DOUG JENSEN'S COMPLETE GUIDE TO THE SONY

PXW-Z750
PXW-Z450

VORTEX MEDIA

DOUG JENSEN'S
COMPLETE GUIDE TO THE SONY
PXW-Z750 AND PXW-Z450
FIRST EDITION

ISBN 978-1-939679-04-8

PUBLISHED BY:

VORTEX MEDIA
2000 CHENEY HWY #103-265
TITUSVILLE, FLORIDA
WWW.VORTEXMEDIA.COM

TABLE OF CONTENTS

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

I wish to thank the following people who provided information and/or helped proof this book. Without their invaluable assistance and attention to detail I could not have completed the project. I take full responsibility for any inaccuracies that may remain.

Alex Rossi, Sony
Joe Perecman, Sony
Martin Lindsay, Sony
Andy Munitz, Sony
Tom Fletcher, Fujifilm/Fujinon
SusanTeuscher, Fujifilm/Fujinon
Sol Comerchero, Vitec Production Solutions
Sally Dewey, Vortex Media
Jane M. Dewey
Mike DesRoches, Sony
Steve Shaw, Light Illusion

ADDITIONAL SUPPORT

Sony provides a wealth of information on their website where you can find product information, specifications, operation manuals, and the latest product firmware:

https://pro.sony/ue_US/products/shoulder-camcorders

A little known resource offered by Sony is free telephone support for U.S. and Canadian customers. The Product Operation Support Center (POSC) is available Monday through Friday 10:00am to 6:00pm EST, excluding holidays at 800-883-6817. You may also contact POSC via e-mail at ProSupport@sony.com.

ABOUT THE AUTHOR

Doug Jensen is the owner of Vortex Media, a cameraman, producer, director, editor, consultant and trainer with nearly 40 years of video production and post-production experience. Doug combines his extensive production experience with his teaching skills to bring a wide-ranging, real-world perspective to his master class training videos and workshops.

As a member of Sony's Independent Certified Experts (I.C.E.) team he has taught high-definition XDCAM classes for Sony and other organizations. He is also on the faculty at Maine Media Workshops and teaches several courses on lighting, directing, and camera operation each summer. Doug owns several cameras, including a Sony PXW-Z750, PMW-F55, PXW-FS7, PXW-Z280, PXW-Z90 and others.

In recent years, he has produced several popular training videos and books including: "Doug Jensen's Sony PXW-FS7 Master Class," "Doug Jensen's Guide to the PMW-F55," "Vortex Media's PDW-F800 Field Guide," "Doug Jensen's Guide to Grading Sony S-LOG & RAW in DaVinci Resolve," "How to Set up and Shoot Awesome Interviews with LED Lights," and "How to Make Money Shooting Stock Footage".

Doug's credits and clients include: Olympic Broadcasting Services (OBS), CBS News, Eco Challenge Fiji, NBC News, ABC News, Fox News, CNN, PBS, BBC, NHK, EBU, TNT, Discovery, ESPN, E!, A&E, HGTV, WGBH, Food Network, NASCAR Images, MLB Productions, Travel Channel, History Channel, Sundance Channel, PepsiCo, Dateline NBC, Warner Bros., Weather Channel, Biography, TLC, TV Land, Golf Channel, HBO Zone, USOC, and NBA Entertainment.

PREFACE

As a freelancer who has owned his own camera, audio, and lighting gear for more than 35 years, I've learned that I have to change with the times and stay ahead of the curve when it comes to new technology. In 2013 I could see that the bulk of my work was moving towards 4K acquisition, 10-bit 4:2:2 recording formats, and of course, S-LOG — all features that did not exist on my Sony PDW-F800 or any other 2/3" ENG camera.

So, it was a bittersweet day when I sold my F800 and replaced it with a PMW-F55 cinema camera. The revolutionary F55 had all the technological advances I needed to stay competitive, but it also meant giving up my Fujinon 22x ENG lens; great shoulder-mount ergonomics; a built-in slot for a wireless receiver; and numerous external buttons and controls we used to take for granted.

Fortunately, what's old is new again. Today we have two excellent Sony 4K 2/3" cameras that include all the bells and whistles that an ENG camera absolutely must have. The PXW-Z750 is the world's first 2/3" 4K camera with three CMOS sensors, global shutter, S-LOG, high frame rates, 10-bit 4:2:2 codecs, and of course, a native B4 lens mount. This is everything I wish I could have had in 2013, but the technology for such a camera didn't exist at the time.

But these cameras are not your daddy's Betacam or your old optical disc XDCAM. The Z750 and Z450 come fully equipped with cutting edge technology and dozens of powerful new features that we couldn't have dreamt of just a few years ago.

But if you don't understand those features, or can't remember how they work, you'll never use them. That's where this book comes in. This book is designed to get you off on the right foot with your camera and flatten the learning curve.

Over the next four hundred pages we're going to take a closer look at the most important features that I think you need to understand in order to go out and shoot excellent video. Some features are going to seem completely familiar and others are going to take some concentration to fully grasp. Please understand that there is

no “easy” button on the Z750/Z450. Nor should there be! These are high-end professional tools that require a certain level of skills, knowledge, and experience to master.

The Z750/Z450 are not entry-level cameras, so with that in mind, I’m going to assume that you understand basic concepts like white balance, zebra, timecode, and exposure. You won’t find too much generic filler in this book which would waste time telling things you already know. The purpose of this guide is to focus on specific features and functions of the Z750/Z450 with hard facts, solid information, and useful tips and techniques that can’t be found elsewhere.

I hope this book will give you the inside edge you need to quickly become proficient with your camera, and get more out of it than you ever thought possible.

— Doug Jensen, Director of Photography
Vortex Media

CHAPTER 1
HOW TO USE THE GUIDE

This book is intended to complement Sony’s PXW-Z750 and PXW-Z450 operation manuals — not replace them. There are many warnings, details, and technical specifications that I did not feel were necessary to re-print here. I encourage you to refer to your camera’s operation manual or service manual whenever you feel it is necessary.

VIEWFINDER
The information in this book is provided with the assumption that you are using an HDVF-EL30 or HDVF-EL20 viewfinder. See chapter 9 for more information on using these viewfinders.

PARTS DESCRIPTION
Connectors, buttons, switches and other physical parts of the camera are written in all capital letters, for example: GAIN switch [25] or ND FILTER knob [30]. Every button, knob, and switch on the camera body, plus most data displays shown in the viewfinder, have been assigned a code number for easy reference. Whenever you see a number within brackets, like this [25], it refers to a control on the camera or to a specific display in the viewfinder. If you are unsure about the location of a button or switch that is being referred to, you can look it up on the parts illustrations on pages 11 - 21. If you are unsure about a display in the viewfinder or on the LCD monitor, please refer to pages 22 and 23.

MENUS
Whenever possible, I have tried to give the complete location of any menu that is being discussed. For example, **PAINT > GAMMA > GAMMA SELECT**. Specific menu settings are written in quotes, for example, in the case of the **GAMMA SELECT** menu, its setting might be “HG4” or “STD5”.

MEMORY CARDS
The Z750 and Z450 are designed to be used with SxS cards, and that is the type of card you should use to ensure trouble-free operation. Although it is also possible to use XQD cards and SD cards with op-

tional adapters, the use of those types of cards comes with many limitations. I have chosen not to point out every restriction for XQD and SD cards. Also, the generic term "SD" card is often used to cover all types of SD, SDHC, and SDXC cards.

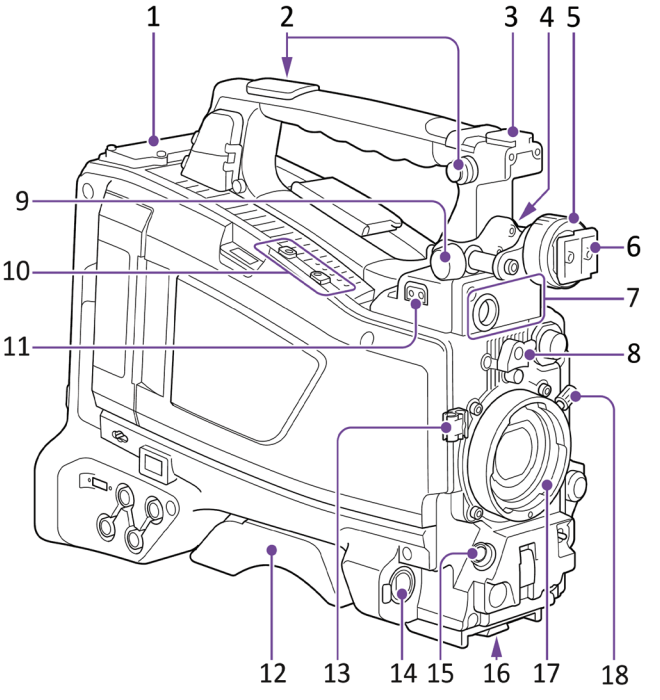
FIRMWARE

This book was written with a PXW-Z750 running firmware v2.00 and a PXW-Z450 running firmware v5.01. If your camera is using different firmware, it is possible that some functions will be slightly different from what is described here.

Sony is well known for frequently releasing free firmware updates to improve the performance of its cameras and to add new features and functions. I think that's great, but it is impossible for me to update this book to account for those changes. Therefore, please be on the lookout for differences and adjust how you use your camera accordingly.

