SONY

CINEALTA ™

Sony Digital 4:4:4 HD Camera System
HDC-F950
HDCU-F950

CineAlta™
— Liberating Movie Makers

CineAlta – a name that proudly symbolizes the bond between cinematography and Digital high-definition imaging. It distinguishes a Sony family of products and systems that offer new levels of creativity in the production, postproduction, and exchange of motion pictures. It also brings together the quality and universality of 24-frame cinematography with the real-time capabilities, efficiency, and flexibility of Digital high-definition technology. And it stimulates the convergence of Motion Picture Film and Digital high-definition production on a global basis.

CineAlta products, delivering cinema-quality pictures at selectable frame rates, are simplifying International Program Exchange by minimizing the need for standards conversion. They are also opening up entirely new possibilities for international co-production. Movie making has been liberated by the creative empowerment of the cinematographer. It is facilitated by real-time HD image evaluation on-set, instant replay of full-color high-resolution digital "takes," real-time image optimization while shooting, a 50-minute shooting load, and most importantly, by the significant cost-benefits associated with this digital medium.

CineAlta products provide a seamless bridge between 24-frame film originals and a final 24P digital master, giving each frame of film a one-to-one correspondence with progressive HD frames. The CineAlta environment readily interfaces with the computer graphics world, liberating postproduction. And the final liberation is achieved through the direct color conversion of progressive 24P masters to film, and to a host of other international digital HDTV and SDTV distribution formats.

The HDC- F950 and HDCU-F950 Digital 4:4:4 Camera System —Aspiring to Ultimate Image Optimization

The introduction of the groundbreaking HDW-F900 HDCAM™ camcorder in the year 2000 revolutionized movie making and high-end television production with its ability to capture digital high-definition pictures at 24-progressive-frames per second — introducing digital motion picture capabilities to high-end program origination.

Because of its outstanding picture quality, flexibility in aesthetics and production methods, and budgetary practicality, the HDW-F900 has been accepted by an impressive number of prominent producers around the world as a creative alternative to 24-frame film origination. The digital 24P system continues to influence those involved, and Sony has closely listened to the feedback from the growing number of digital 24P productions.

Sony's ongoing commitment to the pursuit of the highest picture quality and color performance in digital motion pictures has given rise to the new HDC-F950 portable camera — a powerful new addition to the CineAlta™ acquisition system product line.
Quality, Flexibility and Modularity are the main attributes of this new CineAlta family member — the versatile HDC-F950 high definition multi-format multi-frame rate digital camera. This is a highly configurable camera that relies on externally available recording options — both tape and disk. The system concept was born of the requests of moviemakers working on highly exacting special effects sequences and producers creating elaborate commercials for cinema and television presentation.

The HDC-F950 provides full-bandwidth digital 4:4:4 high-definition Red, Green, and Blue signal processing and output capability, offering superb picture quality for today's digital motion picture productions. These full-bandwidth R, G and B signals can be directly connected to a recording system, or then can be digitally transmitted to the new HDCU-F950 camera control unit via a single optical fiber cable. A variety of camera control signals as well as power to the camera also travel through this composite fiber/copper cable, maintaining the 'single-cable' connection that liberates operators from cumbersome cable handling.

Other innovative features include a significantly extended dynamic range (over previous models), a new 'long term exposure' function, and an innovative gamma-curve editing capability, allowing quick set up of an optimized gamma curve on a PC and subsequent loading of this data to the camera via a MemoryStick™ media card.

The HKC-T950 HD CCD block adapter is a strategic modular element that further enhances the camera system's operational flexibility. It allows the camera's imaging system to become a compact unit that can be extended from the camera body (and the DSP processing system) by up to 50 meters. This facilitates the creative use of the camera system on a Steadicam® and jib arms, the use of precision motion-controlled shooting of movie miniatures, convenient aerial and underwater shooting within highly confined spaces, and the mounting of this miniature imaging system in unusual locations where a full size camera would be restricted.

A new recording option is now available for use with the HDC-F950. The HDC-F950 connects with the new SRW-5000 HD digital videocassette recorder and the SRW-1 portable recorder. This is the ideal solution when aiming to capture the highest quality HD images on removable media. This system, which utilizes the new HDCAM-SR™ recording format, (an extension of the HDCAM platform) dramatically broadens the new CineAlta product line. The HDC-F950 also connects to the conventional HDCAM recording equipments.

