



**DIGITAL CINEMATOGRAPHY** ———  
————— **CAMERA SYSTEM**

—————  
**HD900F OPERATION MANUAL**  
—————

ULTRA PRECISION EQUIPMENT FOR THE MOTION PICTURE INDUSTRY

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written by  
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design, photos, and layout  
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Andrew Young



photographs were shot using the Kodak Preview System with Primo lenses

HD900F OPERATION MANUAL  
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# INTRODUCTION

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In 1997, Panavision and Sony announced their collaboration on the development of a 24P digital high definition camera suitable for use by filmmakers to create big screen motion picture image quality. We knew, from 45 years of experience, that a complete imaging system approach was the only way for traditional film crews to make a seamless transition into digital production. With this in mind, we made a number of modifications to the Sony HDW-F900 24P camera. For starters, the Panavised camera received a heavy duty front plate and lens mount modified to work with our specially designed Primo Digital™ lenses. The system now accommodates most of our standard film camera accessories as well as new accessories designed exclusively for digital cinematography.

In addition to the mechanical modifications to the camera, a unique optical pre-filter gives you better color matching with film emulsions and enhanced resolution for blue screen effects cinematography. Last, but not least, we designed the new ULTRAVIEW® viewfinder for studio and handheld cine-style use. It presents a 2 times larger image along with a greater diopter range.

Panavision is committed to continuously developing our Digital Imaging system in close collaboration with our clients, just as we have done with our film systems over the last 45 years. Now your HD project will benefit from the same dedication to customer service and superior image quality that is the hallmark of Panavision.



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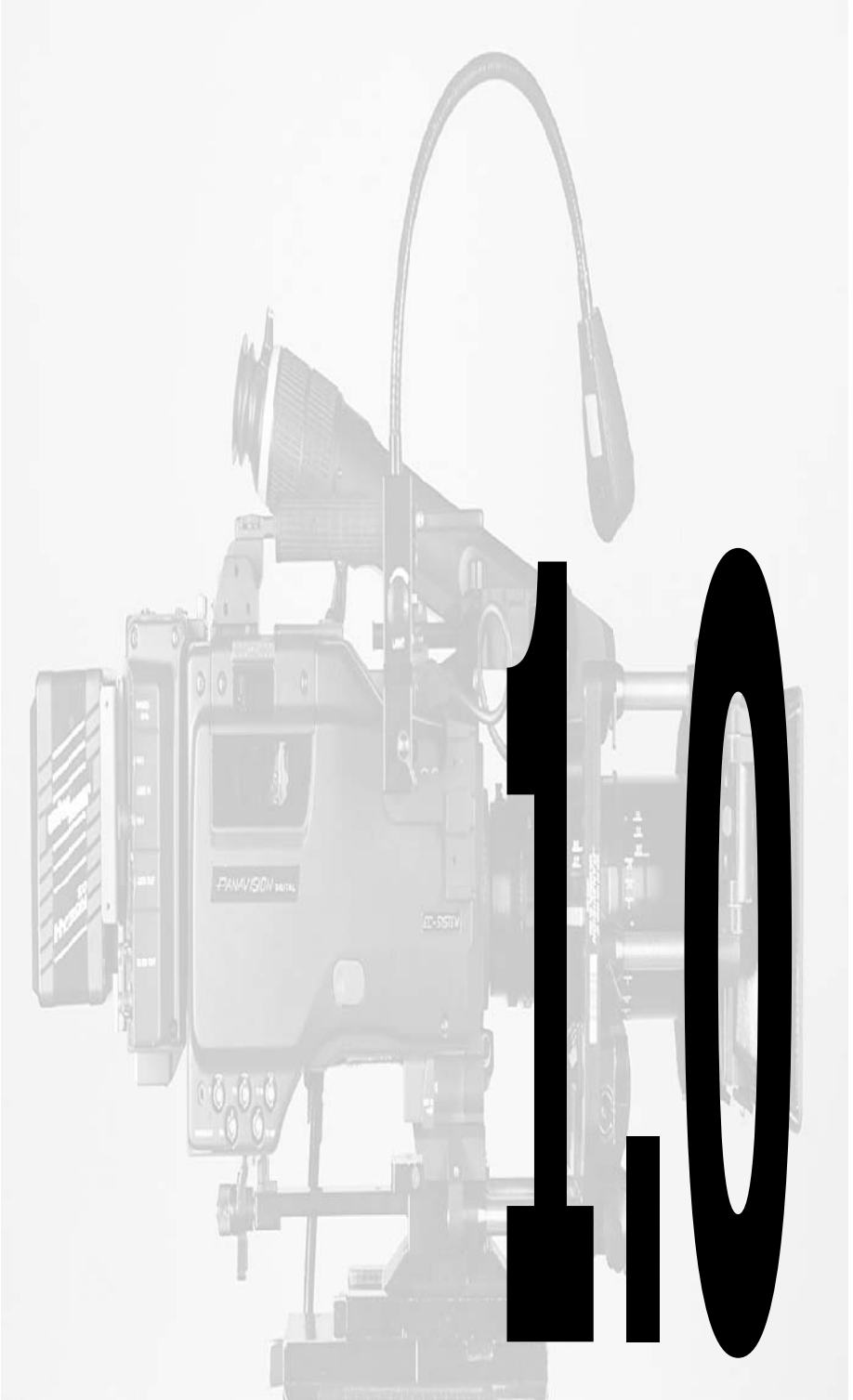
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# 1.0 GENERAL SPECIFICATIONS



# 1.1 CAMERA SPECIFICATIONS

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Imager	RGB 2/3" CCDs
Effective Pixels	1920 (H) x 1080 (V) each 2.1 million pixels each, for a total of 6.3 .378" x .212"
Power	12 v DC (range 11-17v)
Built-in Filters	
ND Filters	CC Filters
1: Clear	B: 3200K
2: .6 - (2 Stops)	C: 4300K
3: 1.2 - (4 Stops)	D: 6300K
4: 1.8 - (6 Stops)	
Lens Mount	Panavision HD Mount (proprietary)
Baseplate	Panavision Dovetail with 5/8" rods
Steadicam Plates	Bottom Dovetail Plate for Regular Mode Top Handle Plate for Low Mode
Sensitivity	Minimum ISO 320 tungsten
Cassette Tape	HDCAM: BCT-22HD, BCT-32HD, or BCT-40HD
Running Times	22 min. @ 30 fps or 27.5 min. @ 24fps 32 min. @ 30 fps or 40.0 min @ 24fps 40 min. @ 30 fps or 50.0 min. @ 24fps
Audio Quality	20 bit, 48kHz Digital (up to 4 channels)
Preset Storage	Sony Memory Stick
Eyepiece	Panavision Ultraview - 2 modes: Extension and Intermediate / Hand-held
SMARTLENS Compatibility	High resolution digital encoders to record T-stop, focus, and zoom positions Recordable up to 16 channels onto Audio channels 3 and 4 on HD SDI adapter



# 1.2 CONNECTOR SPECIFICATIONS

DC In	XLR, 4 pin male 11-17 v Pin 1 ground (-) Pin 4 positive (+)
DC out	Hirose, 12V DC, 4 pin (2 A max)
REM	Lemo, 10 pin 1B Pin 1 - VTR Start / Stop Pin 6 - Ground VTR, shutter, menu controls (HDRP)
Audio In	2 Channels XLR, 3 pin female Pin 1 Ground 2 Input (hi) 3 Input (low) 2 additional channels with HDSDI adapter (HDCAA)
Mic In	1 Channel XLR, 3 pin female (+48v) Pin 1 Ground 2 Input (hi) 3 Input (low)
Audio Out	2 Channel on 1 XLR, 5 pin male (E-E) Pin 1 Analog Ground 2 Ch. 1 Audio 3 Ch. 1 Ground 4 Ch. 2 Audio 5 Ch. 2 Ground 2 additional channels with HDSDI adapter (HDCAA)
Genlock In	BNC
Genlock Out	BNC (using analog Y channel)
Timecode In	BNC
Timecode Out	BNC
Video Out	Y, Pb, Pr Analog HD SDI (with HDCA adapter)
Remote Control	Hirose (special) 8 pin



# 1.3 FRAME RATES AND SHUTTER SPEEDS

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Frame Rates (MAINTENANCE MENU page: M7)

Progressive	Interlace
23.98 PsF	50i
24 PsF	59.94i
25 PsF	60i
29.97 PsF	
30 PsF	

Shutter Angles (PAINT MENU page: P12 or with the Remote Control)

SHUTTER SPEED	EQUIV. SHUTTER ANGLE
Shutter OFF = 1/24 sec	360.00 degree
1/32	270.00
1/48	180.00
1/96	90.00
1/125	69.12
1/250	34.56
1/500	17.28
1/1000	8.64

ECS - Extended Clear Scan 24 Hz - 2200 Hz @ 24fps  
Used to set intermediate shutter speeds and / or shoot practical monitors.

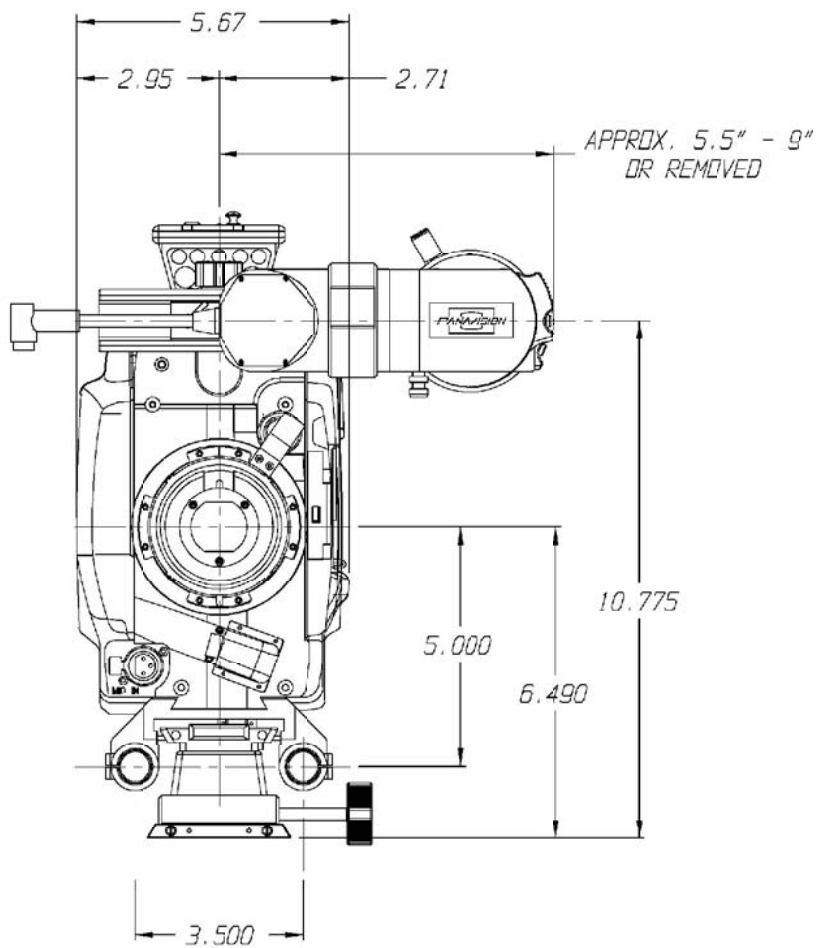
The equivalent shutter angle, for a film camera, is found by the following formula:  $360 * \text{fps} / \text{Hz} = \text{shutter angle}$ .

# 1.4 CAMERA WEIGHTS

Body (without SDI)	HD900F	14.9 lbs.
Body (With SDI)	HD900F, HDCA	17.2
SDI Adapter	HDCA	2.3
Extension Eyepiece	HDET, HDEP	4.8
Intermediate / HH Eyepiece	HDEP	3.6
Follow Focus w/1 Knob	HDFB, HDFD, MFF	1.9
Hand Held Rig	HDHR	2.4
Clip-on Mattebox	MBPC	1.0
Top Steadicam Plate	HDLM	0.5
Bottom Steadicam Plate	HDSP	1.2
Voltage Upconverter w/cable	HDUC	0.9
Anton Bauer Battery	AB100	5.4

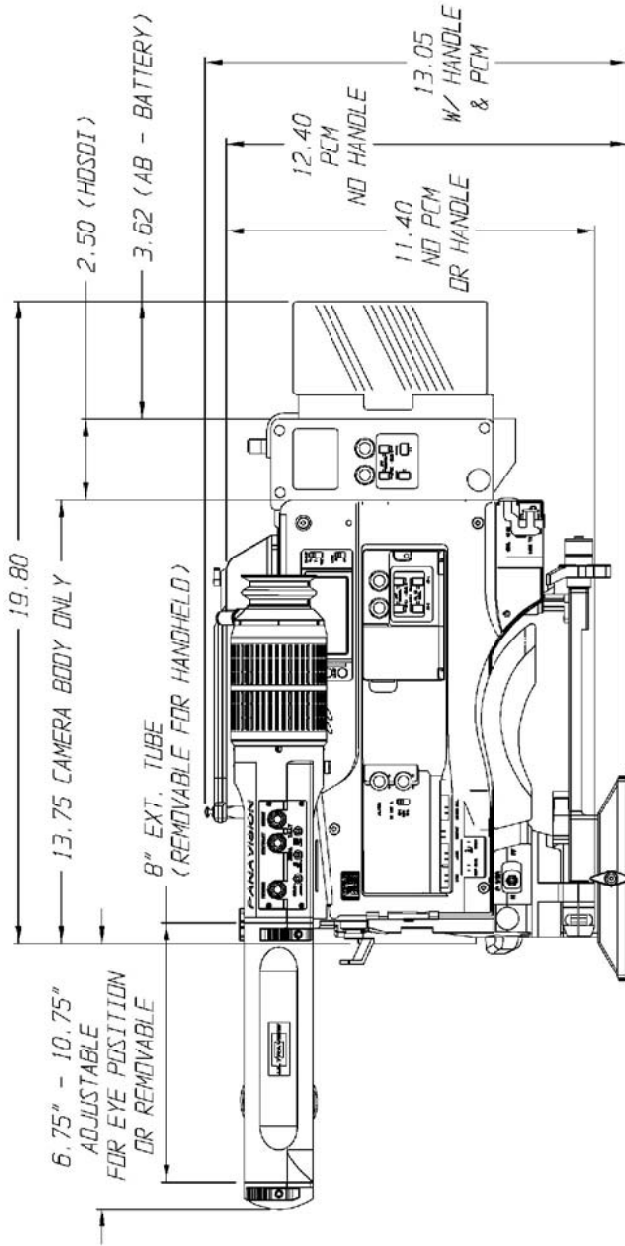
## LENSES

Primo Digital™ 5mm Prime Lens	SD5	3.0
Primo Digital™ 7mm Prime Lens	SD7	3.2
Primo Digital™ 10mm Prime Lens	SD10	3.7
Primo Digital™ 14mm Prime Lens	SD14	2.8
Primo Digital 20mm Prime Lens	SD20	3.6
Primo Digital 35mm Prime Lens	SD35	2.9
Primo Digital™ 6-27mm w/Motor	SDZW	8.0
Primo Digital™ 25-112mm w/Motor	SDZT	7.0
Primo Digital™ 9.5-105mm w/Motor	SLZ11D	23.0
Primo Digital™ 8-72mm w/Motor	SDZ9	8.6
1.4X Extender for Primo Digital Zoom	1.4XSD	0.7
2X Extender for Primo Digital Zoom	2XSD	0.9
Double Asphere Attachment for 5mm	CDA	1.2
Wide Angle Fisheye Adapter for 7mm	WFA	1.4
Hand Held Configuration:		29.3
(Hand Held Viewfinder, SDI, HDUC, Follow Focus w/1 Knob, HDHR, MBPC, Remote No Lens)		