FRAME RATES

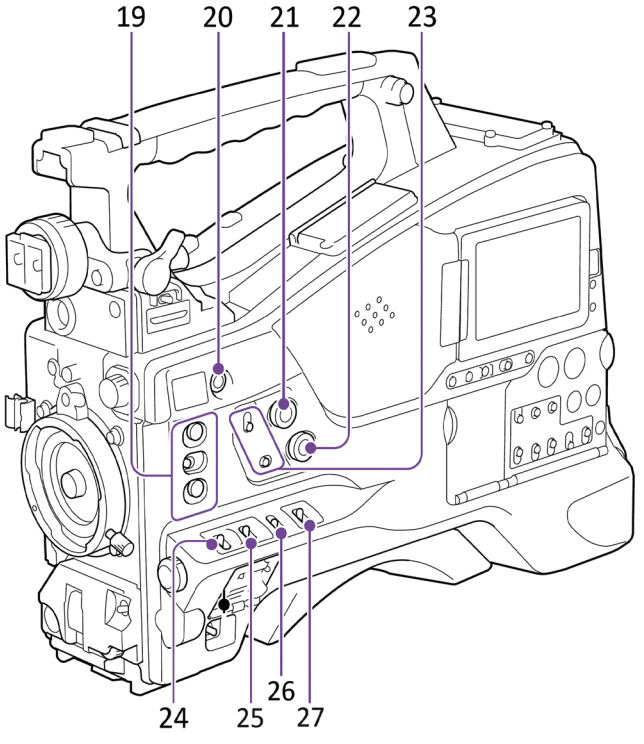
In the interest of readability, I will sometimes abbreviate frame rates as simply 24p, 30p, 60i, and 60p. Please be aware that the actual frame rates are always 23.98p, 29.97p, 59.94i and 59.94p.



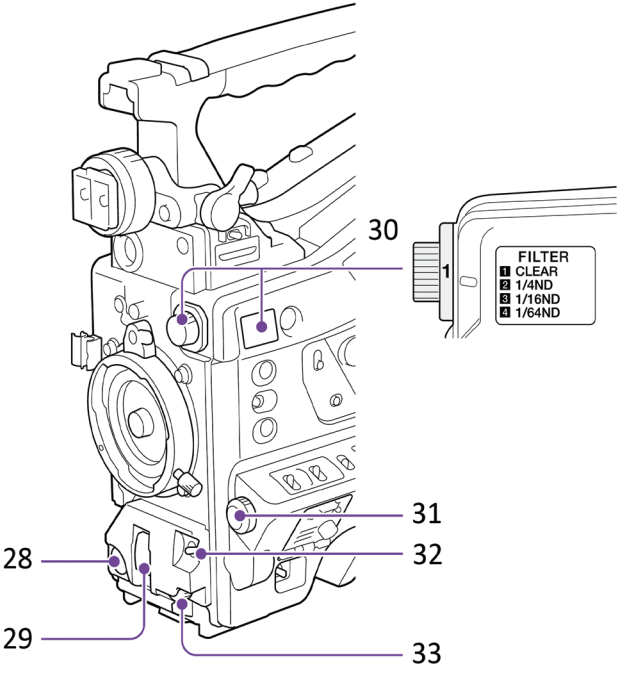
1. WIRELESS RECEIVER SLOT
2. SHOULDER STRAP CONNECTOR
3. ACCESSORY SHOE
4. VIEWFINDER POSITIONING LEVER (FRONT-TO-BACK)
5. VIEWFINDER POSITIONING RING (LEFT-TO-RIGHT)
6. VIEWFINDER ATTACHMENT SHOE
7. VIEWFINDER CONNECTOR
8. LENS MOUNT RUBBER LOCK
9. VIEWFINDER FRONT-TO-BACK POSITIONING KNOB
10. ATTACHMENT FOR OPTIONAL CAC-12 MICROPHONE HOLDER
11. VIDEO LIGHT POWER CONNECTOR (D-TAP)
12. SHOULDER PAD
13. LENS CABLE CLAMP
14. MIC INPUT (+48V, 5-PIN XLR, FEMALE)
15. LENS CONNECTOR (12-PIN)
16. TRIPOD WEDGE MOUNT FOR VCT-14
17. B4 LENS MOUNT
18. LENS LOCKING LEVER

GRAPHICS USED WITH PERMISSION FROM SONY

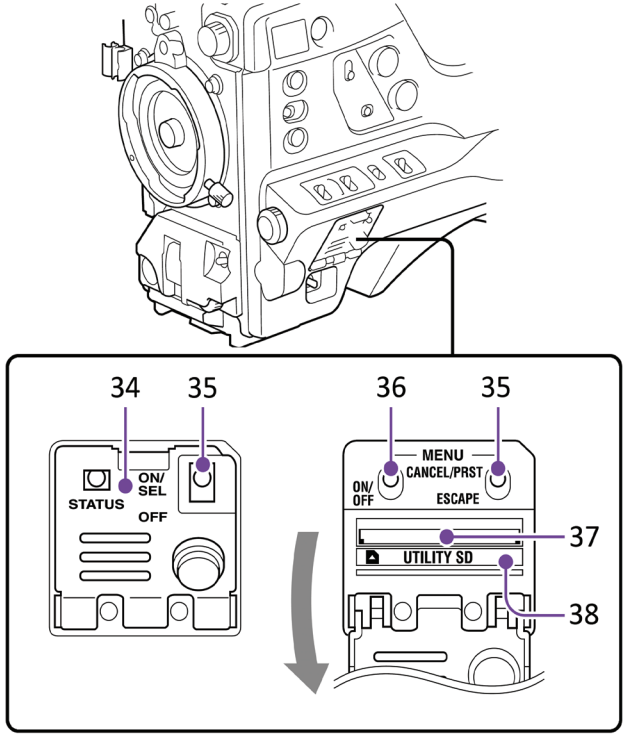
PARTS DIAGRAMS



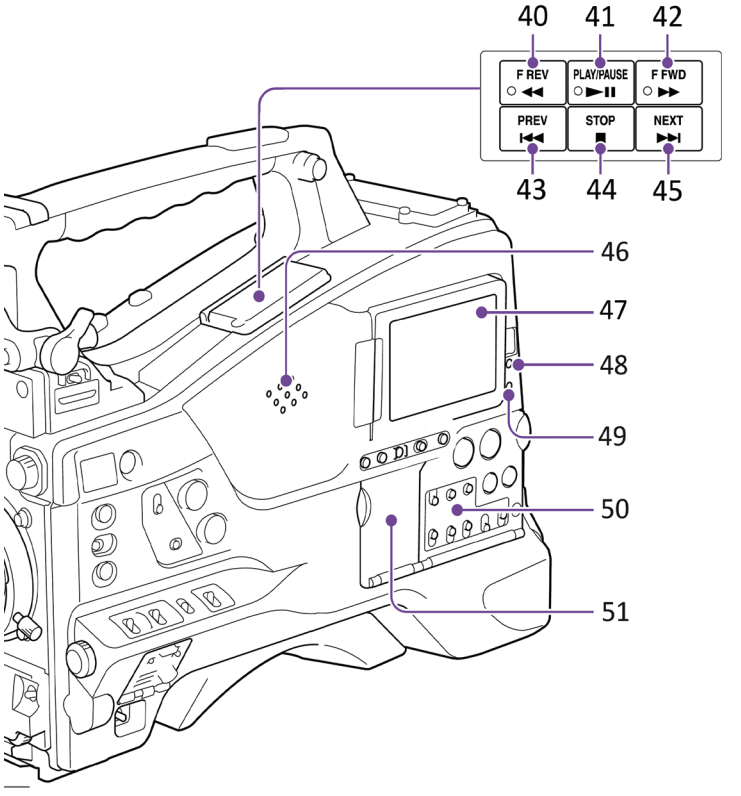
19. ASSIGN SWITCHES 1 - 3
20. ONLINE BUTTON
21. ALARM VOLUME KNOB
22. MONITOR VOLUME KNOB
23. AUDIO MONITORING SWITCHES
24. ASSIGN SWITCH 0
25. GAIN SWITCH
26: BARS / CAM / DCC SWITCH
27: WHITE BALANCE MEMORY SWITCH



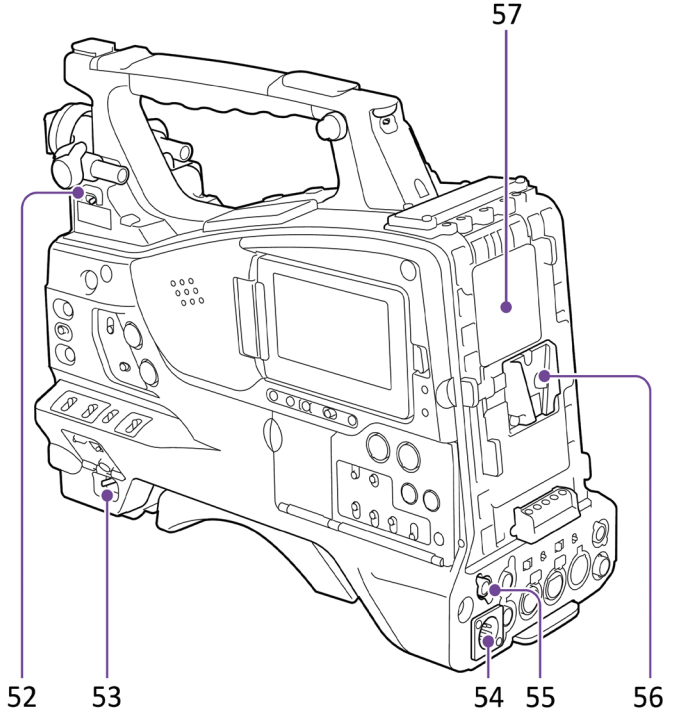
28. RECORD START/STOP BUTTON
29. SHUTTER SWITCH
30. ND FILTER KNOB
31. MENU KNOB
32. AUTO WHITE/BLACK BALANCE SWITCH
33. MICROPHONE RECORDING LEVEL KNOB