Technological Innovations

The Central Element of Image Optimization — Full-Bandwidth 4:4:4 HD Digital RGB Signal Processing

The HDC-F950 offers full-bandwidth 4:4:4 digital high-definition R, G, and B signal processing and output capability — the central element in achieving image optimization. Targeting the highest possible picture quality and color performance for today's digital motion picture productions, the HDC-F950 meets the expectations and recommendations of major filmmakers and numerous cinematographers as well as those involved in high-end television and commercial production — where optimum picture quality and colorimetry are critical priorities.
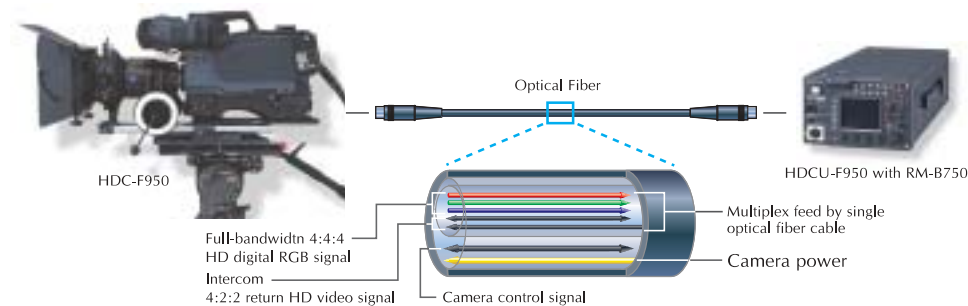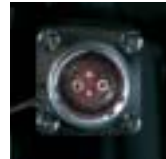
Enhanced Operational Flexibility and Efficiency

Single Fiber Connection

Despite the sophisticated picture performance of the HDC-F950, system connections remain extremely simple and clean. This is because the HDC-F950 implements an all-digital transmission system incorporating the latest optical technology. The result is a 'single-cable' transmission system that carries all required signals from the HDC-F950 to its remote base station — the HDCU-F950 camera control unit. Signals transmitted through this optical cable include the 10-bit digital high-definition R, G and B video signals, audio feeds, intercom, camera power, a variety of camera control signals and 4:2:2 return HD video signals.

The HDC-F950 can also connect directly to the HDCAM-SR portable recording system via the same fiber optic link by utilizing the SRPC-1 processor unit in combination with the SRW-1 VTR. In this configuration, the SRW-1 recording can be triggered from the HDC-F950 REC Start/Stop button.
The optical transmission system of the HDC-F950 plays a vital role in freeing operators from cumbersome cable handling.

HDC-F950

Optical Fiber

HDCU-F950 with RM-B750

Full-bandwidtn 4:4:4 HD digital RGB signal
Intercom
4:2:2 return HD video signal
Camera control signal
Camera power
Multiplex feed by single optical fiber cable

Special Gamma Feature

The special gamma feature of the HDC-F950 allows operators to quickly setup and load an optimized gamma curve with similar contrast characteristics to a specified film gamma curve. It can also be effectively employed to achieve a special creative "look" within a given scene lighting environment.
Optional Windows® PC gamma-editing software allows the gamma curve to be visually edited by GUI on a PC simply by plotting the x and y values of each point of the gamma curve. Once the gamma curve has been created, it can be easily loaded into the HDC-F950 using a MemoryStick media card.

HDC-F950   PC

MemoryStick Slot

Enhanced Highlight Handling

Exposure latitude of the HDC-F950 has been improved, by approximately 1 T-stop compared to the current HDC-950 HD studio camera*. This improvement extends the camera's exposure latitude, allowing operators more headroom when exposing the camera for scenes containing challenging highlight regions. This not only gives greater freedom in highlight control but also in depth-of-field control — both important factors for creative shooting.

*Progressive mode only

Long Term Exposure Function

The HDC-F950 has a Long Term Exposure function that enables operators to alter the exposure time to acquire images under conditions of very low scene illumination*. This function extends image acquisition capabilities under low light conditions to enhance creative image making.

This function also provides a useful degree of "under cranking", which is used to create different degrees of motion that is sped up when played back at 24 frames per second. Different degrees of motion blur for special effects can also be created. Using the new "Long Term Exposure" control of the HDC-F950, operators choose the required exposure time by selecting the number of frames — from 2, 3, 4, 8, 12, 16 and 24 frames, which are equivalent to the motion blur of film cameras at 6 fps, 4 fps, 3 fps, 1.5 fps, 1 fps, 0.75 fps and 0.5 fps respectively with the 180° shutter activated — according to the chart.

