL-50XA has an external Runco video processing including 3:2 film detection circuitry. This 50-inch widescreen boasts High Definition resolution of 1365 x 768 with a 16:9 aspect ratio. The included DVI digital input with HDCP enables a pure digital signal path for optimum image quality. Typically, fixed pixel devices provide a much more resolved and artifact-free image when they are fed a progressive signal matched to the display's native resolution - which is exactly what the DHD™ controller does. It also simplifies the operation of the system, as all image adjustments (including aspect ratio control) and video switching are done at the DHD™ controller, not at the plasma level.

Plasma technology in proving to be the most flexible and reliable type of display device currently available. The PL-50XA is considered a fixed-pixel device. The plasma uses tiny gas-filled pixels to create an image, from ignition of gases within the cells to generate the light displayed. This product has been skillfully engineered for the finest video performance. The advanced design accommodates custom installation and every day operation with ease. This technology allows for great versatility to be used in any situation from a dark dedicated theaters to light-filled rooms. At less than 4 inches thin it can be wall-mounted or used with a table top stand.

This manual will explain how to use the PL-50XA plasma display, combined with the DHD controller to provide the best picture quality within high altitude environments. Please read this manual carefully before using your PL-50XA system, especially the safety precautions!

» The features you'll enjoy include:

• 16:9 Native Resolution: 1365 x 768
• DVI Input with HDCP
• IR and discrete RS-232 Control for custom installation integration
• Multiple Aspect Ratio
• 160 degree horizontal/vertical viewing angle
• Accepts all DTV formats (via outboard decoder), including 1080i, 720p, 480p
• HDTV Ready
• Includes the Runco DHD controller for superior video processing
• Less than 4 inches thin

Contents of the package:
• Plasma display monitor
• Power cord
• Remote control with two AAA batteries
• User's manual
• Safety metal fittings*
• Screws for safety metal fittings*
• Ferrite core (small x 2, large x 2), bands
• Cable clamps

* These are fittings for fastening the unit to a wall to prevent tipping due to external shock when using the tablestand (optional).
Fasten the safety fittings to the holes in the back of the plasma using the safety fitting mount screws.

Options:
• Wall mount unit
• Tilt mount unit
• Tablestand

» Precautions

Please read this manual carefully before using your plasma monitor and keep the manual handy for future reference.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude, it is dangerous to make any kind of contact with any part inside this unit.

This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

WARNING

TO PREVENT FIRE OR SHOCK HAZARDS, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE. ALSO DO NOT USE THIS UNIT'S POLARIZED PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLETS, UNLESS THE PRONGS CAN BE FULLY INSERTED. REFRAIN FROM OPENING THE CABINET AS THERE ARE HIGH-VOLTAGE COMPONENTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

» Warnings and Safety Precautions

No maintenance other than cleaning is required. Please see the section "Plasma monitor cleaning procedure" on page 5. The plasma display panel consists of fine picture elements (cells). There may be some cells that do not produce light or remain lit. For operating safety and to avoid damage to the unit, read carefully and observe the following instructions. To avoid shock and fire hazards:

1. Provide adequate space for ventilation to avoid internal heat build-up. Do not cover rear vents or install the unit in a closed cabinet or shelves. If you install the unit in an enclosure, make sure there is adequate space at the top of the unit to allow hot air to rise and escape. If the monitor becomes too hot, the overheat protector will be activated and the monitor will be turned off. If this happens, turn off the power to the monitor and unplug the power cord. If the room where the monitor is installed is particularly hot, move the monitor to a cooler location, and wait for 60 minutes to cool the monitor. If the problem persists, contact your dealer for service.
2. Do not use this unit's polarized plug with extension cords or outlets unless the prongs can be completely inserted.
3. Do not expose the unit to water or moisture.
4. Do not insert any objects, especially metal or liquids, into the Plasma or DHD™ Controller.
5. Do not place the units in direct sunlight, near heaters or in extremely dusty or humid locations.
6. Do not install this system outdoors or otherwise exposed to the elements.
7. Do not place heavy objects on top of the Plasma or DHD™ Controller.
8. Avoid damage to the power cord, and do not attempt to modify the power cord.
9. Unplug the power cord during electrical storms or if the unit will not be used over a long period.
10. Do not open the cabinet which has potentially dangerous high voltage components inside. If the unit is damaged in this way the warranty will be void. Moreover, there is a serious risk of electric shock.
11. Do not attempt to service or repair the unit. The manufacturer is not liable for any bodily harm or damage caused if unqualified persons attempt service or open the back cover. Refer all service to authorized Service Centers.

NOTE:

When you connect a computer to this monitor, use an RGB cable including the ferrite core on both ends of the cable. And regarding DVI and power cable, attach the supplied ferrite cores. If you do not do this, the monitor will not conform to mandatory FCC standards. Attaching the ferrite cores: Set the ferrite cores on both ends of the DVI cable (not supplied), and both ends of the power cable (supplied). Close the lid tightly until the clamps click. Use the band to fasten the ferrite core (supplied) to the DVI cable.

DVI cable (not supplied)

band   band   Connector

core (small)   core (small)

Power cable (supplied)

core (large)

core (large)
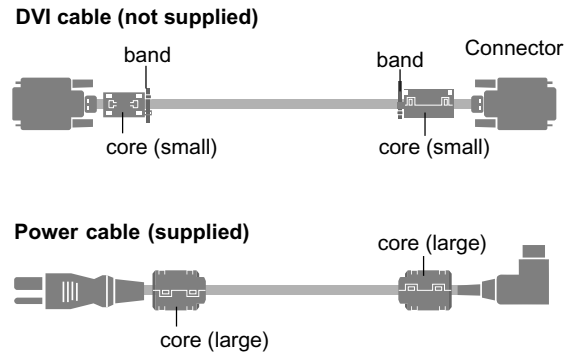
» To avoid damage and prolong operating life:

1. Use only with 120V 50/60Hz AC power supply. Continued operation at line voltages greater than 120 Volts AC will shorten the life of the unit, and might even cause a fire hazard.

2. Handle the unit carefully when installing it and do not drop.

3. Set the unit away from heat, excessive dust, and direct sunlight.

4. Protect the inside of the unit from liquids and small metal objects. In case of accident, unplug the power cord and have it serviced by an authorized Service Center.

5. Do not hit or scratch the panel surface as this causes flaws on the surface of the screen.

6. For correct installation and mounting it is strongly recommended to use a trained, authorized dealer.

7. As is the case with any phosphor-based display (like a CRT monitor, for example) light output will gradually decrease over the life of a Plasma Display Panel.

8. To avoid sulfurization it is strongly recommended not to place the unit in a dressing room in a public bath or hot spring bath.

» Plasma monitor cleaning procedure:

1. Use a soft dry cloth to clean the front panel and bezel area. Never use solvents such as alcohol or thinner to clean these surfaces.

2. Clean plasma ventilation areas with a vacuum cleaner with a soft brush nozzle attachment.

3. To ensure proper ventilation, cleaning of the ventilation areas must be carried out monthly. More frequent cleaning may be necessary depending on the environment in which the plasma monitor is installed.

Recommendations to avoid or minimize phosphor burn-in:
Like all phosphor-based display devices and all other gas plasma displays, plasma monitors can be susceptible to phosphor burn under certain circumstances. Certain operating conditions, such as the continuous display of a static image over a prolonged period of time, can result in phosphor burn if proper precautions are not taken. To protect your investment in this plasma monitor, please adhere to the following guidelines and recommendations for minimizing the occurrence of image burn:

* Always enable and use your computer's screen saver function during use with a computer input source.

* Display a moving image whenever possible.

* Change the position of the menu display from time to time.

* Always power down the monitor when you are finished using it. If the plasma monitor is in long term use or continuous operation take the following measures to reduce the likelihood of phosphor burn:

* Lower the Brightness and Contrast levels as much as possible without impairing image readability.

* Display an image with many colors and color gradations (i.e. photographic or photo-realistic images).

* Create image content with minimal contrast between light and dark areas, for example white characters on black backgrounds. Use complementary or pastel color whenever possible.

* Avoid displaying images with few colors and distinct, sharply defined borders between colors.

NOTE: BURN-INS ARE NOT COVERED BY THE WARRANTY
Contact your dealer for other recommended procedures that will best suit your particular application needs.

LIMITED WARRANTY

Congratulations on your purchase of a Runco International video product and welcome to the Runco family! We believe Runco produces "The World's Finest Home Theater Products". With proper installation, setup and care, you should enjoy many years of unparalleled video performance.

This is a LIMITED WARRANTY as defined in the Magnuson-Moss Warranty Act. Please read it carefully and retain it with your other important documents.

WHAT IS COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:
SERVICE LABOR: Runco will pay for service labor by a Runco Authorized Service Center when needed as a result of a manufacturing defect for a period of three (3) years from the effective date of delivery to the end user (excluding the plasma glass panel).

PARTS: (Not including plasma glass panel) Runco will provide new or rebuilt replacement parts for the parts that fail due to defects in materials or workmanship for a period of three (3) years from the effective date of delivery to the end user. Such replacement parts are then subsequently warranted for the remaining portion (if any) of the original warranty period.

PLASMA GLASS PANEL: Runco will pay for service labor by a Runco Authorized Service Center when needed as a result of a manufacturing defect for a period of one (1) year from the effective date of delivery to the end user. In addition, Runco will provide new or rebuilt replacement parts for the parts that fail due to defects in materials or workmanship for a period of one (1) year from the effective date of delivery to the end user. Such replacement parts are then subsequently warranted for the remaining portion (if any) of the original warranty period.

WHAT IS NOT COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY:
Image burn-in on plasma display panels are specifically excluded from coverage under this Limited Warranty. Image burn-in is the result of misuse of the product and therefore cannot be repaired under the terms of this Limited Warranty.

TO AVOID IMAGE BURN-IN:
Please ensure that still images are left on your plasma display panel for no more than a few minutes. Also ensure that images displayed in the 4:3 aspect ratio mode (black or gray stripes, but no picture information is present on the left and right edges of the screen) are used as infrequently as possible. This will prevent permanent image burns on your plasma display panel, which can be seen permanently under certain conditions once burn-in has occurred.

The types of images to avoid include video games, still images and computer screens with stationary tool bars and icons. (This is why computers are equipped with screen savers – to prevent still images from burning into the monitor's phosphors after being displayed continuously for an extended period of time).

Normal viewing material such as television/satellite broadcasts, videotape or DVDs (not put into pause for extended periods of time) will not cause damage to your display under normal conditions. Many DVD players are also equipped with screen savers for this reason.

IMPORTANT: Runco is not responsible for image burns on any display. Please exercise caution when using a 4:3 image on a 16:9 screen.

This Limited Warranty only covers failure due to defects in materials and workmanship that occur during normal use and does not cover normal maintenance. This Limited Warranty does not cover cabinets or any appearance items; failure resulting from accident, misuse, abuse, neglect, mishandling, misapplication, faulty or improper installation or setup adjustments; improper maintenance, alteration, improper use of any input signal; damage due to lightning or power line surges, spikes and brownouts; damage that occurs during shipping or transit; or damage that is attributed to acts of God. In the case of remote control units, damage resulting from leaking, old, damaged or improper batteries is also excluded from coverage under this Limited Warranty.

CAUTION: THIS LIMITED WARRANTY ONLY COVERS RUNCO PRODUCTS PURCHASED FROM RUNCO AUTHORIZED DEALERS. ALL OTHER PRODUCTS ARE SPECIFICALLY EXCLUDED FROM COVERAGE UNDER THIS LIMITED WARRANTY. MOREOVER, DAMAGE RESULTING DIRECTLY OR INDIRECTLY FROM IMPROPER INSTALLATION OR SETUP IS SPECIFICALLY EXCLUDED FROM COVERAGE UNDER THIS LIMITED WARRANTY.

RIGHTS, LIMITS AND EXCLUSIONS:
Runco limits its obligations under any implied warranties under state laws to a period not to exceed the warranty period. There are no express warranties. Runco also excludes any obligation on its part for incidental or consequential damages related to the failure of this product to function properly. Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages. So the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

EFFECTIVE WARRANTY DATE:
This warranty begins on the effective date of delivery to the end user. For your convenience, keep the original bill of sale as evidence of the purchase date.

IMPORTANT: WARRANTY REGISTRATION:
Please fill out and mail your warranty registration card. It is imperative that Runco knows how to reach you promptly if we should discover a safety problem or product update for which you must be notified.