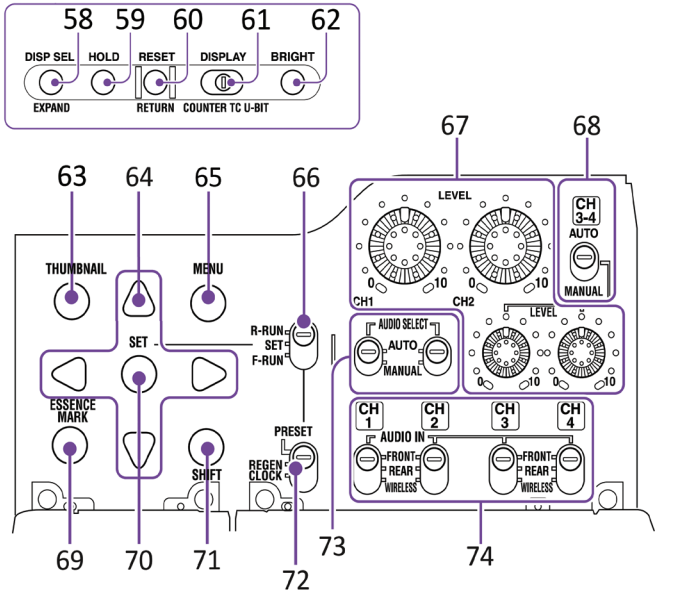
34. SWITCH COVER
35. CANCEL/PRESET/ESCAPE SWITCH
36. MENU ON/OFF SWITCH
37. UTILITY CARD SLOT (SD CARD)
38. UTILITY CARD ACCESS LIGHT



40. FAST REVERSE BUTTON
41. PLAY / PAUSE BUTTON
42. FAST FORWARD BUTTON
43: PREVIOUS BUTTON
44. STOP BUTTON
45. NEXT BUTTON
46. AUDIO SPEAKER
47. LCD MONITOR
48. WARNING LIGHT
49. SxS MEMORY CARD ACCESS LIGHT
50. AUDIO CONTROLS (SEE PAGE 17)
51. PLAYBACK AND MENU CONTROLS (SEE PAGE 17)

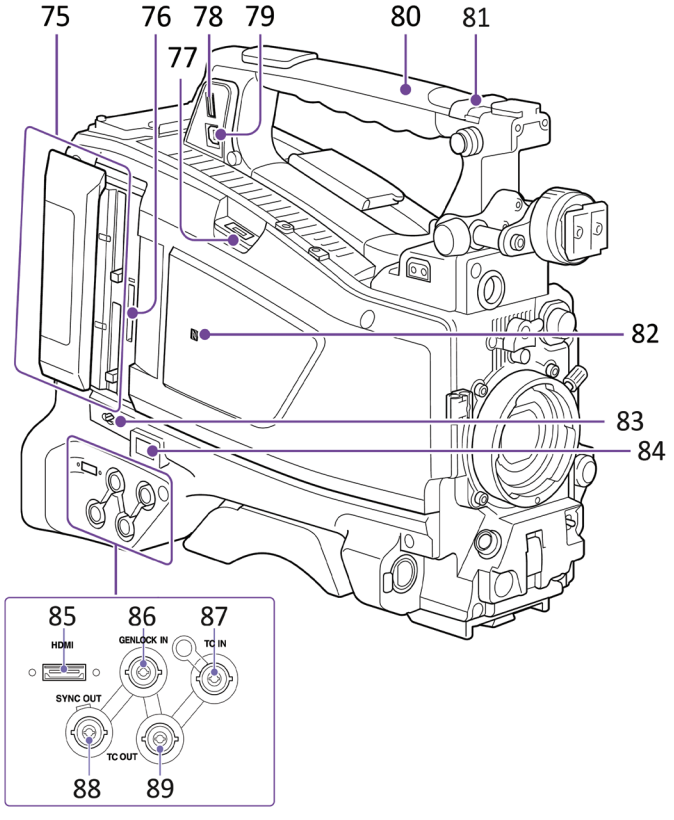


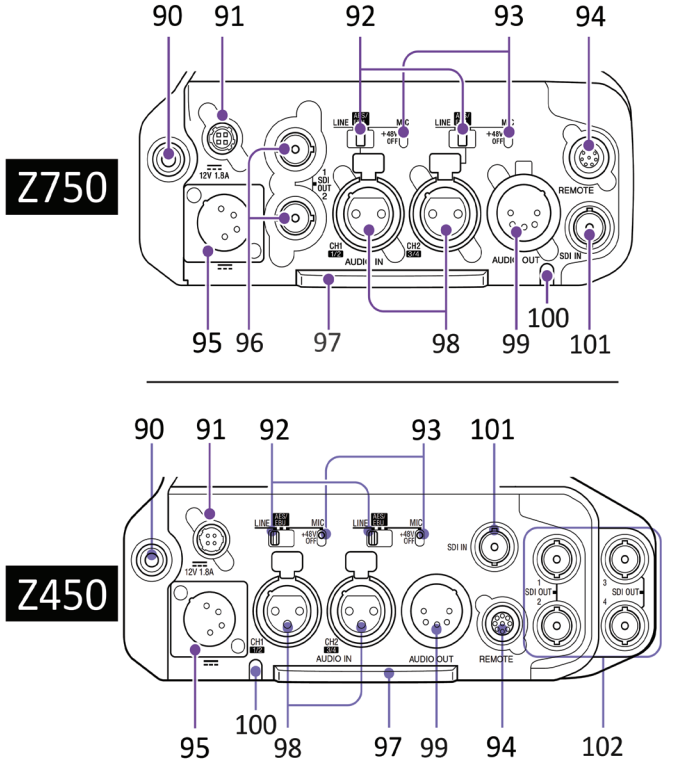
52. VIDEO LIGHT SWITCH
53. POWER SWITCH
54. DC POWER INPUT JACK (4-PIN XLR)
55. DC POWER OUTPUT CONNECTOR (12V, 1.8A, 4-PIN HIROSE)
56. V-LOCK BATTERY ATTACHMENT SHOE
57. CAMERA ADAPTER CONNECTOR (JAPANESE MODEL ONLY)



58. DISPLAY SELECTION BUTTON
59. HOLD (DISPLAY HOLD) BUTTON
60. RESET/RETURN BUTTON
61. DISPLAY SWITCH
62. BRIGHTNESS BUTTON
63. THUMBNAIL BUTTON
64. ARROW BUTTONS
65. MENU BUTTON
66. TIMECODE MODE SWITCH
67. AUDIO RECORDING LEVEL KNOBS
68. AUDIO REC AUTO/MANUAL SWITCH FOR CH3/CH4
69. ESSENCE MARK BUTTON
70. SET BUTTON
71. SHIFT BUTTON
72. PRESET/REGENERATION/CLOCK SWITCH
73. AUDIO REC AUTO/MANUAL SWITCHES FOR CH1/CH2
74. AUDIO INPUT SOURCE SWITCHES CH1/CH2/CH3/CH4

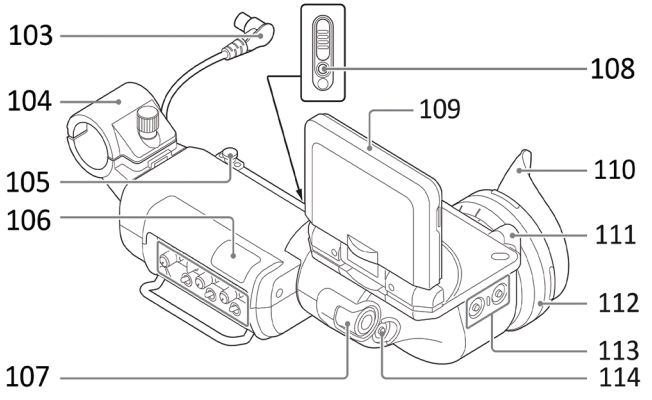
PARTS DIAGRAMS





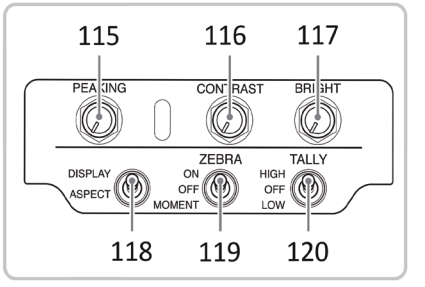
75. SxS MEMORY CARD SLOTS
76. PROXY SD CARD SLOT
77. USB WIRELESS LAN MODULE CONNECTOR
78. USB EXTERNAL STORAGE DEVICE CONNECTOR
79. USB PC CONNECTOR
80. GPS ANTENNA
81. ASSIGN SWITCHES 4 AND 5
82. NFC MARK AND ANTENNA
83. SLOT SELECT BUTTON
84. WIRED LAN CONNECTOR
85. HDMI CONNECTOR
86. GENLOCK IN CONNECTOR
87. TIMECODE IN CONNECTOR
88. SYNC OUT CONNECTOR (Z750) / VIDEO OUT (Z450)
89. TIMECODE OUT CONNECTOR

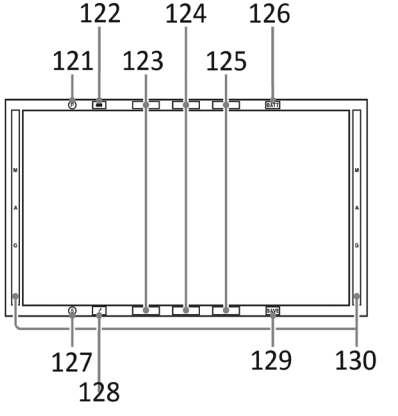
90. HEADPHONE JACK (STEREO)
91. DC POWER OUTPUT CONNECTOR (12V, 1.8A, 4-PIN HIROSE)
92. XLR SOURCE SWITCHES (LINE/AES/EBU/MIC)
93. XLR +48V PHANTOM POWER SWITCHES
94. REMOTE CONNECTOR (8-PIN)
95. DC POWER INPUT JACK (4-PIN XLR)
96. SDI OUT 1 AND 2 CONNECTORS (Z750 ONLY)
97. BOTTOM COVER
98. AUDIO INPUT 1 AND 2 CONNECTORS (3-PIN XLR)
99. AUDIO OUTPUT CONNECTOR (5-PIN XLR, STEREO)
100. TALLY LIGHT
101. SDI INPUT CONNECTOR (POOL FEED)
102. SDI OUT 1/2/3/4 CONNECTORS (Z450 ONLY)