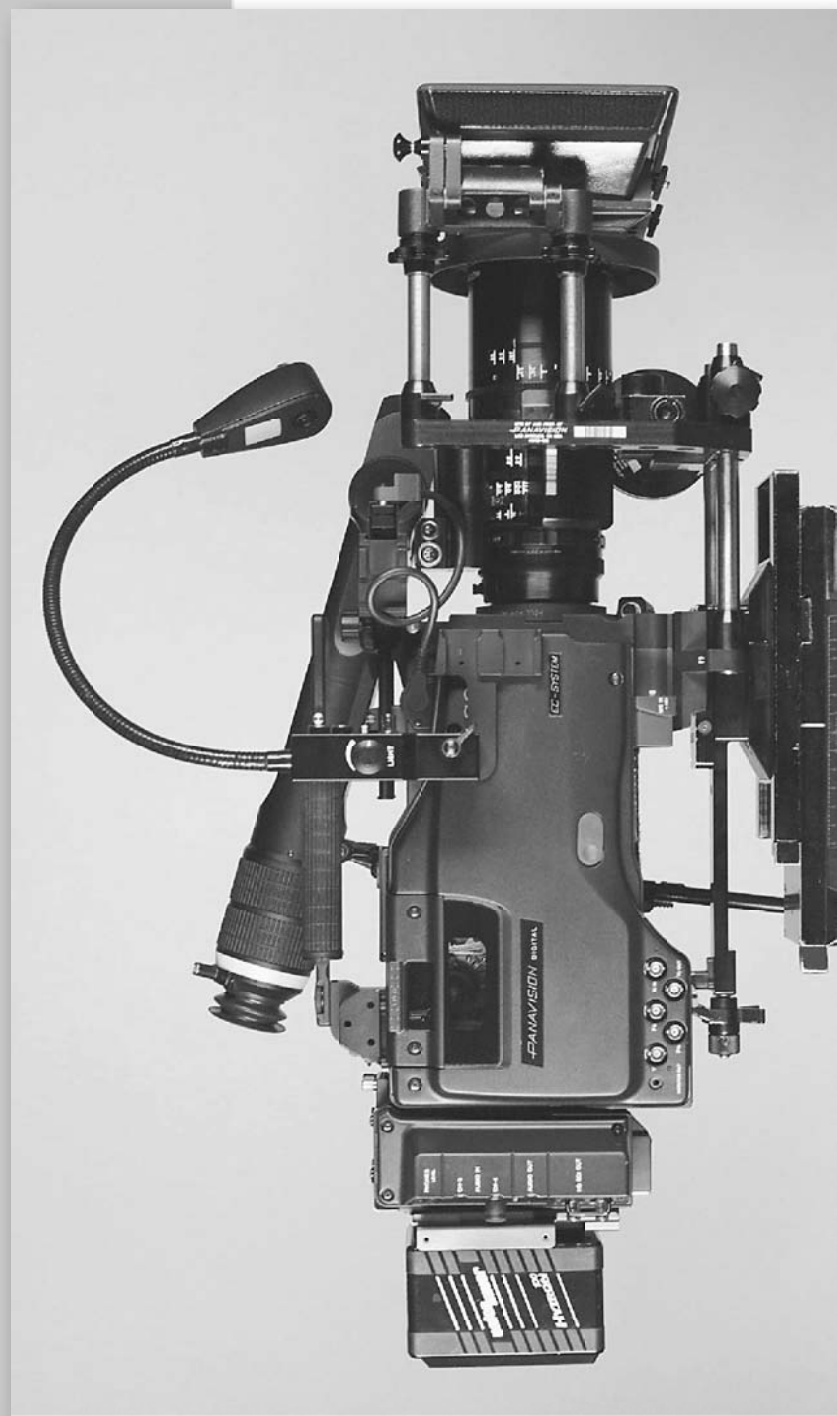


*FRONT VIEW*

# 1.5 CAMERA MEASUREMENTS



SIDE VIEW



# 1.6 SIDE CAMERA VIEWS



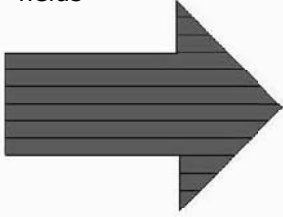




# 1.7 FRONT AND REAR CAMERA VIEWS



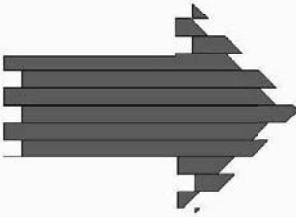
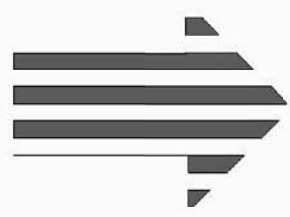
Static Interlaced  
Image consists of two  
fields



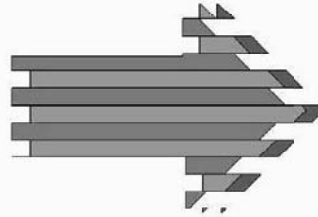
Field 1 (odd lines  
1,3,5, etc.)



Field 2 (even lines  
2,4,6, etc.)



Moving image appears to  
the eye as a blurred, bro-  
ken edge



60 field to 24 frame  
conversion requires the  
mixing of 3 fields  
resulting in additional  
motion blur

## 1.8 PROGRESSIVE VS. INTERLACE

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The 24P HD Electronic Cinematography Camera System is a PROGRESSIVE capture device unlike older video cameras that capture the image in an INTERLACE manner.

**INTERLACE:** A video scanning system where the odd numbered lines are scanned separately from the even numbered lines. The odd numbered lines form field one, the even lines make up the second field. The combination of two fields comprises one frame.

**PROGRESSIVE:** A video system in which all lines comprising a frame are scanned in sequence rather than interlaced.

The interlace mode of capture has inherent motion artifacts and is difficult to transfer to film. The progressive mode of shooting captures the complete resolution at once, at the same point in time; and therefore allows a perfect one-to-one transfer to film.

# 1.9 GENERAL IMAGING CONSIDERATIONS

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The HD900F has a wide range of menu settings that allow the user to control the look of the picture. These settings can be a powerful tool to change or modify the captured image. Most components of the video signal can be manipulated. Levels, saturation, gamma and matrix will have a major influence over the final video output, be it for TV or film.

While there is no right or wrong way to approach how the camera is used, you should be aware of the consequences of employing certain menu functions. We do not determine who will make adjustments or when these functions will be employed, but in most cases, they are made at the behest of the DP. While these features may prove useful for shows that are video out only (TV), if misused, they can have irreversible consequences on a film-out show (feature). Judicious use of these features can prove beneficial. However, minimum manipulation of the image that will result in a clean camera master is desirable. It is better to leave the decision to alter the image for the less stressful environment of the post production suite. Post production tools offer the ability to manipulate the image to a much higher degree than the camera allows. The following list is not inclusive of every menu function, but provides a brief explanation of why certain precautions should be heeded.

**Detail:** The detail function will provide artificial enhancement to the video image particularly around the edge of an object. This feature, like several others, is incorporated into the camera for live TV broadcast productions. Historically, detail circuits were used to compensate for limitations of optics or electronics. While this is useful for TV applications, employing detail for a film output production will put unnatural edging around the subject. In addition, use of detail will make the quality of CGI or mattes very poor since the matte process tries to avoid any appearance of edges.

**DCC:** DCC is Dynamic Contrast Control or auto knee. It is accessible through a toggle switch on the camera body. It is used during news or documentary situations where there is little or no control of lighting and contrast ratios. If there is a bright object in the scene that is over 100% white level, DCC will automatically pull the level down (compress) so the highlight will not "blow out". For a scripted project, it can be seen that automatic correction of highlights could add undesirable elements to the scene as the camera moves or pans throughout the scene. While control of the highlights is necessary, it is best to use the manual knee and slope functions to achieve the desired result.

**Black Gamma:** This circuit allows for stretch or compression of the toe (black) portion of the video signal. This can be used to affect the contrast in the dark areas of the picture while not changing the mid-tones or highlights. Since this portion of the signal contains the highest amount of gain, it is closest to the noise floor. Consequently, expanding the signal will also introduce more noise into the picture. This may not always be a desired addition to the final look. For a film-out project, testing is prudent.

## 1.9 GENERAL IMAGING CONSIDERATIONS

**Matrix:** The matrix is a series of mathematical calculations that are applied to the color output of the camera. Its purpose is to match the color space of the camera to the final display device. It is similar to certain equalization curves that are employed in the recording industry to ensure that the playback system will reproduce the original recording faithfully. In the video world, matrix is used to provide a set of equations that relate to the reproducing characteristics of various sets of phosphors that are used in TV picture tubes. This function (like others on the camera) has roots in the early days of color television when technology and economics determined that some circuits would be placed in the camera and others in the receiver. As with detail, matrix can prove useful for a broadcast or video only production. Use of the matrix for a film-out production is cautioned since the film-out device will not be able to recreate the proper color space from the camera to match the film emulsion (the equation is no longer valid). If color manipulation is desired, it is recommended that one shoot a test using the matrix to create the appropriate look. This test can be used as a guide for the facility that will be doing the film-out.

Use of the camera in the preset modes will produce perfectly good images that can be manipulated with a much higher degree of control in the post environment. In short, you do not need to have a comprehensive knowledge of the paint menu to produce a good image. Again, there is no right or wrong way, but this manual addresses those features that are necessary for a camera assistant to master.

Due to inherent differences in imaging characteristics between a CCD, a monitor, and the human eye, certain translations are necessary. The Gamma and Matrix settings interpret the CCD image so that the monitor image will approximate the actual subject.

Gamma should always be turned ON and set to COARSE 0.45, TABLE STANDARD 5. This references the ITU REC 709 standard. This gamma correction is especially important for video output, and can be manipulated for film output, and so should be left on all the time. (see sec 5.9.2)

# 1.9 GENERAL IMAGING CONSIDERATIONS

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## **Shooting 24P for Film output:**

Since the HD monitor is much closer to the final video image, but only an approximation of the film image, there are some recommendations in order to maximize quality of final film output:

- GAMMA ON as above
- MATRIX OFF
- GAIN set to 6dB or less, to avoid adding excessive noise to final image.
- Use less diffusion. Consider using a filter of 1/2 the value used with film negative.
- DETAIL OFF This is especially important because it will degrade the film output.

We caution against using paint menus for image manipulation if finishing on film because the monitor image and paint effects do not directly correlate to the film image, and they are usually irreversible.

## **Shooting 24P for Video output:**

(No future film-out foreseen or planned)

When shooting for video finish, the HD monitor is in effect your final image. Therefore adjustments can be made in the camera with more confidence in the intended results. Standard recommended settings are:

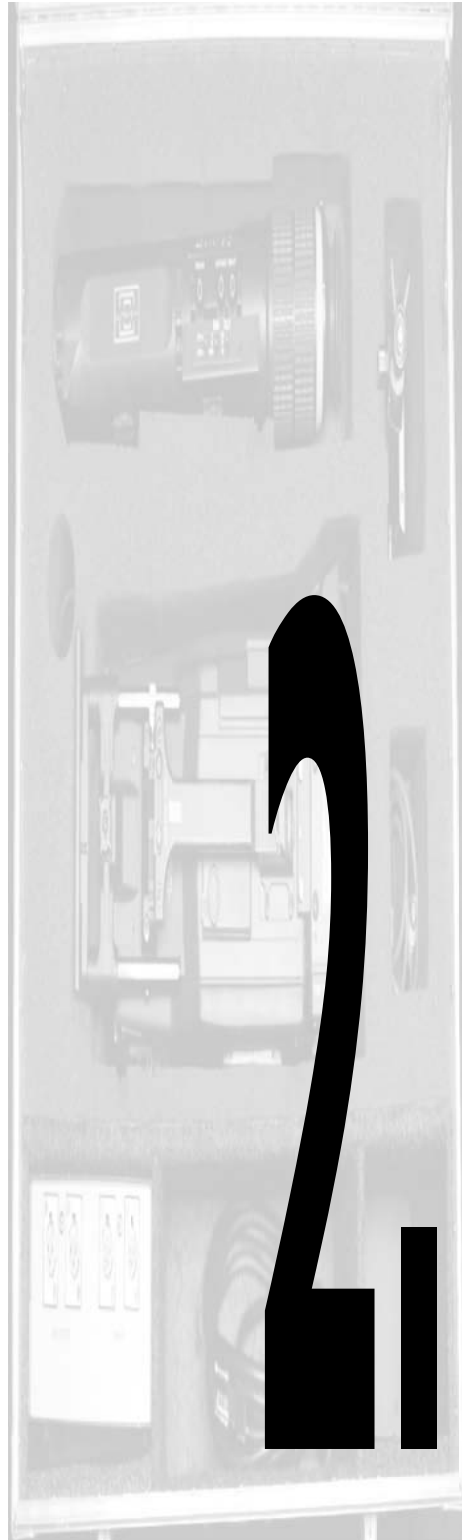
- GAMMA ON as above
- MATRIX ON, PRESET ON, ITU-709
- USER MATRIX OFF
- MULTI-MATRIX OFF
- GAIN set to 6dB or less.

All the paint adjustments can be set for creative effect, but the user must be aware that many settings cannot be undone in post. On the other hand, if the camera image is recorded clean, many powerful creative manipulations are available in the color correction stage.

**NOTE:** The MATRIX must be OFF for blue or green screen shots because it may create undesirable artifacts.

**NOTE:** To restore the paint menus to their Panavision default settings, recall the STANDARD file on menu page P13, by clicking on it twice.

## 2.0 PACKING AND SHIPPING







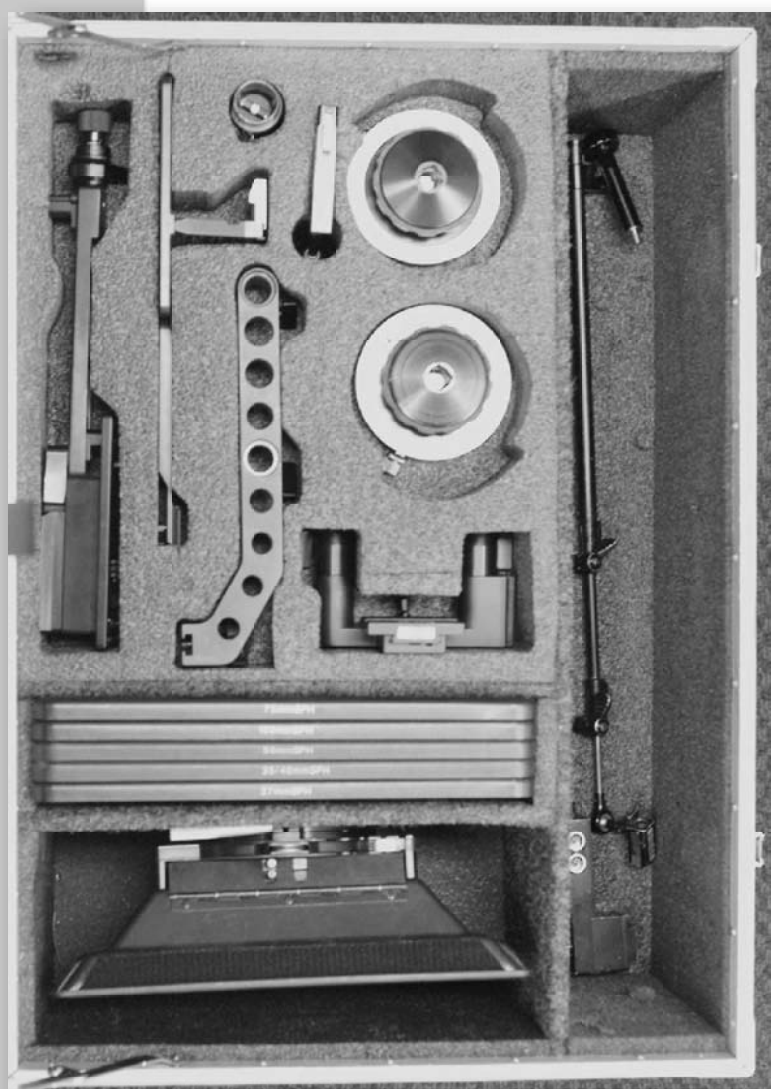
## 2.1 CAMERA BODY CASE

The HD900F camera system is comprised of 2 cases, one containing the camera body and the other containing the camera accessories. The camera is stored without the eyepiece attached.

Included with the camera is an AC to DC power converter (HDPS) with 2 24V DC and 2 12V DC outputs for camera and accessory power.