CONTACT A RUNCO AUTHORIZED SERVICE CENTER TO OBTAIN SERVICE:
Repairs made under the terms of this Limited Warranty covering your Runco video product will be performed at the location of the product, during usual working hours, providing location of product is within normal operating distance from a Runco Authorized Service Center. In some instances it may be necessary for the product to be returned to the Runco factory for repairs. If, solely in Runco's judgment, location of product to be repaired is beyond normal operating distance of the closest Runco Authorized Service Center, or the repair requires the unit be returned to the Runco factory, it is the owner's responsibility to arrange for shipment of the product for repair. These arrangements must be made through the selling Runco Dealer. If this is not possible, contact Runco directly for a Return Authorization number and shipping instructions. Runco will return product transportation prepaid in the United States, unless no product defect is discovered. In that instance, shipping costs will be the responsibility of the owner.

ADDITIONAL INFORMATION:
To locate the name and address of the nearest Runco authorized service location, or for additional information about this Limited Warranty, please call or write:

<div align="center">

RUNCO INTERNATIONAL
Attn: Customer Service Department
2900 Faber Street
Union City, CA 94587
Ph (510) 324-7777
Fax (510) 324-9300
Toll Free 1-800-23-RUNCO

</div>

HOW TO ATTACH OPTIONS TO THE PLASMA MONITOR

You can attach your optional mounts or stand to the plasma monitor in one of the following two ways:

1) While it is upright. (See drawing A)

2) As it is laid down with the screen face down (See drawing B). Lay the protective sheet, which was wrapped around the plasma monitor when it was packaged, beneath the screen surface so it does not scratch the screen face.

• DO NOT touch or hold the screen face when carrying the unit.

> • This device cannot be installed on its own. Be sure to use a stand or original mounting unit. (wallmount unit, stand, etc.)
>
> • For correct installation and mounting, it is required to use a trained, Runco Authorized Dealer. Failure to follow correct mounting procedures could result in damage to the equipment or injury to the installer. Product warranty does not cover damage caused by improper installation.

Use only the mounting kit or stand provided by Runco. Refer to mounting kit for detailed instructions.

A

B
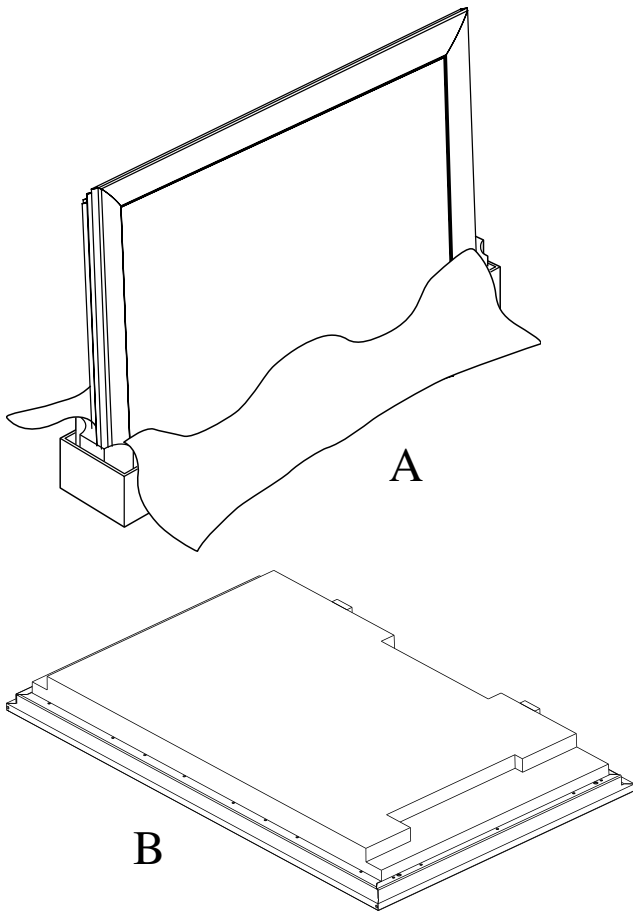
Ventilation Requirements for enclosure mounting
To allow heat to disperse, leave space between surrounding objects as shown on the diagram to the right when installing.
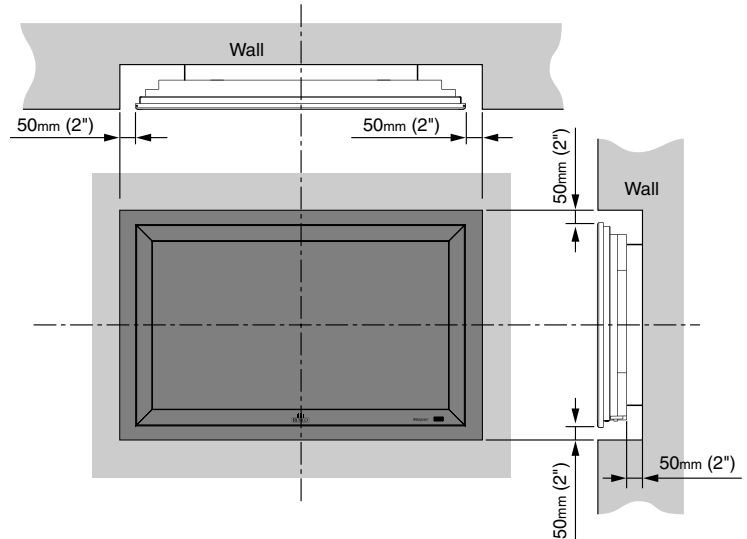
How to use the safety metal fittings and the screws for safety metal fittings
These are fittings for fasting the unit to a wall to prevent tipping due to external shock when using the stand (optional). Fasten the safety fittings to the holes in the back of the monitor using the safety fitting mount screws.
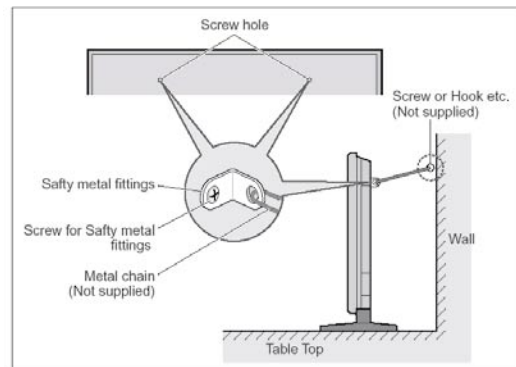
» Step I   Connection

1. Connect the RGBHV cable between the Plasma display and the DHD RGBHV output
2. Connect the 9-pin to RJ-11 adapter only to the plasma's Com Link (RS-232) input, tighten the retaining screws.
3. Connect the RJ-11 phone type cable between the projector and the DHD controller.
4. Connect the AC Power cord to the Plasma, but leave the Main AC in Off position.
5. Connect all input sources to the controller. Video (Composite), S-Video to 1 or 2, Component 480i (RCA) input, HD signals to HD1 or HD2 (BNC), DVI

Note: For proper system calibration S-Video or Component 480i from the DVD player must be used; preferably Component 480i connects to the 3 RCA type input. Joe Kane Video Essential or Avia DVD test disk can be used for image calibration.

6. Connect AC to the DHD controller.
7. Switch both main AC to On position from the Plasma and the DHD.

» Step 2   Calibration and Setup

1. From the controller or use the supplied remote and press the power button (ON) to turn the system on.
2. Make sure you have picture on the screen from all connected sources.

To get into Calibration and Service mode. Press Menu, highlight an empty space below Information. Press "Enter, Right, Right, Left, Left, Enter"

Note: The system must be setup first by using S-Video or Component 480i (RCA input) preferably Component 480i first.

3. Select Component SD from the DHD controller.
4. From the DHD controller, press Menu button to call up the DHD OSD. Use the Up or Down arrow button to select Calibration and press Enter.
5. From the Calibration screen select ISF Night Input Image.
7. Using a test disc and select the Pluge pattern for Brightness and 10-step gray scale for Contrast Adjust for correct Brightness and Contrast.
8. Select Display Color and use the 80 IRE window to adjust the Gain for D6500 Kelvin and 20 or 30 IRE window for Offset setting for D6500.
9. Return to Input Image for Color and Tint adjustments.

For S-Video and Composite input
Select Calibration and highlight Input Image for ISF night option and only adjust the Brightness, Contrast, Color, Tint, and Sharpness. No other adjustment is needed.

» Step 3   HD and DVI Setup
From DHD Controller:

1. For HD input and DVI, select Calibration press Enter and under ISF Night select Input Image for video adjustments.
2. Select Input Color for white balance adjustments.
Special suggestion: For Y/Pb/Pr Input Color, only adjust the Pb and Pr offset.

PLASMA DESCRIPTION

» Plasma Front View

1 POWER
Turns the plasma monitor's power on and off.

2 REMOTE SENSOR WINDOW
Receives the signals from the remote control.

3 POWER
When the power is on it will light GREEN. When the power is on the standby mode, it will light RED.

4 INPUT SELECT / EXIT
Switches the input, in the following order. The available inputs depend on the setting of "BNC INPUT".

RGB: $\rightarrow$ VIDEO1 $\rightarrow$ VIDEO2 $\rightarrow$ VIDEO3 $\rightarrow$ HD/COMP/DTV
$\rightarrow$ RGB/PC3 $\leftarrow$ RGB/PC2 $\leftarrow$ RGB/PC1 $\leftarrow$

COMP: $\rightarrow$ VIDEO1 $\rightarrow$ VIDEO2 $\rightarrow$ VIDEO3 $\rightarrow$ HD1/COMP1/DTV1
$\rightarrow$ RGB/PC2 $\leftarrow$ RGB/PC1 $\leftarrow$ HD2/COMP2/DTV2 $\leftarrow$

5 LEFT/- and RIGHT/+
Enlarges or reduces the image. Functions as the CURSOR (◄/►) buttons in the On-Screen Display (OSD) mode.

6 VOLUME DOWN and UP
Adjusts the volume. Functions as the CURSOR (▲/▼) buttons in the On-Screen Display mode.

7 MENU
Sets the On-Screen Menu mode and displays the main menu.
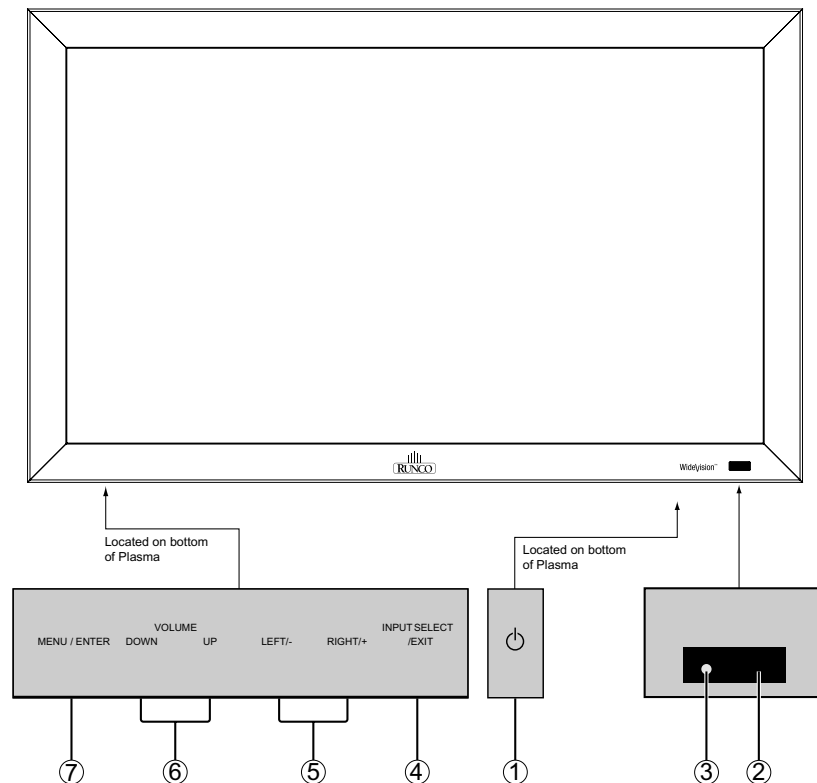
» Plasma Rear View / Terminal Board

A   AC IN
Connect the included power cord here.

B   EXT SPEAKER L and R
Connect speakers (not available from Runco) here. Maintain the correct polarity.

C   VIDEO 1,2,3 (BNC, RCA, S-Video)
Connect VCR's, DVD's or Video Cameras, etc here. VIDEO1 can be used for INPUT or OUTPUT.

D   AUDIO1, AUDIO2, AUDIO3
These are audio input terminals. The input is selectable. Set which video image to distribute them from the audio menu screen.

E   DVD1 / HD1
Connect DVD's, High Definition or Laser Disks, etc here.

F   RGB2, DVD2 / HD2
RGB2: Connect an analog RGB signal and the synchronization signal.
DVD2 / HD2: Connect DVD's, High Definition sources, Laser Discs, etc. here. This input can be set for use with an RGB or Component source.