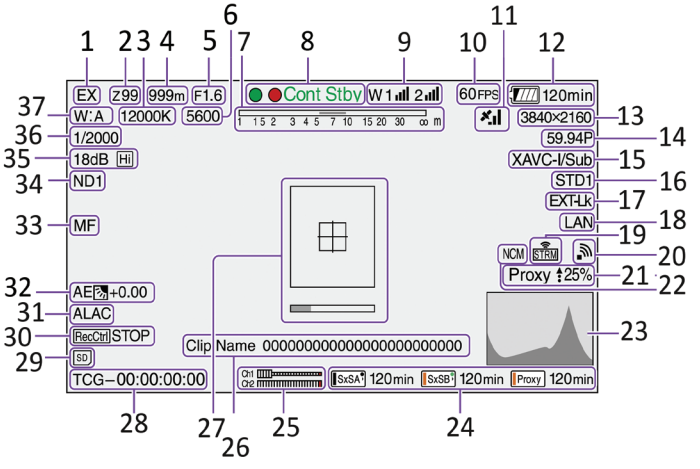
103. VF CONNECTOR CABLE
104. SHOTGUN MICROPHONE HOLDER
105. STOPPER
106. TALLY LIGHT (FRONT)
107. VF MENU SELECT/SET CONTROL
108. TALLY LIGHT (REAR)
109. LCD PANEL (HDVF-EL30 ONLY)
110. EYECUP
111. EYE SENSOR
112. DIOPTER ADJUSTMENT RING
113. VIEWFINDER ASSIGN SWITCHES 1 AND 2
114. VF MENU BUTTON

HDVF-EL30 / EL20

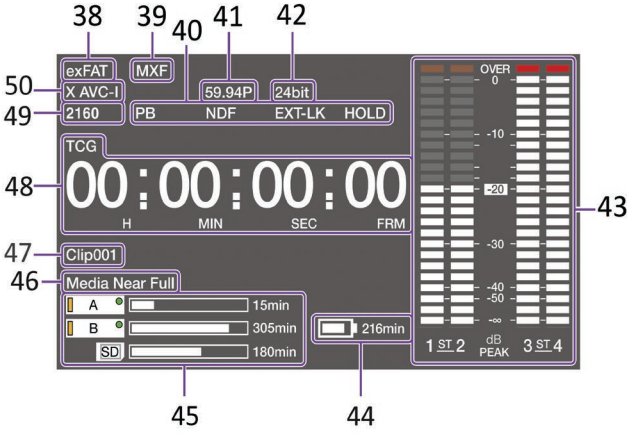




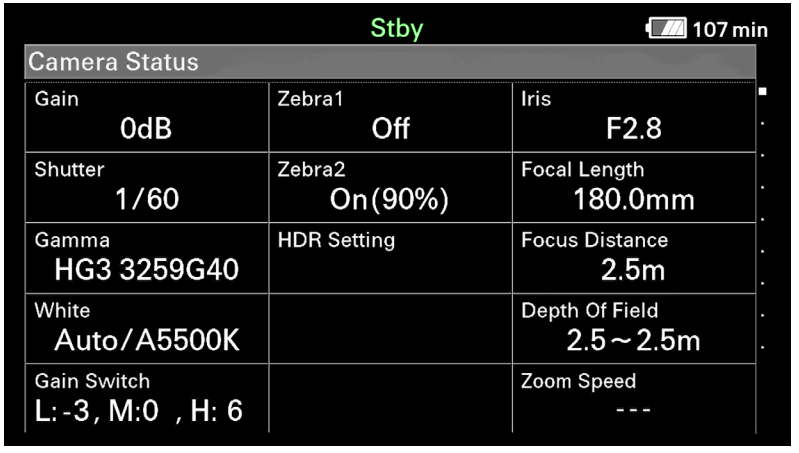
115. PEAKING DIAL
116. CONTRAST DIAL
117. BRIGHTNESS DIAL
118. ASPECT/DISPLAY SWITCH
119. ZEBRA SWITCH
120. TALLY LIGHT (FRONT) SWITCH
121. PEAKING PLUS LIGHT (BLUE)
122. FOCUS MAGNIFICATION POSITION INDICATOR
123. TALLY LIGHTS (GREEN)
124. TALLY LIGHTS (RED)
125. TALLY LIGHTS (YELLOW)
126. BATTERY LIGHT (RED)
127. VF STATUS LIGHT (AMBER)
128. <!> WARNING LIGHT (AMBER)
129. POWER SAVE MODE LIGHT (AMBER)
130. FOCUS MAGNIFICATION LIGHT (AMBER)

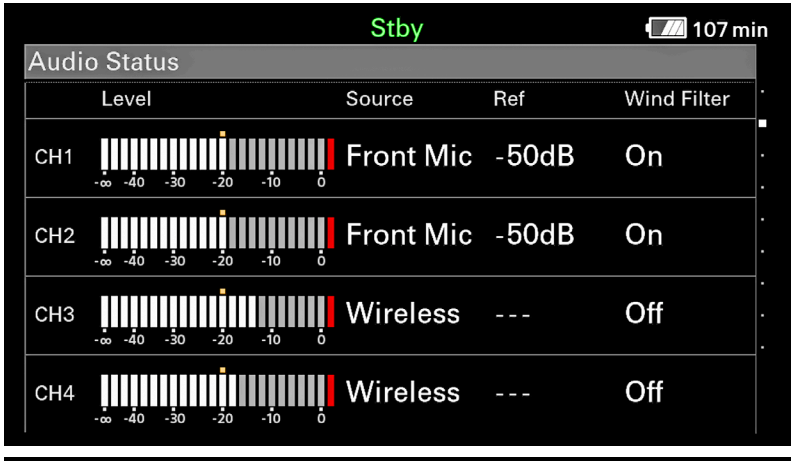


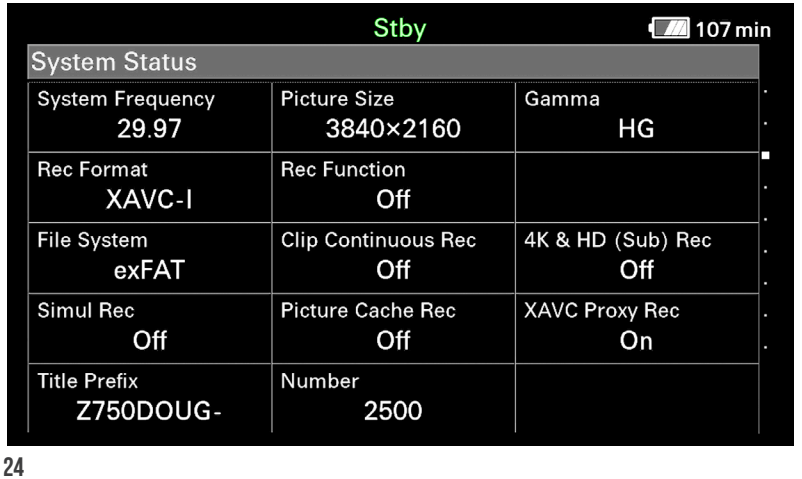
1. EXTENDER
2. ZOOM POSITION
3. COLOR TEMPERATURE
4. FOCUS POSITION
5. IRIS
6. CC5600K COLOR TEMPERATURE FUNCTION
7. DEPTH-OF-FIELD
8. RECORDING MODE
9. WIRELESS AUDIO RECEIVER STATUS
10. S&Q MOTION FRAME RATE
11. GPS STATUS
12. BATTERY CAPACITY
13. RECORDING FORMAT RESOLUTION
14. RECORDING FORMAT FREQUENCY
15. RECORDING FORMAT CODEC
16. GAMMA MODE
17. TIMECODE EXTERNAL LOCK
18. WIRED LAN/MODEM CONNECTION
19. STREAMING
20. WI-FI MODE
21. PROXY
22. NETWORK CLIENT MODE
23. VIDEO SIGNAL (WAVEFORM/VECTOR/HISTOGRAM)
24. MEMORY CARD STATUS AND REMAINING CAPACITY
25. AUDIO CONFIDENCE METERS