### CASE CONTENTS:

HD900F	Camera HD900F
HDEP	HD Ultraview Viewfinder
HDET	HD Extension Tube
HDVP	HD Viewfinder Pivot
HDCA or HDCAA	HD SDI Cam Adapter (data or audio)
HDRP	HD Remote Control Panel
HDPCM	HD Camera Mount
ABSU or ABGM	AB Sony Upconverter /Goldmount Battery Adapter
HDPS	HD 24/12DC Power Supply
CBLE-IECNA	IEC/N. America Mains Plug
CBLE-12P (2)	12V Power Cable (XLR4)



## 2.2 ACCESSORY CASE

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The accessory case holds a 4x5 swing away matte box with mattes, sunshade, follow focus and knobs, Panavision Steadicam® plates, eyepiece leveler, lens light, whip, follow focus bracket, and side rod adapter.

Clip-on polarizer matte box is optional.

**CASE CONTENTS:**

MFFGB	Modular Follow Focus Gear Box
MFFSK (2)	Modular Follow Focus Single Speed Knob
MFFEX	Modular Follow Focus Extension
FXHL	Offset Handle
FFX	Follow Focus Extension 12"
EPL-M	Eyepiece Leveler - Millennium
PLL	Panaflex Lens Light
HDLM	HD Low-Mode Bracket
HDSP	HD Steadicam® Plate
HDRB	HD Rod Bracket
CBLE-ZLP (2)	Zoom Lens Power Cable
IRISROD	Pair of 10" Irisrods





# 3.0 PRIMO DIGITAL LENSES

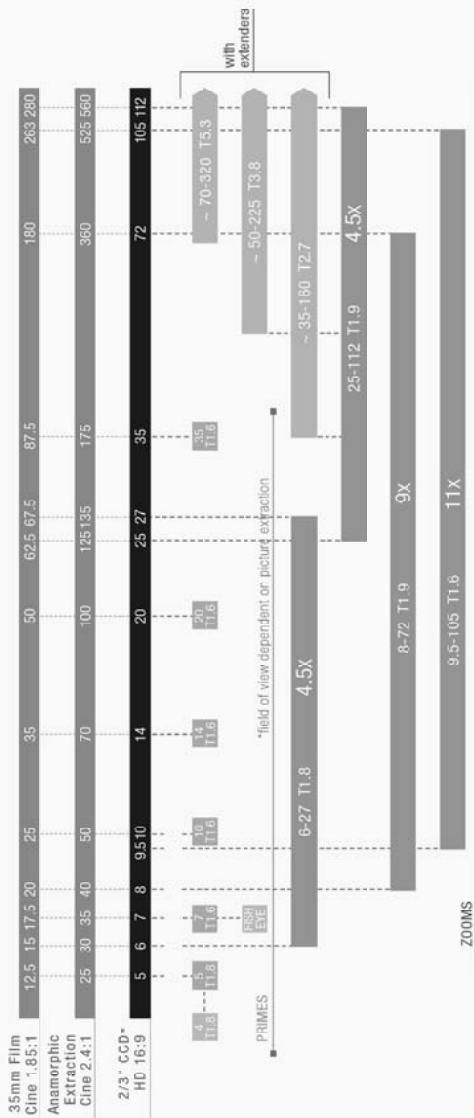
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# 3.0

# Primo Digital™ Imaging

## PRIME AND ZOOM LENS FOCAL LENGTHS, RATIOS AND FEATURES



## 3.1 PRIMO DIGITAL LENS DESIGN

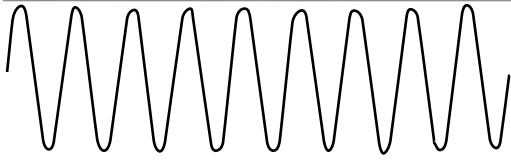
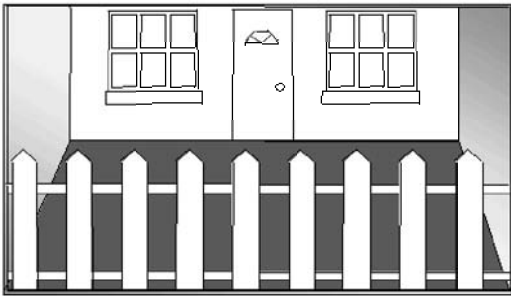
Primo Digital Lenses were designed specifically for the 2/3 CCD imager to optimize image quality. They are not modified cine lenses. However, Primo Digital primes and zoom lenses fully incorporate the optical, mechanical and ergonomic characteristics of our Primo cine lenses with additional features to enhance electronic cinematography.

- High contrast and resolution for maximum sharpness. 2.5 times that of our cine Primo lenses to accommodate the 2/3 imagers.
- Optimized for maximum image quality at fast maximum apertures of T1.6 1.9 (f1.45 1.75), thus enabling depths of field similar to 35mm cine formats.
- Very low veiling glare, ghosting, lateral color and distortion.
- Dual expanded, calibrated and accurate focus scales.
- Precision back focus adjustment on all lenses including Digital Primes.
- Internal filter slot to selectively control colorimetry and resolution/contrast.
- For use with the SMARTLENS system, Panavision lenses are available with integral encoders for display of focus, zoom and aperture position.

### PRIMO DIGITAL LENSES:

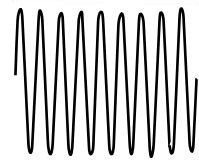
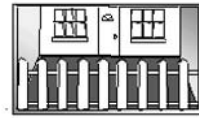
SD5	5mm T1.8 Primo Digital Prime	10 "	CF
SD7	7mm T1.6 Primo Digital Prime	12"	CF
SD10	10mm T1.6 Primo Digital Prime	12"	CF
SD14	14mm T1.6 Primo Digital Prime	12"	CF
SD20	20mm T1.6 Primo Digital Prime	13"	CF
SD35	35mm T1.6 Primo Digital Prime	20"	CF
SDZW	6-27mm T1.8 Primo Digital Zoom	22"	CF
SDZT	25-112mm T1.9 Primo Digital Zoom	32"	CF
SDZ9	8-72mm T1.9 Primo Digital Zoom	3'	CF
SLZ11D	9.5-105 T1.6 Primo Digital Zoom	4 '	CF
1.4SXD	1.4X extender for Primo Digital Zoom		
2XSX	2X extender for Primo Digital Zoom		
CDA	Double Asphere Attachment, 5mm = 4mm		
WFA	Wide Angle Fisheye Adapter for 7mm		

3 perf 16x9 35 mm film area



20 cycles / mm

2/3 HD CCD



50 cycles / mm



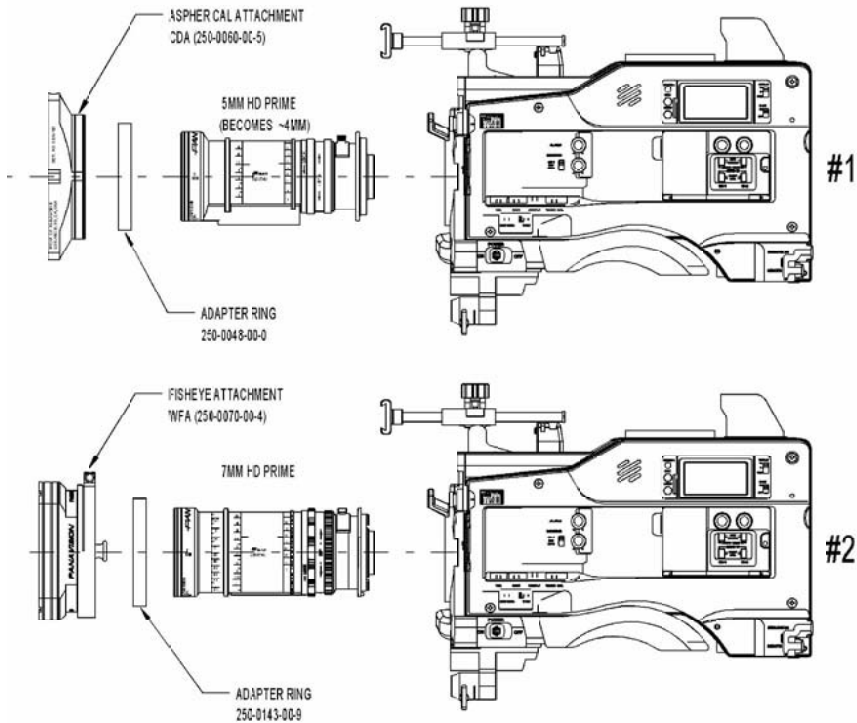
## 3.2 FILM / HD COMPARATIVE RESOLUTION

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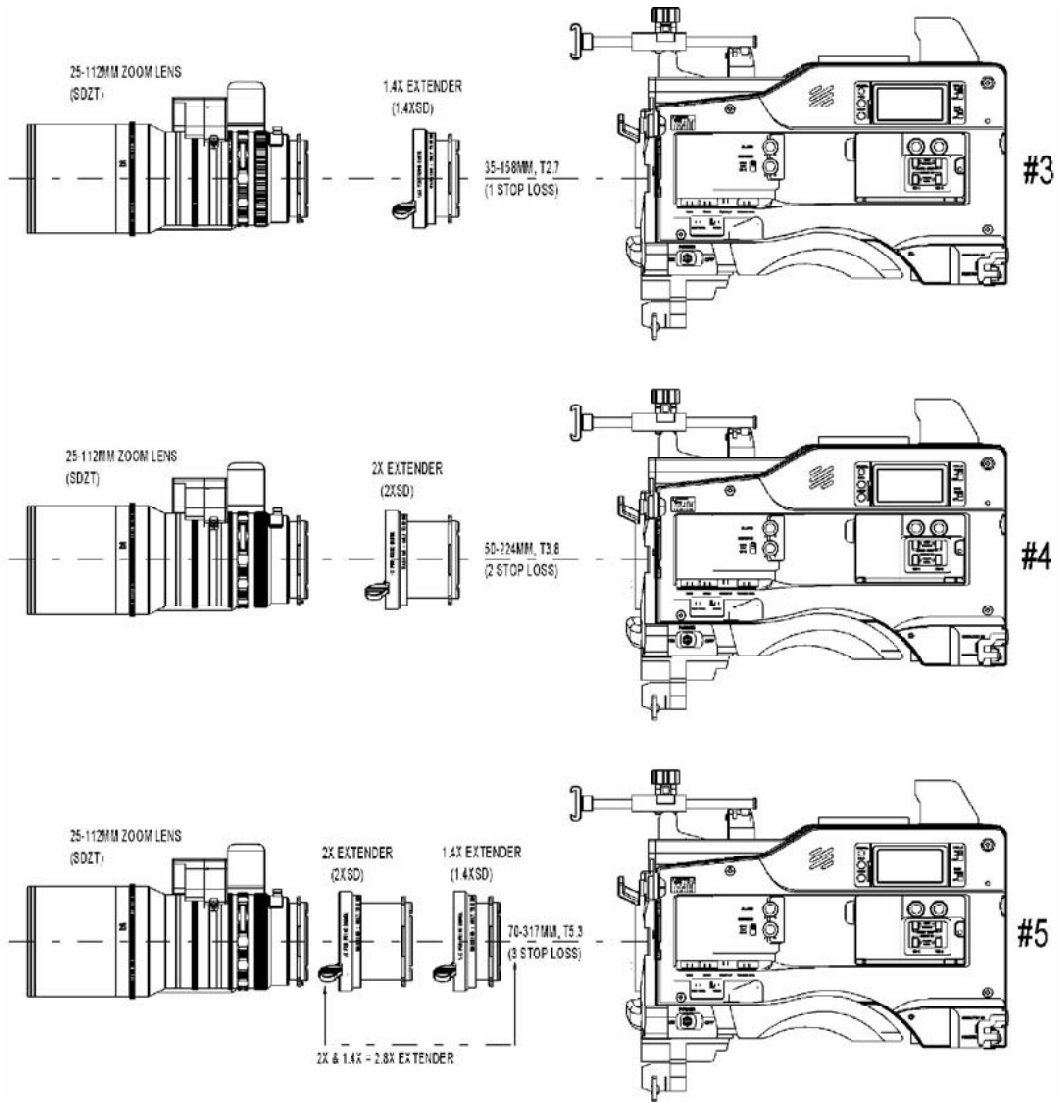
The 2/3" CCD imager is actually only 11mm in diagonal (as opposed to the 27.5mm diagonal of a 35mm motion picture film frame). Therefore, for any given screen size, the 2/3" CCD will require 2.5 times more horizontal magnification than a 35mm film frame. This required that our new Primo Digital lens series be designed to have 2.5 times the performance of our best cine lenses. All of the new Primo Digital lenses provide their optimum performance at their maximum aperture.

On the left side of this graphic is a 16x9 format, 35mm film camera aperture. On the right side is the image area of a 2/3" CCD drawn to the same scale. In order to have the same performance as a Primo cine lens, Primo Digital™ lenses achieve 80% contrast at 50 line pairs per millimeter on the 2/3" CCD (2.5 times better frequency response).

### 3.3 ASPHERICAL AND FISHEYE ATTACHMENTS



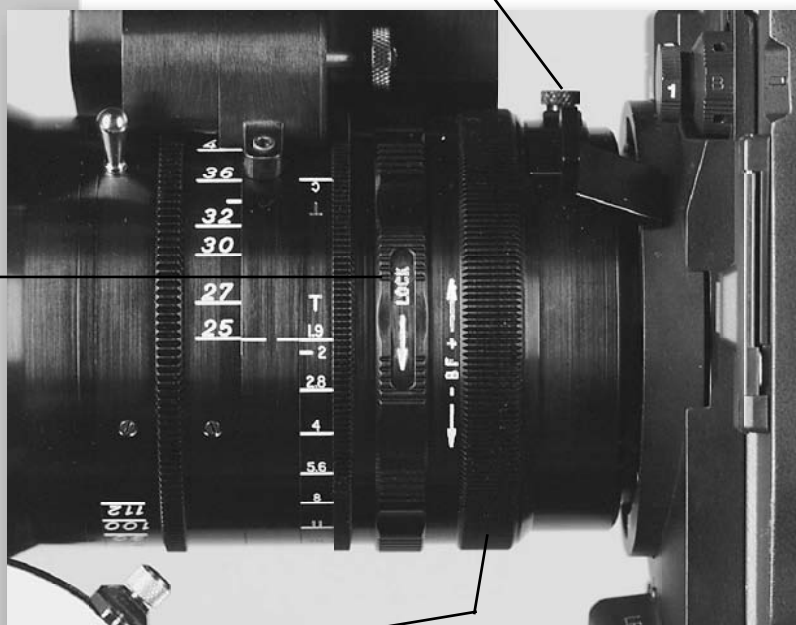
# 3.4 PRIMO DIGITAL LENS EXTENDERS



INTERNAL  
FILTER  
SLOT

BACK  
FOCUS  
LOCK

BACK  
FOCUS  
ADJUST  
RING



## 3.4 SETTING BACK FOCUS

---

In order to gain the maximum performance from any lens, it is necessary that back focus be adjusted. Using a lens that is not properly adjusted will result in soft (out of focus) images. While lenses for motion pictures have a fixed back focus that is adjusted by a service technician, lenses for video employ an integral adjustment that is set by the user.

**WARNING :** Be aware that extreme temperature changes can affect camera parameters such as black balance and back focus. Check the lenses after every lens change and after they have warmed-up on the camera. Also, you **MUST** check and/or readjust back focus when switching lenses on different cameras.

Setting back focus is a simple process and once a few steps are practiced, it can be performed quickly.

### **Test equipment :**

It is helpful to have a chart that contains high frequency (fine vertical lines) information. As an alternative, look at a flat subject with fine detail (newspaper) and high contrast.

If you have a waveform monitor on the set, observe a properly focused image in the green channel. You should find this an aid to finding the proper setting.

If you will be judging focus from a monitor, the 24 is best. The 14 will suffice, but do not use a 9 monitor for this procedure.

The following steps describe the procedure for both zoom and fixed focal length lenses.



