



Crystalimage

VS 4.0 Video Scaler Controller

Operating Instructions

Read these instructions completely before operating this unit.

Contents subject to change without notice or obligation

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SAFETY INSTRUCTIONS

1. Read and apply all of the safety and operating instructions provided with your Video equipment.
2. Keep all safety and operating instructions for future reference.
3. Unplug this video equipment from the wall outlet before cleaning. Never use liquid or aerosol cleaner-S. Use only a damp cloth for cleaning.
4. Do not use any attachments or accessories not recommended by the manufacturer as they may cause hazards.
5. Do not use this video equipment near water. Avoid placing it near a bathtub, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
6.
 - a. Do not place this video equipment on an unstable cart, stand, or table. The video equipment may fall, causing serious injury to a child or an adult and serious damage to the appliance. Use only with a cart or stand recommended by the manufacturer. Wall or shelf mounting should follow the manufacturer's instructions, and should use a mounting kit approved by the manufacturer.
 - b. Move any appliance and cart combination with care. Quick stops, excessive force, and Uneven surfaces may cause the appliance and a cart to overturn.
7. Side openings in the cabinet are provided for ventilation, and to insure reliable operation of the video equipment and protect it from overheating. These openings must not be blocked or covered. Never place the video equipment on a bed, sofa, rug, or other similar surface that may block ventilation openings. Never place this product near or over a radiator or heat register. Do not place this product in a built-in installation such as a bookcase or rack unless proper ventilation is provided.
8. Operate only from the type of power source indicated on the marking label. If you are not sure what the type of power supply to your home, consult with your appliance dealer or local Power Company.
9. This unit is equipped with a three conductor polarized alternating-current line plug. This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
10. Route power-supply cords so that they will not be walked on or pinched by items that placed on or against them. Pay particular attention to cords at plugs, convenience receptacles, and to the points where they exit the products.
11. Protect your video equipment from lightning during a storm or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This way will prevent damaging to the unit due to lightning and power-line surges.
12. Do not overload wall outlets and extension cords as this can result in fire or electric shock.
13. Never push objects of any kind into this video equipment through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the video equipment.
14. Do not attempt to do service this unit by yourself as opening or removing cover may expose you to dangerous voltages or other hazards. Refer all servicing to qualified service personnel.

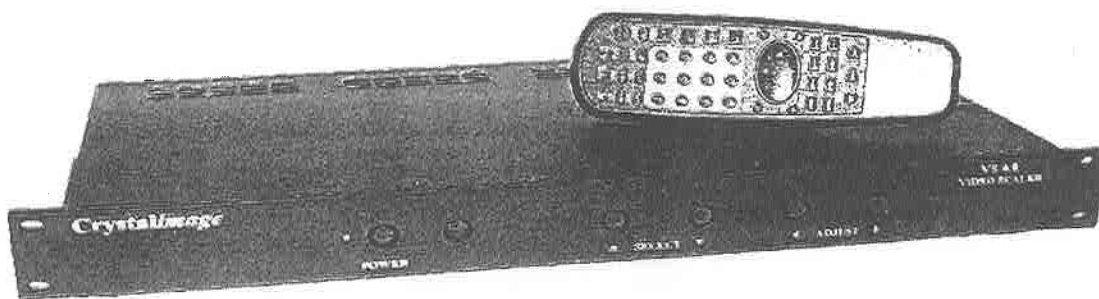
15. Unplug this video equipment from the wall outlet, and refer servicing to qualified service personnel under the following conditions:
 - a. When the power cord or plug is damaged or frayed.
 - b. If liquid has been spilled into the video equipment.
 - c. If the video equipment has been exposed to rain or water.
 - d. If the video equipment does not operate normally by following the operating instructions; adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video equipment to normal operation.
 - e. If the video equipment has been dropped or the cabinet has been damaged.
 - f. When the video equipment exhibits a distinct change in performance.
16. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer that has the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
17. Upon completion of any service or repairs to this video equipment, ask the service technician to perform routine safety checks to determine that the system is in safe operating condition.
18. Do not place anything on the video equipment. Heavy objects placed on any part of this system will cause damage.
19. **WARNING: To prevent fire or shock hazard, do not expose this appliance to rain or moisture.**
20. **CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.**

NOTE 1: This equipment is designed to operate in the U.S.A., Canada and other countries where the broadcasting system and AC house current is exactly the same as in the U.S.A. and Canada.