*The Long Term Exposure function can only be operated in PsF recording mode.

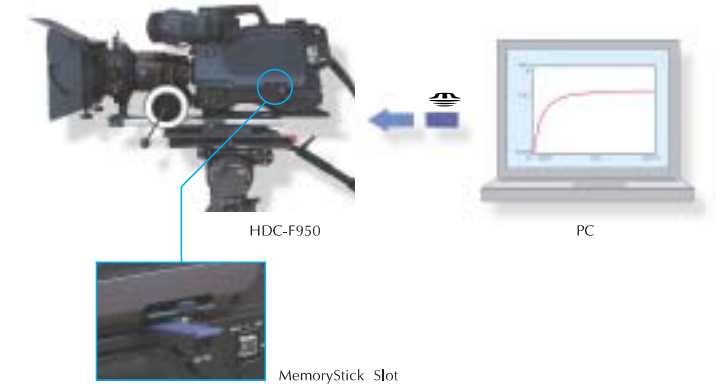| Number of accumulated frames	2	3	4	8	12	16	24
Camera/CCU output image	One active image per 2 frames	One active image per 3 frames	One active image per 4 frames	One active image per 8 frames	One active image per 12 frames	One active image per 18 frames	One active image per 24 frames
Accumulated exposure duration (sec.)	1/24 x 2 = 1/12	1/24 x 3 = 1/8	1/24 x 4 = 1/6	1/24 x 8 = 1/3	1/24 x 12 = 1/2	1/24 x 16 = 1/1.5	1/24 x 24 = 1/1
Equivalent motion blur on film cameras with 180° shutter	6 fps	4 fps	3 fps	1.5 fps	1 fps	0.75 fps	0.5 fps

*This calculation is based on 24PsF mode.
*Internal cooling fan should be operated with 16 and 24-frame calculation mode.

Modular Design

Twin Viewfinder Operation

Two viewfinders can be used simultaneously. This capability greatly contributes to operational convenience when a number of different people have to monitor the same picture at the same time. The combination of the newly developed HDVF-C30W 2.7-inch* type HD LCD color viewfinder and a HDVF-C750W 6-inch* type LCD color viewfinder is particularly recommended.

*Viewable area measured diagonally.

New 2.7-inch type HD LCD Color Viewfinder — HDVF-C30W (Optional)

The new HDVF-C30W 2.7-inch* type HD LCD color viewfinder has been designed to display extremely clear images. Its full-color, flicker-free TFT LCD provides a resolution of 960 pixels horizontally x 540 pixels vertically for each R, G and B color component, a luminance level of 300 cd/m^2 and a 200:1 high-contrast ratio. In addition, the HDVF-C30W delivers several unique features for excellent operability as following.

- The 2x magnification function simplifies focus operation, especially when prime lenses are used.
- Gray scale signals can be generated, allowing camera operators to easily adjust exposure to the appropriate level.
- A detachable eyepiece design allows the user to directly view the LCD.
- Lightweight construction and low power consumption characteristics are a great aid when working in battery-powered mobile applications.

*Viewable area measured diagonally

Separable CCD sensor — HKC-T950 HD CCD Block Adapter (Optional)

The HKC-T950 HD CCD block adapter is a unique accessory of the HDC-F950. It allows the CCD block to be extended from the camera body by up to 10 m (up to 50 m with an optional cable). More creative camera shooting angles and the freedom to place the imaging assembly in areas where a full size camera would be restricted are achieved. The HKC-T950 will expand the spectrum of HD camera applications in area such as snorkel lenses, helicopter mounts or mini jibs.

Camera Control Unit — HDCU-F950 (Optional)

The HDCU-F950 is the half rack size camera control unit that has been designed to support the HDC-F950 camera by providing full camera control capability both in fixed environments and for mobile use. The HDCU-F950 not only accepts the full-bandwidth R, G and B signals that are digitally transmitted from the HDC-F950 camera via a single optical fiber cable but also simultaneously transmit a variety of camera control signals and 4:2:2 return HD video signals as well as power to the camera.
The HDCU-F950 provides these R, G and B signals as two sets of Dual-Link HD-SDI outputs for connection to a recording system or as a system interface. In addition, the HDCU-F950 has two 4:2:2 HD-SDI outputs, two 4:2:2 HD-SDI return inputs and one GPI port.

