English Version

Sony HD-System Cameras

HDC-25xx/-1700 Series
HSC-300R/-100R Series
HXC-D70 Series

Technical Information

Version V6.0_E March 2014

Summary of Contents

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Preface

For more than a decade Sony is successfully producing and marketing HD system cameras.
It all began with the introduction of the HDC-950-Series back in 2000, a 2/3"-CCD System Camera, featuring full HD-resolution (1920x1080 Pixels), multiple frame rate support (all 1080i formats) plus fibre-optic transmission from camera head to CCU. Along with the portable camera (HDC-950), a studio camera head (HDC-900) was available, featuring the same core technology and performance.

In 2005, the famous successor model was introduced to the market, the HDC-1500 series which continued the success story of the HDC-950-series, now offering new features, multi format support (incl. 720p) and an improved overall performance. A few years later, on NAB 2009, an improved HDC-1500-series was launched, the "HDC-1500R-Series" (R = Revised) offering an increased performance level and an enhanced feature set.
2011 was the year of introducing a completely new HDC-camera family, the **HDC-2500 series**, now being equipped with a new CCD sensor generation, 16-bit A/D converters and a 3G fibre transmission to meet the increasing demands for high quality productions, both in 1080P or 3D formats. One year later, the HDC-1700 was added to the HDC-portfolio, being an entry level model for budget-orientated customers.

In order to satisfy the increasing demand for HD mainstream production equipment, Sony launched two further HD system camera product families in 2009, **HSC-300** and **HXC-100.** These two product series were based on a common chassis and a newly developed digital triax transmission technology to further enhance the total HD product line-up and to meet the various production and budgetary requirements of our customers. On IBC 2013, the successor models were introduced, **HSC-300R** and **HSC-100R**, now featuring the latest technology to ensure the very best performance together with the choice for digital triax or fibre transmission.

2012 was the year of another important product introduction, the **HXC-D70 model,** a cost-effective entry-Level HD system camera for the educational and corporate market, featuring 2/3"-CMOS sensor technology with a very flexible transmission system (multicore as a standard and digital triax or fibre transmission on an optional basis).

This updated ***Technical Information (V6.0.)*** includes the latest developments in the Sony HD system camera line-up and contains detailed information about the new products and feature sets. Like the previous version, it was published to provide detailed product and system information to the interested customer to help him selecting the best equipment for his specific HD production.

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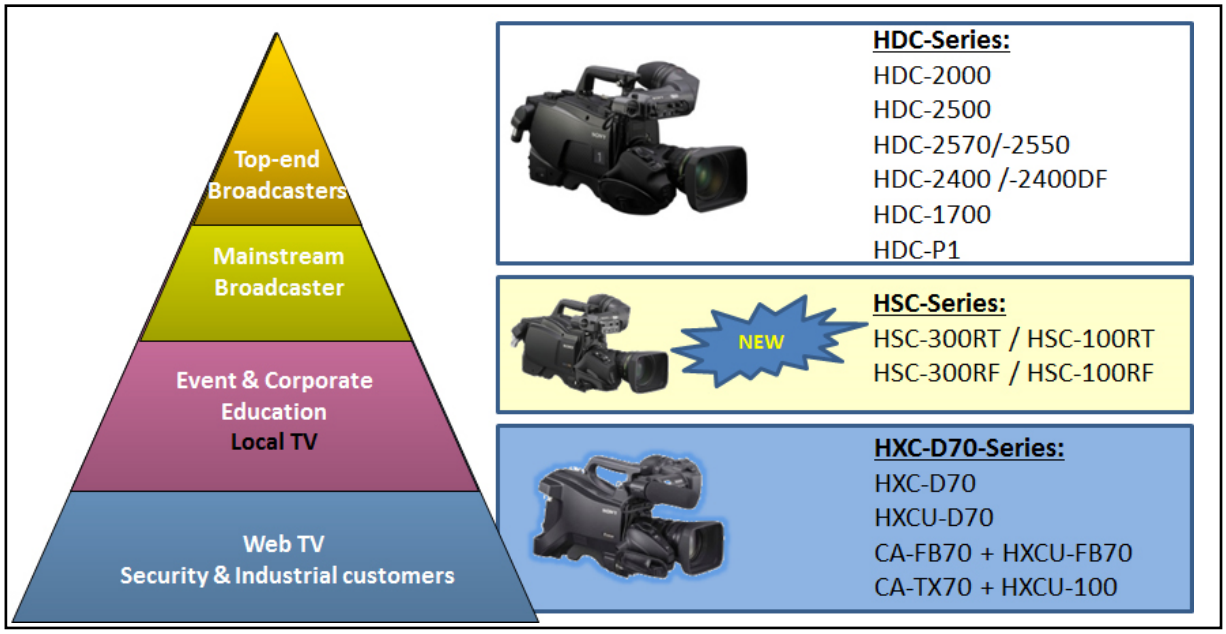
1. Overview: Sony HD System Camera Offerings

Investing into new HD system camera equipment today requires careful considerations by the customer. This kind of equipment will usually be utilized over a very long period of time and, therefore, should offer a very high flexibility, performance and upgrade-ability.
However, the requirements differ from production to production. Whereas one customer is looking for a high-grade equipment with all possible flexibility, the other one is looking for an inexpensive solution offering just a basic performance to satisfy his current needs.

That is the reason why Sony offers a wide variety of HD system camera solutions today, starting from the new high-sophisticating HDC-2500-series down to the new entry-level HXC-D70 camera system for corporate and educational use. Within the current product portfolio, the customer will find modern fibre transmission systems as well as digital triax systems and inexpensive multicore solutions.



Picture 1 shows the positioning of the new Sony HD system camera families.

The following chapters describe in detail about all those different offerings, explain the technology behind and offer a comprehensive decision aid which system to buy in accordance to the individual requirements.

2. The New HDC-Series
(HDC-2xxx models and HDC-1700)

Content of this Chapter:	2.1.	The Basic Concept of the new HDC-Series
	2.2.	State-of-the-Art Picture Quality
	2.3.	Unrivaled Flexibility
	2.4.	Best Ergonomics
	2.5.	Latest Feature Set
	2.6.	Wide Variety of Accessories for all Production Applications
	2.7.	New HDCU Models (HDCU-2000/-2500/-1700)
	2.8.	HDC-2500 Series: Ordering Information
	2.9.	HDC-1700 Series

2.1. The Basic Concept of the new HDC-Series

The new HDC-2500-series is the fully compatible successor to the HDC-1500R series and was launched on IBC 2011. First product shipments were made from January 2012 and since then, the product portfolio was continuously enhanced. The current line-up contains the following models:

Type			Predecessor
	**HDC-2000**	**Studio Camera Head** Dual Filter Wheel Multiformat Support **Fibre Transmission (3G)**	HDC-1000 HDC-1000R
	**HDC-2500**	**Portable Camera Head** Dual Filter Wheel Multiformat Support **Fibre transmission (3G)**	HDC-1500 HDC-1500R
	**HDC-2570**	**Portable Camera Head** Dual Filter Wheel 1080i/720P **Digital Triax Transmission (3G)**	----
	**HDC-2550***	**Portable Camera Head** Dual Filter Wheel 1080i/720P **Analogue Triax Transmission**	HDC-1550 HDC-1550R
	**HDC-2400DF**	**Portable Camera Head** Dual Filter Wheel 1080i/720P **Fibre Transmission (3G)**	HDC-1400 HDC-1400R
	HDC-2400	Same as HDC-2400DF Single Filter Wheel only	
	**HDC-1700**	**Portable Camera Head** Single Filter Wheel 1080i/720P **Fibre Transmission (3G)**	