G   RGB1 (mini D-Sub 15pin)
Connect an analog RGB signal from a computer, etc. here. This input can be used for Input or Output.

H   RGB3, DVD3 /HD3 (DVI 24pin)
Connect a digital signal (TMDS) from a source with a DVI output. This input can be set for use with an RGB3 or DVD3/ HD3 source.

I   EXTERNAL CONTROL (D-Sub)
This terminal is used when operating and controlling the monitor externally by RS-232.
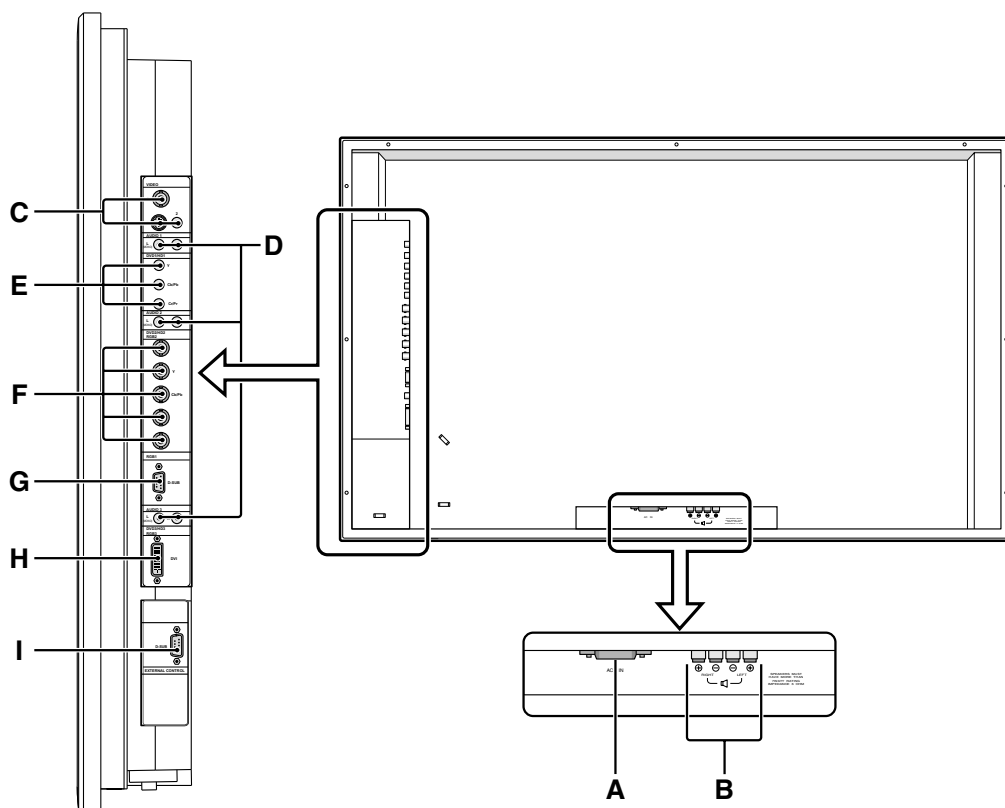
» Plasma Remote Control   (For Service Use Only)

1   ON/OFF
Switches Power ON/OFF. (This does not operate when POWER/STANDBY indicator of the main unit is off.

2   MENU
Press this button to access the OSD controls.
Press this button during the display of the main menu to go to the sub menu.

3   CURSOR (▲ / ▼ / ◄ / ►)
Use these buttons to select items or settings and to adjust settings or switch the display patterns.

4   LIGHT*
Press this to illuminate the buttons.
* Not available on all models.

5   EXIT
Press this button to exit the OSD controls in the main menu.
Press this button during the display of the sub menu to return to the previous menu.

6   VID 1-2-3
Press this button to select VIDEO as the source.
    VID1 → VID2 → VID3
VIDEO can also be selected using the INPUT SELECT button on the monitor.

7   ASPECT
Press this button to select between aspect ratios.

8   MUTE
Mutes the sound.

9   COMP 1-2
Press this button to select between Component 1 and Component 2 inputs.

10   DISPLAY
Displays the source settings on the screen.

11   VOLUME (+/-)
Adjusts the audio volume.

12   RGB 1-2-3
Press this button to select RGB/PC as the source.
The available sources depend on the setting of "BNC INPUT".
    RGB: → RGB1 → RGB2 → RGB3

    COMP: → RGB1 → RGB3

RGB can also be selected using the INPUT SELECT
button on the monitor.

13   AUTO OFF
Use to select AUTO OFF TIMER settings.
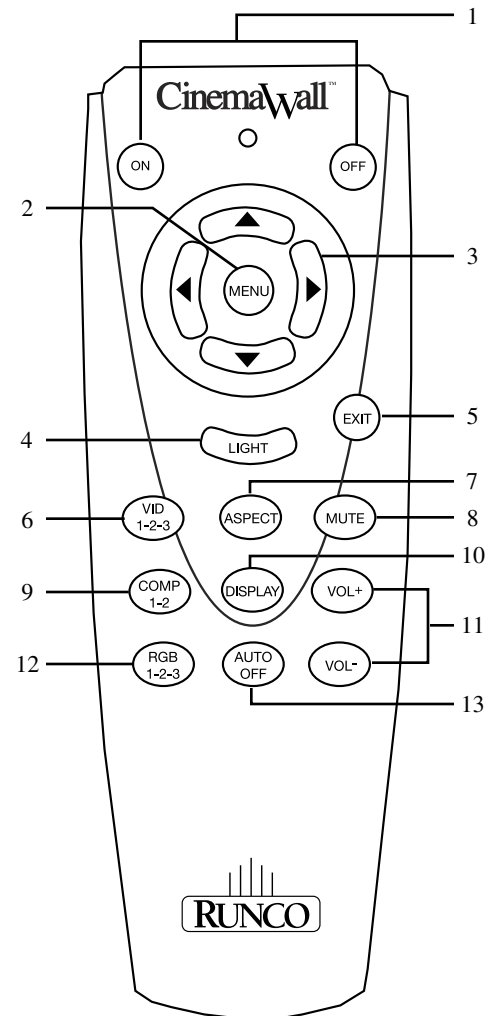
» DHD™ Controller Front Panel
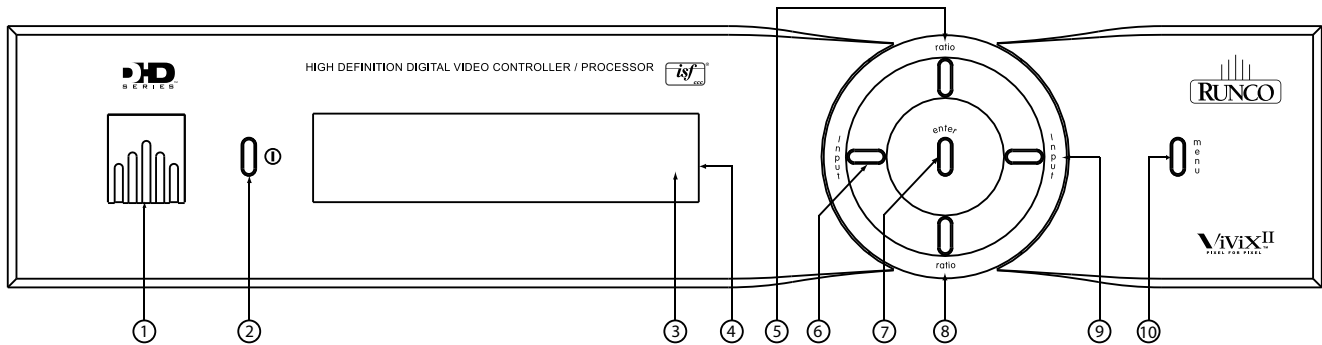
1. **RUNCO ICON**
   When the Red light is displayed the unit is in Standby, when Blue light is displayed the unit is On.

2. **POWER BUTTON**
   Press once to toggle on from Standby mode to On mode, a second time to place into Standby mode.
   For a discreet on or off command, you can use the direct access buttons on the remote control.

3. **IR RECEIVER**
   Receives the IR commands from the remote.

4. **FRONT PANEL DISPLAY**
   Reads out all relevant status information of the DHD at all times. Can be used instead of the On Screen Display.
   Indicates the model number, current source, scan rate (resolution) and aspect ratio.

5. **UP BUTTON**
   Use to direct select aspect ratios or move the menu cursor Up in the On-Screen Display. When no menus are present on-screen, the UP button will toggle you through aspect ratios in the following order:
   Anamorphic → Cinema → VirtualWide → Letterbox → Standard (4:3)

6. **LEFT BUTTON**
   Used to direct select inputs or move the menu cursor Left in the On Screen Display. When no menu is present on-screen, the LEFT button will toggle you through the different sources, in the order of:
   HD Pass Thru 2 → HD Pass Thru 1 → DVI 2 → DVI 1 → HD/RGB2 → HD/RGB1
   → Component SD → S-Video 2 → S-Video 1 → Composite

7. **ENTER BUTTON**
   When an item is highlighted on the On-Screen Display, the ENTER button will select the item.

8. **DOWN BUTTON**
   Use to direct select aspect ratios or move the menu cursor Down in the On-Screen Display.
   When no menu is present on-screen, this button will toggle you through the different aspect ratios.
   Standard (4:3) → Letterbox → VirtualWide → Cinema → Anamorphic

9. **RIGHT BUTTON**
   Used to direct select inputs or move the menu cursor Right in the On Screen Display. When no menus are present on-screen, the RIGHT button will toggle you through the different sources, in the order of:
   Composite → S-Video 1 → S-Video 2 → Component SD → HD/RGB 1 → HD/RGB 2 → DVI 1
   → DVI 2 → HD Pass Thru 1 → HD Pass Thru 2

10. **MENU BUTTON**
    Pressing the MENU button will bring up the main menu. Also, if you are in an adjustment mode or function, pressing MENU will bring the menu back one level.

» DHD™ Controller Rear Panel
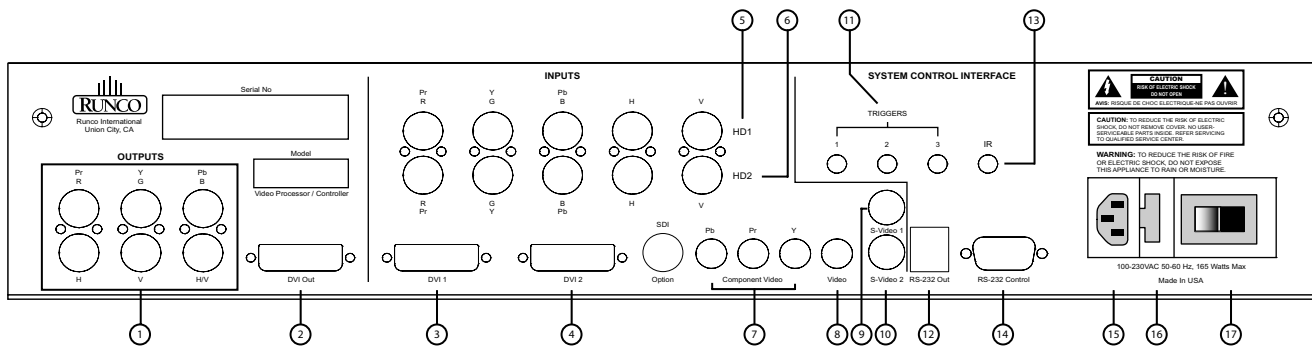
OUTPUTS:

1. **ANALOG OUTPUTS (BNC Connectors)**
The various output lines used to drive the analog input of the display device. Individually, the jacks are: V=vertical sync, H=horizontal sync, B=Blue, G=Green, R=Red. Connect these to the corresponding projector inputs.

2. **DVI OUT**
The DVI digital link used to drive the digital input of an HDCP compliant display device. Connect to the projector's DVI inputs.

INPUTS:

3. **DVI 1 (Digital)**
DVI input #1, HDCP compliant.

4. **DVI 2 (Digital)**
DVI input #2, HDCP compliant.

5. **HD 1 (Analog BNC connectors)**
High Definition input #1, accepts RGB(HV) or YPrPb, 480p, 720p, 480i, 576i or 1080i.

6. **HD 2 (Analog BNC connectors)**
High Definition input #1, accepts RGB(HV) or YPrPb, 480p, 720p, 480i, 576i or 1080i.

7. **COMPONENT INPUT (RCA connectors)**
Standard Definition (480i/576i) Component (YPrPb) input. This is the input for component video from sources such as DVD players. (Do not set DVD player in progressive output mode).

8. **COMPOSITE INPUT (RCA connector)**
This is the input for Composite Video input from sources such as Laser disc players, VCRs and other miscellaneous video sources.

9. **S-VIDEO 1 INPUT**
This is the input for S-Video #1 from sources such as Satellite receivers, S-VHS VCR's and DVD players.