NOTE 2: 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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

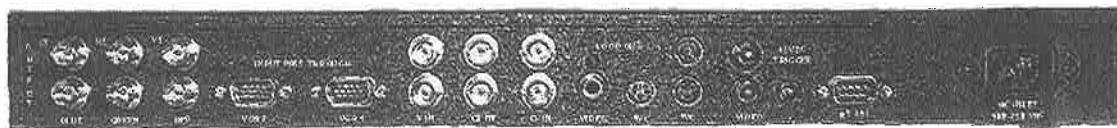
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

INTRODUCTION



CrystallImage Video Scaler (VS) 4.0 is engineered for optimum and high quality performance. Unlike line doublers and quadruplers, the VS 4.0 combines all these in one providing the clearest, crispest, most brilliant detailed video for display on CRT, LCD or DLP projectors and plasma displays. This system uses highly technological processing algorithms to manipulate the image, changing its resolution and refresh rate to exactly match the desired output specifications with virtually no artifacts. Therefore, VS 4.0 exceeds the capabilities of a line doubler or quadrupler, which can only output a signal locked to the input signal.

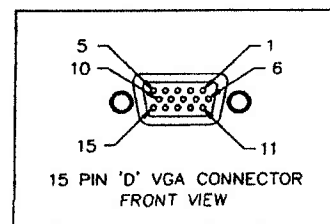
INSTALLATION



The VS 4.0 has inputs for three different video sources plus an RGB input via a D15 connector.

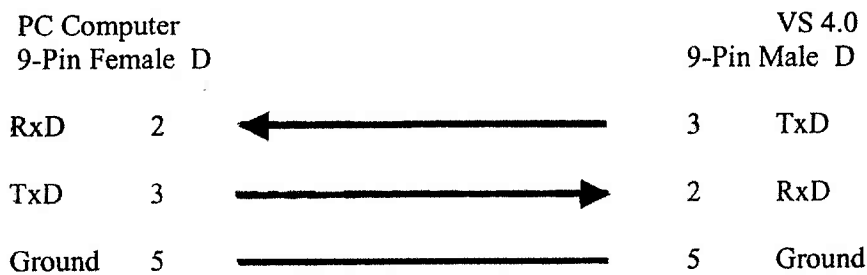
1. Red, Green, Blue, H Sync, V Sync, and C Sync outputs — BNC connectors
The output video signal from the VS 4.0 to the display device is made via five BNC connectors for Red, Green, Blue, HS, VS, and CS.
High quality 75 Ohm coaxial cables are recommended to connect the output of VS 4.0 to the display device. VS 4.0 provides composite sync and separate H/V sync outputs.
2. 2-VGA Inputs — 15 pin D connectors
These inputs are provided for sources like personal computers, HDTV decoder box, and other video equipment with a RGB and H sync and V sync output.
The pin assignments for the 15 pin D plug are as follows:

- | | | |
|----------------|-----------|---------------------|
| 1. Red Video | 6. Ground | 11. N/A |
| 2. Green Video | 7. Ground | 12. N/A |
| 3. Blue Video | 8. Ground | 13. Horizontal Sync |
| 4. N/A | 9. N/A | 14. Vertical Sync |
| 5. N/A | 10. N/A | 15. N/A |



The RGB signals must be an analog signal with a horizontal frequency that is compatible with the scanning frequencies of the monitor. This input can be directly connected to the most personal computers such IBM PS-2 Series, Macintosh MACII Series, and computers with VGA , S-VGA, X-VGA, Graphic Cards.