## 3.4 SETTING BACK FOCUS

### **Zoom lenses :**

1. Set up a chart or flat test subject at around 4 – 6 feet from the focal plane.
2. Open the iris to the **MAXIMUM** aperture (T1.8, etc.). Use the in-camera ND filters if necessary.
3. Set the zoom to the longest focal length (zoom in) and front focus the lens for the sharpest image. At this point you will find it helpful to adjust the camera viewfinder peaking control to a minimal amount of peaking. This will show very fine focus changes. It is sometimes helpful to turn off or lower the brightness on the viewfinder to emphasize contrast. Practice by observing the peaking while racking the follow focus slowly to find the sharpest point (peaking just on).
4. Now, set the lens to the **WIDEST** focal length (zoom out).
5. Unlock the back focus lock. This is the ring located in front of the back focus adjustment ring.
6. Move the adjusting ring slowly while observing the viewfinder peaking, or the waveform monitor, or the picture monitor (24" preferably) for the best focus. Look at the finest detail that you can discern.
7. Again, set the lens to the maximum focal length (zoom in) and front focus for the sharpest image.
8. Zoom wide. If image is not sharp at the wide end, repeat step 4 above and adjust back focus (per step 6).
9. Lock back focus ring, making sure not to move back focus adjustment.
10. Double-check the lens after securing the lock. You should be able to zoom in, front focus and then zoom wide and maintain focus throughout the focal range.
11. Confirm the distance scale on the front focus ring by placing the chart at measured distances and checking the engraved scale.

### **Fixed focal length lenses:**

1. Set the chart and the lens at a precisely measured close distance that coincides with an engraved mark on the focus scale. This mark should be no closer than the minimum focus plus 6" and no further than the ability to resolve fine detail on the chart.
2. Follow steps 2, 5, 6, and 9 above. Note: on wide angle lenses it may be difficult to confirm the distance scale by eye due to the extreme depth of field of a wide angle lens.





## 4.0 CAMERA ASSEMBLY



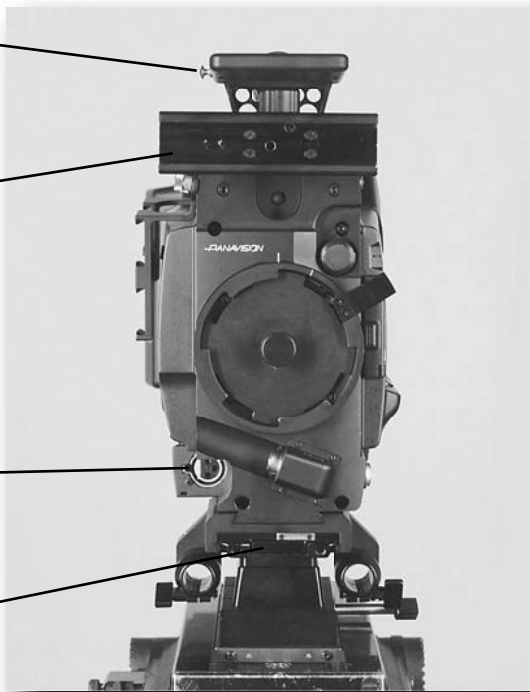
# 4.0

TAPE  
HOOK

EYEPIECE  
AND ACC.  
DOVETAIL

MIC IN

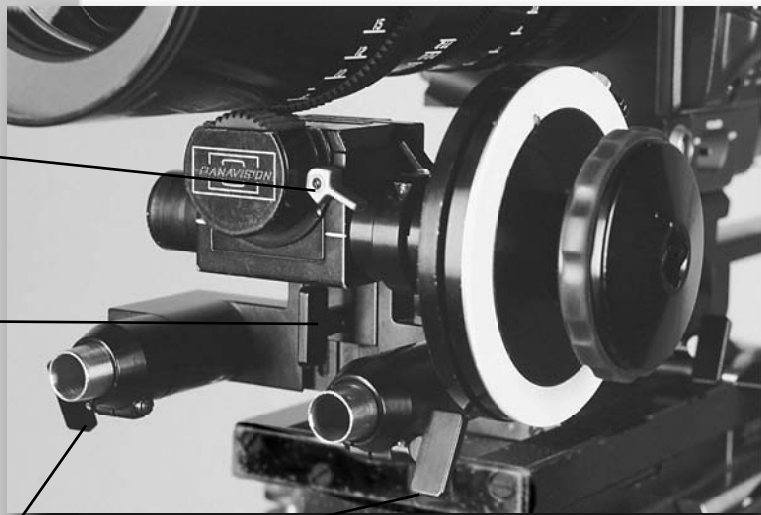
BASEPLATE  
DOVETAIL



FOLLOW  
FOCUS  
LOCK

VERT.  
ADJUST  
LOCK

COLLET  
LOCKS



## 4.1 FRONT FACEPLATE AND FOLLOW FOCUS

---

### Front Faceplate

The front of the camera has been modified with a Panavision HD Lens Mount and a redesigned and strengthened faceplate. A proprietary Panavision bottom dovetail has been added to interface with the baseplate system which includes 5/8" PV iris rod collets for supporting lenses and holding the follow focus assembly.

### Follow Focus Assembly

The follow focus bracket consists of an iris rod bracket that mounts onto the bottom rods and a dovetail bracket that holds the Modular Follow Focus.

1. Slide the bracket assembly onto the rods and adjust fore and aft for centering to the lens focus gear.
2. Slide MFF Gearbox onto dovetail far enough to lock it.
3. Then raise the follow focus until it engages the lens gear with proper gear mesh, and lock the vertical adjustment lock.
4. Fine tune gearbox position and lock fore / aft using irisrod collet locks.

Each lens has its focus gear at a different position so you must reposition the follow focus assembly when changing lenses. The bracket assembly must be mounted forward enough so that the zoom pin clears the gearbox.



LOCK  
LEVER

SAFETY  
BUTTON



## 4.2 VIEWFINDER

---

The Panavision ULTRAVIEW Eyepiece is convertible into two modes that allow it to function as an extension eyepiece, and an intermediate eyepiece / hand-held eyepiece. Adjustments are provided for fore and aft position of the mount as well as side to side for left eye viewing.

The viewfinder assembly also includes additional features such as an extended diopter range and marking ring, a Panaclear eyecup and a 2x larger image than a stock camera. The eyepiece retains the original black and white CRT, but the adjustment controls are relocated to the side. The CRT is interlace (see section 1.8) which shows some exaggerated blur and strobing that is NOT on the tape.

- Attach the assembly into the front dovetail so that the eyepiece leveler can adjust easily and lock in place. Plug the cable into the connector labeled VF on the tape side of the camera before turning on camera power.
- When converting from extension to intermediate / hand-held mode it is recommended to turn off the main power switch on the camera.
- To convert the viewfinder between its two modes, depress the safety button and slide the lock levers.

**WARNING:** DO NOT rotate the finder 180 degrees to the left (to rest it on the mattebox as with a film camera) as this will break the internal stops and wiring!



VMBM

MMBD

MONITOR  
BRACKET  
LOCK

MONITOR  
DOVETAIL  
LOCK

## 4.3 ON-BOARD MONITOR AND BRACKET

### Astro HD Monitor

Slide the HD Auxiliary Light Bracket (HDALB) into the opposite side of the same dovetail that the eyepiece attached onto. Then slide the Dual Modular Monitor Bracket (MMBD) into the receiving hole and lock. Mount the monitor onto Video Monitor Ball Mount (VMBM) with the -20 screw using either top or bottom mounting hole on the monitor. Slide the Ball Mount (VMBM) onto the Monitor Bracket (MMBD).

The monitor can sync to various rates by using the selector switch on the back. The standard rate is 24 PsF (for 23.98 PsF)

The monitor is 12V DC ONLY using a 4 pin Hirose connector, and is powered from the Upconverter (HDUC) with cable CBLE-AMPL, or from a belt battery with cable CBLE-AMPX.

The monitor has the following controls and switches:

- Chroma (on / off)
- Gamma (on / off)
- Center (center cross)
- Frame (16x9 safe zone frameline)
- 4:3 (trans frameline)
- 2.4:1 (2.40 trans frameline)
- Contrast
- Brightness
- B (blue white balance adjustment)
- R (red white balance adjustment)
- Chroma (adjustment)

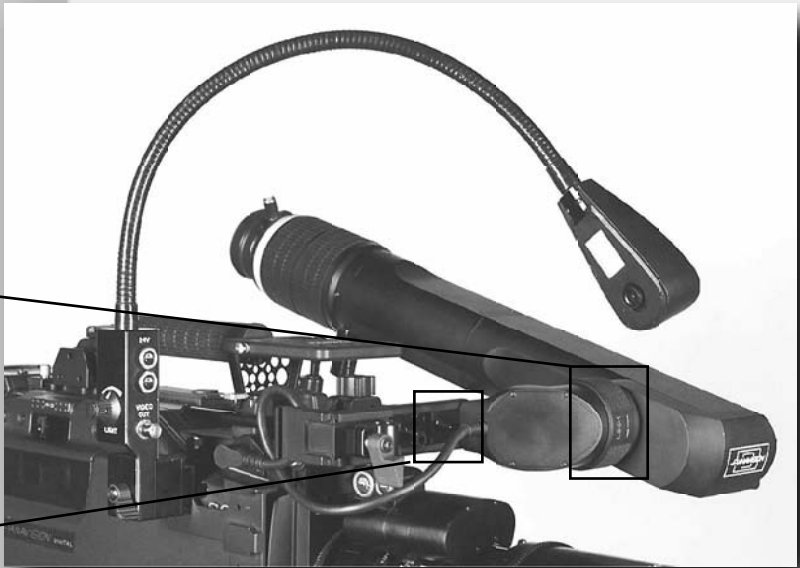
### Video Inputs:

HD SDI or Y, Pb, Pr (analog) depending upon the monitor.

**NOTE:** If using an NTSC monitor you must use a downconverter in order to convert the HD signal into NTSC.

EYEPIECE  
PIVOT  
LOCK

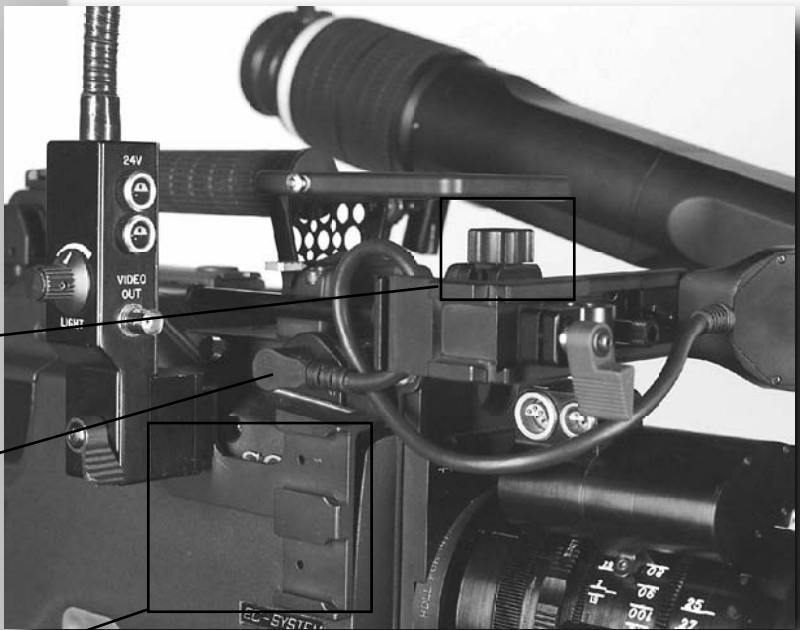
EYEPIECE  
DOVETAIL  
LOCK  
KNOB



EYEPIECE  
FORE/  
AFT  
LOCK

EYEPIECE  
CONNECT

ACC.  
BRACKET





## 4.4 LENS LIGHT

---

Any Panavision lens light can mount onto any of the side or front dovetails on the camera. Just supply power from a 24V DC source, either from a battery, the AC power supply or from the on-board power converter (HDUC) that can attach to the side of the camera.

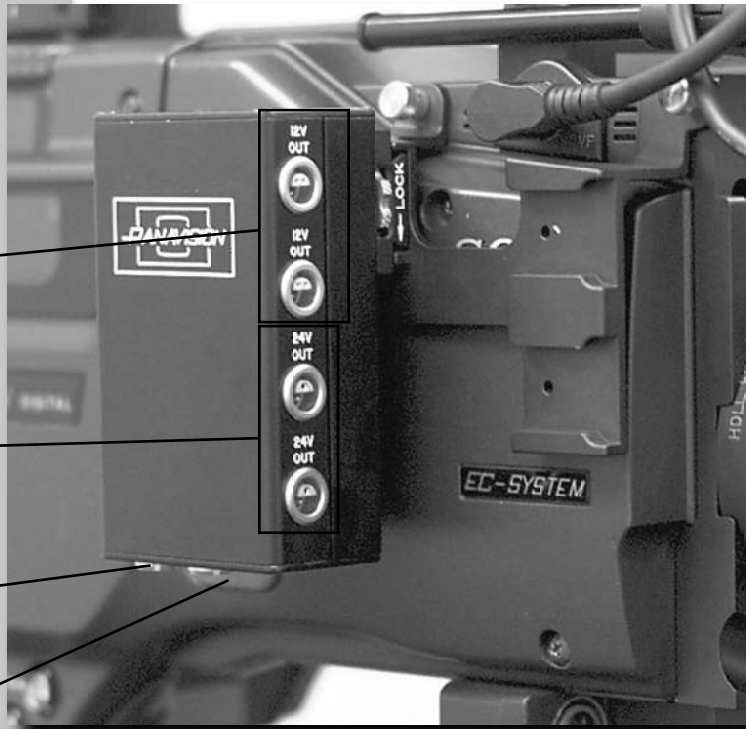
**NOTE:** Although the 24p HD camera is a 12V DC (11-17V) system, all of the standard Panavision accessories are still 24V and need the proper voltage to work.

12V  
OUTPUTS

24V  
OUTPUTS

SMARTLENS  
DISPLAY

SMARTLENS  
INPUT



12V  
INPUT

PANACLEAR  
OUTPUT



## 4.5 HD VOLTAGE UPCONVERTER

---

The HD voltage upconverter (HDUC) provides 2 24V and 2 12V output accessory ports as well as power for the Panaclear heated eyecup. The unit can be mounted to any of the dovetails on the side of the camera. In addition, SMARTLENS input and display output ports are provided.

The HDUC receives power from either the Sony Upconverter (ABSU or ABGM) with cable CBLE-ABSU, or a CBLE-12PUC "Y" cable from a 12V battery.

TAPE  
HOOK

REMOTE  
CONTROL  
MOUNT

FRONT  
RELEASE  
LEVER

REAR  
LOCK

TALLY  
LIGHT  
AND  
SWITCH



## 4.6 CARRY HANDLE

---

This custom Panavision carry handle is removable and replaceable with the Panavision Steadicam® Low Mode Bracket provided in the accessory case.

Simply unlock the rear thumb screw and push down on the front lever to allow the bracket to slide rearwards. Replace and lock into the Steadicam® Plate provided.

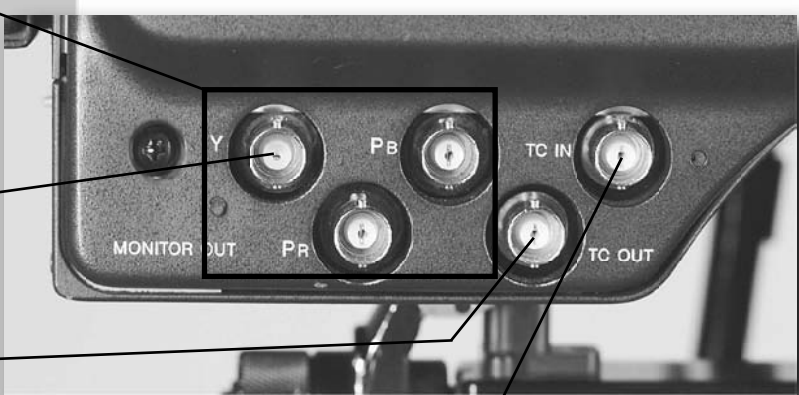
The handle also has a provision to mount the Remote Control (HGRP). Below the rear end of the handle is a tally light (with on / off switch) that allows the operator or camera assistant to see when the camera is recording. There are also red LED lights in the viewfinder to indicate the same.

ANALOG HD  
Y, Pb, Pr  
OUT

GENLOCK  
OUT

TIME  
CODE  
OUT

TIME  
CODE  
IN



NTSC  
COMP.  
OUT

ANALOG HD  
LOOP OUT



## 4.7 SIDE PANEL CONNECTORS

---

On the rear of the tape side of the camera there are 5 BNC connectors.