* Model is discontinued

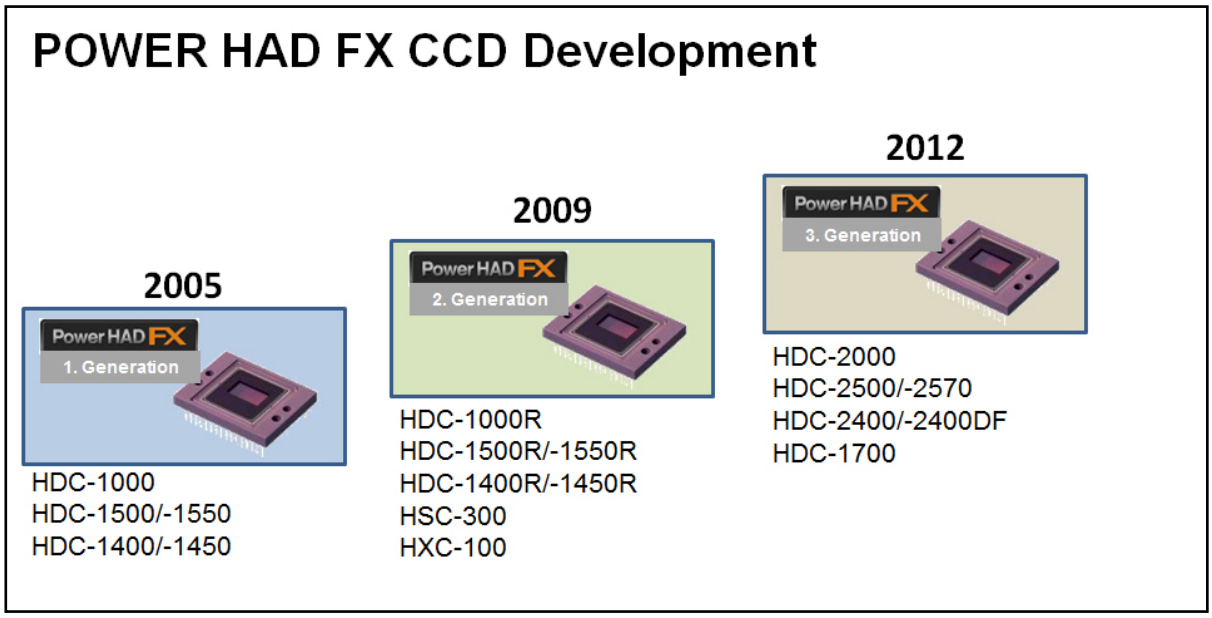
2.2. State-of-the-Art Picture Quality

Although, the new HDC-series is based on its predecessor, the famous HDC-1500R-series, it features 3 newly developed core technology elements which finally deliver a drastically improved picture quality compared to the HDC-1500R-series:

- ✓ **Newly developed 2/3"-POWER-HAD-FX CCD sensors**
- ✓ **16-bit A/D-converters**
- ✓ **Newly developed DSP (Digital Signal Processing)**

2.2.1. Newly developed POWER-HAD-FX CCD sensors

The newly developed 2/3"-POWER HAD FX CCD sensor is based on the latest IT-CCD design and is Sony´s 3rd generation of POWER HAD FX sensors.
Starting from 2005, when POWER HAD FX sensors were used in the HDC-1500-series for the first time, these sensor types were used in a variety of HD system cameras so that the user may expect a perfect colour-matching when using various Sony HD system cameras types together.



Picture 2 shows the development of the POWER HAD FX sensor technology

Improvements were made in the design of the sensor, thus increasing the V-smear specification, the Depth of Modulation (DoM) and giving a better overall SNR performance (Signal-to-Noise Ratio) while keeping the high level of standard sensitivity (F=11@2000lx/1080i mode).
HDC-25xx Series features a digital noise reducer function (NS = Noise Surpression). This function is available only for HDC-25xx series and is adjustable from RCP and MSU. Thus, noise level in the picture can be decreased from -60dB (basic specification w/o NS function) to -64dB (NS set to 100%). The function is individually adjustable in 10 steps (from NS: Off to NS: 100%).

2.2.2. 16-bit A/D-Converters

Further key elements to improve the overall performance of the new HDC-series are the new high-resolution 16-Bit A/D-converters.

Compared to the 14-Bit A/D-converter technology of the predecessor HDC-1500R, it means a 4x higher resolution of the gamma curve, resulting in a better lowlight and highlight handling, providing a wider dynamic range and giving a more natural colour reproduction.

At the same time, Signal-to-Noise (SNR) performance could be improved by keeping the sensitivity on the high level of the HDC-1500R-series (i.e.: F=11 @ 2000lx / 0dB gain, 89.9%-Reflectance, 3200K, 1080/50i format).

Due to the new construction of the A/D-converters, power consumption of the converter could be reduced (less heat, less power consumption of the entire system).

2.2.3. Newly developed DSP (Digital Signal Processing)

The last key element to increase the overall performance of the new HDC-series was the development of the new DSP, which now includes 3 new ASICs.
The new DSP works with a very high accuracy and allows the integration of new key-features as described in chapter 2.5.

2.2.4. Summary: State-of-the-Art Performance

Based on the improved POWER-HAD-FX CCD sensors, the newly developed 16-bit A/D-converters and the new DSP, the new HDC-2500-series features an enhanced performance and unrivalled picture quality which finds issue in the basic specifications:

Specifications	HDC-2500-Series	HDC-1500R Series
Std. Sensitivity (89.9%-Refl., 0dB, 3200K, 1080i format)	F=11 @ 2000lx	F=11 @ 2000lx
Signal-to-Noise Ratio (SNR)	**-60dB (w/o NS)** -64dB (NS: Max.)	-56 dB (w/o NS) -64dB (NS: Max.)
Depth of Modulation (DoM) * (@27.5 MHz)	**50% or more**	45% or more
V-Smear Level	**-140 dB** [~ 24 F-stops]	-135 dB [~ 23 F-stops]

** Measurement with a Multiburst test chart and a conventional ENG/EFP zoom lens at optimal iris setting. Using a ZEISS 2/3"-Digi-Prime fixed focal lens, DoM value can be increased by about +10%.*

2.3. Unrivaled Flexibility

2.3.1. Frame Rates

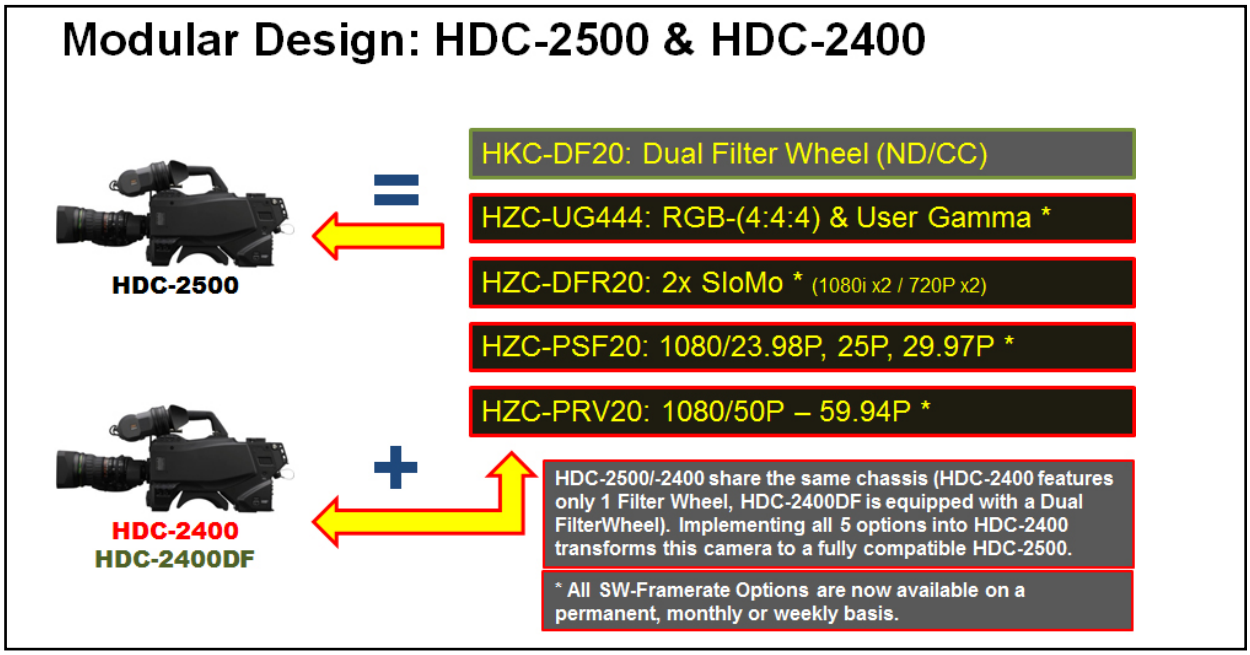
It goes without saying that a modern high-end system camera has to support all current HDTV-formats and has to be open for future (HD) formats, even though the discussion about how the future HD format will look like has not been finished yet.

Let´s have a closer look to the HD formats and the way these are currently implemented into the HDC-2500-series:

Frame Rate	Camera Type	HDC-2000 HDC-2500	HDC-2400	HDC-1700	HDC-2570
	Transmission System	Fibre 3G	Fibre 3G	Fibre 3G	Digital Triax 3G
1080/50i **1080/59.94i**	Standard HDTV	**Included**	**Included**	**Included**	**Included**
720/50P **720/59.94P**	Standard HDTV	**Included**	**Included**	**Included**	**Included**
1080/50P **1080/59.94P**	Future HDTV	**Included**	**Option** [HZC-PRV20]	**Option** [HZC-PRV20]	**Option** [HZC-PRV20]
1080/23.98PsF **1080/24PsF** **1080/25PsF** **1080/29.97PsF**	Standard HDTV	**Included**	**Option** [HZC-PSF20]	**Option** [HZC-PSF20]	**Option** [HZC-PSF20]
1080/50i RGB **1080/59.94i RGB** **1080/23.98P RGB** **1080/24P RGB** **1080/25P RGB** **1080/29.97P RGB**	Future HDTV	**Included**	**Option** [HZC-UG444]	**---**	**---**
1080/100i **1080/119.88i** **720/100P** **720/119.88P**	2x SloMo	**Included**	**Option** [HZC-DFR20]	**---**	**Option** [HZC-DFR20]

The above matrix clearly shows that the HDC-2000/-2500 models are featuring all current and future HD-frame rates as a standard whereas HDC-2400/-2400DF and HDC-1700 can be upgraded by software options if needed (refer to Picture 3/ next page). Thanks to its wide bandwidth within the fibre transmission path, such high data rate signals can be transmitted natively, without using any compression technology.
The new **HDC-2570** with its digital triax transmission system can handle high-bitrate signals, too. This camera employs Sony's unique LLVC codec technology (LLVC = **L**ow **L**atency **V**ideo **C**odec) allowing to transmit either 1080P or 2xSloMo signals over triax cable. Moreover, latency of the codec is very low (below one field; i.e. under 20ms) so that real live broadcasting is no issue.