3. 2-Component Inputs — BNC connectors
Two component video inputs is provided. Use that to connect DVD player and other equipment that has a component video output.
4. 2-S-Inputs (Y/C) — 4pin DIN connectors
Two inputs are provided for video recorders which have an S-VHS (Y/C) output. The tape quality from machines with S-VHS outputs is maximized if the tapes were recorded in the S-VHS format. Although some laser disc machines also have an S-VHS output, this jack is really intended to feed the recording input of an S-VHS VCR. Since laser disc are not recorded with an S-VHS encoded signal, there is no reason to use an S-VHS input when hooking up a laser player to the VS 4.0.
5. 2-Composite Video Input (Video) — RCA jacks
Two composite inputs are also provided. Use that to connect laser disc players, non S-VHS tape machines, satellite receivers, video tuners, video cameras and other equipment, which has a composite video output.
6. +12 Volt DC Trigger output can be used to enable another device such as the electronic motorized screen.
7. RS-232 Data Port — 9pin D connector



RS-232 protocol settings:

Bits per second: 9600
 Data bits : 8
 Parity : None
 Stop bit : 1
 Flow control : None

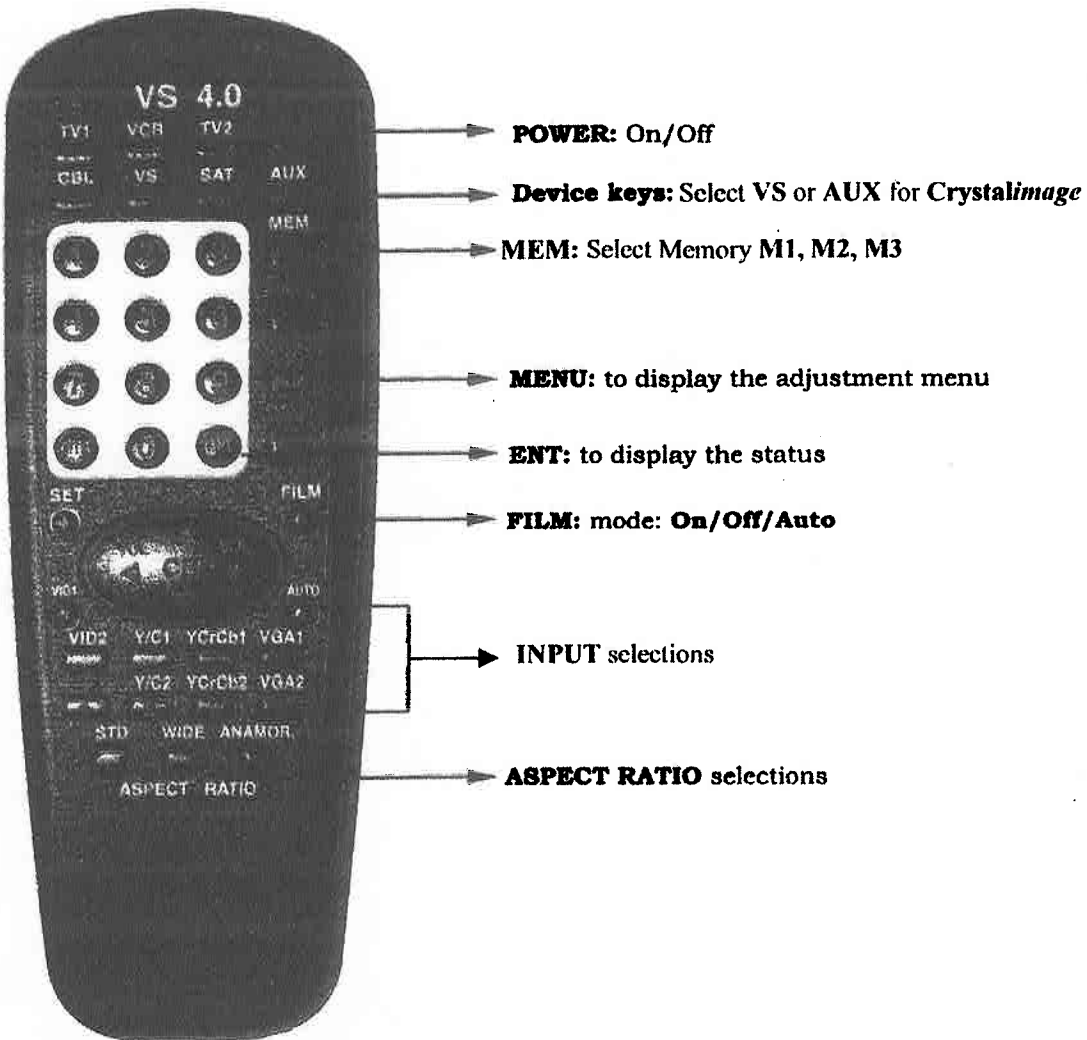
RS232 Commands

Commands must be upper case characters. All commands are terminated by a carriage return (CR). Example: P1 (CR) = Power On