Three are the HD analog color difference outputs Y, Pb, Pr. These are used to send an analog HD signal to a monitor. They can also be used to display the viewfinder character generator image out to an external monitor for convenient viewing. This is done by:

- Hold down the MENU switch to the cancel position with your left hand as you push the DISPLAY switch down to the menu position.

The other BNCs are for Timecode IN and Timecode OUT

## 4.8 MIRANDA DOWNCONVERTER

---

The Miranda on-board downconverter (MDC) converts the camera's HD analog color difference signal (Y, Pb, Pr on the side of the camera) into a standard definition NTSC composite signal.

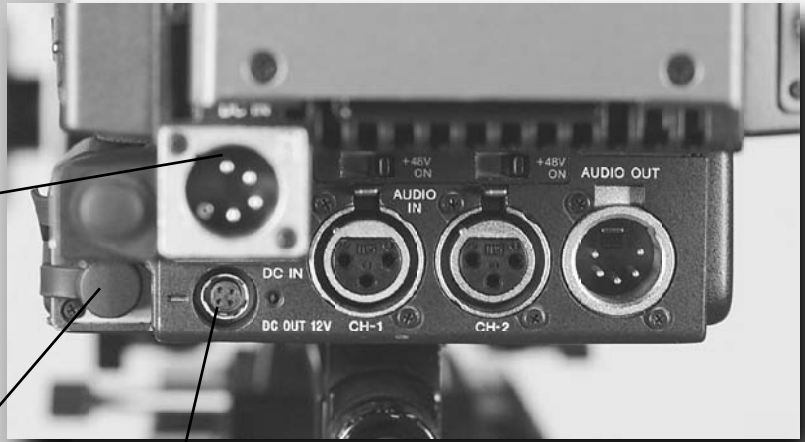
This allows the NTSC video image to be displayed on a Steadicam® monitor, be wirelessly transmitted to external monitors, or be used on any standard video device monitors, VTRs, video playback systems, etc.

Simply attach the downconverter to the three BNC connectors on the side of the camera and lock with the screw. Connect the power cable to the 4 pin Hirose connector that supplies 12V DC OUT of the rear to power the unit. Then attach a BNC cable to the COMP connector on the downconverter to any NTSC standard definition device.

12V DC IN

REMOTE

12V DC OUT  
(MIRANDA)





## 4.9 REAR PANEL CONNECTORS

---

On the rear panel of the camera are the power and audio connectors. See section 1.2 for specifications.

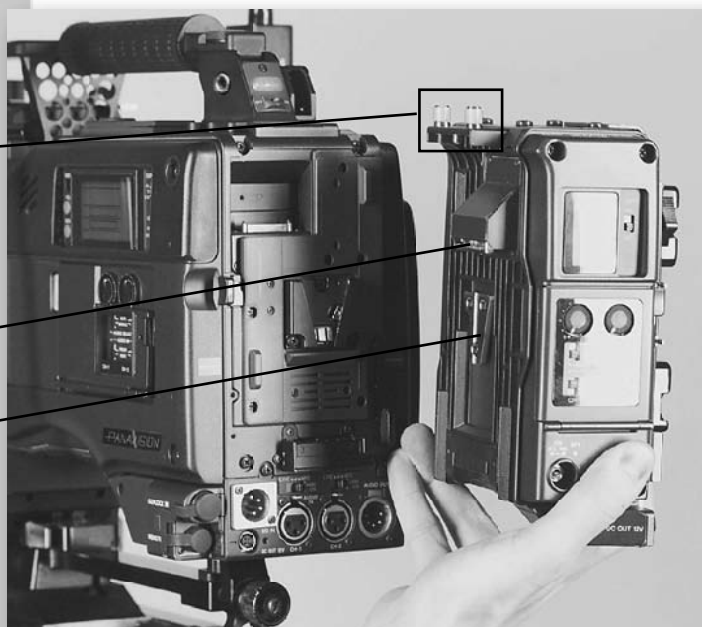
- 4 pin power IN connector accepts a standard 4 pin XLR female.
- REMOTE connector that connects to an external Paintbox (RMB150 or CNU500).
- 4 pin Hirose 12V DC OUT (very limited current (2A) only use for the on-board downconverter)
- 3 pin XLR Audio IN connectors (2) - switchable
- 5 pin XLR Audio OUT connector

**WARNING:** External camera control box will override menu settings. When disconnected the camera will retain the changes.

**NOTE:** Camera operating voltage range is 11-17 volts. Nominal camera power voltage is 13.2 or 14.4 volts.

LOCK  
SCREWS

ENGAGE  
CONNECTOR  
AND  
DOVETAIL



ON-BOARD  
BATTERY  
ADAPTER

BATTERY  
RELEASE

METADATA  
IN

HD SDI  
OUTPUTS



## 4.10 HD SDI ADAPTER

---

The HD SDI Adapter (HDCA or HDCAA) allows the camera to output an HD SDI signal. HD SDI stands for: High Definition Serial Digital Interface . A serial digital signal is just that, a serial stream of 1s and 0s that represents the picture information. The digital signal is then converted to a video signal by the external devices (e.g., monitors, downconverters, etc.) The SDI signal also includes timecode and audio. This one cable is the most useful and convenient way to output the video image.

Simply attach a heavy gauge 75 ohm BNC cable from either of the 2 outputs and then attach to an external monitor or other device.

The SDI Adapter can also be removed in order to allow the on-board downconverter to be attached for Steadicam® work see section 4.7

**NOTE:** An SDI Adapter (HDCAA) that allows 3<sup>rd</sup> and 4<sup>th</sup> audio tracks is available upon request. The camera body itself only supplies an HD analog color difference signal (Y, Pb, Pr).

**WARNING:** The On/Off switch on the adapter must be on in order to function!

HEADPHONE  
JACK

TALLY  
LIGHT

BATTERY  
RELEASE

ABSU  
RELEASE

GENLOCK  
IN

REMOTE /  
PAINTBOX  
(CNU connector)

12V DC IN



## 4.11 ON-BOARD BATTERY

---

The Anton Bauer on-board battery mounts onto the adapter bracket (ABSU) that attaches either on the rear of the camera body itself or on the HD SDI Adapter (HDCA or HDCAA).

The Anton Bauer batteries are 14.4V DC, 7 AH rated, and are charged on a quick charger station that allows up to 4 batteries to charge in order one after the other. The charger also has a built-in provision for battery discharging and analyzing to insure long battery life. Each battery has a built-in 12.5 amp / 125 volt fuse.

**NOTE:** Camera operating voltage range is 11-17 volts. Nominal camera power voltage is 13.2 or 14.4 volts.



## 5.0 CAMERA OPERATION







## 5.1 HDCAM CASSETTE

---

The HDCAM cassette loads as shown with the window facing up and the tape cover facing toward the lens. The eject button is on top of the camera exposed through the circular hole of the VTR control cover. Simply push the cassette down until it seats and then close the cover until it clicks. As with any tape, after recording it is sensible to push in the red record protect tab on the side to prevent accidental re-recording.

Upon insertion of a new tape, reset the CTL track. Then reset the timecode track (if using R-Run) to zero and using the Hour number set a camera roll number for that tape. Record color bars and tone at the head for future use in post.

See section 5.7 for more timecode information.

## 5.2 VTR CONTROLS

---

Use these standard VTR controls to play, rewind, fast forward, stop and eject the tape.

You can view the image in the viewfinder or on a monitor that is connected to the camera.



## 5.3 VIEWFINDER CONTROLS

---

- **Peaking Knob**

Used to emphasize edge frequencies in the viewfinder to judge focus. Helpful with setting the lens back focus.

- **Contrast Knob**

Used to adjust the eyepiece contrast for comfortable viewing. It is helpful to use the internal color bars when adjusting.

- **Brightness Knob**

Used to adjust the eyepiece brightness for comfortable viewing. It is helpful to use the internal color bars when adjusting.

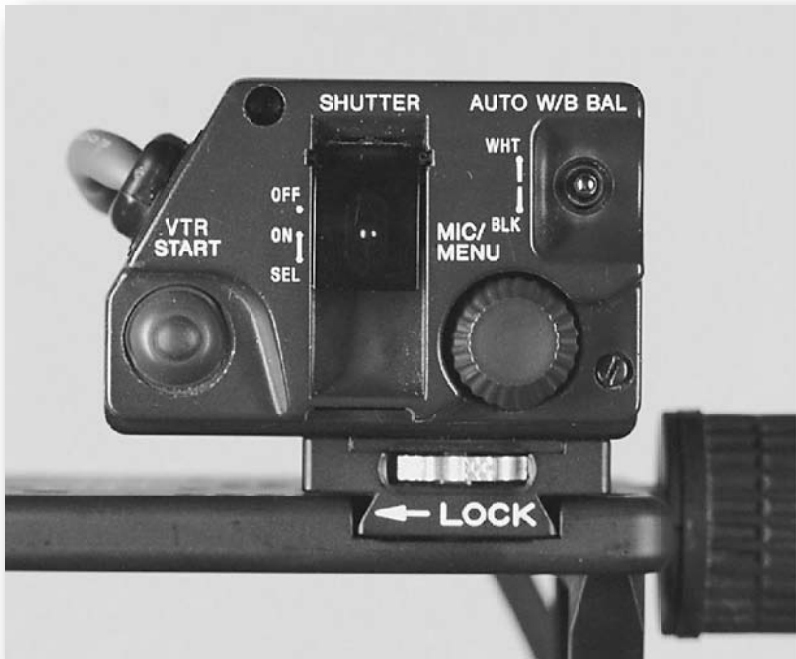
- **Display and Aspect Switch**

Used to turn on and off the two independent frameline generators in the viewfinder that are pre-programmed in OPERATION MENU page 3. Toggle the same direction for ON and OFF of each frameline.

- **Zebra Pattern Switch**

Used to turn on and off the zebra stripe exposure patterns that are preprogrammed in OPERATION MENU page 5.

The original camera Remote Control has been redesigned into a removable box which connects to the 10pin Lemo connector labeled "REM" on the side of the camera near the POWER Switch. It can mount onto the carry handle or be removed when not needed (e.g., for Steadicam® or hand holding).



**WARNING:** If the shutter is switched off on this box (HDRP) and the HDRP is disconnected from the camera, the camera will automatically return to the last shutter ON speed selected.

## 5.4 REMOTE CONTROL

- **Rotary Encoder Wheel (MIC/MENU jog control)**

Used to enter and change values in the MENUS:

1. Set the DISPLAY switch to the MENU position.
2. Click the rotary wheel to enter a menu listing or to change the cursor from an arrow into a ? .
3. Turning the wheel while the cursor is a ? changes the value of that field.
4. Clicking the wheel locks in the value and changes the cursor back into an arrow that can be moved within the screens.

- **VTR Start / Stop Switch**

Used as an On / Off switch for the record deck.

- **Shutter On / Off / Select Switch**

Three position toggle switch sets electronic shutter speed either Off, On and/or selects the preset values. In order to view shutter settings in the viewfinder the DISPLAY switch must be on. Shutter speed can also be accessed through PAINT MENU page: P12. (See section 5.9.2)

- **AWB - Auto White Balance Switch**

Used to set the white balance:

1. Select the appropriate filter wheel for the closest Kelvin temperature of the lighting.
2. Select either A or B switch position on the WHITE BAL switch on the side of the camera this is used to save and memorize the setting. (It retains the values unless replaced with another setting.)
3. Set a white reference card/paper to the proper size (at least 70% of frame) and exposure and then push the switch to the AWB position and let go.
4. Confirm white balance OK in the viewfinder.
5. If white balance is NG select the next filter setting on the CC filter wheel and try again, or re-check exposure. Continue this process until OK.

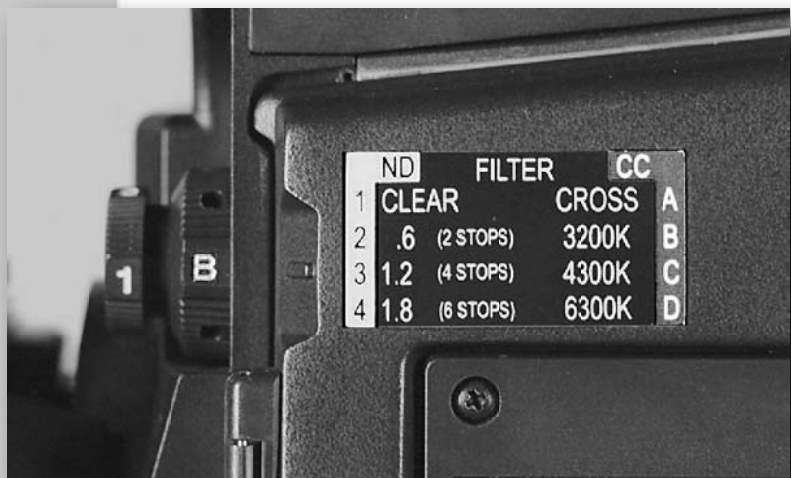
**NOTE:** Perform an AWB as desired or needed for lighting conditions. Or leave WHITE BALANCE switch on PRST and the CC filter wheel on B . This sets the camera to Tungsten balance and should be color corrected as required.

- **ABB - Auto Black Balance Switch**

Used to perform an auto black balance:

1. Close the lens iris to C or cap it to ensure no light entering.
2. Make sure the GAIN is at 0 dB.
3. Set the DISPLAY switch to the ON position.
4. Click the switch to the ABB position and let go it will return to the middle.
5. Confirm ABB: OK in viewfinder.

**NOTE:** Perform an ABB before shooting and upon extreme temperature change from cold to hot conditions. Black balance resets the black set.



## 5.5 FILTER WHEELS

---

Internal filters for neutral density (CLEAR, ND .6, 1.2, 1.8) and color correction (3200K, 4300K, 6300K) are built into the system. These are manually rotated at the front of the camera.

**WARNING:** Make sure filter wheels are firmly in their detents.





## 5.6 MEMORY STICK

---

The camera uses the standard Sony Memory Stick to allow the user to save and recall the Operator File (OPERATION MENU page: 9) and the 5 Paint Scene Files (PAINT MENU page: P13). (See sections 5.9.1, 5.9.2)

Simply insert the stick into the slot under the cover door with the notch facing upward and the label facing toward you.

**NOTE:** DO NOT eject the stick when the red eject button is lit. The sticks have a lock to prevent accidental erasure.

TAPE  
COUNTER

BATTERY  
LEVEL

F-RUN  
R-RUN



## 5.7 TIMECODE

---

You have two basic choices for timecode, either F-RUN ( Free Run ) or R-RUN ( Record Run ). The choice of which to use depends upon the requirements for Post Production.

Using the R-RUN setting for timecode is equivalent to using the footage counter on a film camera. It only rolls when the camera rolls. The Script Supervisor may need to record the timecode number at the beginning of each take.

**Free Run:** Used when syncing the camera to an external source using the TC IN connector on the side panel. The numbers are always rolling.

**Record Run:** Used with the camera's internal timecode generator as the source of the timecode. It only rolls the numbers when recording.

**NOTE:** The camera's recorded timecode **MUST** be the same as the frame rate of the camera. For example, if trying to jam in 24 frame timecode the camera must be set to 24 PsF exactly not 23.98Psf.

DISPLAY SWITCH

RESET

F-RUN  
R-RUN



## 5.7.1 TIMECODE SWITCHES AND BUTTONS

**HOLD:** Temporarily holds the F-Run display so it can be noted. Pushing again releases it.

**RESET:** Resets the time data on the display either timecode or control track.

**DISPLAY:** Selects which data to display in window.

**CTL:** Control Track

**TC:** Timecode

**U-BIT:** User Bits

**ADVANCE:** Advances the digit selected by the SHIFT button

**SHIFT:** Selects the digit to be changed. The selected digit flashes.

**PRESET / REGEN:**

Selects whether to set a new timecode or to match the existing timecode on the tape.

**F-RUN / SET / R-RUN:**

Sets the operating mode for the internal timecode generator.

**F-RUN:** Timecode generator keeps running. Used to jam external code into camera or is set to the time of day.

**SET:** Allows the timecode to be set using the ADVANCE and SHIFT buttons.

**R-RUN:** Timecode generator only runs while recording. Used when not jamming from an external source.

**DF / NDF:** Sets Drop or Non-Drop frame code. Usually set in the NDF position.

**REAL TIME:** Selects whether or not real time is recorded in the VITC track

**ON:** Real time is recorded as VITC.

**OFF:** Real time is not recorded.

**SET:** Used to set the real time.

DISPLAY SWITCH

RESET

F-RUN  
R-RUN



## 5.7.2 USING TIMECODE

### Setting the Timecode:

With each new tape you must reset the timecode if using R-RUN timecode.