New: all above noted framerate options are now available on a permanent, monthly and weekly basis.



Picture 3 illustrates the upgrade path of HDC-2400 / -DF to HDC-2500

2.3.2. Exchanging the Transmission Technology

The HDTV signal occupies a bandwidth of about 5-times of a standard SDTV signal (refer to Picture 4). In order to natively transmit the HDTV signal from the camera head to the CCU, the appropriate transmission technology has to be carefully selected.

Looking at the data rates of an HDTV-signal, it becomes obvious that conventional analogue triax transmission is not able to transmit such a high-performance signal without compromise. Therefore, Sony has decided to employ fibre and digital triax transmission as a standard technology for the HDC-system cameras.

Video Data Rates of an HDTV Signal

[Pixel (Y) + Pixel (U) + Pixel (V)] x Bit x TV-Lines x Framerate

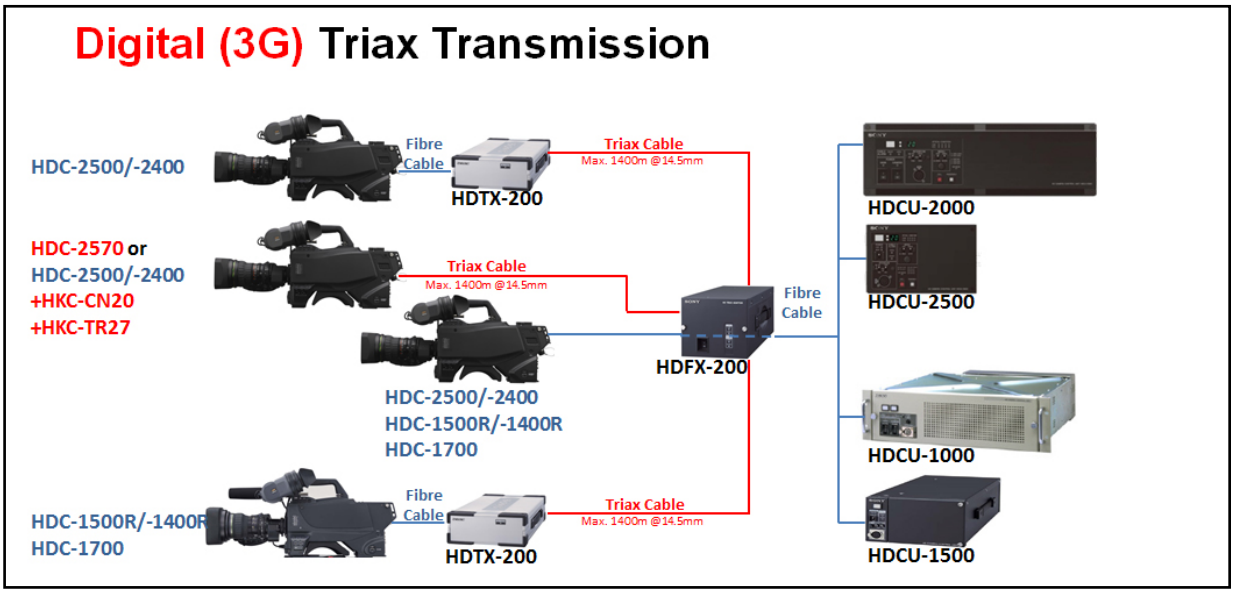
HDTV Format	Pixel (H)	Sampling	Color Depth (Bit)	TV Lines	Framerate	Uncompressed Data Rate
HD 1080p	1920	4:2:2	10	1080	50p	2.073.600.000 **~2 Gbps**
HD 1080i 2xSlomo	1920	4:2:2	10	1080	100i	2.073.600.000 **~2 Gbps**
HD 720p 2xSlomo	1280	4:2:2	10	720	100p	1.843.200.000 **~ 1,8 Gbps**
HD 1080i	1920	4:4:4	12	1080	25i	1.866.240.000 **~ 1,9 Gbps**
HD 1080i	1920	4:2:2	10	1080	25i	1.036.800.000 **~ 1 Gbps**
HD 720p	1280	4:2:2	10	720	50p	921.600.000 **~ 0,9 Gbps**
SDTV	720	4:2:2	10	575	25i	207.000.000 **~ 200 Mbps**

Data rates for the video signal only

Picture 4: Video data rates of selected HDTV signals compared to the SDTV signal

1080i (50Hz or 59.94Hz/ 2:1-interlaced), 1080PsF (23.98; 24; 25; 29.97 PsF) and 720P (50P and 59.94P) HDTV signals occupy a data rate of about 1 Gbps. These signals can easily be transmitted within an HD-SDI data stream and can be handled by a standard HD-SDI interface.
The new HDTV formats marked with yellow color in Picture 4 cannot be handled by a conventional HD-SDI infrastructure. Here, either a dual-link HD-SDI or a 3G HD-SDI interface is requested. The fibre transmission system of the HDC-series supports 3G data rates as a standard, so all future HDTV formats can be transmitted in their native form, without using compression or data reduction.

However, in many locations, triax cables are pre-installed and there is no other choice for a broadcaster than using these cables for his production. To satisfy these specific production requirements, Sony has developed special converters to adapt the triax cables in the field (**HDTX-200** on the camera side and **HDFX-200** on the CCU-side).
All HDCU-models feature fibre transmission technology so that in case a triax infrastructure is used, the **HDFX-200** converts the signal back into the digital fibre domain to be accepted by the HDCU.



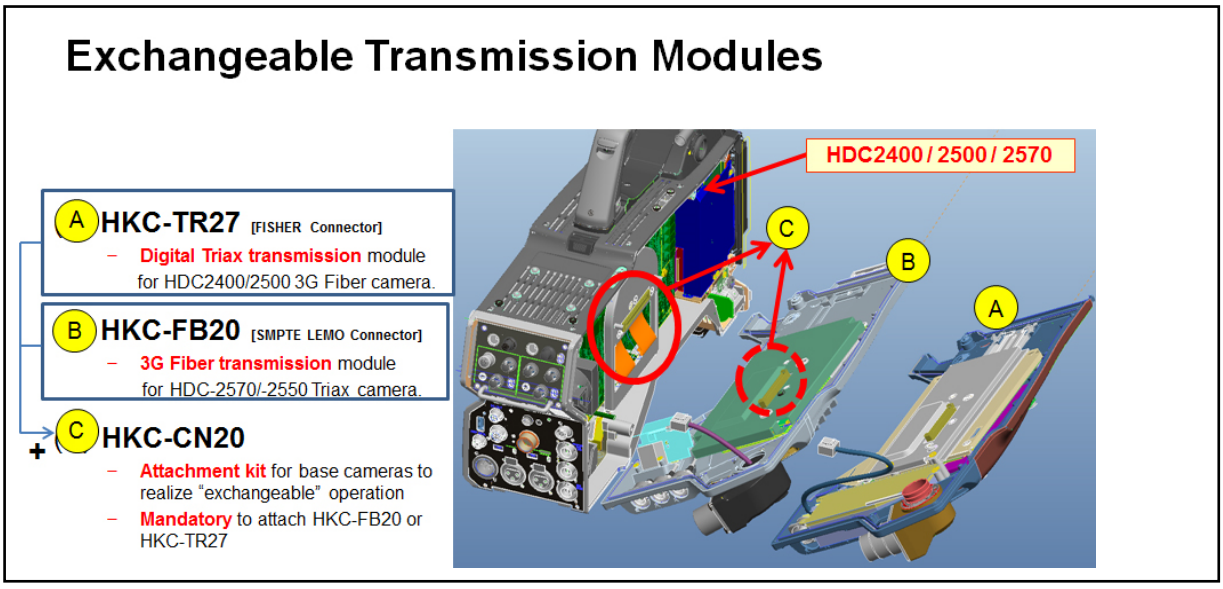
Picture 5 illustrates the compatible use of fibre and triax cables (HDC-range)

By using the digital triax technology, some limitations occur compared to the fibre transmission system. The following charts explains the major differences of both transmission technologies:

Camera Head	**HDC-2500 HDC-2400**	**HDC-1700**	**HDC-2570 HDTX-200/HDFX200**
Transmission Technology	**3G Fibre**	**3G Fibre**	**Digital Triax (3G)**
HD Prompter Channel	Yes	----	----
HD-Trunk Channel	Yes	----	----
Ethernet Trunk Channel	Yes	----	----
RS-422/RS-232 Trunk	1-CH: 150 kbps 2-CH: 75 kbps	1-CH: 150 kbps 2-CH: 75 kbps	1-CH: 38.4 kbps 2-CH: 19.2 kbps
VBS Prompter Channels	2	1	1
Utility Power Output	12V / 2.5A	----	12V / 2.5A

2.3.2.1. Fibre / Triax Transmission

The HDC-1500-series as well as the new HDC-2500-series and HDC-1700 are based on a ***single-piece design chassis***. That simply means that the transmission technology is integral part of the camera body and as such cannot be changed (compared to a dockable camera type with camera head and a separate camera adaptor).
Big advantage of the single-piece design is its high reliability and its compact and lightweight construction, attributes being very essential for todays` productions.
In order to flexibly react on the transmission requirements, only ***HDC-2500-series*** offers a unique and brand new feature: the right side cover of the camera can be changed to accommodate a wide variety of different transmission systems.
Currently, the standard 3G-fibre system can be exchanged to the new digital triax transmission side cover. In the same way, it is also be possible to accommodate wireless RF-technology for cable-free operation (refer to chapter 2.3.2.2.).