P_ Power on/off (0-1) 0= Off 1= On	B_ Brightness (0-1) 0= Decrease 1 level 1= Increase 1 level
I_ Input Select (1-4) 1= Video1 2= Video2 3= Y/C1 4= Y/C2 5= YCrCb1 6= YCrCb2 7= VGA1 8= VGA2 9= AUTO	D_ Detail (0-3) 0= Decrease 1 Level (H Detail) 1= Increase 1 Level (H Detail) 2= Decrease 1 Level (V Detail) 3= Increase 1 Level (V Detail)
A_ Aspect Ratio (1-4) 1= Standard 2= Widescreen 3= Anamorphic-1 4= Anamorphic-2	S_ Saturation (0-1) 0= Decrease 1 Level 1= Increase 1 Level
R_ Output Format (1-7) 1= 640 x 480 2= 852 x 480 3= HDTV-540p 4= 800 x 600 5= HDTV-720p 6= 1024 x 768 7= 1365 x 768 8= 1024 x 1024 9= 1280 x 1024 10= 1365 x 1024	T_ Tint (0-1) 0= Decrease 1 Level 1= Increase 1 level
O_ Display Format (1-2) 1= 4 x 3 2= 16 x 9 3= 16 x 9 LCD	F_ Film Mode (0-2) 0= Auto 1= Off 2= Auto
M_ Memory Select (1-3) 1= MEM1 2= MEM2 3= MEM3	
C_ Contrast (0-1) 0= Decrease 1 level 1= Increase 1 level	

OPERATION

The remote control or front panel buttons will control your **Crystalimage** VS 4.0 whenever any programming and adjustments are desired. Panel controls include a set of selection cursors ▲ ▼ and a set of adjustment cursors ◀ ▶, a power button, an IR receiver window, and a LED light that illuminates when the unit is on. The remote control can be operated using the same buttons when pointed at the remote sensor on the player's front panel.



Note: * Pres **1, 2, 3, ENT** keys in sequence to access **SETUP** menu

* *Crystalimage* scaler 3 digit code: **VS = 136, AUX = 053**

To program the remote: Press and hold the SET key and the device key until the red light is on, then input 3 digit brand code.

SET-UP MENU

The SETUP menu can only be accessed by either through front panel or remote control: On the front panel, press and hold both the Up and Down adjustment cursor buttons ▲ ▼ simultaneously for 10 seconds. On the remote control, press 1 2 3 ENT keys in sequence.

The SET-UP menu contains: **OUTPUT FORMAT, AUTO POWER, DISPLAY FORMAT, SYNC TRACKING, REMOTE CTL,** and **EXIT.**

OUTPUT FORMAT Submenu

Output formats are provided:

- | | | |
|--------------|----------------|-----------------|
| 1. 640 x 480 | 5. HDTV-720p | 9. 1280 x 1024 |
| 2. 852 x 480 | 6. 1024 x 768 | 10. 1365 x 1024 |
| 3. HDTV-540p | 7. 1365 x 768 | |
| 4. 800 x 600 | 8. 1024 x 1024 | |

NOTE: The resolution selected should match the native resolution of the projector or display; not the highest resolution that the device will support.

AUTO POWER

The VS 4.0 is normally turned off and on using the power button on the remote control or front panel. **This is only possible when the Auto Power function is turned off.** This is the default selection.

The **Auto Power** feature allows the VS 4.0 to automatically turn the unit off when there is no signal and turns it on when there is a video input signal. To activate the Auto Power function, select Auto Power and press ▶. This will turn the function on.

DISPLAY FORMAT

There are three screen size for Display Format: 16x9, 16x9LCD and 4x3. **You must select correct screen size first in order to have the ASPECT RATIO control in main menu to work properly.**

4x3 is selected if the screen is in the form of 4x3 format.