1. Set the DISPLAY switch to TC.
2. Set the PRESET/REGEN switch to PRESET.
3. Set the REAL TIME switch to ON or OFF (user preference).
4. Set the F-RUN/R-RUN switch to SET.
5. Push the RESET switch to clear the numbers.
6. Using the SHIFT and ADVANCE buttons set the hours number to the roll number that you want (usually starting at 1 and going until 23 when you have to use number 1 again but it will be a different day).
7. Set the F-RUN/R-RUN switch to R-RUN (to act as a footage counter that runs only when recording).
- (8.) Set the F-RUN/R-RUN switch to F-RUN if jamming from an external source.
9. Set the DISPLAY switch to CTL and push the RESET button to clear the Control Track.
10. Record Color Bars and Tone on the head of the tape.

### Regenerating Timecode:

Used after a tape has been ejected and reinserted to make the timecode continuous.

1. Set the PRESET/REGEN switch to REGEN.
2. Use the tape transport control buttons to play back (see section 5.2).
3. Watching the playback, find the end of the tape from which to continue recording and press the STOP button.
4. Press the ASSIGNABLE switch down toward #2 and let go to do a record review. This cues up the tape.
5. Continue recording from there.





## 5.8 MAIN CAMERA SWITCHES

**POWER:** This is the main switch that turns the power ON and OFF on the camera itself. It is NOT a VTR record switch.

**WARNING:** Switch the POWER switch to OFF whenever changing cables on the camera or re-configuring the viewfinder to prevent possible damage.

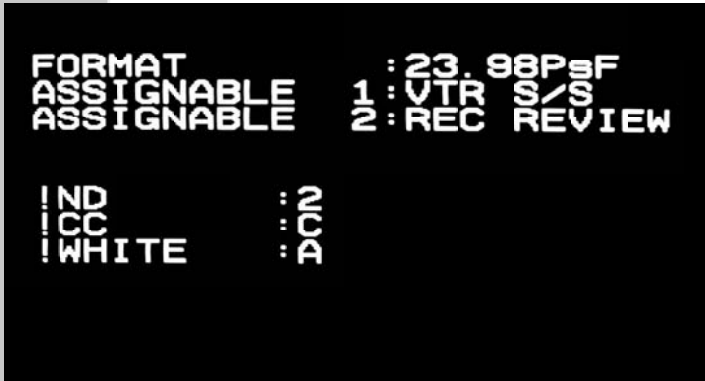
**ASSIGNABLE:** This switch is preprogrammed in the OPERATION MENU page: 8 to the following settings:

- #1** Push UP to record, push UP to stop.
- #2** Push DOWN to do a Record Review of the last 3 seconds on the tape. Used to Check the Gate (You must have recorded at least 3 seconds on the last take.) Also used when regenerating timecode. (see section 5.7.2)

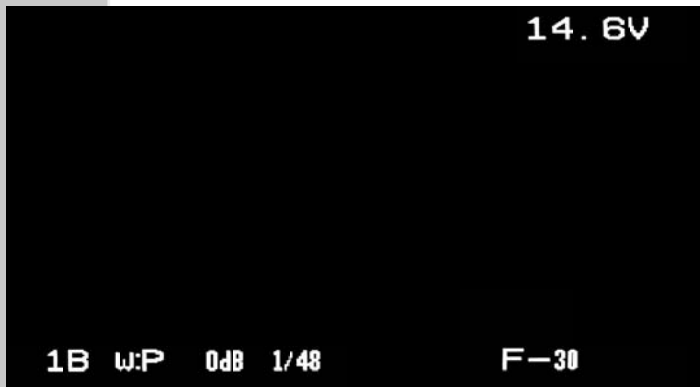
**VTR:** Changes the status of the VTR when not recording from SAVE to STANDBY. The recommended position is SAVE which saves battery life and reduces wear on the record head.

**GAIN:** Chooses between the three user settable gain positions. Either L, M or H. These are programmable from 3 dB to +18 in the OPERATION MENU page: 4.

**NOTE:** It is a standard practice to have L=0 dB. Using negative (-) gain reduces dynamic range.



Sample viewfinder display when MENU switch held to STATUS position. See also Section 5.9.1



Sample viewfinder display with DISPLAY switch in ON position. See also Section 5.9.1

## 5.8 MAIN CAMERA SWITCHES - CONTINUED

**OUTPUT:** Switches the output signal of the camera between color bars, camera or camera with DCC on.

**WARNING:** DCC is an autoknee circuit which will adjust the highlights in the image depending on their brightness. (Also see section 1.9).  
If the DCC is switched on and then off, the KNEE circuit still remains on!

**WHITE BALANCE:** Sets the white balance of the camera between either the PRST (preset) or the two saved switch positions A or B.

Leaving the switch on PRST and the CC filter wheel on B sets the camera to the factory default tungsten white balance when using 3200K lighting.

**MENU:** Holding the switch up to the STATUS position shows the current frame rate of the camera in the viewfinder as well as warning indications and the programmed settings of the ASSIGNABLE switch. Pushing down toward CANCEL when in the menus cancels a selection or reverses order through a menu list.

**DISPLAY:** Used to turn on or off the preprogrammed DISPLAY indicators in the viewfinder (set with OPERATION MENU page: 1) or to enter into the MENUs of the camera.

See Section 5.9 for description of the MENUs.

<TOP MENU>

→OPERATION  
PAINT  
MAINTENANCE  
FILE  
DIAGNOSIS

We will outline the commonly useful pages in the OPERATION and PAINT menus.

### Using the Menus

1. Set the DISPLAY switch to the MENU position and look in the viewfinder.
2. Move the arrow cursor opposite the menu to be displayed and push in on the Rotary Encoder Wheel.
3. To change pages in the menu, set the cursor to the page number, click the Wheel to make the cursor a ? and turn the Wheel to change pages.
4. To change a setting value, set the cursor to the item to be changed and press the Wheel. The cursor turns into a ? and the value changes by turning the Wheel. (A fast turn changes the value greatly, a slow turn changes it slightly.) To lock the change press the Wheel again. To cancel a change, press the MENU switch to the CANCEL position.
5. Every click of the MENU switch to the CANCEL position will revert up one menu level.
6. To exit from the MENUs, turn the DISPLAY switch to OFF.
7. When re-entering into the MENUs the camera will display the last menu page used.

**NOTE:** If the TOP MENU list does not show when you set the DISPLAY switch to the MENU position do the following: Return the DISPLAY switch to the OFF position. Then hold IN the Rotary Encoder Wheel on the Remote Control while you set the DISPLAY switch to the MENU position.

```

<VF DISPLAY>          →1      TOP
EX      : OFF      BATT   : ON
ZOOM    : OFF      TAPE   : ON
ND      : ON       TC     : OFF
CC      : ON       AUDIO  : OFF
IRIS    : OFF
WHITE   : ON
D5600K  : OFF      MESSAG : ALL
GAIN    : ON
SHUTT   : ON

```

```

<'!' IND>             →2      TOP
                                [IND] [NORMAL]
ND      : ON      1---
CC      : ON      -B--
WHITE   : ON      P---
D5600K  : OFF     OFF
GAIN    : ON      --L
SHUTT   : ON      ON
FAN     : OFF     AUTO1
EXT     : OFF     OFF
FORMAT  : ON      23.98PsF

```

```

<MARKER>              →3      TOP
MARKER      : OFF
CENTER      : ON
SAFETY ZONE : ON      3
EFFECT      : ON      90.0%

ASPECT MODE : VAR H
MASK        : OFF      50
VAR WIDTH   : 1292H

```

```

<GAIN SW>             →4      TOP
LOW        : 0 dB
MIDDLE     : 6 dB
HIGH       : 12 dB

```

## 5.9.1 OPERATION MENU

---

- The OPERATION MENU is used to set up various attributes of the camera. These attributes do not affect the image captured by the camera directly, unlike the PAINT MENU.
1. VF DISPLAY
    - Used to turn ON and OFF display indicators of various attributes of the camera in the viewfinder such as ND and CC filter status, battery voltage, shutter speed, gain, white balance, and tape remaining. (Picture shows Panavision default settings.)
  2. ! IND
    - Used to set the warning indicators. Displays which warnings are active by holding the MENU switch to the STATUS position. Any camera setting that changes from the [NORMAL] setting will turn on the ! LED in the viewfinder. (Picture shows Panavision default settings.)
  3. MARKER
    - Used to set the 2 framelines in the viewfinder. See section 5.10 for details. Turning the MARKER and the ASPECT MODE in this menu is the same as toggling them ON and OFF with the switch on the side of the viewfinder. (Picture shows example of TV 16x9 TRANS & 4X3 TRANS / SAFE.)
  4. GAIN
    - Used to program the three settings for the GAIN switch on the side of the camera. Note: you can set any of the possible values to any switch position. Usually L = 0. The choices are: -3, 0, 3, 6, 12 or 18 dB. (Picture shows Panavision default settings.)

<ZEBRA/VF DTL> →5 TOP

ZEBRA : OFF  
: 1

ZEBRA1 : 70%  
ZEBRA2 : 100%  
VF DTL : 0  
: OFF

<AUTO IRIS> →6 TOP

WINDOW : 1  
OVERRIDE : 0



<BATT ALARM> →7 TOP

BATT  
TYPE: LITHIUM  
BEFORE END: 12.5V  
END : 12.0V

DC IN  
TYPE: AC ADP  
BEFORE END: --  
END : --



## 5.9.1 OPERATION MENU - CONTINUED

---

5. ZEBRA / VF DTL
  - Used to program the 2 zebra patterns. The ON / OFF setting here is the same as the toggle switch on the side of the viewfinder. The zebra patterns are independent and can be used separately or together.
  - The zebra pattern is a convenient way to judge your highlight exposure when a waveform monitor is not available.  
(Picture shows Panavision default settings.)
6. AUTO IRIS
  - Not used.
7. BATT ALARM
  - Displays the low and out battery voltage settings that are programmed in the MAINTENANCE MENU page: M9.  
(Picture shows Panavision default settings.)

<OTHERS> →8 TOP

D5600K : OFF  
ASSIGNABLE 1 : VTR S/S  
ASSIGNABLE 2 : LENS RET

<OPERATOR FILE> →9 TOP

READ (MS →CAM)  
WRITE (CAM→MS )

PRESET

FILE ID :  
CAM CODE HDW-F900  
DATE 2001/09/05

<LENS FILE> →10 TOP

FILE : 8  
NO OFFSET  
F1.4

## 5.9.1 OPERATION MENU - CONTINUED

---

8. OTHERS
  - Shows the programmed setting of the ASSIGNABLE switch.  
(Picture shows Panavision default settings.)
9. OPERATOR FILE
  - Used to read and write the OPERATION MENU file to and from a Memory Stick
10. LENS FILE
  - Not used.

<SW STATUS> →P1 TOP

FLARE : OFF  
GAMMA : ON  
BLK GAM : OFF  
KNEE : OFF  
WHT CLIP : ON  
DETAIL : OFF  
LEL DEP : OFF  
SKIN DTL : OFF  
MATRIX : OFF

<VIDEO LEVEL> →P2 TOP

	[R]	[G]	[B]	[M]
WHITE	0	0	0	
BLACK	0	0	0	0
FLARE	0	0	0	
GAMMA	0	0	0	0
V MOD	0	0	0	0
FLARE	OFF			
V MOD	OFF			
TEST	OFF			ABS

<GAMMA> →P3 TOP

	[R]	[G]	[B]	[M]
LEVEL	0	0	0	0
COARSE	0.45			
TABLE	STANDARD			
	5			
GAMMA	ON			
TEST	OFF			ABS

<BLK GAMMA> →P4 TOP

	[R]	[G]	[B]	[M]
RGB				
LEVEL	0	0	0	0
RANGE	15%			
	OFF			
Y				
LEVEL	0			
RANGE	15%			
	OFF			
TEST	OFF			ABS

## 5.9.2 PAINT MENU

---

- The PAINT MENU is used to adjust the way in which the camera captures an image.

**CAUTION:** Some image adjustments are not reversible in post. (See also section 1.9)

1. SW STATUS
  - Used to conveniently turn ON or OFF various paint switches. They are duplicated in later pages. (Picture shows Panavision default settings.)
2. VIDEO LEVEL
  - Used to manually set a white balance and black level. (Picture shows Panavision default settings.)

**NOTE:** The [M] BLACK level is usually set to 0 or 1 so that the video signal is being recorded just above clip level on the waveform monitor.

3. GAMMA
  - Used to adjust the video GAMMA. Should be ON. The normal setting is COARSE 0.45, STANDARD 5. These settings reference the ITU-709 standard. (Picture shows Panavision default settings.)
4. BLK GAMMA
  - Used to adjust the gamma in the black part of the picture. Nominal setting is OFF. (Picture shows Panavision default settings.)

**CAUTION:** Changing the black gamma could adversely affect noise in the picture.

<LOW KEY SAT> →P5 TOP  
LEVEL : 0  
: OFF

TEST : OFF

<KNEE> →P6 TOP

	[R]	[G]	[B]	[M]
POINT :	0	0	0	0
SLOPE :	0	0	0	0
WHT CLP :	0	0	0	0

KNEE : OFF  
KNEE SAT : OFF  
WHT CLIP : ON  
TEST : OFF ABS

<DETAIL 1> →P7 TOP

	[M]	[WHT]	[BLK]
LEVEL :	0		
LIMITER :	00	0	0
CRISPEN :	00		
HV RATIO :	00		
FREQ :	00		
LVL DEP :	0		

DETAIL : OFF  
LVL DEP : OFF ABS

<DETAIL 2> →P8 TOP

KNEE APERTURE : 0  
: OFF

ABS

## 5.9.2 PAINT MENU - CONTINUED

---

5. LOW KEY SAT
  - Used to adjust the color saturation in the dark areas of the picture. Nominal setting is OFF.  
(Picture shows Panavision default settings.)
6. KNEE
  - Used to adjust the highlight portion of the picture. Use as desired. Usually turned OFF.  
(Picture shows Panavision default settings.)
7. DETAIL 1
  - Used for electronic image enhancement.  
(Picture shows Panavision default settings.)
8. DETAIL 2
  - Used for electronic image enhancement.  
(Picture shows Panavision default settings.)

**NOTE:** Historically detail circuits were used to compensate for limitations of optics or electronics.

The detail circuits should NOT BE USED since our Primo Digital Lenses have very high contrast and resolution. Consequently there is no need for additional electronic detail, and the use of detail can cause unwanted artifacts.

```

<SKIN DETAIL>      →P9  TOP
SKIN DTL : OFF
SKIN GATE : OFF
CH SW : [1] [2] [3]
        (ON) OFF OFF ABS
GATE : ON OFF OFF
PHASE : AUTO AUTO AUTO
        : 0 0 0
WIDTH : 30 30 30
SAT : -89 -89 -89
LEVEL : 0 0 0

```

```

<USER MATRIX>      →P10 TOP
R : [-R] [-G] [-B]
G : -- 0 -- 0
B : 0 0 --
MATRIX: OFF
PRESET: --
        : --
USER MATRIX: --
MULTI MATRIX: --

```

```

<USER MATRIX>      P10 TOP
R : [-R] [-G] [-B]
G : -- 0 -- 0
B : 0 0 --
MATRIX: → ON
PRESET: ON
        : ITU-709
USER MATRIX: OFF
MULTI MATRIX: OFF

```

```

<MULTI MATRIX>    →P11 TOP
PHASE : 0
HUE : 0
SAT : 0
        ALL CLEAR
MATRIX: OFF
PRESET: --
        : --
USER MATRIX: --
MULTI MATRIX: --

```



## 5.9.2 PAINT MENU - CONTINUED

---

### 9. SKIN DETAIL

- Disables detail circuitry for specified colors.  
(Picture shows Panavision default settings.)

**NOTE:** This circuit should NOT BE USED since our Primo Digital Lenses have very high contrast and resolution. Consequently there is no need for additional electronic detail, and the use of detail can cause unwanted artifacts.