10. **S-VIDEO 2 INPUT**
This is the input for S-video #2 from sources such as Satellite receivers, S-VHS VCR's and DVD players.

11. **TRIGGERS 1/2/3 (Outputs)**
Connection for 3 different 12V trigger controlled devices.

12. **RS-232 OUT (RJ-11 Connector)**
To transmit control signals to the plasma display.

13. **IR**
Wired input from an external remote control.

14. **RS-232 CONTROL**
Connection for an external RS-232 controller device to integrate the DHD with system automation control.

15. **POWER INPUT (100-230V)**
Plug in main power here.

16. **MAIN FUSE**
This is the main AC input fuse. (Main Fuse: 5mm x 20mm, 500mA, 250V, Slow Blow)

17. **MAIN POWER SWITCH**
Disconnects or applies main power to the processor.

» DHD ™ Controller Remote Control

(1) ON/OFF
Switches Power ON/OFF. (This does not operate when POWER/STANDBY indicator of the main unit is off.)

(2) IR OUTPUT INDICATOR
Illuminates when a button in pressed, indicating that an IR signal is being transmitted.

(3) ENTER BUTTON
When an item is highlighted on a menu, pressing ENTER will select that item.

> **NOTE:** If the remote control loses its 'memory' as a result of weak or dead batteries, it must be re-programmed for the Controller's code set. To reprogram the remote to the default IR Code Set, press and hold the CODE button followed by 1, 7.

(4) CURSOR (▲ / ▼ / ◄ / ►)
Use these buttons to select items or settings and to adjust settings or switch the display patterns.
UP Button: When no menus are present on-screen, the UP button will toggle through aspect ratios in the following order: (RATIO) Anamorphic → Cinema → VirtualWide → Letterbox → Standard (4:3)

LEFT Button: When no menus are present on-screen, the LEFT button will toggle through the different sources in the following order: (INPUT)   HD Pass Thru 2 → HD Pass Thru1 → DVI 2 → DVI 1 → HD/RGB2 → HD/RGB 1 →   Component SD → S-Video 2 → S-Video 1 → Composite

DOWN Button: When no menus are present on-screen, the RIGHT button will toggle through the different sources in the following order: (RATIO) Standard (4:3) → Letterbox → VirtualWide → Cinema → Anamorphic

RIGHT Button: When no menus are present on-screen, the RIGHT button will toggle through the different sources in the following order: (INPUT)   Composite → S-Video 1 → S-Video 2 → Component SD → HD/RGB 1 → HD/RGB 2 →DVI 1 → DVI 2 → HD Pass Thru 1 → HD Pass Thru 2

(5) LIGHT BUTTON
Press this to illuminate the buttons.

(6) MENU BUTTON
Pressing this button will access the OSD (On-Screen Display) controls. Press this button during the display of the sub-menu to return to the previous menu, or exit the OSD menus.

(7) VIDEO BUTTON
Press this button to select VIDEO (composite video) as the source.

(8) COMP BUTTON
Press this button to select Component SD (480i/576i) input.

(9) DIRECT ACCESS BUTTONS
These red buttons to the right hand-side will allow you direct access to an aspect ratio, based on the format of the input signal. These buttons are:
   ANA - selects Anamorphic (16:9) widescreen aspect ratio
   LETBOX - selects Letterbox format aspect ratio
   4x3 - selects Standard 4:3 aspect ratio
   V-WIDE - selects VirtualWide aspect ratio

(10) S-VID 1 and S-VID 2 BUTTONS
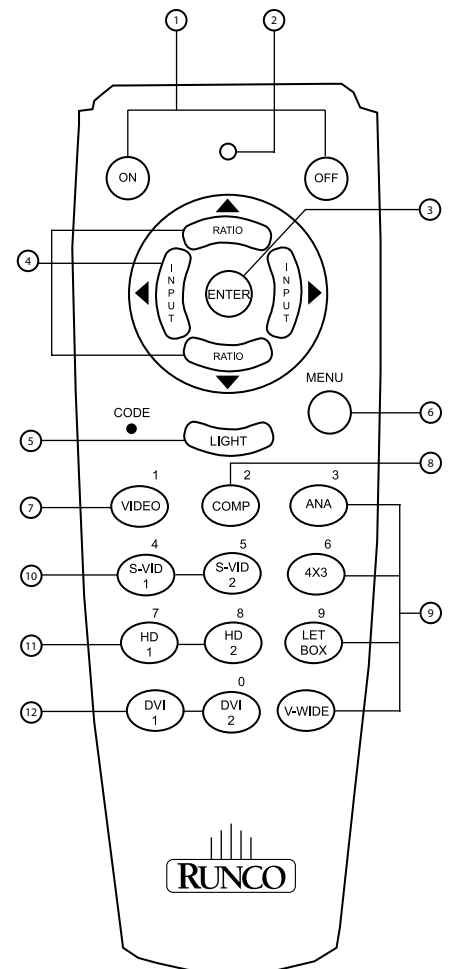Press this button to select between the S-Video 1 and S-Video 2 inputs.

(11) HD1 and HD2 BUTTONS
Press this button to select between HD1 (High Definition) signal and HD2 signal inputs. These inputs can auto-detect input signals between YPbPr and RGBHV.
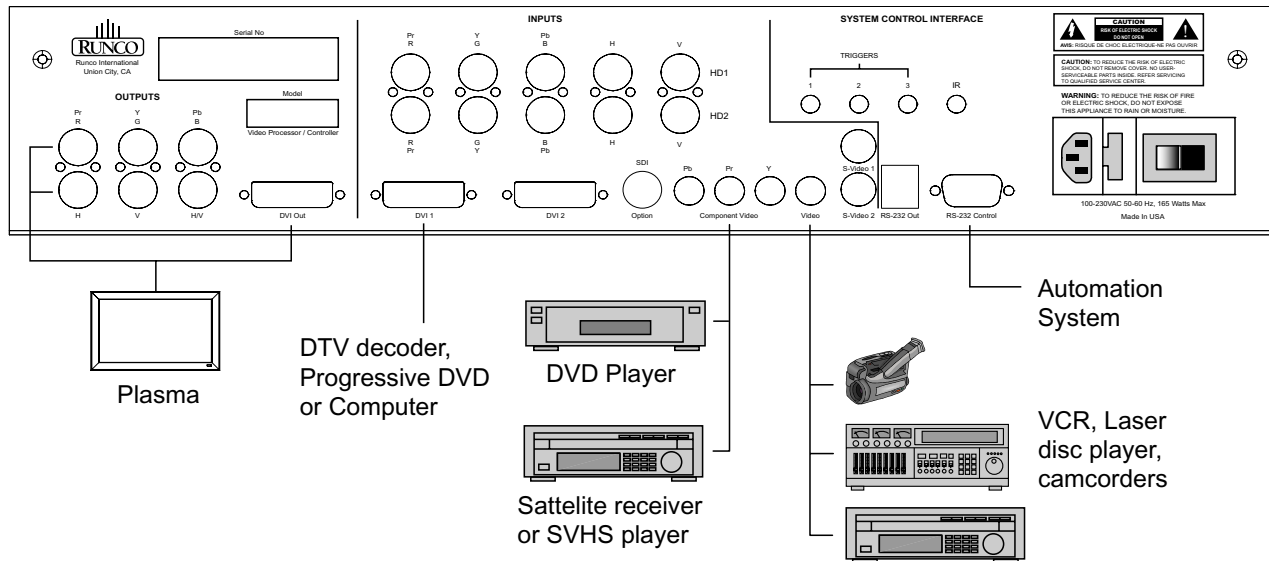
(12) DVI 1 and DVI 2 BUTTONS
Press this button to select between the DVI1 signal and DVI2 signal inputs.

15

DHD™ CONTROLLER CONNECTION EXAMPLES

Plasma

DTV decoder, Progressive DVD or Computer

DVD Player

Sattelite receiver or SVHS player

Automation System

VCR, Laser disc player, camcorders

While there are many different ways to connect your source equipment to your DHD Controller, the examples shown above are the most common and are recommended by Runco.

• COMPOSITE VIDEO INPUT
Composite video is the most common type of signal used, but is also the lowest in picture quality. Many sources have outputs that are limited to Composite video, such as some VCR's and camcorders. Others, such as Laser Disc players, actually produce slightly better results when using Composite video. While the DHD Controller has an excellent decoder for Composite video, it is recommended that Composite video be used only if necessary.

• S-VIDEO INPUT
S-Video is an improved video input over composite video. Using such sources as satellite receivers, high-quality VCRs and DVD players (that have no Component output) will produce a MUCH cleaner and sharper signal. Video signal decoder artifacts that are associated with Composite video (dot crawl and 'rainbows') are non-existent when using S-Video.

• COMPONENT INPUT
Component video is the best type of standard definition signal that can be used. The most common sources that use Component outputs are DVD players, and it is highly recommended that Component be used when possible. Component video goes one step beyond S-Video in picture quality; chroma (color) information is more resolved and the overall picture appears more well-defined.

• HD1/HD2
All analog HDTV signals must be input into this port. It may also be used for other high-resolution signals such as progressive DVD players or analog (VGA or better) computer video.

DIGITAL INPUTS:

• DVI 1 / DVI 2

These are High Definition Digital Video Interface (DVI) inputs; Runco recommends using these digital inputs whenever possible. Using the DVI 1 and DVI 2 inputs ensures the highest video quality because the signal is carried in the digital domain throughout the entire signal path, from source component output, through the DHD and finally into the plasma. This maintains maximum signal purity.

Use these inputs to connect digital High Definition sources that have a DVI output, such as HD tuners and set top boxes, satellite receivers, DVD players, etc. Both DVI inputs supports the HDCP (High Definition Content Protection) system.

ISF Calibration:

The PL-50XA plasmas have been designed to incorporate setup and calibration standards established by the Imaging Science Foundation (ISF). The ISF has developed carefully crafted, industry-recognized standards for optimal video performance and has implemented a training program for technicians and installers to use these standards to obtain optimal picture quality from Runco video display devices. Accordingly, Runco recommends that setup and calibration be performed by an ISF certified installation technician.

All signal types require separate processing. Therefore there is a need to calibrate each and every input separately.

When beginning calibration of the DHD and display, it is imperative that at least one of the analog SD inputs (S-Video or RCA Component) be calibrated first. In doing this, the plasma is calibrated to the controller. After one of the SD inputs is calibrated, calibration of the HD analog or DVI sections can follow.

Once the initial settings have been completed, the "front panel display" (color, tint, sharpness, etc.) can be adjusted for each aspect ratio. The calibration procedures for these adjustments are outlined in "picture quality adjustments".

MENU DESCRIPTION AND NAVIGATION

When the MENU button is pressed on either the remote control or the front panel, the main menu will appear on-screen. An example of the main menu is shown to the right. The UP and DOWN buttons on the front panel, and IR Remote Control will move the selected item on the menu.

» Opening Screen
- Press ENTER to access the Input Source selection menu
- Press ENTER to access the Aspect Ratio selection menu
- Press ENTER to access the Picture setting menu
- Press ENTER to access the Input Position setting menu
- Press ENTER to access the ISF and Custom Presets menu
- Press ENTER to view information about the controller

Runco Video
Input Source
Aspect Ratio
Picture
Input Position
ISF Presets
Information
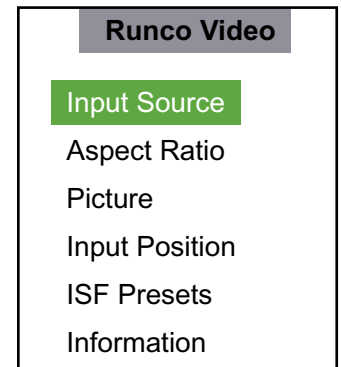
The active source is indicated by an arrow to the left of the source; note that in the example to the right, Composite is the current source.