16x9 is selected if the projector is the CRT type that is vertical height can be compressed in the Anamorphic format or non-CRT projector with a permanent installed anamorphic lens adapter.

16x9LCD is intended for DLP, JVC-DILA projector or 4x3 fixed panel displays which can display 3 aspect ratio (Standard, Widescreen, Anamorphic) images on 16x9 screen. Its output formats are only available in 800x600, 1020x768, 1365x768, 1280x1024, and 1365x1020 for NTSC; and 1020x768, 1280x1020 for PAL

Factory preset is 4x3 screen.

SYNC TRACKING

Allows fine adjustment of the frequency of the digital clocks within the VS4.0 to allow perfect synchronization with the scanning circuitry in your video display, or periodic flashing (and possible bending) in a solid-state displays (D-ILA, LCD, or DLP). Adjust for minimum bending, or to eliminate any periodic flashing of the picture.

Range Adjustment: 0 +/- 6

REMOTE CTL = VS 136 or AUX 053

Allows the User to change IR codings if the present IR device code of remote control is interfering with another device in the system.

Factory preset is VS 136. To change to AUX code: Access to SETUP menu and select REMOTE CTL = AUX 053. On remote control (AVS-2000), press and hold the "SET" key and press "AUX" key, when red light is on, release both keys, then input 053 code.

MAIN MENU

Complete **Crystalimage** controls are provided through onscreen menus listing the various control options. To access the main menu, simply press any cursor button on the remote control or the front panel. The Main Menu will appear on the screen. The Main Menu includes: **VIDEO ADJUSTMENT, INPUT SELECT, MEMORY SELECT, ASPECT RATIO, FILM MODE, POSITION ADJ, and EXIT.**

A boxed cursor arrow will be situated in front of the **EXIT** option. Pressing either one of the adjustment buttons ◀ ▶ will immediately clear the screen.

Scrolling up and down the main menu with the selection cursor buttons ▲ ▼ will move the cursor arrow to the desired submenu. To activate the desired menu, simply move the cursor arrow to that function by pressing the selection cursor buttons ▲ ▼ on the remote control or front panel controls. Then press the ▶ cursor button. Various control options for that submenu will then appear on the screen.

Note A "time out" feature will automatically clear the onscreen menus within thirty seconds unless a button is pressed on the remote control or panel controls.

MEMORY SELECT Submenu

Scrolling up or down \blacktriangle \blacktriangledown the **Main Menu** will access the **Memory Menu**. Press the \blacktriangleright button to select the **Memory Menu**. The memory can also be selected through the remote control by pressing the MEM key and then the number key. Ex: M1= press MEM, then 1

Three Memories (M1, M2, and M3) are provided for each kind of inputs. Memories are automatically saved in each memory, including all video settings, aspect ratio, and film mode.

ASPECT RATIO Submenu

In order to have this function works properly, the DISPLAY FORMAT in Setup menu must be selected correctly.

For DISPLAY FORMAT = 4X3, the Apect Ratio of video material can be selected:

1. **STANDARD:** for 4:3 video source. The image looks normal.
2. **WIDESCREEN:** for 16:9 video source. The image is stretched vertically and horizontally to fill the screen. The image is being cropped at left and right.
3. **ANAMORPHIC-1:** for Anamorphic video source. The image has black band on top and bottom (Letterbox). This feature works only at scan rate of 540P or higher.
4. **ANAMORPHIC-2:** The image is stretched vertically and horizontally to fill the screen. The image is being cropped at left and right.

For DISPLAY FORMAT = 16X9 (or 16X9LCD), The Aspect Ratio can be selected:

1. **STANDARD-1:** for 4:3 video source. The image is normally inside of 16:9 screen (black band at left and right).
2. **STANDARD-2:** for 4:3 video source. The image is stretched to fill screen. (Not implemented for 16X9LCD)
3. **WIDESCREEN:** for 16:9 video source. The mage looks normal.
4. **ANAMORPHIC:** for Anamorphic video source. The image looks normal and fill in the 16X9 screen

FILM MODE = Auto / On / Off

This feature is automatically to detect the video converted from film (2:3 pull-down). For material originated from video cameras, it should be **off**.

Auto: Film is detected and go into film mode automatically.