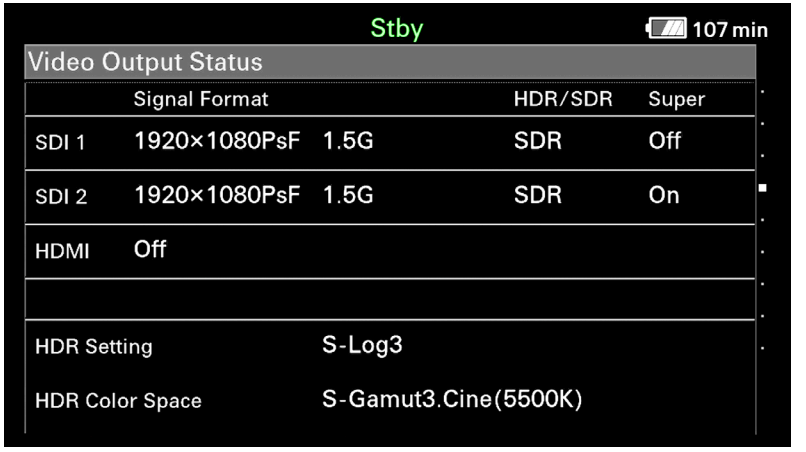


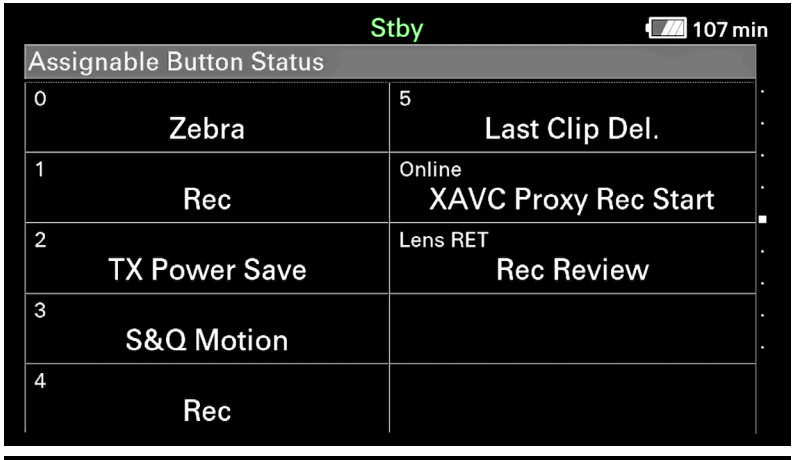
26. CLIP NAME
27. FOCUS ASSIST INDICATOR and FOCUS AREA MARKER
28. TIME DATA DISPLAY
29. SD CARD STATUS
30. SDI REC TRIGGER
31. ALAC (AUTOMATIC LENS ABERRATION CORRECTION)
32. AUTO-IRIS MODE
33. FOCUS MODE
34. ND FILTER POSITION
35. GAIN
36. SHUTTER SPEED
37. WHITE BALANCE MODE
38. FILE SYSTEM
39. FILE FORMAT
40. STATUS
41. RECORDING FORMAT FREQUENCY
42. AUDIO FORMAT BIT-RATE
43. AUDIO LEVEL METERS
44. REMAINING BATTERY CAPACITY
45. REMAINING MEMORY CARD CAPACITY
46. WARNING MESSAGES
47. CLIP NAME
48. TIME DATA DISPLAY
49. RECORDING FORMAT RESOLUTION
50. RECORDING FORMAT CODEC

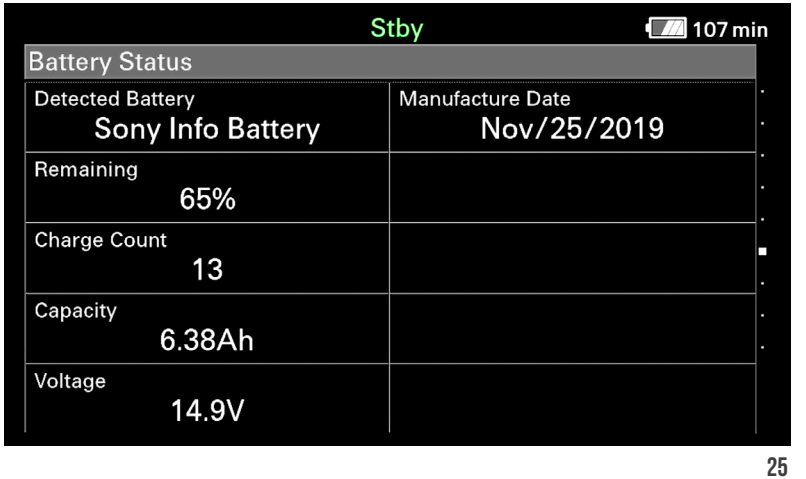












Stby 107 min

Media Status

	Media Remain	Life
SxSA	0 50 100% 89min	100%
SxSB	0 50 100% 53min	90%
SD Proxy	0 50 100% 824min	
SD Utility	0 50 100% 15.6GB	

Stby 107 min

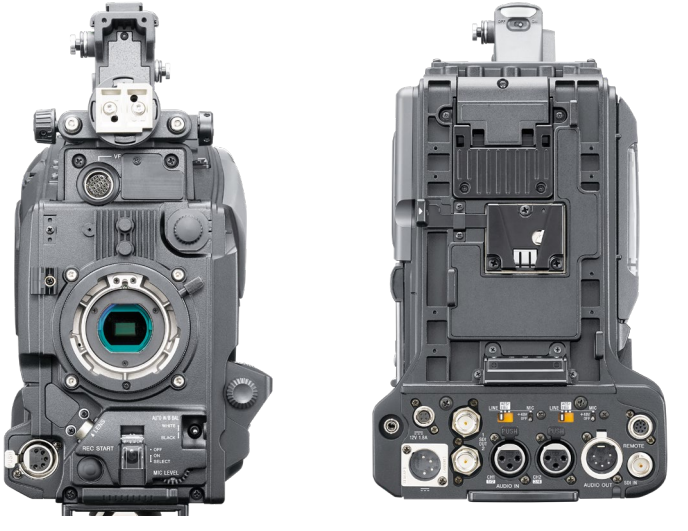
Network Status 1

Setting Off		
Wireless Network ---	Wireless Network ---	Wired LAN ---
Device Name ---	Device Name ---	Wired LAN Remote ---
IP Address(Wireless) ---	IP Address(Modem) ---	IP Address(Wired) ---
MAC Addr.(Wireless) ---		

Stby 107 min

Network Status 2

NW Client Mode Status Off	Streaming Type MPEG2 TS/UDP	Number of Distribution 1
CCM Name ---	Streaming Dest. Add. 0.0.0.0	File Transfer ---
Streaming Status Off	Streaming Dest. Port 1234	Transfer To: ---
Streaming Size 640×360		
Streaming Bit Rate 3Mbps		



CHAPTER 5
PXW-Z750 AND PXW-Z450 HIGHLIGHTS

- Three 2/3” 4K CMOS image sensors with Global Shutter (Z750).
- Single 2/3” 4K CMOS image sensor (Z450).
- Native B4 lens mount.
- Compatibility with all 2/3” B4 ENG lenses.
- Automatic Lens Aberration Correction (ALAC).
- Industry-standard placement of external controls.
- Padded shoulder-mount with built-in VCT-14 quick-release.
- Balanced for comfortable shoulder-mount shooting.
- S-LOG3 and Hybrid Log Gamma (HLG).
- Several 4K 60p and 50p 10-bit 4:2:2 formats.
- Multiple 4K and HD frame rates: 60p, 50p, 30p, 25p, and 24p.
- 4K and HD codecs: XAVC-I, XAVC-L, MPEG HD422.
- Sony’s newest XAVC-L200 2160P codec (Z750 only).
- Dual SxS card slots (compatibility with XQD and SDXC cards).
- Customizable USER MENUS, USER FILES, SCENE FILES, ALL FILES, LENS FILES, and USER GAMMA FILES.
- Special SD card slot just for saving/loading/storing custom files.
- Special SD card slot just for recording Proxy files.
- Ability to record Proxy files only (without a full-res file).
- Multiple options for Proxy resolution and bit rate.
- Simultaneous 4K and HD recording on one SxS card.
- Built-in slot for 2-channel digital wireless audio receiver.
- Remote control of wireless transmitters from the camera.
- Four channels of 24-bit/48kHz audio.
- External recording level dials for all four audio channels.
- External recording level meters for all four audio channels.
- Meters displayed in viewfinder for CH-1 and CH-2.
- Two XLR audio inputs jacks.
- Built-in speaker and headphone jack.
- External headphone volume control and monitoring switches.
- 5-pin XLR audio input for stereo or mono shotgun mic.
- 5-pin XLR stereo audio monitor output.
- Compatibility with Sony’s HDVF-EL30 and EL20 OLED viewfinders.
- Flip-out 3.5” color LCD on the camera body.
- 12G SDI output for 4K monitoring or recording (Z750 only).

CAMERA FEATURES AND SPECIFICATIONS

- All the standard Sony paint menus, including: HyperGamma, User Gamma, Matrix, Multi-Matrix, Knee, Black, Detail, etc.
- Built-in ND filters
- Seven customizable Assign Switches.
- External shutter speed selector switch.
- V-lock battery mount.
- 4-pin 12V power input.
- Peaking and Peaking Plus for focus.
- Two customizable Zebras.
- 8-pin connector for remote operation.
- Ethernet jack: RJ-45.
- Dedicated ONLINE button for one-touch streaming.
- D-TAP connector for on-camera light or other 12V accessories.
- A & B white balance memory switch with a customizable preset.
- External White Balance Set and Black Balance switches.
- Shockless Gain and Shockless White Balance.
- Slow Shutter (SLS) mode with up to 16-frame accumulation.
- Custom clip naming on-board the camera.
- Planning Metadata compatibility.
- Customizable clip naming with the file name shown in viewfinder.
- Last Clip Delete.
- Excellent low-light sensitivity.
- Noise suppression that is customizable for every level of gain.
- Ability to transfer files directly to USB drives without a computer.
- Genlock connector.
- Timecode In and Out (two connectors).
- HD-SDI input connector for recording a pool feed.
- Multiple HD-SDI output connectors and HDMI.
- Picture Cache Recording (up to 10 seconds for 4K).
- Interval recording for time-lapse.
- 4K and HD Slow & Quick Motion from 1 fps to 60 fps.
- HD from 72 - 120 fps with cropped sensor mode (Z750 only).
- Built-in shoulder strap connectors.
- Built-in capability for wireless live streaming, automatic proxy file transfers, full-res file transfers, and remote camera control from mobile devices and computers.
- More than 50 types of metadata captured with every clip, including GPS location, camera serial number, f-stop, focal length, irs, gamma, shutter speed, gain, lens model, ND filter, white balance mode, color temperature, and more.

CHAPTER 6
DIFFERENCES BETWEEN THE CAMERAS

The PXW-Z750 and PXW-Z450 are very similar cameras. They both share the same body style, the same weight, same viewfinders, same lenses, and 98% of the same menu options and other capabilities. But there are still some important differences to be aware of:

NUMBER OF SENSORS

One of the biggest differences between the two cameras is that the Z750 has three 2/3" CMOS sensors while the Z450 only has one. Using a prism to separate light into its component red, green, and blue wavelengths and using a dedicated sensor for each channel effectively triples the sensor area of the Z750. In fact, three-chip cameras offer twice as many red and blue photosites as single-sensor cameras, and that produces uniform sensitivity across the color spectrum.