Picture 6 shows the principle of exchanging the side cover modules to change the transmission path from fibre to triax and vice versa

In order to exchange the side cover (HKC-TR27 or HKC-FB20), the internal connector panel is mandatory to be installed (Type: HKC-CN20).

Components	Description
HKC-TR20	Side cover with analogue triax transmission system *(discontinued)*
HKC-TR27	Side cover with digital triax transmission (3G bandwidth)
HKC-FB20	Side cover with 3G fibre transmission (digital)
HKC-CN20	Internal Connector Panel (mandatory to mount HKC-TR20/-TR27/ -FB20 or the wireless side panel)

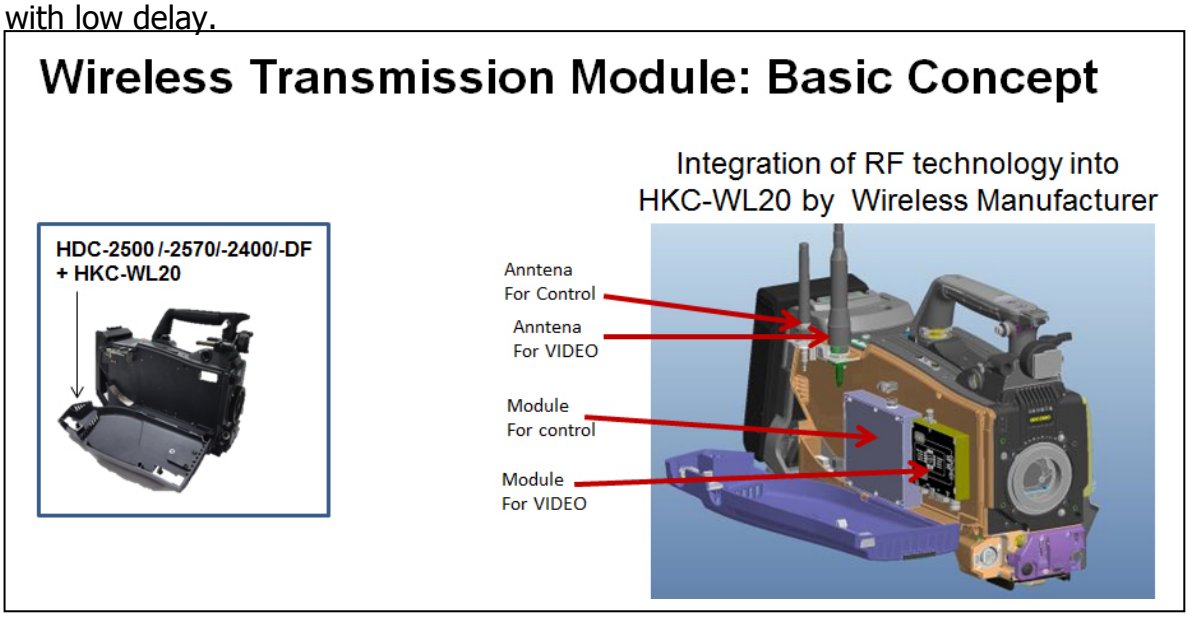
Please note: HDC-1700 does only support fibre transmission to the CCU. From SW version V2.0 onwards, 3G bandwidth is supported. The HDC-1700 is not equipped with the exchangeable side cover technology.
If HDC-1700 has to be employed in a triax environment, this is only possible by using the external convert (HDTX-200 for digital triax transmission).

⇨ refer to Picture 5

2.3.2.2. Wireless Transmission Technology

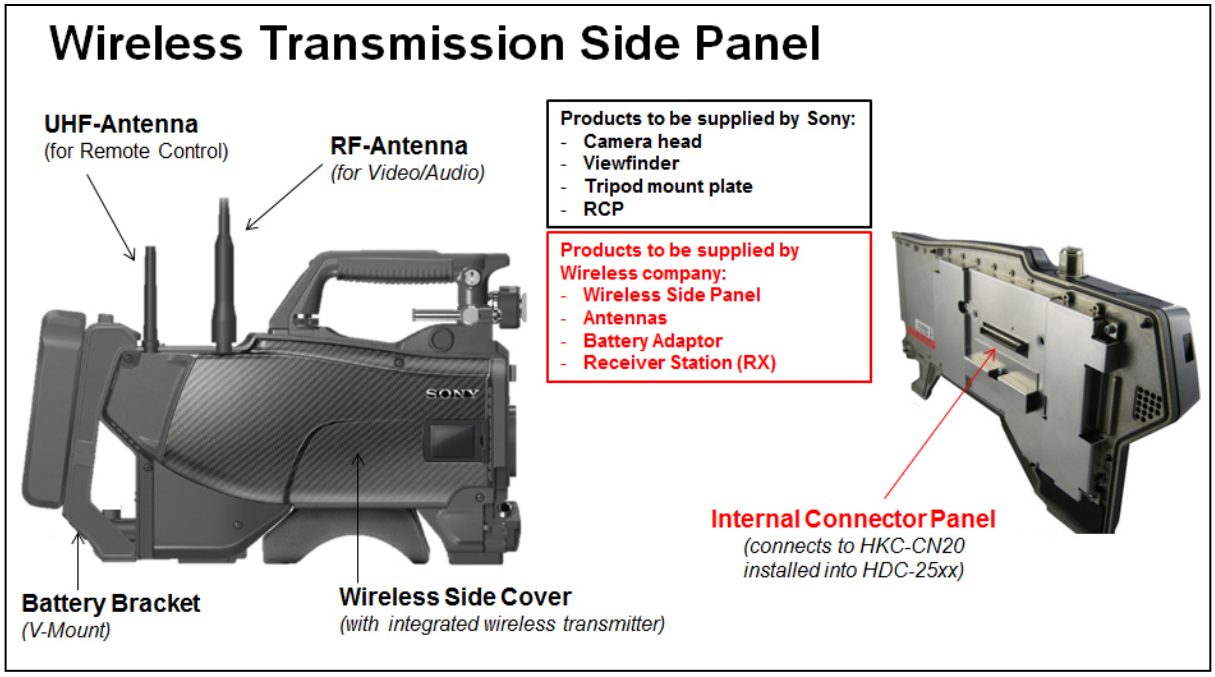
The exchangeable side cover technology of the HDC-2500-series allows to flexibly mount a triax transmission or a wireless module. The wireless module will not be supplied by Sony but by third party vendors being specialized on wireless transmission technology. Sony does only deliver the empty side panel (type: HKC-WL20) to the wireless company and in close cooperation with Sony they integrate their wireless modules into the HKC-WL20 side cover. The basic settings of the wireless modules are accessible via the camera menu. All remote control functions are also supported via the wireless system by using a standard Sony RCP (e.g. RCP-1500) to remote control the camera functions.

Finally, the entire wireless transmission module for the HDC-2500-series is only available by the wireless companies, not from Sony. In Europe, these are currently BMS (Broadcast Microwave systems, Germany) and VisLink (UK). Both companies utilize the latest wireless transmission technology thus ensuring highest performance with low delay.