» Input Source
Indicates selection has been made for the Input Source selection menu
- Press ENTER to select the Composite input
- Press ENTER to select the S-Video 1 input
- Press ENTER to select the S-Video 2 input
- Press ENTER to select the Component SD input
- Press ENTER to select the HD/RGB 1 input
- Press ENTER to select the HD/RGB 2 input
- Press ENTER to select the DVI 1 input
- Press ENTER to select the DVI 2 input
- Press ENTER to select the HD Pass Thru 1 input
- Press ENTER to select the HD Pass Thru 2 input

Input Source
➡ Composite
S Video 1
S Video 2
Component SD
HD/RGB 1
HD/RGB 2
DVI 1
DVI 2
HD Pass Thru 1
HD Pass Thru 2

To select a source via the main menu, press either the up or down buttons on the remote or front panel and highlight the desired source, and press ENTER. Otherwise, you may select a source by pressing either the left or right arrow buttons (on the remote or front panel) when no menus are on-screen, or by pressing one of the direct access buttons on the remote control (recommended).
NOTE: If DVI input is used with HDCP content, RGBHV output is automatically disabled. This is in compliance with HDCP regulations.
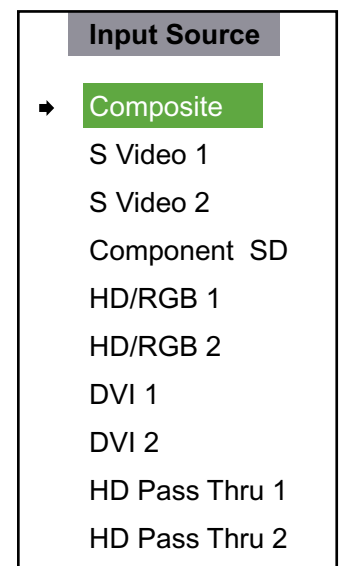
If pass-through is selected, note that no on-screen menus will be displayed since the signal is simply being 'looped' directly through the analog output. When pass-through is the selected source, pressing MENU will not automatically select the last selected input before Pass-through was selected. If you wish to choose another source, Runco recommends using the direct access buttons to select the desired source as opposed to pressing MENU. Pass-through is not available when the DVI output is in use.

Aspect Ratio provides selection of one of five aspect ratios: Anamorphic, Standard 4:3, Letterbox, VirtualWide and Cinema. To select an aspect ratio via the main menu, press either the up and down buttons on the remote or front panel, highlight ASPECT RATIO and press ENTER. The aspect ratio menu will then appear with the four choices; highlight the desired aspect ratio with the up or down buttons and press ENTER. Otherwise, you may select an aspect ratio by pressing either the up or down arrow buttons (on the remote or front panel) when no menus are on-screen, or by pressing one of the direct access buttons on the remote control. The aspect ratio setting is saved for each input and resolution separately.

» Aspect Ratio
Indicates selection has been made for the Aspect Ratio selection menu
- Press ENTER to select the Anamorphic Aspect Ratio, 16:9
- Press ENTER to select the Standard 4:3 Aspect Ratio
- Press ENTER to select the Letterbox Aspect Ratio, 16:9 in 4:3
- Press ENTER to select the VirtualWide Aspect Ratio
- Press ENTER to select the Cinema Aspect Ratio for 2.35

Aspect Ratio
[X] Anamorphic
[ ] Standard 4:3
[ ] Letterbox
[ ] VirtualWide
[ ] Cinema
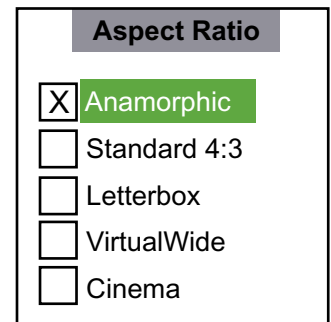
Picture quality adjustments are the controls that change different parameters of the image such as the amount of color, black level, etc. This section will describe what each function does and how to adjust them properly. The picture settings are stored separately for each input. To access the picture quality adjustments, press MENU and over the cursor down to Picture (indicated by the green highlight) and press ENTER. The picture quality sub-menu will then appear.

To make an adjustment to a particular function, highlight the function with the up or down arrow buttons and press ENTER. Once the function is on-screen (i.e. brightness), pressing the UP arrow button on the remote or front panel will increase the value of that function; pressing the DOWN arrow on the remote or front panel will decrease the value of that function.

» Picture (These settings are stored separately for each input).
Indicates selection has been made for the Picture selection menu
- Press ENTER to allow the increase and decrease of image Brightness with the LEFT and RIGHT arrows.
- Press ENTER to allow the increase and decrease of image Contrast with the LEFT and RIGHT arrows.
- Press ENTER to allow the increase and decrease of image Color with the LEFT and RIGHT arrows.
- Press ENTER to allow the increase and decrease of image Tint with the LEFT and RIGHT arrows.
- Press ENTER to allow the increase and decrease of image Sharpness with the LEFT and RIGHT arrows.

NOTE: A BLUE FILTER must be used so only the blue color bars can be seen on a standard color bar test pattern. Blue filters are provided with Video Essentials or AVIA test DVDs.

Picture
Brightness
Contrast
Color
Tint
Sharpness
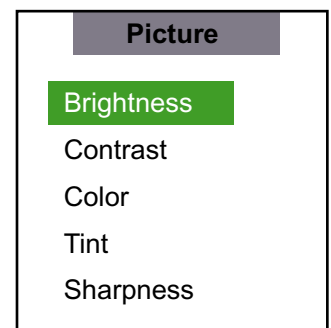
While each of the picture quality adjustments can be set to suit the needs of the user, there is a 'proper' way to set the adjustments. For setting TINT and COLOR, please refer to the color bar test pattern below.

TINT (also known as 'hue') is essentially the ratio of red to green in the color portion of the image. If TINT is decreased, the image will appear redder, and increasing it will cause the image to appear greener. To set TINT properly, look at the color bar pattern through a blue filter (or mute the red and green outputs). Adjust TINT until the middle two tall color bars (labeled as "cyan" and "magenta") to match the middle short color bars (see color bar drawing below).

COLOR (also known as 'saturation') increases or decreases the amount of color in the image. To set COLOR properly, look at the color bar pattern through a blue filter (or mute the red and green outputs). Adjust COLOR until the outer two tall color bars match (labeled as "white" and "blue") to the outer short color bars (see color bar drawing below).
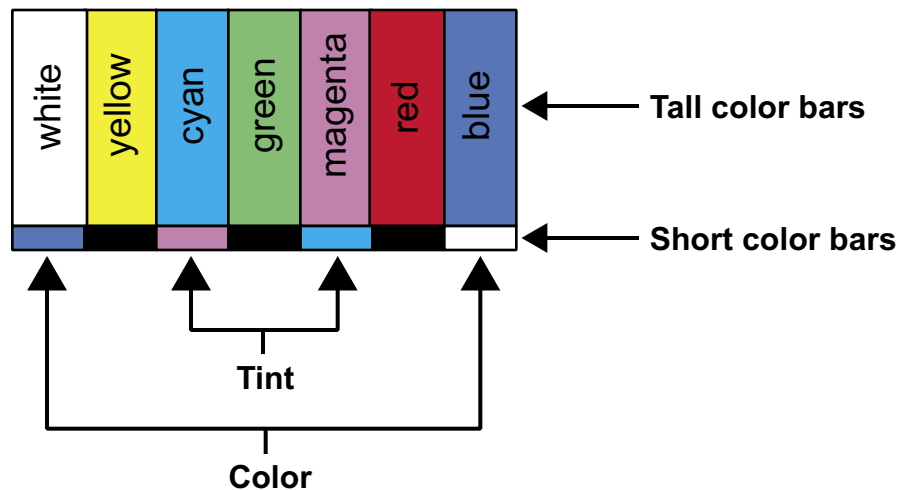
BRIGHTNESS adjusts the black level of the image. To adjust this properly, adjust BRIGHTNESS until the 'below black' bar JUST disappears, but the 'above black' bar is still barely visible (see lower left chart).
NOTE: Some DVD players cannot pass the 'blacker than black' bar (they won't pass PLUGE), and that bar will never be visible. In a case like this, adjust the 'above black' bar until it is slightly brighter than the background that surrounds it.

CONTRAST adjusts the white level of the image. For Fixed-pixel displays, adjust contrast until there is a distinct definition between the two brightest bars.
NOTE: For best results, Runco recommends that CONTRAST be set to '0' or very close to it.
(see lower right chart).
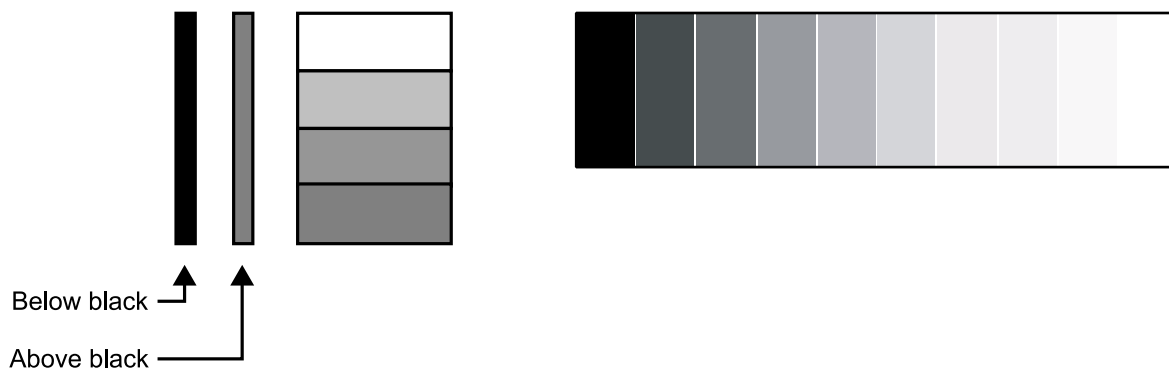
SHARPNESS adjusts the amount of high-frequency detail in the image. This can be adjusted to the   preference of the user. Keep in mind that when SHARPNESS is decreased, fine details in the image will become 'soft'; when it is increased, fine details will become sharper but will also make the picture appear 'noisy' if adjusted too high.

All the picture adjustments (contrast, brightness, color, tint and sharpness) must be saved manually to Custom 1 or Custom 2 under ISF presets menu. If not, all the picture adjustments will be whited out when ISF presets (ISF Night, ISF Day, Custom 1, Custom 2) are changed.

» Input Position

Indicates selection has been made for the Input Position selection menu.
These settings are stored separately for each input and each resolution for that input.
- Press ENTER to shift the Image Position Left/Right with the LEFT and RIGHT arrows.
- Press ENTER to shift the Image Position Up/Down with the LEFT and RIGHT or UP/DOWN arrows.
- Press ENTER to adjust the Image Position Width with the LEFT and RIGHT arrows.
- Press ENTER to adjust the Image Position Height with the LEFT and RIGHT or UP/DOWN arrows.
- Press ENTER to allow shifting the Image Position Overscan percentage with the LEFT and RIGHT arrows.

Input Position
Left/Right
Up/Down
Width
Height
Overscan

» ISF Presets

Indicates selection has been made for the ISF Presets selection menu. These presets allow you to save the settings that are optimized for different viewing conditions. When you select a preset, all the picture settings will be reset. Any settings you have made but not saved will be lost. There are two (ISF Day and ISF Night) custom presets that you may use to save picture settings.
- Press ENTER to select the ISF Night calibration settings.
- Press ENTER to select the ISF Day calibration settings.
- Press ENTER to select the Custom 1 calibration settings, or scroll RIGHT and press ENTER to save settings you have made.
- Press ENTER to select the Custom 2 calibration settings, or scroll RIGHT and press ENTER to save settings you have made.
- Press ENTER to force the Presets back to their Factory Default settings.

ISF Presets
X ISF Night
☐ ISF Day
☐ Custom 1   Save
☐ Custom 2   Save
Factory Default

» Information

Indicates selection has been made for the Information selection menu
- Indicates the unit Serial Number on the front panel display.
- Indicates the Hardware Version number on the front panel display.
- Indicates the Firmware Version number on the front panel display.
- Indicates the Firmware Version build date on the front panel display.

Information	
Serial Num	
Hardware	0
Firmware	0000.0000
Date	April 7 2004

This information will help your service technician if there is a problem with your system.

INSTALLATION

» Connecting Your PC or Macintosh Computer

Connecting your PC or Macintosh computer to your plasma monitor will enable you to display your computer's screen image for an impressive presentation. The plasma monitor supports the signals described on page 58.

To connect a PC, Macintosh or compatible graphics adapter, simply:

1. Turn off the power to your plasma monitor and computer.

2. If your PC does not support SXGA/XGA/SVGA/VGA you will need to install an SXGA/XGA/SVGA/VGA graphics board. Consult your computer's owner's manual for your SXGA/XGA/SVGA/VGA configuration. If you need to install a new board, see the manual that comes with your new graphics board for installation instructions.

3. This plasma monitor provides signal compatibility up to VESA 1600 x 1200 (UXGA). However, it is not recommended to use this resolution due to image readability on the monitor's native pixel resolution panel.

4. Use the signal cable to connect your PC or Macintosh computer to the plasma monitor. For Macintosh, use the monitor adapter to connect to your computer's video port, if necessary.

5. Turn on the plasma monitor and the computer.

6. If the plasma monitor goes blank after a period of inactivity, it may be caused by a screen saver installed on the computer you've connected to the plasma monitor.

When using a Macintosh with the plasma monitor, the following four display standards are supported using the Macintosh adapter:

    13" fixed mode
    16" fixed mode
    19" fixed mode
    21" fixed mode

The 13" fixed mode is recommended for your 42" Wide VGA.