So, all other things being equal, a three-chip camera will provide improved sensitivity and overall better performance. In addition, because three-chip cameras don't use Bayer interpolation to decipher color information, edges of objects usually look cleaner and subtle shades of colors can be differentiated very precisely with no loss of resolution.

GLOBAL SHUTTER

The PXW-Z750 was released about three years after the Z450 and, not surprisingly, technology had moved forward significantly during that time. The Z750 uses the world's first 2/3-inch 4K CMOS sensor (three of them) with global shutter technology. According to Sony, the picture matches the highly regarded HDC-3500/5500 live production cameras, which helps account for the Z750's excellent image quality.

Most CMOS sensors use a rolling shutter that scans through the photosites line by line from top to bottom. That line-by-line scanning can result in the appearance of unwanted artifacts in scenes with lots of motion. For example, when panning to follow a quickly moving vehicle, an athlete, or fast-moving animal, stationary objects in the foreground or background of the scene (trees, signs, poles, walls, fences, etc.), may be captured with skewed vertical lines. These artifacts become more evident with handheld footage and longer focal lengths — exactly the kind of shooting that ENG cameras are typically used for.

Rolling shutters can also cause partially exposed images when shooting near camera flashes, strobe effects, lightning, and other situations that have very short bursts of light that are so brief that only part of the CMOS sensor gets illuminated. You've probably seen video from weddings or red-carpet events where the top half of the picture might be brightly lit while the bottom half is dark. That effect is called "banding."

Some cameras exhibit rolling shutter artifacts more than others, and I think Sony does a very good job of mitigating this problem in its professional video cameras. So, with a high-end ENG camera like the Z450, which does have a rolling shutter, you might never notice problems during normal shooting. But if you want to completely eliminate the risk of rolling shutter artifacts, then you need to shoot with a camera that has a global shutter, such as the Z750. The Z750 captures the entire frame all at once, like a snapshot, instead of progressively from top to bottom. This is a superior method of capturing video and one of the Z750's biggest selling points for sports, reality TV, and wildlife shooting where action is the norm.

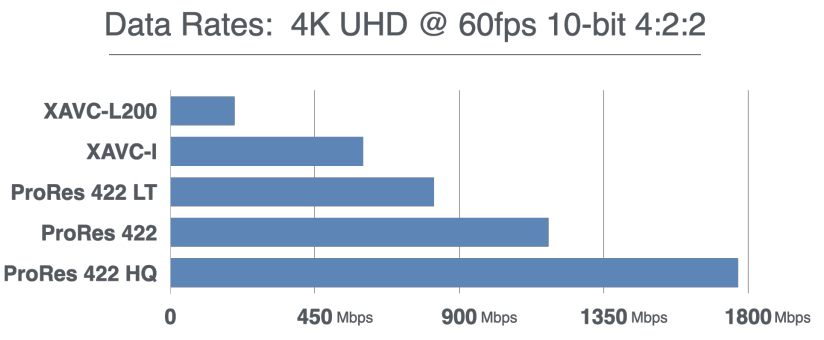
HIGH FRAME RATES

Although both cameras can record up to 60 fps in 4K and HD, only the Z750 allows you to choose speeds up to 120 fps in HD. However, be aware that choosing any frame rate above 60 fps will force the camera into a cropped sensor mode. I will cover that topic in more detail in chapter 23.

RECORDING FORMATS

For the most part, any format that is available on one camera is also available on the other, with two notable exceptions. First, only the Z450 offers standard definition recording formats. Second, only the Z750 offers Sony's latest and greatest XAVC-L200 2160P recording format, which is known simply as "XAVC-L200" for short. This very efficient 4K 10-bit 4:2:2 Long-GOP codec (at only 200 Mbps)is an ideal choice for 4K HDR productions with high shooting ratios be-

cause it records with file sizes that are about one-third the size of its XAVC-I counterpart while still maintaining similar picture quality. Keep in mind that Sony's excellent XAVC-I codec is already three times more efficient than ProRes 422 HQ, and twice as efficient as ProRes 422. So, now we have XAVC-L200, which is almost 6 times more efficient than ProRes 422 and almost 9 times more efficient than ProRes 422 HQ. I cover the recording formats in chapter 12.



SDI and HDMI OUTPUT

The Z750 has two 12G SDI connectors and one HDMI connector that are all capable of outputting a variety of 4K and HD signals simultaneously at up to 60 frames per second, depending upon your needs. On the other hand, HDMI on the Z450 is limited to only HD and its four SDI outputs are 3G rather than 12G. So, although each of the four SDI connectors can output a beautiful 1080p 10-bit 4:2:2 signal, getting 4K out of the Z450 requires the use of a Quad-Link connection. Quad-Link is a system whereby the 4K signal is output from the camera as four separate 1080p signals (each containing 1/4 of the picture) that are then combined at the other end by a compatible Quad-Link monitor to form a full-resolution 4K image. Obviously, the use of Quad-Link requires the simultaneous use of all four SDI connectors on the camera plus four 75 ohm BNC coax cables (not provided) which can support at least 3G bandwidth. In the factory default mode, the maximum quality supported by Quad-Link HD-SDI is 10-bit 4:2:2 at 30p. However, it is possible to boost the maximum frame rate to 60p by purchasing Sony's CBKZ-Z450QL Quad-Link upgrade license, which costs about $4,000 (list price) at the time this book is being written.

VPID

Only the Z750 offers support for VPID (Video Payload Identification) for use with certain high-end video monitors. This is a relatively new technology that you may never have heard of before because there are currently only three Sony monitors that use it (BVM-HX310, PVM-X1800, and PVM-X2400). The least expensive of these monitors is about $8,500. Basically, VPID embeds EOTF (HDR brightness information), color space, and RGB source information into the SDI signal so that the monitor's settings are adjusted automatically, thus reducing the chances of human error during set up. VPID might be a little ahead of its time for those of use who can't justify buying monitors in that price range, but if VPID trickles down to less expensive monitors, I'll be very glad my Z750 already has that capability.

POWER CONSUMPTION and WEIGHT

Both cameras are basically the same size and shape, but the Z750 is just a few ounces heavier at 7.15 lbs. However, there is a huge difference in power consumption. The Z450 clocks in at 24W and the Z750 almost doubles that number to 43W, mostly due to having three CMOS sensors instead of one. Obviously, sensors account for the biggest power draw in a camera.

SENSITIVITY AND NOISE

The Z750 has a better signal to noise ratio and slightly better sensitivity to light.

HIGH SENSITIVITY MODE

Only the Z750 has a special gain mode called "High Sensitivity" that can increase the camera's overall sensitivity by approximately +4dB, when compared to the normal gain mode.

GAIN

The Z450 can be set to -9dB gain, while the lowest gain on the Z750 is -3dB.

VIDEO OUT / SYNC OUT

The Z750 has a dedicated BNC connector for SYNC OUT [88]. But on the Z750 this connector can be programmed for "HD Sync", "HD Y", or analog "Composite", thus allowing it to be used to connect

to a device that supports analog composite video signals, such as a monitor, recorder, switcher, or other video equipment.

HDMI TIMECODE OUT
Only the Z750 allows you to choose whether or not you want to embed timecode in the HDMI output.

CHAPTER 7
MENU SYSTEM OVERVIEW

The menu system is the heart, soul, and brains of the Z750 and Z450 cameras. Without a good understanding of how to use the menus, and what changes can be made with them, you'll never feel at home with your camera – or maximize its full potential. In fact, there are so many different ways to customize your camcorder that it might seem overwhelming at first, but in reality, it's actually great to have this much control. Some of the menu choices you select will have major implications for the "look" and format of the video you shoot. Some choices will affect your workflow later in post. And other choices will simply make shooting more efficient.

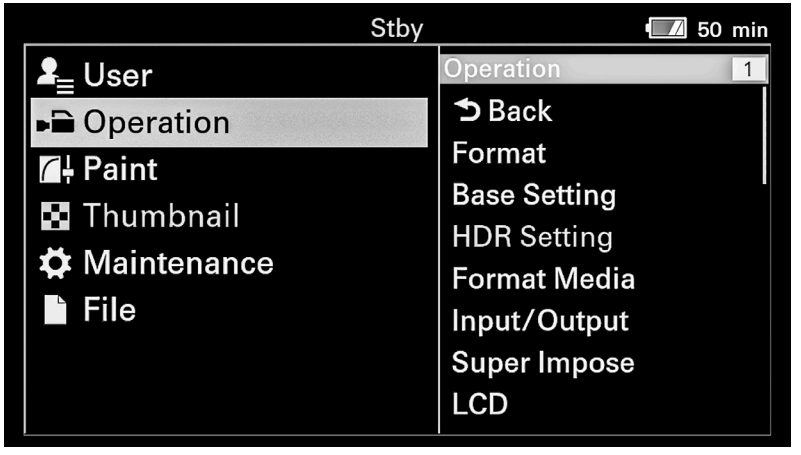
By my count, there are over 620 menus on the camera and the purpose of this book is not to go through all those menus one-by-one and describe the thousands of changes that can be made. Nearly every menu will be explained as needed throughout the book, and the rest of them are either self-explanatory or should probably only be changed by advanced users whose needs go beyond the scope of this book.

WHAT YOU NEED TO KNOW:

The menu system is divided into six main sections:

1. **USER**
2. **OPERATION**
3. **PAINT**
4. **THUMBNAIL**
5. **MAINTENANCE**
6. **FILE**

If you've ever used any of Sony's earlier shoulder-mount ENG cameras, such as the F800 or a Betacam, you'll be happy to learn that the clunky old GUI of those cameras has been put out to pasture and the Z750/Z450 have a much sleeker and far more intuitive interface. The new layout should look familiar to anyone who has used one of Sony's more recent cinema cameras, or even the Z750/Z450's baby brother, the PXW-Z280.