Picture 7 shows the concept of the wireless transmission module

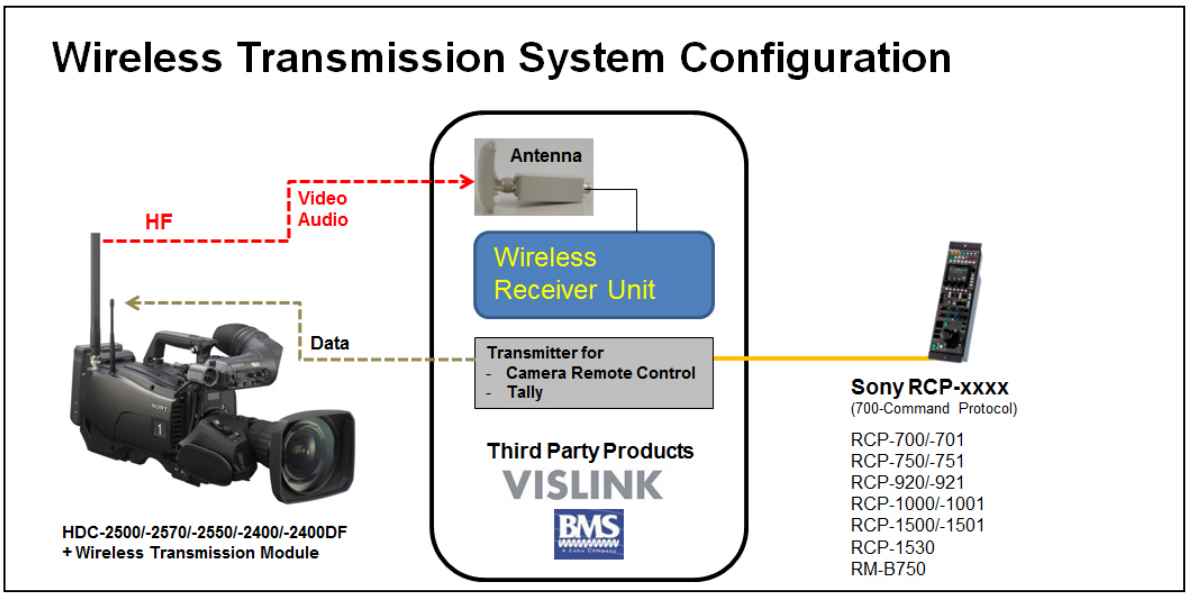
To mount the wireless transmission unit to the HDC-2500-series camera body, HKC-CN20 (internal connector panel) has to be installed.



Picture 8 schows the parts that come delivered with the wireless side panel from the wireless manufacturer (BMS or VisLink)

The battery bracket is a standard accessory of the wireless side panel and can easily be clicked on the rear side of the camera. It carries a V-mount shoe for a standard type of broadcast batteries. Only the DC-connector has to be connected to the DC-In port of the HDC-25xx camera.
The basic transmitter settings are accessible via the camera menu on a dedicated menu page. All connections for the audio-/video/remote-/tally-signals are provided by the internal connector of the wireless side panel which connects to the HKC-CN20 within the HDC-25xx camera.

Picture 9 illustrates a typical configuration of a wireless system for the HDC-25xx camera series.



Picture 9 shows the typical wireless system configuration

The entire wireless system (Wireless Side Panel, RX-Receiver unit, antenna systems and UHF-transmitter for the remote control signals) is exclusively offered by each wireless manufacturer. These items are not sold by Sony Europe Ltd.

Contact to the wireless manufacturers:

BMS Broadcast Microwave Services Europe GmbH	**VISLINK**
Alexander Normann (Sales) Schwalbacher Str. 12 D-65321 Heidenrod-Kemel Germany Phone: +49 6124 7239 06 Fax: +49 6124 7239 29 E-Mail: saleseurope@bms-inc.com Web: www.bms-inc.com	Robert King (Sales Manager) Vislink House 27, Maylands Avenue Hemel Hempstead Hertfordshire, HP2 7DE United Kingdom Phone: ++44-1442-431.300 Customer Support: ++44-1442-431.410

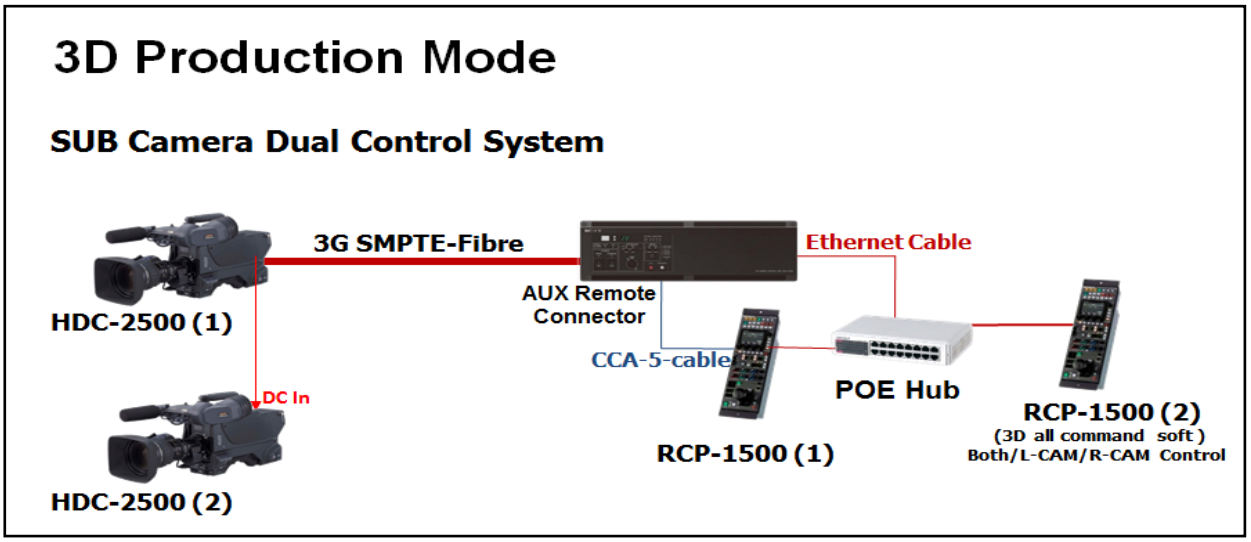
2.3.3. 3D Productions

3D HDTV was the buzz-word in 2011. On all major exhibitions, 3D equipment was displayed and due to the success in the digital cinema world, broadcasters expected 3D to become an issue for TV productions very soon.
However, the situation has changed since last year: 3D is still of a certain impact and keeps momentum in the market, but for the broadcasters it became clear that 3D will not become a major production standard soon. As long as auto stereoscopic displays will not be available for the consumer market, 3D will not become a major breakthrough in the home TV environment.

The HDC-2500 series has always been designed to take 3D production applications into consideration:

- ✓ With its 3G bandwidth on the fibre cable, it is possible to transmit standard HDTV camera signals of two cameras parallel via one single cable (e.g. 2x1080i or 2x720P).
- ✓ The HDC-2500-series is equipped with a 12V DC-output (10.5~17V) on the camera head (Anton Bauer 2-pin connector) to power a second camera mounted in a 3D rig (max. power out is 40W).
- ✓ The HDC-2500 comes equipped with a new feature set allowing 3D productions to be setup easily and quickly (e.g. OPAC-Function/ refer to chapter 2.5.1.).
- ✓ By using one single HDCU the signals of 2 cameras can be output and controlled via a single RCP-1500 (using HZC-3DRCP software).
- ✓ Transmission of LENS METADATA is assured

Picture 10 illustrates the 3D mode by using two HDC-2500 cameras via a single fibre cable.



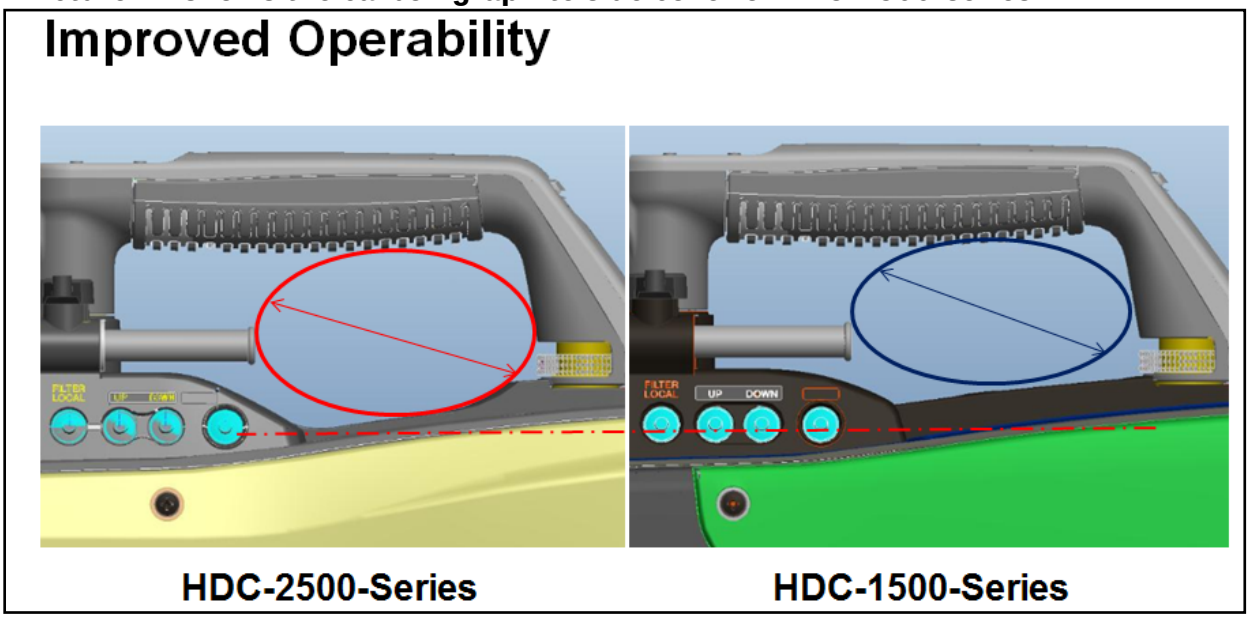
Picture 10: Example for the 3D production mode

2.4. Best Ergonomics

For a cameraman it is very important to carry a camera on his shoulder which is well-balanced, lightweight and shows the very best ergonomical features.
With the new HDC-2500-series, Sony has carefully listened to the needs of the cameramen and has improved the design of the portable camera accordingly:

- ✓ Thanks to the use of carbon graphite for the right side cover, the weight of the camera body is only 4.5 kg (refer to picture 11).
- ✓ The center of gravity is exactly on the shoulder thanks to the new location of the power supply unit and the arrangement of the boards.
- ✓ The camera handle and the shape of the camera body have been improved to allow a better sight through the handle (refer to picture 12).
- ✓ In order to improve the reliability esp. under outdoor conditions, Sony has improved the shielding of the parts by using silicon tubes and increasing the area for painting to protect the body against water immersion.