### 10. USER MATRIX

- Used to set or adjust the linear matrix for an overall adjustment of the picture.  
(First picture shows Panavision default settings for film-out or video finish. Second User Matrix picture shows option for video finish only.)

### 11. MULTI MATRIX

- Used to change specific vectors of a color and their saturation.  
(Picture shows Panavision default settings.)

**WARNING:** DO NOT use the matrices unless you know the exact effect you want, since it is NOT reversible in post.

**WARNING:** If there is ANY future possibility of the footage getting recorded out to a film negative then you should shoot with the MATRIX turned OFF. If the project will stay on tape then you can turn the MATRIX ON with the PRESET value set to ITU-709.

<SHUTTER>                    →P12 TOP

SHUTTER : ON  
          : 1/48  
ECS FREQ: 24.00Hz  
S-EVS    : OFF  
          : ---%

<SCENE FILE>                →P13 TOP

1    2    3    4    5    STORE  
STANDARD

READ (MS →CAM)  
WRITE(CAM→MS)

FILE ID :  
CAM CODE    HDW-F900  
DATE        2001/09/05

## 5.9.2 PAINT MENU - CONTINUED

---

### 12. SHUTTER

- Used to adjust the shutter speed of the camera. Changing the values here is the same as with the toggle switch on the Remote Control. See Section 5.4.

(Picture shows Panavision default settings.)

### 13. SCENE FILE

- Used to read and write the 5 PAINT MENU SCENE files to and from a Memory Stick.

**NOTE:** To restore the paint menus to their Panavision default settings, recall the STANDARD file on menu page P13 by clicking on it twice.

<MULTI FORMAT> →M7 TOP

CURRENT 23.98PsF  
NEXT : 23.98PsF

60I 50I \*\*\*  
59.94I \*\*\* \*\*\*

30PsF 25PsF 24PsF  
29.97PsF \*\*\* 23.98PsF

## 5.9.3 SETTING THE FRAME RATE

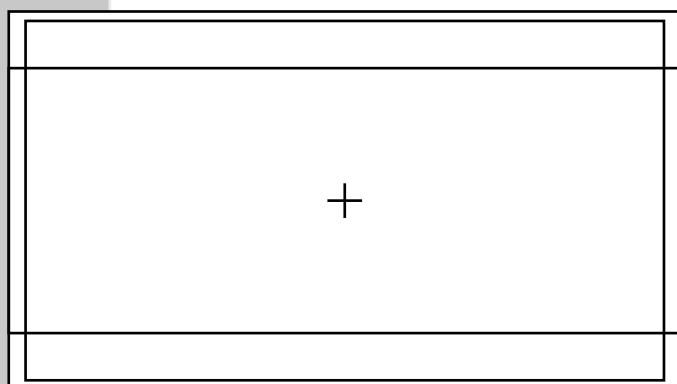
---

The current frame rate can be viewed by looking in the viewfinder while holding the MENU switch to the STATUS position.

See picture at left or section 1.3 for the list of the possible frame rates.

### Changing the Frame Rate

1. Turn on the MENU by moving the DISPLAY switch to the MENU position
2. Go to page M7 of the MAINTENANCE MENU
3. Move the cursor opposite the NEXT frame rate number and push in the rotary wheel to turn the cursor into a ?
4. Scroll through the list until you have highlighted the frame rate you want and then push in the rotary wheel again to enter the frame rate into the field
- 5. Turn OFF the Main Power Switch**
- 6. Turn the Main Power Switch back ON**
7. Verify the new frame rate by holding the MENU switch to the STATUS position



## 5.10 VIEWFINDER FRAMELINE MARKINGS

Framelines are programmed in the OPERATION MENU page: 3

There are two sets of framelines that can be generated in the viewfinder. They work together when composing two different aspect ratios (e.g., 16x9 and 4x3) or for composing theatrical widescreen formats. If only shooting 16x9 for television broadcast then use only a Safety Zone with the Marker function. All the areas are "common center."

**NOTE:** Framelines in eyepiece DO NOT go out to the monitors. Set the monitors separately either with their built-in generator or an external one.

### 1. 16x9 Marker (with optional center crosshair)

16x9 Transmission	Full Image in Viewfinder
16x9 Safe Areas	80%, 90%, 92.5% and 95%

### 2. Aspect Mode (mask function)

16x9	Transmission
15x9	Transmission (1.66:1)
14x9	Transmission
13x9	Transmission
4x3	Transmission
VISTA 1	1.85 Transmission (approx.)
VISTA 2	2.40 Transmission (approx.)

### Use the following functions for Safe and Projection Areas:

VAR H (horizontal)	0	1920 pixels
4x3 Safe Action	=	1292

VAR V (vertical)	0	1080 pixels
1.85 Projection Aperture	=	984
2.40 Projection Aperture	=	764

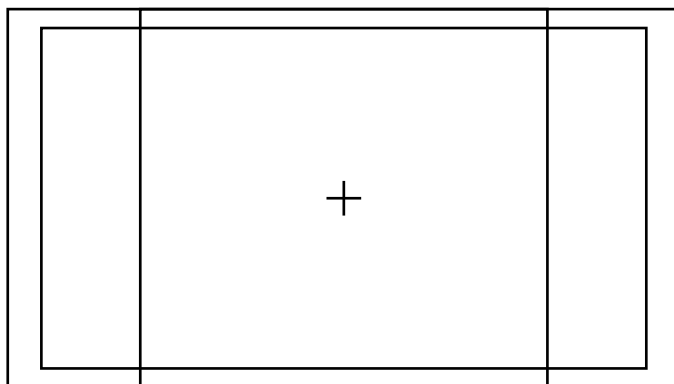




## 5.10.1 TV 16X9 TRANS & 4X3 TRANS / SAFE

OPERATION MENU page: 3

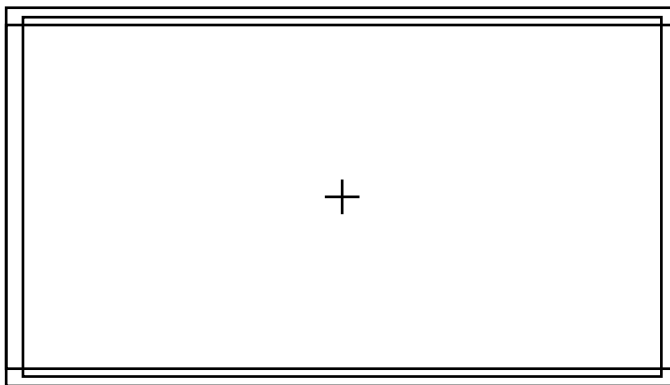
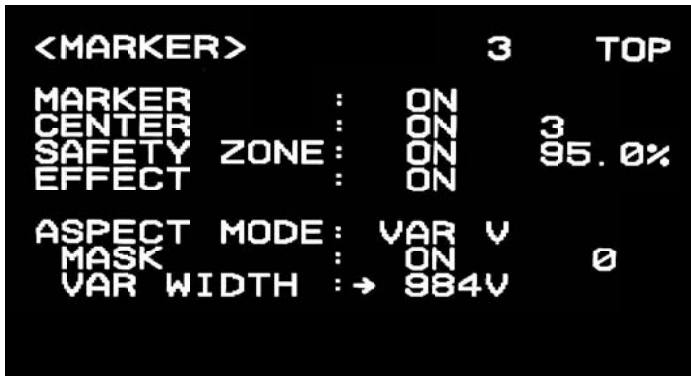
- Turn the MARKER ON and set a 90% Safety Zone, and then turn the ASPECT MODE ON and set the VAR H at 1292 to indicate the 4x3 safe area. The innermost box formed by these lines represents the 1.33 TV safe action area.



## 5.10.2 TV 16X9 TRANS & 1.85 THEATRICAL

OPERATION MENU page: 3

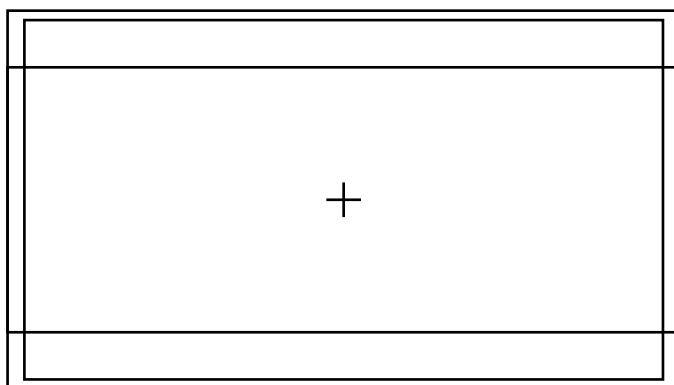
- Turn the MARKER ON and set a 95% Safety Zone, and then turn the ASPECT MODE ON and set the VAR V at 984. The innermost box formed by these lines represents the 1.85 projection aperture, which is the area which will be seen in a theater.



## 5.10.3 TV 16X9 TRANS & 2.40 THEATRICAL

OPERATION MENU page: 3

- Turn the MARKER ON and set a 95% Safety Zone, and then turn the ASPECT MODE ON and set the VAR V at 764. The innermost box formed by these lines represents the 2.40 projection aperture, which is the area which will be seen in a theater.





## 5.11 PREP ROUTINE

The following is a list of the common items to check during your prep. This list is by no mean exhaustive nor in any particular order.

- Set up and power up monitors (section 6.0)
- Build and power up camera
- Set up monitor channels and framelines (section 6.1-6.5)
- Check and set camera frame rate (section 5.9.3)
- Check and set shutter speed (section 5.4)
- Perform an Auto Black Balance ABB (section 5.4)
- Check Master [M] Black Level (section 5.9.2)
- Check GAMMA in PAINT MENU (section 5.9.2)
- Check MATRIX in PAINT MENU (section 5.9.2)
- Check and set Auto White Balance AWB redo before shooting (section 5.4)
- Check and set viewfinder settings including framelines (section 5.10)
- Set back focus on lenses and check focus scales (section 3.4)
- Check camera filters (section 5.5)
- Check and set all other camera switches (section 5.8)
  - Standard switch settings for tungsten light:
 

VTR:	save
GAIN:	L [0]
OUTPUT:	camera
WHITE BAL:	preset
DISPLAY:	off
CC:	B
ND:	[where needed]
- Check and set all other MENU items (section 5.9)
- Check VTR record and playback (section 5.2)
- Set timecode on camera (section 5.7)

## 5.12 A.C. PRE-ROLL CHECKLIST

---

The following is a checklist that should be done prior to shooting to insure proper imaging.

- Perform an Auto Black Balance ABB (section 5.4)
- Check the Gain is correct (usually 0 dB) (sections 5.8, 5.9.1)
- Check White Balance (section 5.4)
- Check and/or set back focus of lens (section 3.4)
- Check frame rate with MENU switch held to STATUS position (section 5.8)
- Check shutter speed with DISPLAY switch set to ON position (section 5.8)  
Check OUTPUT switch is **NOT** set to DCC (unless desired) (section 5.8)
- Load tape and reset timecode (or regen timecode on existing tape) (section 5.1, 5.7)
- Record color bars and tone on head of tape

## 5.13 PRODUCTION CONSIDERATIONS

---

- **Are there any locations where AC power is unavailable?** If so then a 9 monitor is required as it is the only one that runs from 12V DC. You will potentially need extra batteries for camera and accessory power.
- **Are there any extremes of temperature or environments anticipated?** You may need a weather protector or a hair drier to dry out humidity inside camera.
- **Are you going to have any Steadicam®, crane work or the use of any NTSC playback systems?** You will need the appropriate downconverter.
- **Do you need one stop of ND to shoot a wider aperture?** You will need an external ND.3 since the camera only has 2 stop increments built in.
- **What framing are you shooting?** Set viewfinder and monitors appropriately.
- **Are you shooting any monitors? What are there frame rates? Will they be synced to the HD camera? How?** You may be able to use the ECS shutter mode to hide the scan bar but only if you do not move the camera.
- **Is the project EVER possibly getting recorded out to negative?** If so shoot with the MATRIX OFF. If the project will NEVER see film then you can shoot with the MATRIX ON.
- **Are you shooting outdoors or in other bright areas?** You will want to get a Hoodman or other monitor shade and keep all extraneous light off of the monitors.

## 5.14 TROUBLESHOOTING

---

Possible problems and their solutions:

No image on monitor.

- Is SDI adaptor switched on?
- Is monitor powered?
- Is monitor set to appropriate channel?
- Check cable connections.
- Is BNC cable proper gauge supplied by Panavision?
- Try another video cable.
- Try output from Y,Pb,Pr on camera side. If image is good, exchange SDI adaptor (HDCA).

Monitor shows coloring in corners of image.

- Degauss monitor.
- For 24" monitor set Landing. See section 6.4.1.

No image in viewfinder (image on monitor).

- Is camera powered?
- Is eyepiece cable connected?

No image through Miranda downconverter.

- Is power LED lit up?
  - If not check power cable connection.
  - If cable connection ok, internal camera fuse could be blown, not user-servicable. Call Panavision.
- Check video cable connections.
- Check power and DIP switches on Miranda.
- Check video monitor.

Camera will not power up.

- Check power cable and connections.
- Check battery voltage or
- Check that power supply is on.
- Did camera overheat and shut off? - let it cool down. Make sure fan ports are unblocked (near handle area), and keep camera cool.

Won't record.

- Is camera powered up? (see above).
- Is tape write-protected? Check red tab.
- Humidity warning on display? - dry out camera.
- Check diagnosis menu for indication of problem - report to Panavision.
- Other internal problem.

Monitor image too bright when using component (Y, Pb, Pr) inputs.

- make sure inputs are terminated.

Monitor is green when using component (Y, Pb, Pr) inputs.

- Is monitor channel configured for RGB instead of Y, Pb, Pr? Reconfigure.



## 5.14 TROUBLESHOOTING

---

Monitor shows constant colored pixel.

- Perform black balance repeatedly until pixel disappears.

Image vignetting on one side and/or blue flickering band at top of screen.

- Filter wheels are not in detent position.

Image has excessive blur while panning.

- Make sure shutter is on and at proper shutter speed.

Image looks soft on 24" monitor.

- Check lens back focus.

Footage marks on lens are not accurate.

- Check lens back focus.

Camera will not accept external timecode.

- Is timecode set to F-Run? If not switch to F-Run.

No audio signal level on VU meter.

- Check cable connections.
- Is input switch (above XLR input) set to proper setting (mic/line)?
- Check audio in switch (front/rear).

LENS RET (aka REC REVIEW) function on assignable switch not working.

- Is tape write-protected? Check red tab.
- Check programmed function of switch.
- Was last take at least 3 seconds?

White Balance no good (AWB : NG in display).

LEVEL HIGH

- Exposure too high. Close iris so that white level is about 70%.

COLOR TEMP LOW / COLOR TEMP HIGH

- Wrong CC filter selected on wheel. Try another filter.

LEVEL LOW

- Not enough light. Open iris or add light.

AWB: WHITE PRESET

- WHITE BAL switch is set to PRST setting. Change to A or B.

Audio not in sync with downconverted image.

- Audio delay box must be used to achieve sync due to downconverter delay.

## 5.15 SMARTLENS

---

Panavision's SMARTLENS is a system for reading and displaying lens data. For the first time, camera assistants can control how and where they see critical lens information. Place the SMARTLENS Display on the matte box within sightline of the action, or on the dolly track to follow marks, or at the end of a crane 100 feet away. SMARTLENS assists the Assistant.

SMARTLENS calculates and displays Focus Distance, T-Stop, Focal Length, and Depth of Field in real time.

Connect a Panatape ultrasonic ranging system to SMARTLENS, and create a powerful focus assist tool. Now you can see Subject Distance, Focus Distance, and Depth of Field all on the same scale.

The SMARTLENS Reader fits onto ALL EXISTING Panavision Primo Lenses, including the Panavision Primo Digital lens series. Each SMARTLENS Reader has its own memory so no calibration is required in the field. The Reader is connected to the SMARTLENS Display which is user configurable and comes in two sizes. You can choose to display as much or little information as desired.