USER is a customizable group of menu pages where you can create shortcuts to many of your most frequently used functions. This is a great timesaving feature of the camera, and I highly recommend that you take the time to customize the User Menu to suit your own needs. You can even lock the menu system so that only the User Menu is available if you want to prevent unauthorized menu changes by other people (see page 179).

OPERATION contains 27 menus and dozens of submenus that control routine camera operations like recording format, markers, zebra, gain, and others.

PAINT holds dozens of menus that are used for customizing the "look" of the camera. These include settings such as gamma, knee, detail, and matrix.

THUMBNAIL contains all the menus that pertain to the playback of clips. This section will always be grayed out unless you have pressed the THUMBNAIL button [63] to activate the playback mode.

MAINTENANCE contains 28 menus and dozens of submenus for making changes to things such as the time and date, timecode, firmware, audio, and the network functions that allow you to stream live video and/or transfer files remotely.

FILE contains all the functions that are related to creating, importing, storing, and exporting custom settings. Those files include: User files, All files, Scene files, Reference files, Lens files, and User Gamma files.

HOW TO USE:

There are two ways of entering the menu system. The most common way is to click down on the MENU ON/OFF switch [36] that is located behind a small plastic door near the POWER switch. An alternative method is to press the MENU button [65] located farther back on the camera body, which just happens to also be located behind a plastic door.

When you enter the menu system, the camera will usually return to whatever menu you were last using, and that's a great time saver when you need to keep changing the same setting over and over again. However, if the camera has been turned off since the last time you used the menus, it logically defaults to the top level of the menu system.

There are a couple of ways of navigating through the menu pages to check settings or make changes. The most common way is to use the MENU knob [31] located at the front of the camera. Rotating the knob will move the cursor up or down through the menus, and then you press in on the knob to make a selection.

Any menus that are grayed out are not available with the camera's current configuration. To navigate back one level in the menu hierarchy, you just click down on the CANCEL/PRST/ESCAPE switch [35]. Another way of navigating the menus is to use the four ARROW buttons [64] and the SET button [70]. To exit the menus at any time and return to the normal shooting display, just click down on the MENU switch or press the MENU button a second time.

A handy method of resetting an individual menu (and in some cases a group of related menus on the same page) back to its factory default setting is to highlight the menu you want to reset . . . click up on the CANCEL/PRESET/ESCAPE switch* . . . a small message will appear at the top left corner of the viewfinder that says "Preset

Data OK" . . . click up on the switch a second time and the menu will be reset to the factory default values.

** If the FILE > ALL FILE > 3SEC CLEAR PRESET menu has been turned on, then you will need to click up on the CANCEL/PRESET/ESCAPE switch and hold it there for 3 seconds in order to set the menu back to the factory default values.*

DOUG'S RECOMMENDATIONS:

Although the menu system of the Z750/Z450 is far more user friendly than those of their predecessors, the organization of the menus still leaves a lot to be desired. Grouping over 600 menus into just six sections results in not enough divisions to make navigation as efficient as it could be. I would prefer a menu hierarchy that has separate divisions for Audio, Camera, Viewfinder, Network, and System settings. By contrast, the Z280 has thirteen main sections and much better organization of the menus.

For example, you might assume that timecode and audio settings would be part of the OPERATION menus, but no, those settings are actually located in the MAINTENANCE menus. And you might assume that all the menus that have something to do with white balance would be grouped together in one place, but no, they are randomly spread out all over the place in OPERATION, PAINT, and MAINTENANCE.

This disorganization, which is unlike the menu systems of other Sony cameras, does make the camera harder to figure out. I'll admit that I still cannot remember, off the top of my head, where some of the menus are located — and I'm the author of this book! But all is not lost. Fortunately, thanks to the User Menu, you don't need to have a photographic memory in order to become fast and efficient with the camera (see chapter 22).

CHAPTER 8

VIEWFINDER AND LCD MONITOR INFO

Attempting to shoot with the Z750/Z450 without having important operational data displayed in the viewfinder would be like piloting an airplane through clouds without instruments. You can take a look at page 22 to see an example of what most of the viewfinder display information looks like. I call this my dashboard display, and I never turn it off. Fortunately, a viewfinder that has that much information is just for illustration purposes only, and it would be impossible to actually have that much clutter in your viewfinder during actual operation.

Unlike some cameras, where you must show all of the viewfinder information or none at all, the Z750 and Z450 give operators the ability to pick and choose which data to show on an item-by-item basis. For example, I don't care about GPS on most shoots, and there is no reason for me to have its icon cluttering up my viewfinder, so the camera allows me to turn it off without affecting any of the other data displays. And turning off that icon has no effect on whether the camera is going to record GPS data or not. Just to be clear, choosing to show or hide information on the "dashboard" has nothing to do with the actual operation of whatever function it represents.

Obviously, everyone's needs are different. And with that in mind, I recommend that you take a few minutes right now to customize your camera so that the information YOU want to see is visible, and all the other clutter that you don't care about is turned off.

WHAT YOU NEED TO KNOW:

- The ASPECT/DISPLAY toggle switch [118] on the front of the viewfinder can be clicked-up to instantly hide/show all of the information and markers that are shown in the viewfinder.
- You can use the **MAINTENANCE > VF DISPLAY > CHARA/MARKER BRIGHTNESS** menu to make the superimposed data and markers brighter (higher number) or dimmer (lower number). I prefer "3".

- The **OPERATION > DISPLAY ON/OFF** menus only control whether or not certain settings are shown in the viewfinder. They don't actually control the operation of those settings.
- Whenever the **OPERATION > SUPER IMPOSE > SUPER(VF DISPLAY)** menu is turned on the viewfinder information will be superimposed over the picture on SDI OUT 2 on the Z750, SDI OUT 2 and SDI OUT 4 on the Z450, and the HDMI output of both cameras.
- You can use All files to store multiple viewfinder display configurations for use with different types of shooting situations.
- Confirmation messages (white text in a black box) are usually displayed for three seconds after a button, switch, or knob has been used to change a setting. On some earlier ENG cameras you could disable those messages from appearing, but that option is not available on the Z750/Z450.

HOW TO USE:

If you navigate to the **OPERATION > DISPLAY ON/OFF** menu page, you will see 36 submenus that allow you to choose which information you want to show or hide. The majority of these menus offer a simple choice of on/off, but a few have other options as well.

VIDEO LEVEL WARNING:
Displays a warning message whenever the camera thinks the picture is under-exposed or over-exposed.

VIEWFINDER AND LCD MONITOR INFO

SHUTTER SETTING [36]:
Shows the current shutter speed or shutter angle.

ND FILTER POSITION [34]:
Shows which one of the neutral density filters has been selected.

GAIN SETTING [35]:
Displays the current value of the gain setting (the camera has no option for ISO display).

REC/PLAY STATUS [8]:
Controls the indicator at the top of the screen that shows whether the camera is recording, in standby, or playing back a clip.

COLOR TEMP [3]:
Displays the Kelvin value, rounded off to the nearest hundred degrees, of the current white balance.

FRAME RATE/INTERVAL [10]:
Shows the S&Q Motion or Interval Recording frame rate. It does not display the frame rate of the camera's current recording format.

BATTERY REMAIN [12]:
Controls the display of the remaining battery capacity, or the DC input voltage when an external power source is being used. There are three choices:

1. "**Auto"** Displays the remaining capacity of the battery as either Voltage or as Minutes according to the type of battery that is mounted on the camera.
2. **"Voltage"** only displays the input voltage regardless of the battery type.
3. **"Off"** turns the display completely off.

TIMECODE [28]:
Despite the name, this setting actually controls the display of all types of time data in the viewfinder and not just timecode. Time data could be timecode, user-bits, counter, or duration, depending on the choices you have made with the DISPLAY switch [61] and the **TIMECODE > COUNTER DISPLAY** menu.

AUDIO LEVEL METER [25]:
Displays audio recording levels for CH-1 and CH-2. There is no way to change the meters to show channels 3 or 4.

MEDIA STATUS [24]:
Shows the remaining capacity of the two SxS cards and the SD card that is used for proxy file capture. The currently selected card will have a green dot on it. The time shown is calculated from the remaining capacity of the card and the camera's currently selected video format.

SD CARD(UTILITY) [29]:
Shows the status of the SD Utility card.

FOCUS POSITION [4]:
If a compatible lens is mounted, the focus distance can be displayed in meters or feet. If you don't have a compatible lens, then nothing will be shown even if this setting is turned on.

IRIS POSITION [5]:
Shows the current f-stop when a compatible lens is being used.

ZOOM POSITION [2]:
Shows the focal length of a compatible zoom lens as a percentage, but note that the actual focal length of the lens can never be shown.

EXTENDER [1]:
"EX" is superimposed in the corner of the viewfinder when the extender of a compatible lens is being used.

ALAC [31]:
This indicator will be displayed when the Automatic Lens Aberration Correction (ALAC) function has been activated. Requires the use of an ALAC compatible lens.

AE MODE [32]:
Shows the Auto-Exposure mode and the Auto-Exposure level (exposure compensation) settings when Auto-Exposure is active.

VIEWFINDER AND LCD MONITOR INFO

FOCUS MODE [33]:
Displays the focus mode when a compatible lens is mounted.

WHITE BALANCE MODE [37]:
Shows whether the camera is set for automatic white balance or manual white balance — and if it is set for manual, the current position of the white balance toggle switch.

CC5600K [6]:
Displays "5600" when the CC5600K white balance function is turned on via an Assign Switch. See page 148.

REC FORMAT [13, 14, 15]:
Shows the resolution, frequency, and codec of the currently selected recording format. These three settings are grouped together and cannot be shown/hidden individually.