VIDEO 1-3

To video inputs on the plasma monitor

VCR or Laser Disc Player

DVD Player

IBM VGA or Compatibles

Macintosh or Compatibles (Desktop type)

Monitor adapter for Macintosh

HD Set Top Box with DVI HDCP Output 480p, 720p, 1080i

To Mini D-Sub 15 pin connector on the plasma monitor
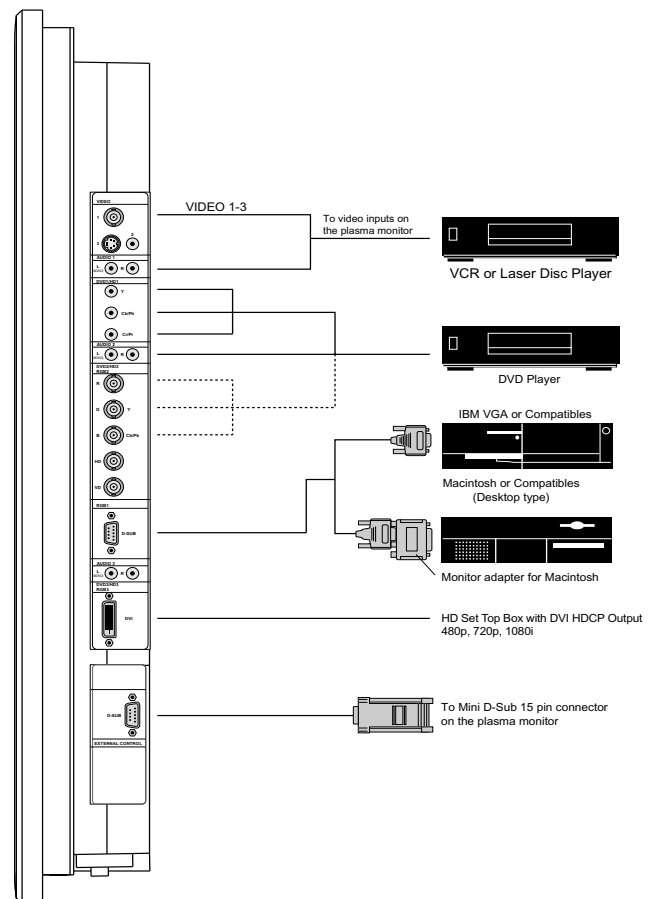
» Connecting Your VCR or Laser Disc Player:

Use common RCA cables (not provided) to connect your VCR or laser disc player to your plasma monitor. To make these connections, simply:

1. Turn off the power to your plasma monitor and VCR or laser disc player.

2. Connect one end of your RCA cable to the video output connector on the back of your VCR or laser disc player, connect the other end to the Video input on your plasma monitor. Use standard RCA audio patch cords to connect the audio from your VCR or laser disc player to your plasma monitor (if your VCR or laser disc player has this capability). Be careful to keep your right and left channel connections correct for stereo sound.

3. Turn on the plasma monitor and the VCR or laser disc player.

> *Note: Refer to your VCR or laser disc player owner's manual for more information about your equipment's video output requirements.*

» Connecting Your DVD Player:

You can connect your plasma monitor to a DVD player. To do so, simply:

1. Turn off the power to your plasma monitor and DVD player.

2. Use a component video cable to connect your DVD player to the Y, Cb, and Cr inputs on your plasma monitor.
Or use the DVD player's S-Video output. Use a standard S-Video cable to connect to the S-Video input on the plasma monitor.

3. Turn on the plasma monitor and the DVD player.

» Mini D-Sub Pin Assignment and Signal Levels for 15-pin connector RGB (analog)
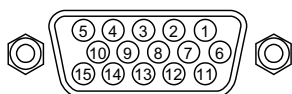
Pin No.	Signal (Analog)
1	Red
2	Green or sync-on-green
3	Blue
4	No connection
5	Ground
6	Red ground
7	Green ground
8	Blue ground
9	No connection
10	Sync signal ground
11	No connection
12	Bi-directional DATA (SDA)
13	Horizontal sync or Composite sync
14	Vertical sync
15	Data clock

» DVI-D 24 -pin connector and Signal of the RGB 3 Connector (DVI Connector)

The unit is equipped with a type of connector commonly used for digital. (This cannot be used for an analog input.) (TMDS can be used for one link only.)

RGB 3
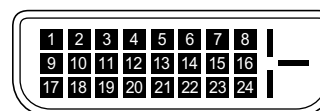
Pin No.	Signal (Digital)	Pin No.	Signal (Digital)
1	T.M.D.S Data 2 -	13	No connection
2	T.M.D.S Data 2 +	14	+5V Power
3	T.M.D.S Data 2 Shield	15	Ground
4	No connection	16	Hot Plug Detect
5	No connection	17	T.M.D.S Data 0 -
6	DDC Clock	18	T.M.D.S Data 0 +
7	DDC Data	19	T.M.D.S Data Shield
8	No connection	20	No connection
9	T.M.D.S Data 1 -	21	No connection
10	T.M.D.S Data 1 +	22	T.M.D.S Clock Shield
11	T.M.D.S Data 1 Shield	23	T.M.D.S Clock +
12	No connection	24	T.M.D.S Clock -

ASPECT RATIO CONTROLS

» Aspect Ratio Operations (Manual)

There are four aspect ratios available that can be selected for video signal inputs.

When viewing videos or DVDs:
1. Press the ASPECT button on the remote control.
2. Within 3 seconds...
    Press the ASPECT button again.
    The screen size switches as follows:
→ LETTERBOX→ STD (4:3) → ANAMORPHIC → VIRTUALWIDE

LETTERBOX mode

The image in the Letterbox mode will be zoomed in, and the top and bottom portion 'blanked off.' This ratio is best suited for LaserDisc movies or non-anamorphic DVD's.

Active Image Area

STD 4:3 mode

The image is displayed at a standard 4:3 aspect ratio.
The input signal will be scaled to fit in the center of the 16:9 screen.
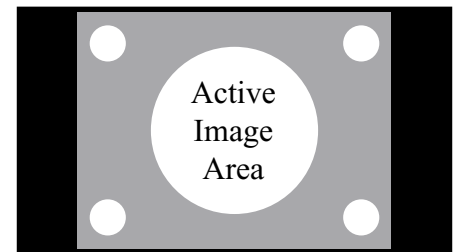
> **NOTE:**
> Limit the amount of extended time displayed 4:3 images, as this can cause a phosphor burn-in. (see page 5 for prevention)

Active Image Area

ANAMORPHIC mode

The Anamorphic aspect ratio expands the image in the horizontal direction. The image is compressed vertically, but with anamorphic software the image will appear properly proportioned. This is best suited for use with 16:9 DVD's.

Active Image Area

VIRTUALWIDE mode

The VirtualWide mode is an aspect ratio is designed to fill the 16:9 screen with a 4:3 image. The center of the picture is not stretched, and it gradually stretches on the sides reaching the most extreme stretch at the far edges of the picture. (non-linear scaling) In addition, we apply a very slight vertical stretch uniformly (no graduation) which results in a very small amount of cropping of the top and bottom of the image area. Thus a 4:3 image is transformed into a 16:9 image with minimal distortion.

Active Image Area

» Aspect Ratio Operation with Computer Signals

Switch to the wide screen mode to expand the 4:3 image to fill the entire screen.

1. Press the ASPECT button on the remote control.
2. *Within 3 seconds...*
Press the ASPECT button again. The screen size switches as follows:
→ STD (4:3) → ANAMORPHIC→ LETTERBOX

### STD 4:3 mode (4:3 or SXGA 5:4)
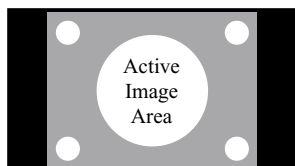
The picture has the same size as the normal computer image.

ANAMORPHIC mode

The image is expanded in the horizontal direction.

LETTERBOX mode

When wide signals are input.

NOTE:
Do not leave the displayed in 4:3 mode for an extended period.
This can cause a phosphor burn-in.

Information
■ Supported resolution
See page 58 for details on the display output of the various VESA signal standards supported by the monitor.

■ **When 853 (848) dot x 480 line wide VGA *signals with a vertical frequency of 60 Hz and horizontal frequency of 31.7 (31.0) kHz are input.**
Select an appropriate setting for RGB SELECT mode referring to the "Table of Signals Supported" on page 58.
* "IBM PC/AT" and "VGA" are registered trademarks of IBM, Inc. of the United States.

RS-232 COMMUNICATIONS AND COMMANDS

Baud rate: 19200 (fixed)
Bits: 8
No Parity

All protocol in ASCII format

RS-232 input connector pin numbers: TxD= Pin# 2, RxD= Pin# 3, GnD= Pin# 5

Command format (single command): command value (i.e. brightness 100).
NOTE: A space (not an underscore) or comma may be used between the command and its value.

Command string format: command, command value, command etc.
(i.e. COMPOSITE, BRIGHTNESS 100, ANAMORPHIC, <CR>)

NOTE: In between commands, a comma or space may be used

NOTE: A carriage return must be used after each command or string.

Other notes:

• For command strings, a maximum of 255 characters can be used in a single string.

• PARAMETER min/max refers to a function's minimum and maximum value range.
  Inputting values above or below their range may cause unpredictable (but not fatal) results.

» RS-232C Commands

Command	Parameter (min/max)	Value Stored?	Description
POWER	0/1	NA	Turns DHD On and Off
ON	NA	NA	Turns DHD Controller on
OFF	NA	NA	Turns DHD Controller off
COMPOSITE	NA	YES	Selects the Composite video input
SVIDEO1	NA	YES	Selects the S-Video 1 input
SVIDEO2	NA	YES	Selects the S-Video 2 input
COMPONENT	NA	YES	Selects the Component input
HD1	NA	YES	Selects the RGB HD 1 input
HD2	NA	YES	Selects the RGB HD 2 input
DVI1	NA	YES	Selects the DVI 1 input
DVI2	NA	YES	Selects the DVI 2 input
HD1Pass	NA	YES	Selects the HD 1 Pass Thru input
HD2Pass	NA	YES	Selects the HD 2 Pass Thru input
ANAMORPHIC	NA	YES	Selects the anamorphic aspect ratio
STANDARD	NA	YES	Selects the standard (4:3) aspect ratio
LETTERBOX	NA	YES	Selects the letterbox aspect ratio
VIRTUALWIDE	NA	YES	Selects the VirtualWide aspect ratio
CINEMA	NA	YES	Selects 2.35 aspect ratio
RGBNN	NA	YES	Outputs color space RGB w/negative, negative sync
RGBPP	NA	YES	Outputs color space RGB w/positive, positive sync
RGBS	NA	YES	Outputs color space RGB w/embedded sync on green
YUV	NA	YES	HD YUV output color space
IHPOS	-100/100	YES	Sets a value for input horizontal position offset (for current input and resolution)
IVPOS	-100/100	YES	Sets a value for input vertical position offset (for current input and resolution)
IWIDTH	-100/100	YES	Sets the value for input width adjustment (for current input and resolution)
IHEIGHT	-100/100	YES	Sets the value for input height adjustment (for current input and resolution)
OVERSCAN	0/10	YES	Sets the overscan value in % (for current input and resolution)
OHPOS	-100/100	YES	Sets the value for output width adjustment
OVPOS	-100/100	YES	Sets the value for output height adjustment
OWIDTH	-100/100	YES	Sets the value for output width adjustment
OHEIGHT	-100/100	YES	Sets the value for output height adjustment
BRIGHTNESS	-100/100	YES	Sets a value for brightness for current input
CONTRAST	-100/100	YES	Sets a value for contrast
COLOR	-100/100	YES	Sets a value for color
TINT	-100/100	YES	Sets a value for tint
SHARPNESS	-6/6	YES	Sets a value for sharpness
NIGHT	NA	YES	Selects the ISF Night preset
DAY	NA	YES	Selects the ISF Day preset
CUSTOM1	NA	YES	Sets the user custom/preset
CUSTOM2	NA	YES	Sets the user custom/preset
TRIGGER	0-7	YES	Sets the triggers for the current aspect ratio
BKGND	-100/100	YES	Sets the background color for letterbox, black, grey, white
POWER?	NA	NA	Returns ON or OFF
DATE?	NA	NA	Returns FW build date
SWVER?	NA	NA	Returns FW version