Remote Control Unit — RM-B750 (Optional)

The RM-B750 remote control unit has been designed for used with the HDCU-F950 camera control unit to establish a highly mobile and fully controllable camera system.
The RM-B750 can either be connected to the HDCU-F950 via a cable or directly attached to the front panel of the HDCU-F950.
The combination of an LCD touch-panel screen and direct push buttons enables full parameter adjustment of the camera to be controlled. For further operational convenience, the RM-B750 has a MemoryStick media card slot so that various setup parameters can be stored and transferred between cameras.
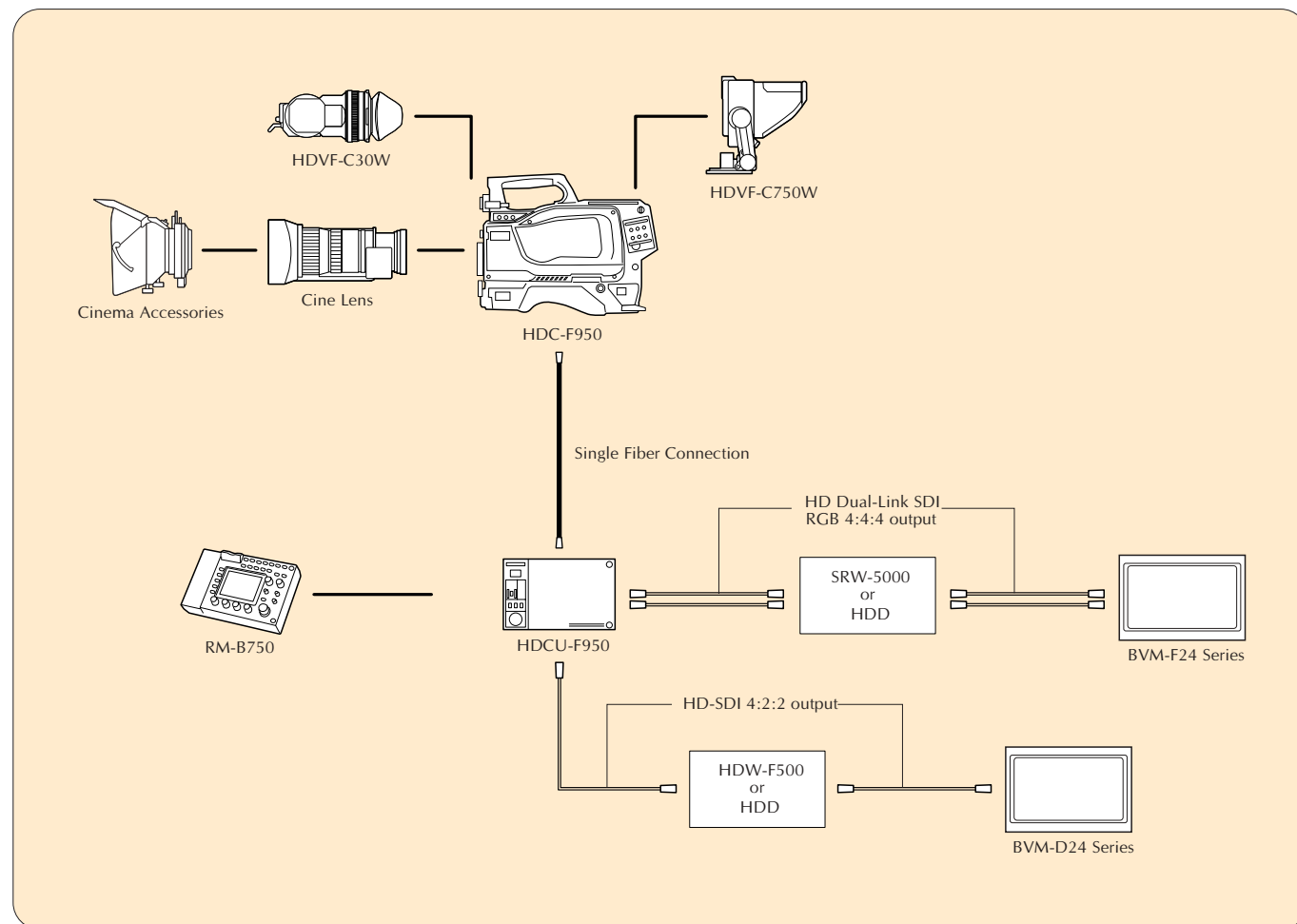
HKC-T950
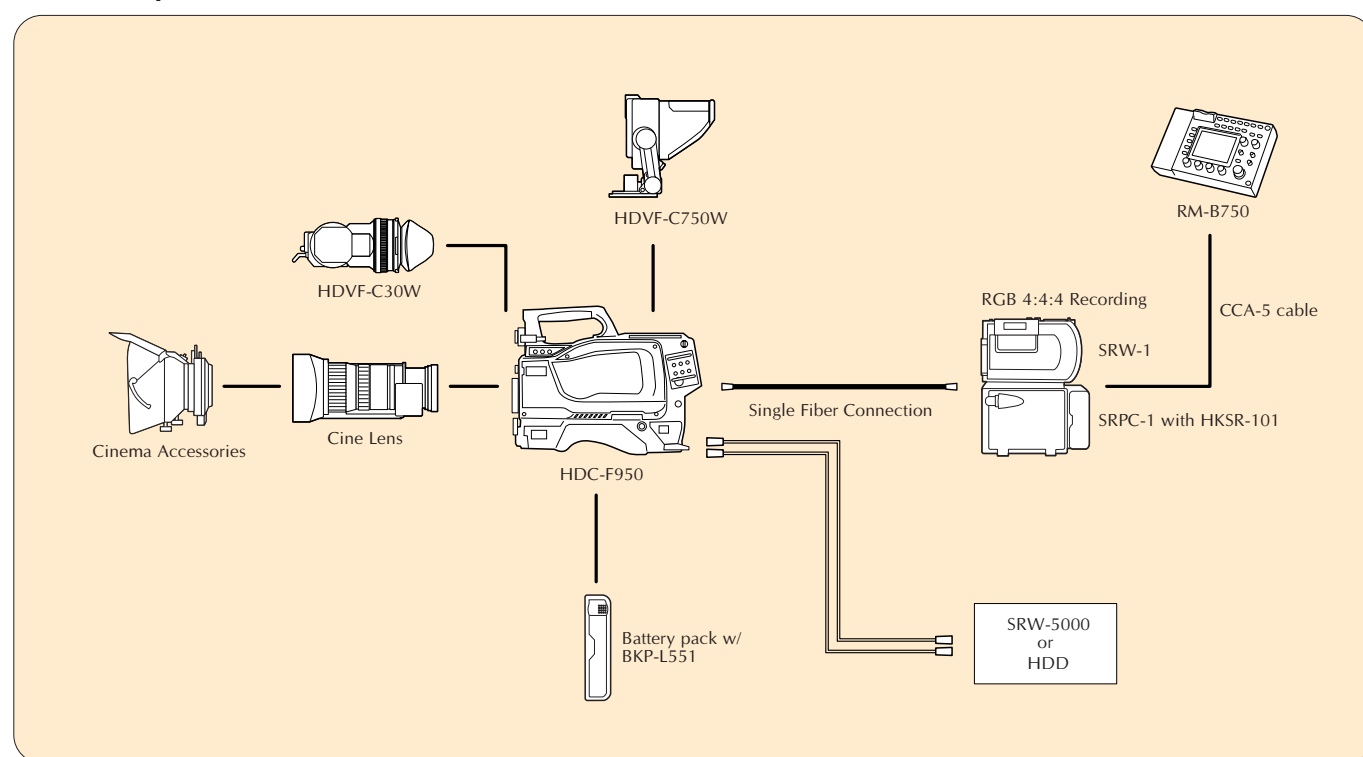
HDCU-F950