GAMMA [16]:
Displays the gamma mode. When SDR is being used, the Gamma Category will be shown first followed by a number to indicate the particular Gamma that has been selected within that category. When HDR(S-LOG3) is being used, the display will show "S-LOG3" followed by the currently selected SDR gamma, such as "HG3". The SDR gamma has no effect on the recorded image when shooting with the HDR mode, but knowing this setting is important because it does influence the picture that is shown in the viewfinder and monitor outputs. When HDR(HLG) is being used, the display will show "HLG" followed by the current SDR gamma setting — for the same reason as mentioned above.

TIMECODE LOCK [17]:
This display will appear when the camera's timecode generator has been successfully jam-synced to another camera or other device.

NETWORK CONDITION [18]:
Displays various icons to indicate the network setting and connection status.

PROXY STATUS [21]:
When this menu is turned on, the word "Proxy" will be displayed

whenever proxy recording is turned on and the camera is in the standby mode. The display will change to "Proxy Rec" during recording.

NW CLIENT MODE STATUS [22]:
Displays various icons to indicate the status of the connection to the CCM (Network RX Station configured as Connection Control Manager) when network client mode is turned on.

STREAMING STATUS [19]:
This will display the status of the transmission signal during streaming. A light-colored icon indicates the camera is streaming. A dark icon means that the camera is not streaming. A dark icon with an "X" on it means there is an error. Usually the error icon means that the destination is set incorrectly, or that the camcorder cannot connect to the network.

GPS [11]:
Your camera has a built-in GPS receiver that inserts special metadata into each clip to document exactly where it was shot. The GPS system is accurate to within about 20 feet and can be useful if you're editing, for example, a documentary or large-scale multi-camera production and you would like to be able to determine exactly where and when individual clips were shot. This menu setting determines whether or not an icon will be shown to indicate the strength of the GPS signal that the camera is receiving. If you don't care about capturing GPS metadata, and would prefer to keep that information private, then you can turn off the GPS function entirely with the **OPERATION > GPS** menu.

VIDEO SIGNAL MONITOR [23]:
Offers a choice of three different video scopes that can be displayed down in the lower right-hand corner. The choices are Waveform, Vectorscope, or Histogram.

CLIP NAME [26]:
Allows you to display the name of the current clip in the viewfinder while shooting. This is a great feature for logging or taking notes during the shoot, and is often more useful than the traditional method of writing down timecode numbers.

FOCUS ASSIST INDICATOR [27]:
Displays a horizontal bar at the center of the viewfinder that is supposed to indicate whether the part of the image that falls within the Focus Area Marker box is in focus or not. The bigger the bar . . . the more confident the camera is that the focus is correct.

FOCUS AREA MARKER [27]:
This is a rectangular frame at the center of the screen that can be superimposed to indicate the area of the picture that Auto Focus and the Focus Assist Indicator are analyzing when the camera judges the focus. This menu can only be used if the Focus Assist Indicator (see above) is also turned on.

LENS INFO [7]:
This provides a depth-of-field scale at the top of the screen. The information can be shown in meters or feet.

WRR RF LEVEL [9]:
If you have a compatible microphone receiver mounted inside the built-in WIRELESS SLOT [1] you can use this menu to display the RF signal strength of both transmitters. Just as with your phone, the more bars the better.

CLIP NUMBER:
This setting shouldn't be confused with Clip Name. Clip Number is purely a playback function and controls the display of a number in the upper left-hand corner. The digits to the right of the slash tell you how many clips are on the SxS card, and the number to the left tells you which one of those clips is currently being viewed.

In addition to all the information we've just talked about that can be superimposed over the picture, there is even more information that can appear around the perimeter of the viewfinder. Please see chapter 9 for a complete explanation of the HDVF-EL30 and HDVF-EL20 viewfinders.

THE LCD MONITOR

The 3.5” side-panel LCD Monitor [47] can be easily released from its storage position and rotated to any angle — or even pushed back into the camera body so it’s out of the way. One glance at the screen will tell you that it’s not intended to be used for critical evaluation, but it does have a much better picture than the low-resolution screen that was used on the Z750/Z450's predecessors. The primary purpose of this screen is not for monitoring video, but rather for displaying audio meters, changing camera menus (without having to press your eyeball up against the viewfinder), and video playback.

In the camera’s normal shooting mode, there are three different display options for the LCD MONITOR that can be selected by pressing the DISPLAY SELECT button [58]:

1. Video with superimposed information. This is basically identical to whatever is shown in the viewfinder.

2. Clean video signal without any superimposed information or menu screens.

3. The Shooting Status Screen.

The Shooting Status Screen ought to be your default mode because it is the best place to monitor the recording levels of all four audio channels [43]. Even though you can show the levels of CH-1 and CH-2 in the viewfinder, that particular display has no markings and is too crude to allow precise adjustment of the levels. The display in the viewfinder is designed to be used a confidence monitor to verify that audio is being recorded — not to actually set the audio levels. Although you can also view all four channels on the Audio Status page, turning on that display will block 90% of the viewfinder’s image so that makes it impractical to use while shooting.

The Shooting Status Screen is also the best place to keep tabs on many other important settings, such as the recording format [39], resolution [49], system frequency [41], audio bit rate [42], the remaining capacity of all three memory cards [45], the battery status [44], and the file name of the current clip [47].

OPERATION > LCD > LCD COLOR
OPERATION > LCD > LCD MARKER & ZEBRA
These two submenus can be used to boost or reduce the saturation of the LCD’s color, and to turn the display of markers and zebras on or off. These are really the only menus that affect the LCD exclusively. Most of the side-panel LCD screen’s settings are determined by whatever settings have been chosen for the viewfinder.

DOUG’S RECOMMENDATIONS:

I can’t stress enough how important it is to take a few minutes to customize the settings that affect what information will be shown to you in the viewfinder and on the side-panel LCD monitor. Would you drive a new car without bothering to adjust the position of the seat and mirrors to make driving safer and more comfortable? I have quite a few of the **OPERATION > DISPLAY ON/OFF** menus disabled because I don’t need them cluttering up my viewfinder. Everyone’s needs are different, but with that said, here is a list of the displays I generally have turned off, and my reasons why:

VIDEO LEVEL WARNING
The camera doesn’t know what I am shooting or what creative decisions I may have made when I set the exposure. Believe me, if the

picture is too dark or too bright I will know about it already, and I don't need a warning message in my viewfinder nagging me about it. By the way, the picture must be extremely under/over exposed to trigger this warning, so the absence of this warning does not indicate proper exposure.

FOCUS POSITION, ZOOM POSITION, and LENS INFO
For me, these are meaningless numbers that provide no additional information beyond what I can already see by just looking at the actual picture in the viewfinder.

ALAC
Automatic Lens Aberration Correction is a great feature of the camera, and I wouldn't want to use any lens that didn't have it. Since all the lenses I shoot with do have it, I don't need "ALAC" constantly shown in the viewfinder to remind me of that fact.

FOCUS MODE
There are very few 2/3" ENG lenses that offer auto-focus, and I've never used one, let alone own one. The focus mode on my camera will always be on manual, and so there is no point in having the letters "MF" shown in the viewfinder all of the time.

GPS
I am usually indifferent about capturing GPS data so I really don't care if the camera is getting a strong signal from the satellites or not. Therefore, why clutter up my viewfinder with the GPS icon? Of course, if location metadata is important to you, then by all means, you should leave this setting turned on so you can monitor the status of the satellite signal.

VIDEO SIGNAL MONITOR
I never use the Waveform, Histogram, and Vectorscope functions, so there is no reason for me to allow them to take up precious space in my viewfinder.

FOCUS ASSIST INDICATOR and FOCUS AREA MARKER
These focus assist tools are harder to use and far less accurate than peaking on the awesome HDVF-EL30 and EL20 viewfinders.

CHAPTER 9
VIEWFINDER OPERATION
(HDVF-EL30 and HDVF-EL20)

Earlier in this book, I described all the information, icons, and other data that can be superimposed over the picture that is shown in the viewfinder. Now I want to go a little deeper into some of the extra features that are provided by the HDVF-EL30 and HDVF-EL20 viewfinders themselves.

The two viewfinders are identical in most regards, but the EL30 comes equipped with an additional 3.5-inch, flip-up LCD screen and built-in sunshade [109]. The screen can be rotated and tilted to almost any angle, which makes it very handy for low-angle shooting, jibs, sliders, dollies, and other times when you don't want to have your eye pressed up against the diopter. In my opinion, the extra cost of the EL30 over the EL20 to get this feature is worth it. Both the flip-up LCD screen and the regular OLED viewfinder can be used at the same time . . .

END OF PREVIEW

HDVF-EL30

ALSO AVAILABLE FROM VORTEX MEDIA

VORTEXMEDIA.COM

"HOW TO MAKE MONEY SHOOTING STOCK FOOTAGE" (video)

"GRADING SONY SLOG & RAW IN DAVINCI RESOLVE" (video)

"SONY PXW-Z280 MASTER CLASS" (video)

"SONY PXW-Z90 MASTER CLASS" (video)

"SONY PXW-FS7 MASTER CLASS" (video)

"SONY PXW-FS7 FIELD GUIDE" (book)

"SONY PXW-FS5 MASTER CLASS" (video)

"SONY PXW-Z150 MASTER CLASS" (video)

"GUIDE TO THE SONY PMW-F55" (iBook)

"VORTEX MEDIA'S SONY PDW-F800 FIELD GUIDE" (iBook)

"HOW TO SET UP AND SHOOT AWESOME
INTERVIEWS WITH LED LIGHTS" (video)

INSTABACKGROUNDS

4K VIDEO CLIPS FOR GREEN SCREEN INTERVIEWS

INSTABACKGROUNDS.COM

WARMCARDS 3.0

WHITE BALANCE REFERENCE SYSTEM

WARMCARDS.COM

STORM JACKET CAMERA COVERS

STORMJACKET.COM

INDEX

INDEX