Command	Parameter (min/max)	Value Stored?	Description
IHPOS?	NA	NA	Returns input horizontal position value
IHEIGHT?	NA	NA	Returns input vertical height value
OHPOS?	NA	NA	Returns output horizontal position value
OHEIGHT?	NA	NA	Returns output vertical height value
COLOR?	NA	NA	Returns color setting value
ASPECT?	NA	NA	Returns current aspect ratio
INPUT?	NA	NA	Returns active input
OUTRES?	NA	NA	Returns output resolution
SERIALNUM?	NA	NA	Returns serial number
DATE?	NA	NA	Returns the date of firmware
IVPOS?	NA	NA	Returns input vertical position value
OVERSCAN?	NA	NA	Returns overscan percentage
OVPOS?	NA	NA	Returns output vertical position value
BRIGHTNESS?	NA	NA	Returns brightness setting value
TINT?	NA	NA	Returns tint setting value
PRESET?	NA	NA	Returns preset ISF day or night
POWER?	NA	NA	Returns power status
ASPECTIN?	NA	NA	Returns the input source aspect
SWVER?	NA	NA	Returns software version number
IWIDTH?	NA	NA	Returns input horizontal width value
PHASE?	NA	NA	Returns phase setting value
OWIDTH?	NA	NA	Returns output horizontal width value
CONTRAST?	NA	NA	Returns contrast setting value
SHARPNESS?	NA	NA	Returns sharpness setting value
BKGND?	NA	NA	Returns background setting value
INRES?	NA	NA	Returns input resolution
ASPECTOUT?	NA	NA	Returns output screen aspect ratio
HWVER?	NA	NA	Returns hardware version number

• When the screen mode is STD 4:3, each signal is converted to a 960 dots x 768 lines signal. (Except for *2, *4)
• When the screen mode is ANAMORPHIC, each signal is converted to a 1365 dots x 768 lines signal. (Except for *3)

Computer input signals supported by this system

| Model [Signal Type] | Dots x Lines | Vertical Freq. (Hz) | Horizontal Freq. (kHz) | Sync Polarity | | Presence | | Screen Mode | | RGB Select *5 | DVI | Memory |
				Horizontal	Vertical	Horizontal	Vertical	Normal (4:3)	Full (16:9)			
*IBM PC/AT Compatible Computers	640 x 400	70.1	31.5	NEG	NEG	YES	YES	YES*2*3	YES	--	NO	4
	640 x 480	59.9	31.5	NEG	NEG	YES	YES	YES*3	YES	STILL	YES	5
		72.8	37.9	NEG	NEG	YES	YES	YES*3	YES	--	YES	7
		75.0	37.5	NEG	NEG	YES	YES	YES*3	YES	STILL	YES	8
		85.0	43.3	NEG	NEG	YES	YES	YES*3	YES	--	YES	9
		100.4	51.1	NEG	NEG	YES	YES	YES*3	YES	--	YES	41
		120.4	61.3	NEG	NEG	YES	YES	YES*3	YES	--	YES	42
	848 X 480	60.0	31.0	POS	POS	YES	YES	--	YES*3	WIDE2	YES	19
	852 X 480*1	60.0	31.7	NEG	NEG	YES	YES	--	YES*3	WIDE1	YES	17
	800 X 600	56.3	35.2	POS	POS	YES	YES	YES	YES	STILL	YES	11
		60.3	37.9	POS	POS	YES	YES	YES	YES	STILL	YES	12
		72.2	48.1	POS	POS	YES	YES	YES	YES	--	YES	13
		75.0	46.9	POS	POS	YES	YES	YES	YES	--	YES	14
		85.1	53.7	POS	POS	YES	YES	YES	YES	--	YES	15
		99.8	63.0	POS	POS	YES	YES	YES	YES	--	YES	43
		120.0	75.7	POS	POS	YES	YES	YES	YES	--	YES	44
	1024 X 768	60.0	48.4	NEG	NEG	YES	YES	YES	YES	STILL	YES	24
		70.1	56.5	NEG	NEG	YES	YES	YES	YES	--	YES	25
		75.0	60.0	POS	POS	YES	YES	YES	YES	STILL	YES	26
		85.0	68.7	POS	POS	YES	YES	YES	YES	--	YES	27
		100.6	80.5	NEG	NEG	YES	YES	YES	YES	--	NO	45
	1152 X 864	75.0	67.5	POS	POS	YES	YES	YES	YES	STILL	YES	51
	1280 X 768	56.2	45.1	POS	POS	YES	YES	--	YES	WIDE1	NO	52
		59.8	48.0	POS	NEG	YES	YES	--	YES	WIDE3	YES	80
	1360 X 765	60.0	47.7	POS	POS	YES	YES	--	YES	WIDE1	NO	22
	1360 X 768	60.0	47.7	POS	POS	YES	YES	--	YES	WIDE1	YES	22
	1376 X 768	59.9	48.3	NEG	POS	YES	YES	--	YES	WIDE2	YES	53
	1280 X 1024	60.0	64.0	POS	POS	YES	YES	YES*4	YES	STILL	YES	29
		75.0	80.0	POS	POS	YES	YES	YES*4	YES	--	NO	30
		85.0	91.1	POS	POS	YES	YES	YES*4	YES	--	NO	40
		100.1	108.5	POS	POS	YES	YES	YES*4	YES	--	NO	47
	1600 X 1200	60.0	75.0	POS	POS	YES	YES	YES	YES	--	NO	54
		65.0	81.3	POS	POS	YES	YES	YES	YES	--	NO	55
		70.0	87.5	POS	POS	YES	YES	YES	YES	--	NO	56
		75.0	93.8	POS	POS	YES	YES	YES	YES	--	NO	57
		85.0	106.3	POS	POS	YES	YES	YES	YES	--	NO	58
*Apple Macintosh*6	640 X 480	66.7	35.0	Sync on G	Sync on G	--	--	YES*3	YES	--	NO	6
	832 X 624	74.6	49.7	Sync on G	Sync on G	--	--	YES	YES	--	NO	16
	1024 X 768	74.9	60.2	Sync on G	Sync on G	--	--	YES	YES	WIDE1	NO	28
	1152 X 870	75.1	68.7	Sync on G	Sync on G	--	--	YES	YES	WIDE1	NO	39
Work Station (EWS4800)	1280 X 1024	60.0	64.6	NEG	NEG	YES	YES	YES*4	YES	--	YES	29
		71.2	75.1	NEG	NEG	YES	YES	YES*4	YES	--	NO	48
Work Station (HP)	1280 X 1024	72.0	78.1	--	--	--	--	YES*4	YES	--	NO	59
Work Station (Sun)	1152 X 900	66.0	61.8	C Sync	C Sync	--	--	YES	YES	--	NO	60
		76.0	71.7	C Sync	C Sync	--	--	YES	YES	--	NO	61
	1280 X 1024	76.1	81.1	C Sync	C Sync	--	--	YES*4	YES	--	NO	30

Model [Signal Type]	Dots x Lines	Vertical Freq. (Hz)	Horizontal Freq. (kHz)	Sync Polarity		Presence		Screen Mode		RGB Select*5	DVI	Mem- ory
				Horizontal	Vertical	Horizontal	Vertical	Normal (4:3)	Full (16:9)			
Work Station	1024 X 768	60.0	49.7	--	--	--	--	YES	YES	--	YES	62
(Sun)	1280 X 1024	60.0	63.9	--	--	--	--	YES*4	YES	--	YES	29
IDC-3000G												
PAL625P	768 X 576	50.0	31.4	NEG	NEG	YES	YES	YES*7	YES*7	--	NO	31
NTSC525P	640 X 480	59.9	31.5	NEG	NEG	YES	YES	YES*7	YES*7	MOTION	NO	32

*1 Only when using a graphic accelerator board that is capable of displaying 1365 X 768.

*2 Display only 400 lines with the screen center of the vertical orientation located at the center.

*3 The picture is displayed in the original resolution. The picture will be compressed for other signals.

*4 Aspect ratio is 5:4. This signal is converted to the following signal: 960 dots x 768 lines).

*5 Normally the RGB select mode suite for the input signals is set automatically. If the picture is not displayed properly, set the RGB mode prepared for the input signals listed in the table above.

*6 To connect the monitor to a Macintosh computer, use the monitor adapter (D-Sub 15-pin) to your computer's video port.

*7 Other screen modes (LETTERBOX and VIRTUALWIDE) are available as well.

NOTE:

• *While the input signals comply with the resolution listed in the table above, you may have to adjust the position and size of the picture or the fine picture because of errors in synchronization of your computer.*

• *This monitor has a resolution of 1365 dots x 768 lines. It is recommended that the input signal be VGA, wide VGA or equivalent.*

• *With digital input some signals are not accepted.*

• *The sync may be disturbed when a nonstandard signal other than the aforementioned is input.*

• *If you are connecting a composite sync signal, use the HD terminal.*

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* "IBM PC/AT" and "VGA" are registered trademarks of International Business Machines, Inc. of the United States.

* "Apple Macintosh" is a registered trademark of Apple Computer, Inc. of the United States.

If the picture quality is poor or there is some other problems, check the adjustments, operations, etc., before requesting service.

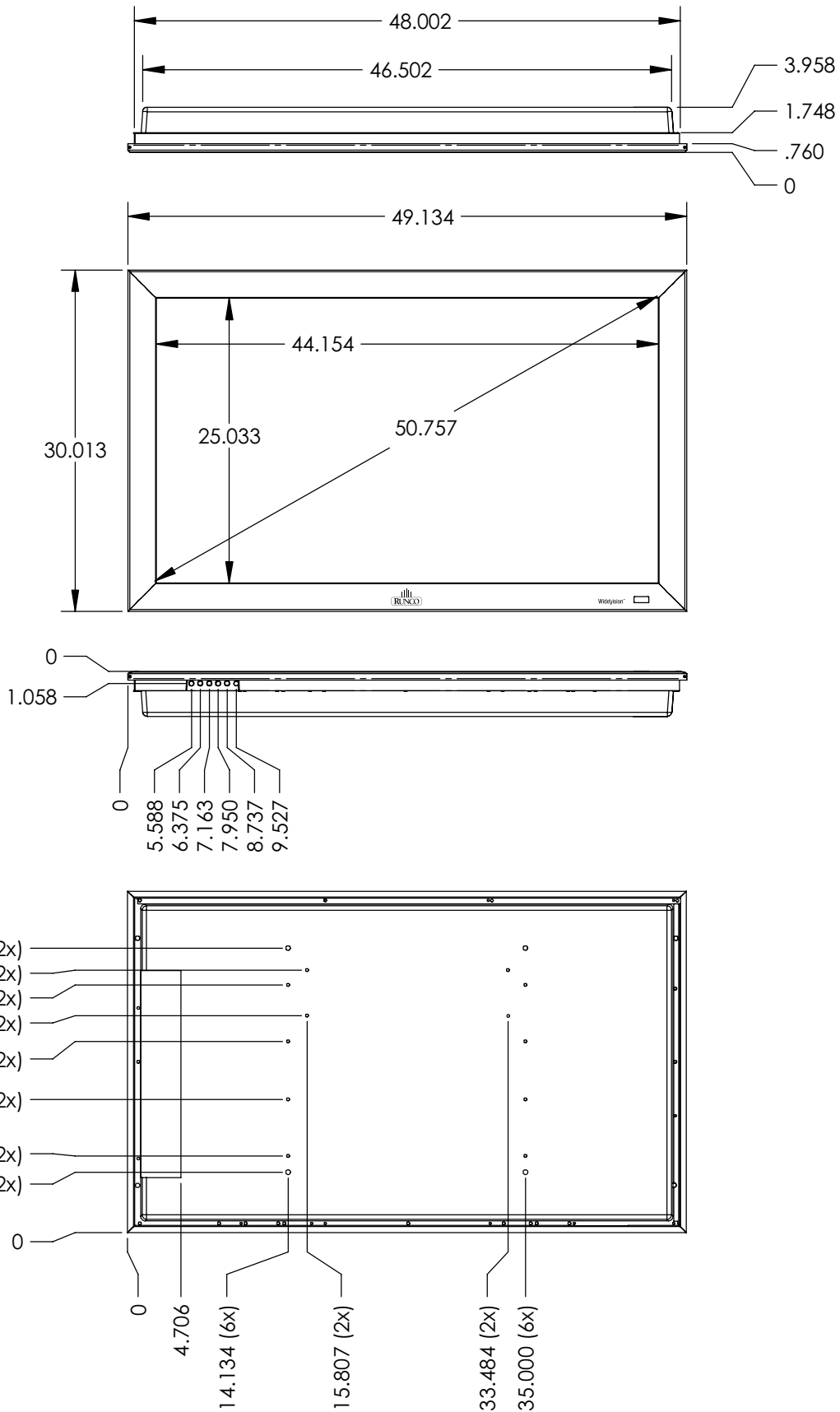| SYMPTOM	CHECKS	REMEDY
Mechanical sound is heard.	• Maybe the sound from the cooling fans used to prevent overheating.	
The unit emits a crackling sound.	• Are the images and sound normal?	• If there are no abnormalities in the image and sound, the noise is caused by the cabinet reacting to changes in temperature. This will not affect performance.
Picture is disturbed. Sound in noisy. Remote control operates erroneously.	• Is a connected component set directly in front or at the side of the display?	• Leave some space between the display and the connected components.
The remote control does not work	• Are the remote control's batteries worn out?	• Replace both batteries with new ones.
Monitor's power does not turn on when the remote control's power button is pressed	• Is the monitor's power cord plugged into a power outlet?	• Plug the monitor's power cord into a power outlet.
	• Are all the monitor's indicator's off?	• Press the power button on the monitor to turn on the power.
	• Are the remote control's batteries worn out?	• Replace both batteries with new ones.
Monitor does not operate when the remote control's buttons are pressed.	• Is the remote control pointed at the monitor, or is there an obstacle between the remote control and the monitor?	• Point the remote control at the monitor's remote control sensor when pressing buttons, or remove the obstacle.
	• Is direct sunlight or strong artificial light shining on the monitor's remote control sensor?	• Eliminate the light by closing curtains, pointing the light in a different direction, etc.
	• Are the remote control's batteries worn out?	• Replace both batteries with new ones.
No sound or picture is produced.	• Is the monitor's power cord plugged into a power outlet?	• Plug the monitor's power cord into a power outlet.
Picture appears but no sound is produced.	• Is the volume set at the minimum?	• Increase the volume
	• Is the mute mode set?	• Press the remote control's MUTE button.
	• Are the speakers properly connected?	• Connect the speakers properly.
	• Is AUDIO INPUT set correctly?	• Set AUDIO INPUT on the AUDIO menu correctly.
Poor picture with Video signal input.	• Improper control setting. Local interference. Cable interconnections. Input impedance is not correct level.	• Adjust picture control as needed. Try another location for the monitor. Be sure all connections are secure.
Poor picture with RGB signal input	• Improper control setting. Incorrect 15 pin connector pin connections.	• Adjust picture controls as needed. Check pin assignments and connections.
Tint is poor or colors are weak.	• Are the tint and colors properly adjusted?	• Adjust the tint and color (under PICTURE ADJUST).
Nothing appears on screen.	• Is the computer's power turned on?	• Turn on the computer's power.
	• Is a source connected?	• Connect source to the monitor.
	• Is the power management function in the standby or off mode?	• Operate the computer (move the mouse, etc.)
Part of picture is cut off or picture is not centered.	• Is the position adjustment appropriate?	• Adjust the IMAGE OPTIONS properly.
Image is too large or too small.	• Is the screen size adjustment appropriate?	• Press the ASPECT button on the remote control and adjust properly.
Picture is unstable.	• Is the computer's resolution setting appropriate?	• Set to the proper resolution.
POWER/STANDBY indicator is lighted in red.	• Horizontal and / or vertical sync signal is not present when the Auto Off control is on.	• Check the input signal.
POWER/STANDBY indicator is blinking in red.	• The temperature inside the main unit has become too high and has activated the monitor.	• Promptly switch off the power of the main unit and wait until the internal temperature drops. See *1.
POWER/STANDBY indicator is blinking in green and red, or green.	----------	• Promptly switch off the power of the main unit. See *2.