RM-B750

RM-B750 attached to the HDCU-F950 front panel

HDC-F950 + HDCU-F950 Operation

HDVF-C30W

HDVF-C750W

Cinema Accessories

Cine Lens

HDC-F950

Single Fiber Connection

HD Dual-Link SDI
RGB 4:4:4 output

SRW-5000
or
HDD

BVM-F24 Series

RM-B750

HDCU-F950

HD-SDI 4:2:2 output

HDW-F500
or
HDD

BVM-D24 Series

Non-CCU Operation

HDVF-C750W

RM-B750

HDVF-C30W

RGB 4:4:4 Recording

CCA-5 cable

Cinema Accessories

Cine Lens

HDC-F950

Single Fiber Connection

SRW-1

SRPC-1 with HKSR-101

Battery pack w/
BKP-L551

SRW-5000
or
HDD

HDC-F950 Specifications

General	
Mass	5.1 kg (11 lb. 11 oz, without VF and lens)
Dimensions (Approx. W x H x D)	133 x 276 x 360 mm
Operating temperature	-20 °C to +45 °C (-4 °F to +113 °F)
Storage temperature	-20 °C to +50 °C (-4 °F to +122 °F)
Lens mount	Sony bayonet mount
Imaging System	
Pickup device	3-CCD 2/3-inch type 16:9 FIT
Picture elements	2.2 million pixels
Spectrum system	F1.4 prism system
Inputs/Outputs	
Input connector	Front Mic in: XLR-3-31 type (Female x1) A
	Audio in: XLR-3-31 type (Female x 2)
	phantom +48 V, 600 Ω, balanced
	Return control: 6-pin
	DC in: XLR 4-pin type (Male x 1)
Output connector	Test out: BNC type, 1.0 Vp-p, 75 Ω
	Dual Link HD SDI out (4:4:4) (BNC x 2)
	HD SDI out (4:2:2): BNC type for RET
	DC out : 4-pin, 10.5 to 17 V, Max. 200 mA
	Earphone: Minijack, 8 Ω
Input/output connectors	CCU: Optical fiber connector
	Lens: 12-pin
	Viewfinder connector: 20-pin
	Remote: 8-pin (for RCP-700 Series)
	External I/O: 20-pin (for CA-905L)
	Memory Stick slot (x 1)
	Genlock in/Return in/Prompter out (Selectable): BNC type
Filter system	
Color correction filter-A	Cross
Color correction filter-B	3200 K
Color correction filter-C	4300 K
Color correction filter-D	6300 K
Color correction filter-E	8000 K
Neutral density filter-1	Clear
Neutral density filter-2	1/4 ND
Neutral density filter-3	1/8 ND
Neutral density filter-4	1/16 ND
Neutral density filter-5	1/64 ND
Servo filter control	Yes
Performance	
Sensitivity	f 10 at 2000 lux (3200 K, 89.9 % reflectance)
Minimum illumination	10 lux (F 1.4, + 12 dB gain up)
Signal to noise ratio	54 dB (typical)
Horizontal resolution	1000 TV lines
Registration	Within 0.02 % (all zones, without lens)
Shutter speed selection (1080/24P)	1/32, 1/48, 1/96, 1/125, 1/250, 1/500, 1/1000 (s)
Gain selection	-3, 0, +3, +6, +12 dB
Extended Clear Scan (1080/24P)	24 to 2200 Hz
Modulation depth	45 % or more horizontally
	(800 TV lines at center, 27.5 MHz, with typical lens)
Smear level	-135 dB
Frequency response	Within ±0.5 dB, 10 to 25 MHz
	Within ±1.0 dB, 25 to 30 MHz
Accessories	
Supplied accessories	Operation manual (1)
Optional accessories	HDVF-C30W,
	2.7-inch type LCD color viewfinder
	HDVF-C750W,
	6-inch type LCD color viewfinder
	HDVF-20A,
	CRT B/W viewfinder
	HDCU-F950, camera control unit
	RM-B750, Remote Control Unit
	HKC-T950, HD CCD block adaper
	CAC-12, Mic Holder
	BKW-401,
	Viewfinder Rotation Bracket