## 5.16 METADATA

---

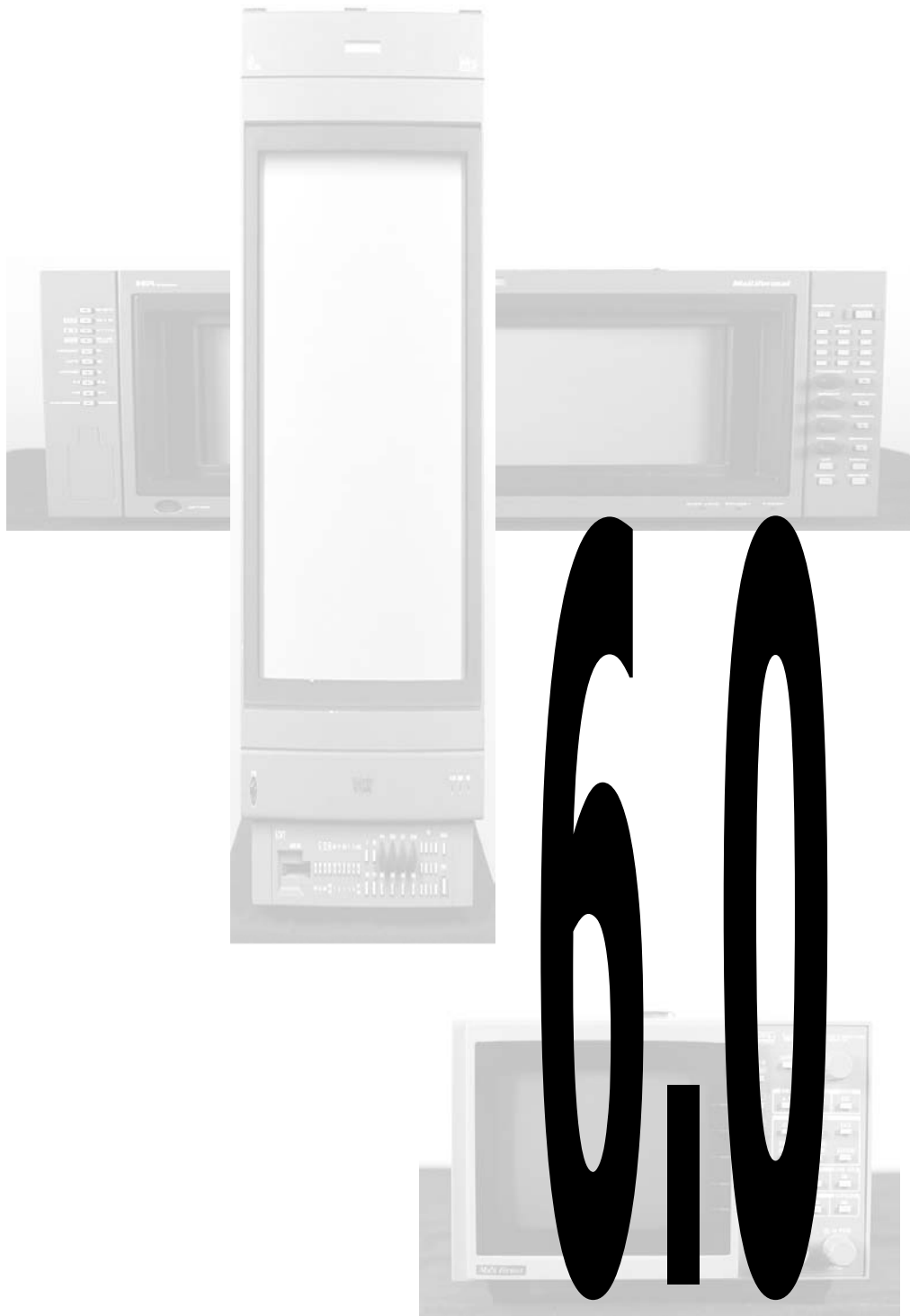
Metadata consists of any data other than picture that can be recorded along with picture. This can include focus, T-stop and zoom from Primo Digital lens, pan, tilt, timecode dolly and crane information

The Panavision SDI adapter has the ability to record Metadata on the 3rd and 4th audio tracks using our Panadata Hub. This greatly simplifies visual FX work using CGI because every frame of the picture has the image information file with it on the tape that represents how the picture was captured.

The Panadata Hub, along with the precision encoded Primo Digital Datalenses, will allow the encoding of many camera related parameters to be saved as data on the AES/EBU digital audio channels of the HDW-F900 camcorder. Panadata includes accurately encoded values of Zoom, focus and T-Stop from the Panavision Primo Digital lenses.

# 6.0 MONITORS

---





## 6.1 MONITORS

---

Not all monitors of the same size have the same rear panel configuration but the following pages will describe the most common. Not all monitors can accept all types of signals and some are limited on frameline choices.

**NOTE:** Only the 9 monitor can accept a 12V DC power source.

### Input Channel Selection:

On the rear of each monitor is the connector panel. The panel slots start counting from the left and go right. Even a card without any connectors is still counted as a slot. Using the slot number and the input connector number you can program channels for the various signals on the monitor using the SET UP MENU on the monitors. For example, HD SDI is commonly programmed as Channel 1 using SLOT 2 - INPUT 1.

To select and view a channel, simply push the corresponding number on the keypad on the front of the monitors. For numbers above 9, you must push a zero (0) first - e.g., for channel 12 push 012 .

**NOTE:** Standard color temperature is 6500 K

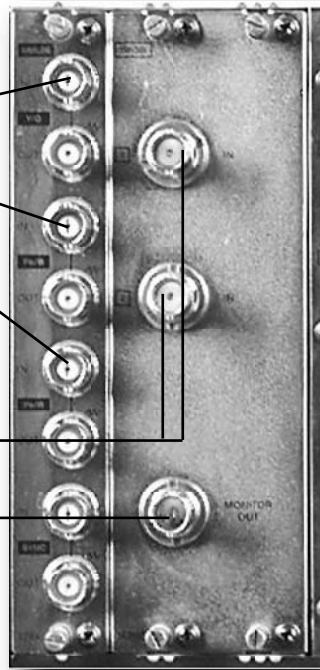
ANALOG IN  
Y

Pb

Pr

HD SDI IN

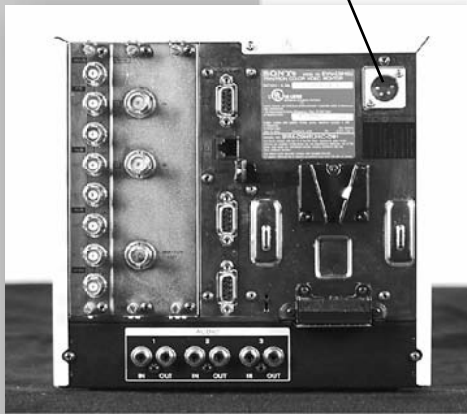
MONITOR  
OUT



1 2 3  
SLOTS

AC IN

12V DC IN



## 6.2 9" HD SDI MONITOR

**INPUTS:** HD SDI (Serial Digital)  
Y, Pb, Pr (HD Analog) or NTSC

**Power:** AC (with adapter) or 12V DC

**Framing:** 16x9 Transmission  
4x3 Transmission

### To check the programming on a particular channel:

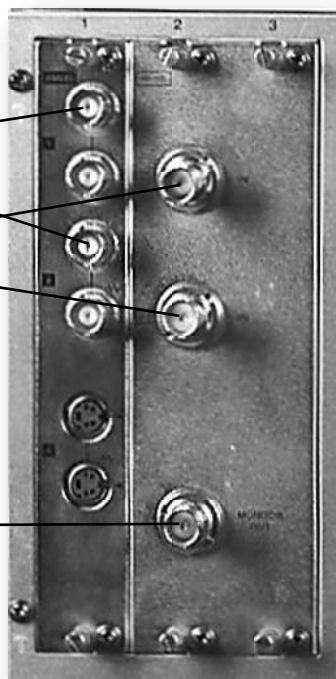
1. Push the MENU button.
2. Move the cursor using the UP and DOWN buttons until it is opposite the INPUT CONFIGURATION menu and then push the ENTER button.
3. Read the FORMAT for what type of signal is programmed.
4. Read the SLOT NO for which panel slot is used.
5. Read the INPUT NO for which connector on the slot is used.
6. To read other channels simply change the channel number on the keypad as you are watching this menu.



NTSC IN

HD SDI IN

MONITOR  
OUT



1 2 3  
SLOTS





## 6.3 14" HD SDI MONITOR

**INPUTS:** HD SDI (Serial Digital)  
NTSC

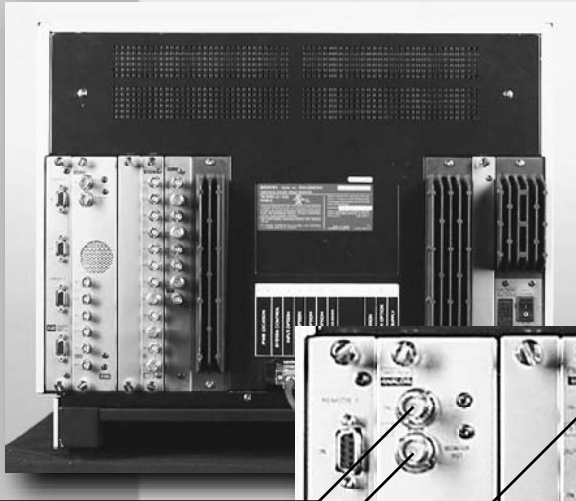
**Power:** AC only

**Framing:** 16x9 Transmission  
4x3 Transmission

### To check the programming on a particular channel:

1. Push the MENU button.
2. Move the cursor using the UP and DOWN buttons until it is opposite the INPUT CONFIGURATION menu and then push the ENTER button.
3. Read the FORMAT for what type of signal is programmed.
4. Read the SLOT NO for which panel slot is used.
5. Read the INPUT NO for which connector on the slot is used.
6. To read other channels simply change the channel number on the keypad as you are watching this menu.





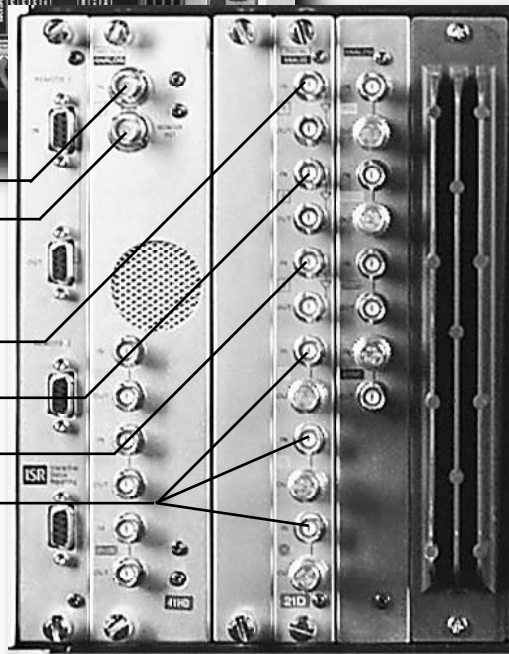
HD SDI IN  
MONITOR  
OUT

ANALOG IN  
Y

Pb

Pr

NTSC IN



1 2 3 4 5 6  
SLOTS

## 6.4 24" HD SDI MONITOR

- INPUTS:** HD SDI (Serial Digital)  
Y, Pb, Pr (HD Analog)  
NTSC, PAL, etc. (composite video)
- Power:** AC only
- Framing:** 16x9 Transmission and Safe Areas  
4x3 Transmission and Safe Areas  
16x9 Variable (used for wide screen images)  
4x3 Variable

### To check or program the input on a particular channel:

1. Push the MENU button.
2. Move the cursor using the UP and DOWN buttons until it is opposite the SET UP menu and push ENTER.
3. Move the cursor using the UP and DOWN buttons until it is opposite the INPUT CONFIGURATION menu and the push ENTER.
4. Read the FORMAT for what type of signal is programmed.
5. Read the SLOT NO for which panel slot is used.
6. Read the INPUT NO for which connector on the slot is used.
7. To read other channels simply change the channel number on the keypad as you are watching this menu.

### To check or program the frameline on a particular channel:

1. Enter the channel number on the keypad to go to that channel.
2. Move the cursor using the UP and DOWN buttons until it is opposite the SET UP menu and push ENTER.
3. Move the cursor using the UP and DOWN buttons until it is opposite the INPUT CONFIGURATION menu and the push ENTER.
4. Move the cursor to the MODE menu item and push ENTER.
5. Read or change the SAD MODE, the H SIZE and V SIZE as well if needed See Frameline Settings.



## 6.4.1 24" MONITOR CALIBRATION

---

The 24" monitor is the only one which is full resolution and can be considered a reference. Test signals are available on channels 091 - 098.

If the image does not appear uniform, i.e. if a white field shows color in the corners (Use channel 093 to check this), press the degauss button. If this does not correct it, adjust the "Landing" as described in the following paragraphs.

When the 24" monitor is moved, the image white uniformity may change due to the strength of the magnetic field around the monitor and its interaction with the Earth's magnetic field.

1. press MENU
2. scroll down to SET UP, press ENTER
3. scroll to WHITE UNIFORMITY, press ENTER.
4. select MANUAL by pressing ENTER.
5. select DIRECTION. (Note: The parameter being adjusted turns to yellow text.) Scroll UP or DOWN until the direction indicated is the same direction you are facing as you look at the monitor. Press ENTER.
6. Press DEGAUSS button above POWER button
7. If you still see color in any of the corners, choose the appropriate screen quadrant (TOP LEFT etc.) and use the UP/DOWN keys to remove the coloring. Press ENTER to save the setting. RESET will restore all parameters on this screen to 100.
8. At this point the rotation may need adjustment. Press MENU repeatedly until you get back to the SET UP menu. Choose ALIGNMENT. Select channel 95 (crosshatch pattern to assist with rotation) by pushing 0-9-5 on the keypad. Choose ROTATION. Press UP or DOWN keys until picture is rotated properly. (Note: the picture position settings must be set separately for underscan and overscan modes.) Press ENTER to select setting, and then press MENU repeatedly to exit the menus.

SAFE AREA MODE

SAD MODE 16:9- 90%  
 H SIZE ---  
 V SIZE ---  
 H POSITION 000  
 SHAPE A  
  
 4:3 AREA MARKER ---  
 4:3 BLANKING ---

SAFE AREA MODE

SAD MODE 4:3- 90%  
 H SIZE ---  
 V SIZE ---  
 H POSITION 000  
 SHAPE A  
  
 4:3 AREA MARKER ON  
 4:3 BLANKING OFF

SAFE AREA MODE

SAD MODE 16:9- ANY SIZE  
 H SIZE 095  
 V SIZE 091  
 H POSITION 000  
 SHAPE A  
  
 4:3 AREA MARKER ---  
 4:3 BLANKING ---

SAFE AREA MODE

SAD MODE 16:9- ANY SIZE  
 H SIZE 095  
 V SIZE 071  
 H POSITION 000  
 SHAPE A  
  
 4:3 AREA MARKER ---  
 4:3 BLANKING ---

## 6.4.2 24" MONITOR FRAMELINE SETTINGS

**NOTE:** The entire underscanned picture is the full chip dimension of 1920 x 1080 pixels and represents the Transmission Area. Safe Action Areas and Projection Apertures are set using the following values.

### 16x9 Safe Action

- SAD MODE: 16:9 90%

### 16x9 Safe Action with 4x3 Safe Action

- SAD MODE: 4:3 90%

### 1.85 Projection Aperture (for film-out)

- SAD MODE: 16:9 ANY SIZE
- H SIZE: 095
- V SIZE: 091

### 2.40 Projection Aperture (for film-out)

- SAD MODE: 16:9 ANY SIZE
- H SIZE: 095
- V SIZE: 071

RESET

PARADE



HD SDI IN

MONITOR OUT





## 6.5 HD SDI WAVEFORM MONITOR

Using the waveform monitor can be considered analogous to using a reflective spot meter. It is useful for the determination of exposure and shows the relative values of the reflected light.

INPUT: HD SDI  
OUTPUT: HD SDI or Y, Pb, Pr

**NOTE:** The monitor is AC powered only and has a fan. It may be necessary to turn off the monitor if it can be heard while shooting sync sound.

### Resetting the Monitor

It is useful to save the settings of the monitor on the F1 key during the prep. This allows for an easy reset if the parameters get changed. The standard mode is the PARADE mode with the channels shown in the order of G B R with the scale going from 0 100%.

1. Push MENU key several times until menus disappear.
2. Hold the F1 key down until the monitor shuts off and then let go.
3. The monitor will reset to the saved settings.



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