*1 Overheat Protector

   If the monitor becomes too hot, the overheat protector will be activated and the monitor will be turned off. If this happens, turn off the power to the monitor and unplug the power cord. If the room where the monitor is installed is particularly hot, move the monitor to a cooler location and wait for the monitor to cool for 60 minutes. If the problem persists, contact your Runco Authorized Dealer.
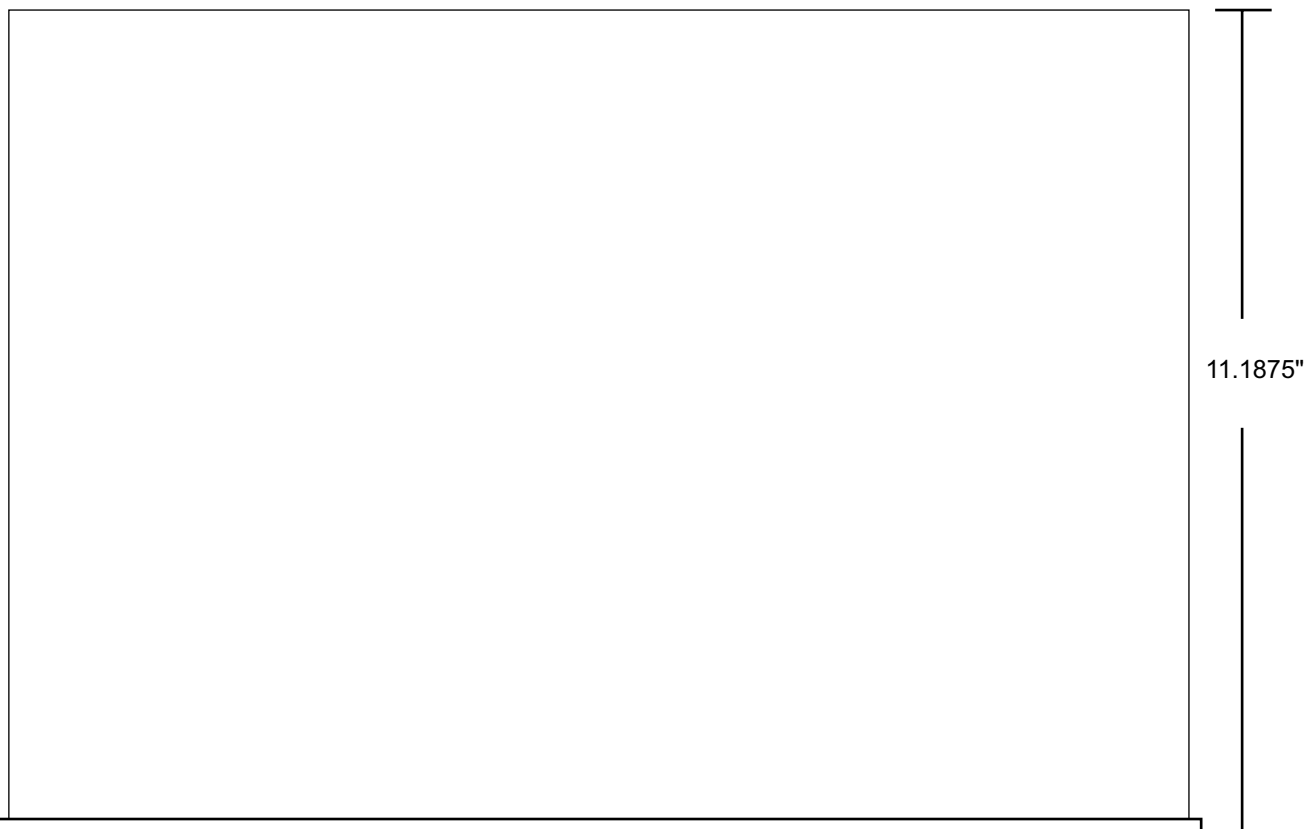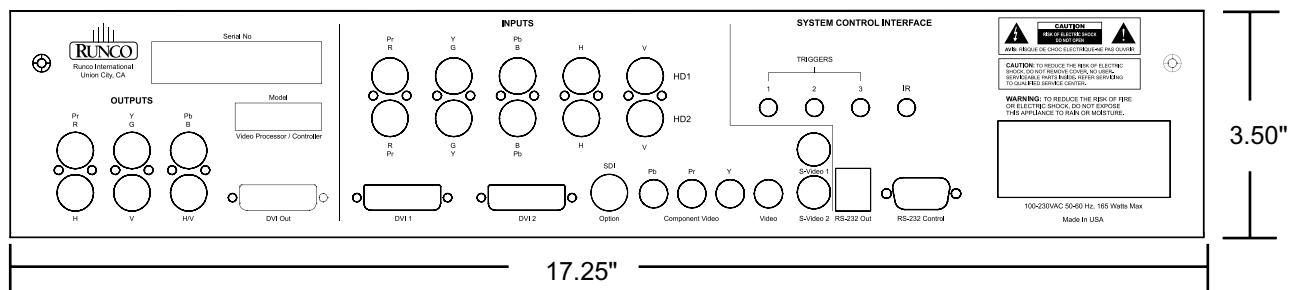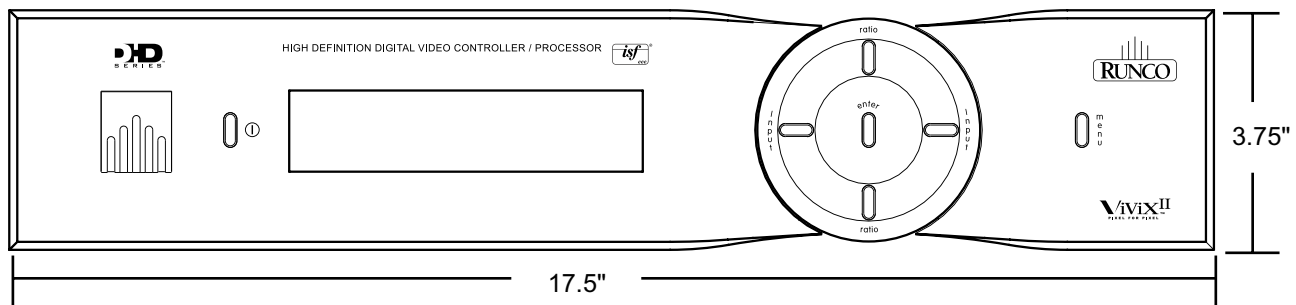
*2 In the following case, power off the monitor immediately and contact your Runco Authorized Dealer or Runco Authorized Service Center. The monitor turns off 5 seconds after powering on and then the POWER/STANDBY indicator blinks. It indicates that the power supply circuit, plasma display panel or temperature sensor have been damaged.

DIMENSIONS

» PL-50XA Plasma

» DHD Controller

3.75"

17.5"

3.50"

17.25"

11.1875"

SPECIFICATIONS

» PL-50XA Plasma

Native Resolution:	1365 x 768
Screen Aspect Ratio/ Screen Size (Diagonal):	16:9 / 50 in.
Aspect Ratio:	4:3, Letterbox, 16:9 Anamorphic, VirtualWide™
Image Area W x H:	43 1/3 in. (1106 mm) W x 24 1/2 in. (622.30 mm) H
DTV Compatibility:	480p, 720p, 1080i
Power Requirements:	100–120VAC, 50/60 Hz
Power Consumption:	480W
Inputs:	(2) Composite Video (1-BNC, 1-RCA), (2) Component Video (1-BNC, 1-RCA), (1) S-Video, (1) RGB (15-pin mini D-Sub), (1) RGB via BNC, (1) DVI w/HDCP, (1) RS-232C, (3) Stereo RCA jacks
Operating Environment:	32˚-95˚F, (0˚-35˚C), 20-80% humidity (non-condensing)
Dimensions:	Width: 49 1/4 in. (1251 mm) Depth: 3 15/16 in. (100 mm) Height: 30 1/8 in. (765.20 mm) Weight: 96 lbs. (44 kg)
Regulatory Approvals:	FCC, CE, C-Tick
Limited Warranty:	(3) Three years parts and labor from the date of delivery to the end user. (1) One year parts and labor on the plasma glass panel.

» DHD™ Controller

Aspect Ratios:	Anamorphic, Letterbox, VirtualWide™, 4:3 (on either 16:9 or 4:3 screens)
Input Standards:	NTSC/PAL
Output Resolution:	720p
Output:	(1) HD- R (Pr), G (Y), B (Pb), H, V; (1) DVI with HDCP
Inputs:	(1) Composite; (2) S-Video; (1) Component; (2) HD- R (Pr), G (Y), B (Pb), H, V; (2) DVI with HDCP
Control Options:	Discrete infrared remote, (2) RS-232, (1) 9-pin Connector, (9) RJ-11, Front panel controls
Screen Trigger/ Masking Outputs:	(3) 12V DC, 1/8A
Bandwidth:	180 Mega Samples/Second (MSPS)
Power Requirements:	100-240V AC (auto sensing), 50/60 Hz, 160W
Operating Environments:	41˚ - 95˚F (5˚ - 35˚C), 0-90% Humidity (non-condensing)
Dimensions :	Width: 17 1/2 in. (444.50 mm) Depth: 4 3/8 in. (111.13 mm) Height: 26 3/4 in. (679.40 mm) Weight: 80 lbs. (36.3 kg)
Included Accessories:	Rack mounting brackets
Regulatory Approvals:	Complies with FCC, CE, C-Tick
Limited Warranty:	(2) Two years parts and labor from the date of delivery to the end user.

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