HDCU-F950 Specifications

General	
Power supply	AC 90 to 260 V, 50 Hz/60 Hz
Current consumption	3 A (AC 100 V, entire system active)
Operating temperature	-10 °C to +40 °C (+41 °F to +104 °F)
Storage temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Dimensions (Approx. W x H x D)	200 x 127 x 410mm (8 x 5 1/9 x 16 1/4 inches)
Mass (Approx.)	6.5 kg
HD input/outputs	
Dual Link HD SDI out	BNC type (Link-A x 2, Link-B x 2),
(RGB 4:4:4)	1080/50i, 60i, 30P, 25P, 24P
HD SDI output (4:2:2)	BNC type (x 2), 1080/50i, 60i, 30P, 25P, 24P
Return inputs	
HD SDI return input (4:2:2)	BNC type (x 3)
Sync	
Reference input	BNC type (x 1, with loop-through), HD tri-level sync
Sync output	BNC type (x1), HD tri-level sync
Intercom/Tally/PGM	
Intercom PD & ENG	D-sub 25-pin (x 1), 4W/RTS/CC selectable
PGM1/PGM2	0/-20 dBu selectable
R-Tally/G-Tally	24 V power in /make contact
Audio	
MIC1/MIC2 output	XLR-3-31 type (Female x 2), 0/-20 dBu selectable
Prompter	
Prompter in	BNC type (x 1, with loop-through), Analog, NTSC/PAL/HD-Y
Others	
RCP/MSU/CNU interface	8-pin (x 1), Sony Camera Command Network Protocol
	(for entire camera system control)
MIC REMOTE (WF control)	D-sub 15-pin (x 1), GPI (for SDI component WF control)
Camera	
Optical fiber cable interface	SMPTE 304M based optical fiber connector (x 1)
	1.5 Gb/s optical fiber digital transmission,
	SMPTE 292M, AC 240 V

RM-B750 Specifications

General	
Power requirements	DC 10.5 to 30 V (max)
	(supplied from camera/camcorder/CCU
Operating temperature	+5 °C to +40 °C
Storage temperature	-20 °C to +55 °C
Dimensions (Approx. W x H x D)	197 mm x 62 mm x 124 mm
Mass	Approx. 0.7 kg
Inputs	
Control interface	8-pin (x 1), Sony Camera Command Network Protocol
Monitor in	BNC type (x 1) VBS (No HD signal capable)

HKC-T950 Specifications

General	
Current consumption	DC 13.0 to 17.0 V
Operating temperature	-20 °C to +45 °C
Operating humidity	10% to 90% (no condensation)
Dimensions	Cable adapter: approx. 0.5 kg (1 lb 2 oz)
(Approx. W x H x D)	CCD block adapter: approx. 0.85 kg (1 lb 14 oz)
	(adapter only), approx. 1.65 kg (3 lb 10 oz)
	(with the CCD block)
CCD block adaptor I/F	
Camera cable	CCZ type 26 pin (Male)
MIC IN	XLR-3 (Female)
VIDEO OUT (HD Y)	BNC x 1
LENS	12-pin
VF	20-pin
INCOM	XLR-5 (Female)
Cable adaptor I/F	
Camera cable	CCZ type 26-pin (Female)
MIC OUT	XLR-3 (Male)
VF	20-Pin
INCOM	XLR-5 (Male)
Supplied accessories	
HDCZ-A10 cable (10 m) (1), VF relay cable (1), MIC relay cable (1),	
INCOM relay cable (1), Top cover (1), Operation manual (1)	
Optional accessories	
HDCZ-A25 (25 m) Part number: 1-823-616-11	
HDCZ-A50 (50 m) Part number: 1-523-617-11	

HDVF-C30W and HDVF-C750W Specifications

	HDVF-C30W	HDVF-C750W
Picture device	2.7-inch type TFT LCD 960 (H) x 3(RGB) x 540 (V) pixel TFT LCD	6-inch type TFT LCD 960 (H) x 3(RGB) x 540 (V) pixel TFT LCD
Screen diagonal	59.04 (H) x 33.21 (V) mm (2 3/8 x 1 5/16 inches)	132 (H) x 74 (V) mm (5 1/4 x 3 inches)
Horizontal resolution	500 TV lines or more	500 TV lines or more
Brightness	300 cd/m²	300 cd/m²
Color temperature	6500 K	6500 K
Power requirments	DC 10.5 to 17.0 V (from camera head)	DC 10.5 to 17.0 V (from camera head)
Power consumption	5.5 W	10 W
Operating temperature	0 °C to 45 °C (32 °F to 115 °F)	0 °C to 45 °C (32 °F to 115 °F)
Storage temperature	-20 °C to 60 °C (-4 °F to 140 °F)	-20 °C to 60 °C (-4 °F to 140 °F)
Mass	800 g (1 lb 13 oz)	2.2 kg (4.4 lb) not including hood
Indication	R Tally, G Tally, BATT, MAG, SAVE, !	R Tally, G Tally, BATT, !

SONY

Distributed by