On: Film mode is forced in.

Off: Video mode only. Film mode will not be entered.

Factory preset at **Auto**

POSITION ADJ Submenu

H-POSITION: To move the image horizontally (Left / Right).

V-POSITION: To move the image vertically (Up / Down)

VIDEO ADJUSTMENT Submenu

Adjusting for optimum viewing can be achieved by controlling the **Contrast**, **Brightness**, **H Detail** (sharpness), **V Detail**, color **Saturation** and **Tint** settings to deliver a sharp, clear, crystal-like image. The video controls are based on a scaled numeric ratio.

The boxed cursor will be position in front of the **EXIT** function. Pressing **▶** will exit the Video Adjustment Menu and return to the Main Menu. To adjust the video settings, simply scroll up or down **▲ ▼** with the selection cursors to move the boxed cursor to the desired function. Then press the **▶** button. The scaled numerical values will be highlighted in white. Pressing **▼** will decrease the ratio and pressing **▲** will increase the ratio. To adjust a different setting, press the **◀** button. Again, scroll up and down **▲ ▼** to access the desired video settings. You should note your preferred settings for future reference.

The contrast level is the amount of white in the picture. For optimum contrast, set the control by pressing the selection cursor buttons until the value of the ratio confers brightness to the white areas while still seeing detail in the picture. This contrast ratio is based on a scale of 100.

Brightness level is used to determine the level of black in the picture. The optimum setting is when the dark areas are black, yet maintaining some visible detail. The brightness ratio is based on a scale of 50.

H Detail and **V Detail** level to add more depth and resolution to the image horizontally and vertically. Maximum detail will sharpen the edges of many low quality sources like VHS tapes. These settings are based on a scale of 5.

Color saturation level determines the amount of color in the signal.

Tint levels, also known as hue and phase, are crucial for realistic color images. Adjust the tint control if the colors have a greenish or magenta-like overtone. The proper setting will drastically improve the flesh coloring.

INPUT SELECT Submenu

Scrolling up or down **▲ ▼** the **Main Menu** will access the **Input Select Menu**. Press the **▶** button to select the **Input Select Menu**.

Source switching for the multiple inputs include: **VID-1**, **VID-2**, **YC-1**, **YC-2**, **YCrCb-1**, **YCrCb-2**, **VGA-1**, **VGA-2**, and **AUTO**. To switch to the proper input, press the selection cursor buttons on either the remote control or panel controls to sequence through input sources. When the boxed cursor is position in front of the desired input function, pressing **▶** will select it. This will be indicated by the highlighted option. If any input is selected but not connected, the image will be blank.

The **AUTO** function, when selected, will automatically search for the input signal in this order: **VGA ▶ YCrCb ▶ Y/C ▶ VIDEO...**

FACTORY RESET

* : Press and hold the buttons on front panel until blue LED blink (approximately 10 seconds) to reset the unit for factory preset: Video settings = mid-range, Film mode = Auto, Frame Sync = On, and Display Format and Output Format as following:

Power ▲	▼	◀	▶	<u>Output Format</u>	<u>Display Format</u>
Hold	—	—	—	640 x 480	4 x 3
—	Hold	Hold	—	SETUP menu	
—	Hold	—	Hold	540P	4 x 3
—	Hold	—	—	Hold 800 x 600	16 x 9 LCD
—	—	Hold	Hold	— 720P	4 x 3
—	—	Hold	—	Hold 1024 x 768	16 x 9 LCD
—	—	—	Hold	Hold 1280 x 1020	16 x 9 LCD

SERVICE AND WARRANTY

Dealers offer service through their own service departments or through one or more authorized repair centers. Situations that may not be resolved to the owner's satisfaction should be reported to:

AVS at (818) 701-9073

Limited Warranty

This warranty protects the owner of VS 4.0 for one (1) year from the date of purchase for labor and parts.

Implied warranties of merchant ability and fitness for particular purpose are limited in duration to a period of one year from the date of purchase. AVS shall not be liable or in any way responsible for any incidental or consequential damages of any kind. Some states do not allow limitations on how long a6 implied warranty lasts and/or do not allow the exclusion of incidental or consequential damages, so the above limitations and 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.