Picture 11 shows the carbon graphite side cover of HDC-2500-series



Picture 12: new HDC-2500 series new shape of camera design

2.5. Latest Feature Set

In order to meet the increasing demands of the operators for a high-end camera system, Sony included many new features into the HDC-2500-series which are introduced in this chapter:

2.5.1. OPAC Function

A newly developed **OPAC-function** (OPAC = **O**ptical **A**xis **C**ompensation) allows adjusting the optical axis of the lens electronically. Usually, each zoom lens shows a certain tolerance level in regard to its optical axis. When zooming in, it can happen that the center is moving out.
In a traditional 2D production, this is not a big issue, but in 3D mode, where the zoom lenses of both cameras have to be synchronized perfectly, a tolerance in the optical axis adjustment is critical and will create big problems. The HDC-2500-series comes equipped with the OPAC function allowing to control the optical axis and to correct it electronically (over H and V) without losing resolution.
The scanning area of the new CCD is slightly bigger than the conventional 1920x1080 HD pixel raster. As such, the 1920x1080 raster can be shifted (via menu) to perfectly center the optical axis of the lens.

2.5.2. ALAC-2 Function

ALAC (Auto Lens Aberration Control) was already introduced along with the HDC-1500R-series and the HSC-300/HXC-100 system cameras back in 2009.
ALAC-2 is the second generation of the ALAC function and allows aberration control in both directions (H and V). It is a fully automated function and available with all zoom lenses supporting the ALAC functionality (please contact the lens supplier for further details).
ALAC helps to improve the longitudinal chromatic aberrations of the lens.

⇨ Please refer to picture 39

2.5.3. Adaptive Matrix Function

Traditionally, Sony HDC-system cameras are equipped with a wide choice of matrix adjustment functions.

All HDC-system cameras feature:

(A) USER MATRIX
Conventional adjustment of the matrix

(B) MULTI MATRIX
Integrated 16x vector color corrector to individually adjust a selected color (hue and saturation control)

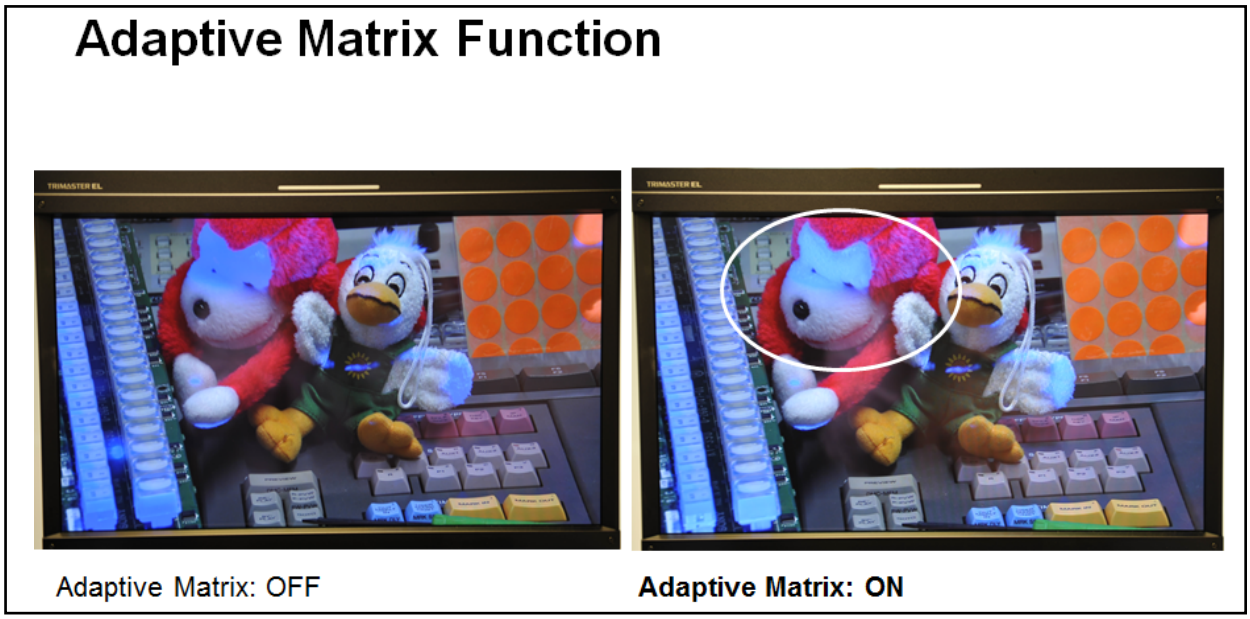
(C) PRESET MATRIX
Factory preset matrix adjustments can be recalled via menu

In addition to these common matrix features, the new HDC-2500-series features the new Adaptive Matrix function.

The chart on the next page shows the individual adjustment items for the matrix functions of HDC-cameras.

	USER MATRIX		**ON / OFF**
		R-G	-99 … +99
		R-B	-99 … +99
		G-R	-99 … +99
		G-B	-99 … +99
		B-R	-99 … +99
		B-G	-99 … +99
	PRESET MATRIX		**ON / OFF**
		SMPTE-240M ITU-709 SMPTE-Wide NTSC EBU ITU-601	
	MULTI MATRIX		**ON / OFF**
		PHASE	**0**, 23, 45, 68, **90**, 113, 135, 158, **180**, 203, 225, 248, **270**, 293, 315, 338
		HUE	-99 … +99
		SAT	-99 … +99
		GATE	ON / OFF
HDC-2500-Series only	**ADAPTIVE MATRIX**		**ON / OFF**

The adaptive matrix function controls the color reproduction in the blue areas of the picture often being reproduced in over-saturated way, especially under LED-lighting conditions. With new SW-version V2.0 or higher, this function can individually be adjusted from RCP/MSU.



Picture 13 shows the impact of the adaptive matrix function

2.5.4. Natural Skin DTL Function

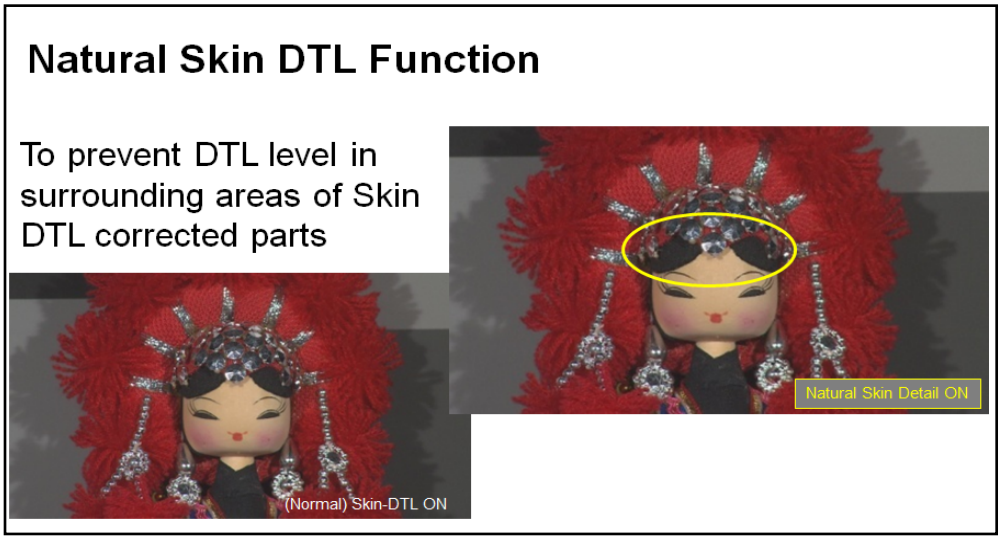
Like its predecessor, the HDC-1500-series, the new HDC-2500-series comes equipped with a wide choice of Detail adjustment features:

DETAIL 1		**ON / OFF**
	LEVEL	-99 … +99
	LIMITER M	-99 … +99
	LIMITER WHT	-99 … +99
	LIMITER BLK	-99 … +99
	LIMITER V-BLK	-99 … +99
	CRISP	-99 … +99
	LEVEL DEPEND	**On / Off**
		-99 … +99
DETAIL 2	H/V RATIO	-99 … +99
	FREQ	-99 … +99
	MIX RATIO	-99 … +99
	KNEE APT	-99 … +99
	DTL H/V MODE	H/V, V only
SKIN DETAIL		**ON / OFF**
	SKIN GATE	Off, 1, 2 , 3
	NATURAL SKIN DTL	On / Off
	ZOOM LINK	On / Off
	TELE	0 … 99
	WIDE	0 … 99
	CH SW	1: On, 2/3: Off
	HUE	1 / 2 / 3
	PHASE	1 / 2 / 3: 0 … 359
	WIDTH	1 / 2 / 3: 0 …99
	SAT	1 / 2 / 3: -99 … +99
	LEVEL	1 / 2 / 3: -99 … +99

HDC-2500-Series only

The new Natural Skin DTL function helps to maximize the Skin DTL reproduction: usually, when SKIN DTL is selected, not only the skin tone area is reproduced smoothly, but also the areas around resulting in a reduction of detail in eyebrows or hairs surrounding the skin tone area.

With the Natural Skin DTL function, this impact is eliminated so that hairs or fine structures are reproduced with high accuracy.



Picture 14: Impact of the Natural Skin DTL Function

2.5.5. Ethernet Trunk Channel

The HDC-2500-series is the first system camera featuring an Ethernet Trunk Channel function. The HDCU-2000/-2500 features an RJ-45 connector allowing to send an IP-signal from the CCU to the camera head. There is another RJ-45 connector on the right side of the camera head to output the IP-signal.
This function allows sending protocols via fibre cable to control third party equipment (such as 3D rigs etc…).
Another interesting application works in combination with the new NXL-IP55 system. By using these converter boxes, it is possible to send up to four HD-SDI signals via the Ethernet trunk channel embedded in the fibre transmission system. Hence, up to 3 cameras can be connected to the NXL-IP55 and their HD-SDI signal is then transmitted via IP protocol to the output of the HDCU-2000/-2500.

2.5.6. Teleprompter Channels

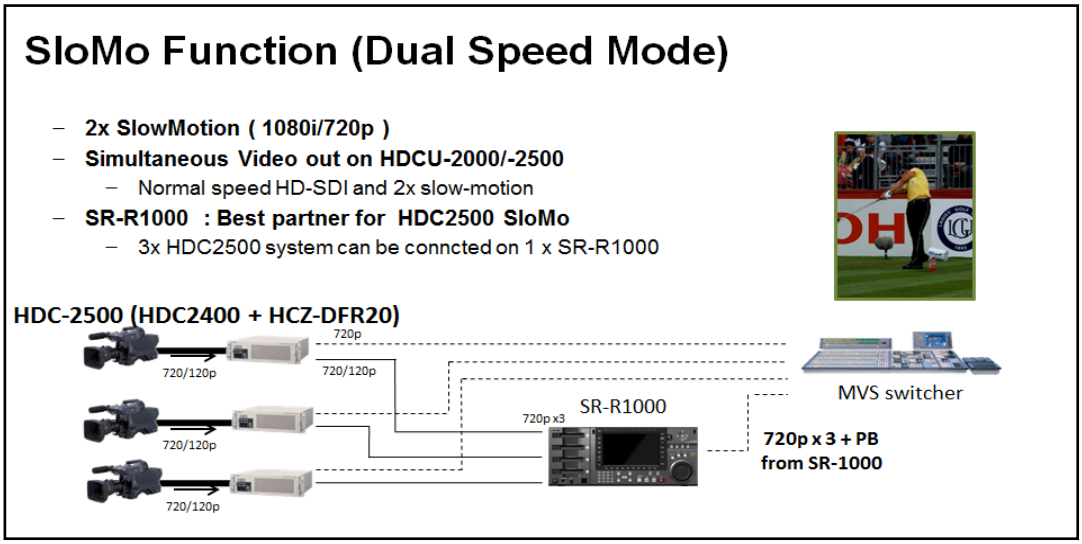
The new HDC-2500-series features a variety of Teleprompter channels depending on the HCU-type used:

CCU-Type	Teleprompter Channels
HDCU-2000	2x CVBS 1x HD Trunk*
HDCU-2500	1x CVBS 1x HD Trunk*
HDCU-1700	1x CVBS

*) The HD Trunk line is a freely assignable HD-SDI way, either from camera head to CCU or from CCU to camera head.

2.5.7. SloMo Function (Dual Speed)

The HDC-2000/-2500 cameras come equipped with a 2xSloMo function (standard feature). For HDC-2570/-2400/-2400DF types, the SloMo frame rates (1080/100i; 119.88i and 720/100P; 119.88P) are a software option (HCZ-DFR20).
The HDCU-2000/-2500 can output a SloMo signal (2x) and a normal speed signal simultaneously, thus eliminating the needs of purchasing dedicated SloMo cameras.

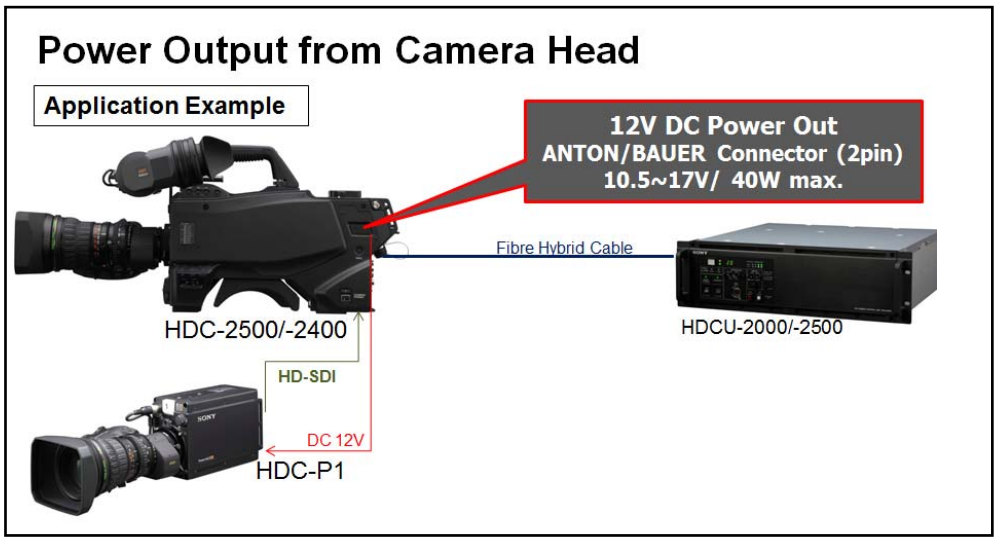


Picture 15: SlowMotion Mode with HDC-2500-series and SR-R1000 as a server

As a server to record/playback the SloMo signals, Sony recommends to utilize the SR-R1000 deck which can record up to 3 SloMo signals parallel onto SR-MEMORY cards. EVS server or BLT-server systems can also be used.

2.5.8. DC-Power Out from Camera Head

In addition to the traditional 12V DC power output for a script light (12V/0.5A) the new HDC-2500-series features a separate DC power output (Anton-Bauer 2-pin connector) to power a second camera, a headlight or an LCD-Tele Prompter.
This additional power output delivers up to 40W power.
Please note: HDC-1700 does not feature 12V-DC power out from the camera head.



Picture 16: Power supply to a second camera in a sub camera system

2.5.9. New Software Features (V2.0 and higher)

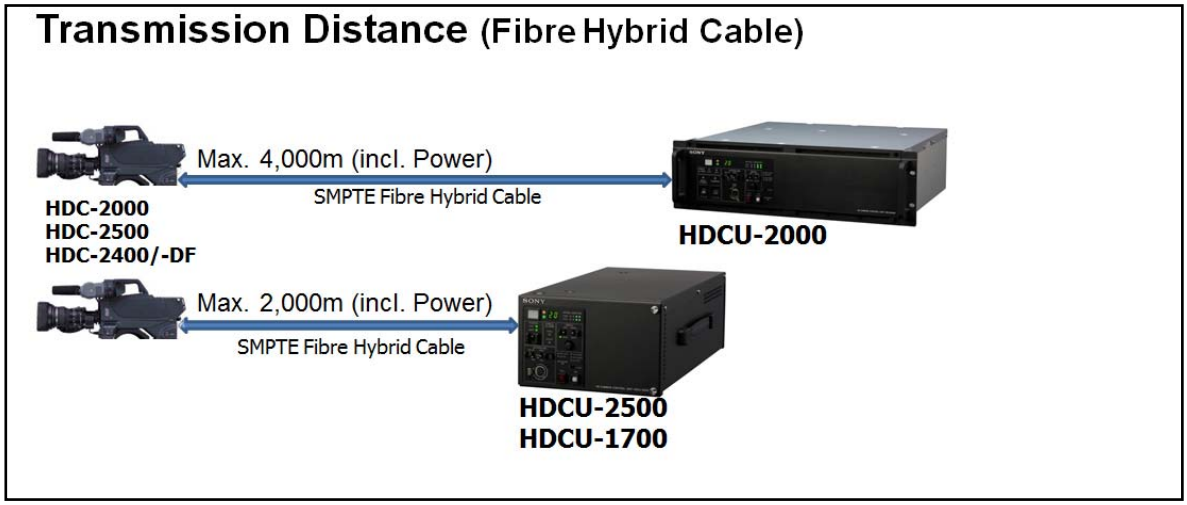
In March 2014, new features were added to the HDC-series by software upgrade. The below matrix shows the major improvements coming delivered with the new software for camera heads, CCUs and peripheral equipment:

Model	SW-Version	New Features
HDC-2000/-2500 **HDC-2550/-2570** **HDC-2400/-2400DF** **HDC-1700**	V2.03	• Support of Pay per Use Licenses • Upgrade HDC-1700 for 3G Fiber Transmission • Scene File Dissolve Function • Adaptive Matrix Level Adjustment • 3-Second Display Function • Intercom ½ Mix Function • Tally Guard Function • Interlocking of Camera Head & CCU Number • HDTX-200 connectivity
HDCU-2000 **HDCU-2500** **HDCU-1700**	V2.00	• Support of 3G-Level A • Support of Pay per Use Licenses • Upgrade HDCU-1700 (3G Fiber Transmission) • Format Warning function • Menu Improvements • Improvement of Network Trunk (HDCU-2000 & HDCU-2500)

MSU-1000 **MSU-1500** **RCP-1500/-1501** **RCP-1530**	V2.30	• Spare LED setting (OFF/F DROP/X0.8) • Scene File Dissolve function (gradual change) • Adaptive Matrix Level adjustment • Skin Detail Zoom Link • Zoom & Focus Control • DIAGNOSIS message is added

2.5.10. Transmission Distance & Connector Types

Compared to HDC-1500-series, the new HDC-2500-series features are drastically improved maximum cable extension. Using an SMPTE Hybrid-Fibre Cable, it is now possible to cover a distance of up to 4000m (HDCU-2000).



Picture 17 illustrates the maximum SMPTE Fibre Hybrid cable extensions

The max. cable extension varies with the camera configuration and the cable condition:

- ☞ The above given values are valid for the camera in shoulder configuration (camera head + ENG-lens plus monocular viewfinder)

In case triax transmission is used (HDC-2570 or HDC-2500/-2400 with HKC-TR27), the maximum triax cable distance is 1400m (with 14.5mm Fujikura Cable).
For fibre operations, camera head and HDCUs are equipped with SMPTE LEMO connectors. For triax operations, FISHER connectors are installed on camera head (HDC-1450/-1550/-2550/-2570) and HDTX-200 and HDFX-200:

Type		**Type of LEMO Connector** (Cable Side)
HDC-2000 HDC-2500 HDC-2400/-2400DF HDC-1700	Camera Head Units	PUW.3K.93C.TLCC96
HDC-2570 + HKC-FB20		
HDC-1500/-1400		
HDTX-200	Fibre-to-Triax Converter	FUW.3K.93C.TLMC96
HDFX-200	Triax-to-Fiber Converter	PUW.3K.93C.TLCC96
HDCU-2000/-2500 HDCU-1700 HDCU-1000/-1500	HD-CCUs	FUW.3K.93C.TLMC96

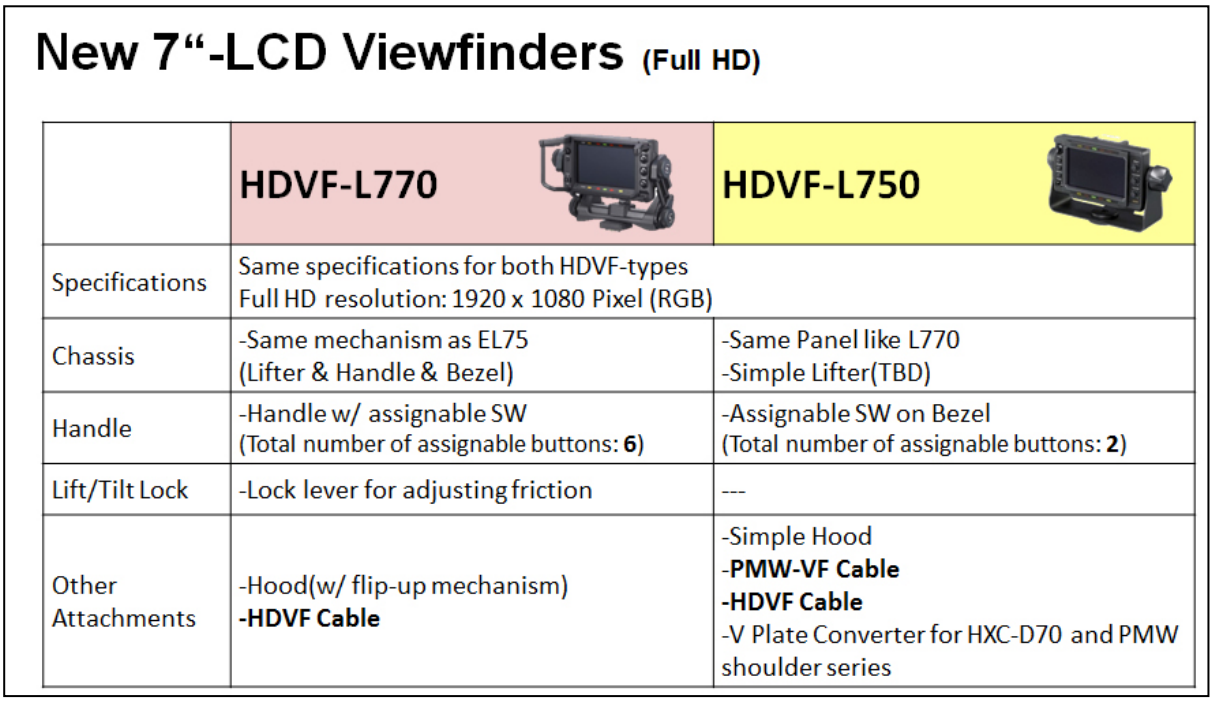
2.6. Wide Variety of Accessories for all Production Applications

2.6.1. HD Viewfinder Systems (HDVF)

All HDVF-viewfinders available for the HDC-/HSC-300R/-100R series can compatibly be used:

Application	Type	Description	Remarks
Monocular Viewfinder	**HDVF-200**	2″-Monochrome Viewfinder (CRT)	Entry level model
	HDVF-20A	2″-Monochrome Viewfinder (CRT)	Professional model
	HDVF-C30WR	2.7″-LCD Color Viewfinder	High resolution
	HDVF-C35W *	3.5″-LCD Color Viewfinder	Larger screen size
Studio Type	**HDVF-550**	5″-Monochrome Viewfinder (CRT)	Direct Mount to camera head (via V-Mount)
	HDVF-C550W	5.5″-LCD Color Viewfinder	
	HDVF-C730W	6.7″-LCD Color Viewfinder	
	HDVF-EL75	7.4″-OLED Viewfinder	
New	**HDVF-L740**	7″-LCD Color Viewfinder	
New	**HDVF-L770**	7″-LCD Color Viewfinder	
	HDVF-C950W*	9.5″-LCD Color Viewfinder	
	HDVF-EL70	7.4″-OLED Viewfinder	Only in combination with HDLA-1500 or HDLA-1507
	HDVF-700A/B	7″-Monochrome Viewfinder (CRT)	
	HDVF-9900*	9″-Color Viewfinder (CRT)	

) Models are already discontinued



Picture 18 shows the 2 new Viewfinder types with full HD resolution

Both new models will be shipped from September 2014 and will replace HDVF-C730W and HDVF-C550W.

The new HDVF-L750 viewfinder features the standard HDVF-connector to be compatible to the HDC-/HSC-Series as well as the PMW-VF connector to fit to the HXC-D70 as well as PMW-F5/-F55 and PMW-Camcorder series.

Comparing the color viewfinder specifications:

⇨ Monocular Color Viewfinders

Product Name	HDVF-C35W *	HDVF-C30WR
Type	**Monocular VF**	**Monocular VF**
Panel	**LCD**	**LCD**
Picture Diagonal	3.5"	2.7"
Image Size [mm]	76.8 x 43.2	59.04 x 33.21
Pixel Resolution (RGB)	640 x 480	960 x 540
Luminance	250 cd/m^2	280 cd/m^2
H-Resolution	500 TV-L	500 TV-L
Colour Temperature	6500 K	6500 K
Mounting	Camera direct	Camera direct
Power Consumption	6.3 W	5.2 W
Power Supply	AC / 10.5 ~ 17.0 V	AC / 10.5 ~ 17.0 V
Weight	850 g	840 g

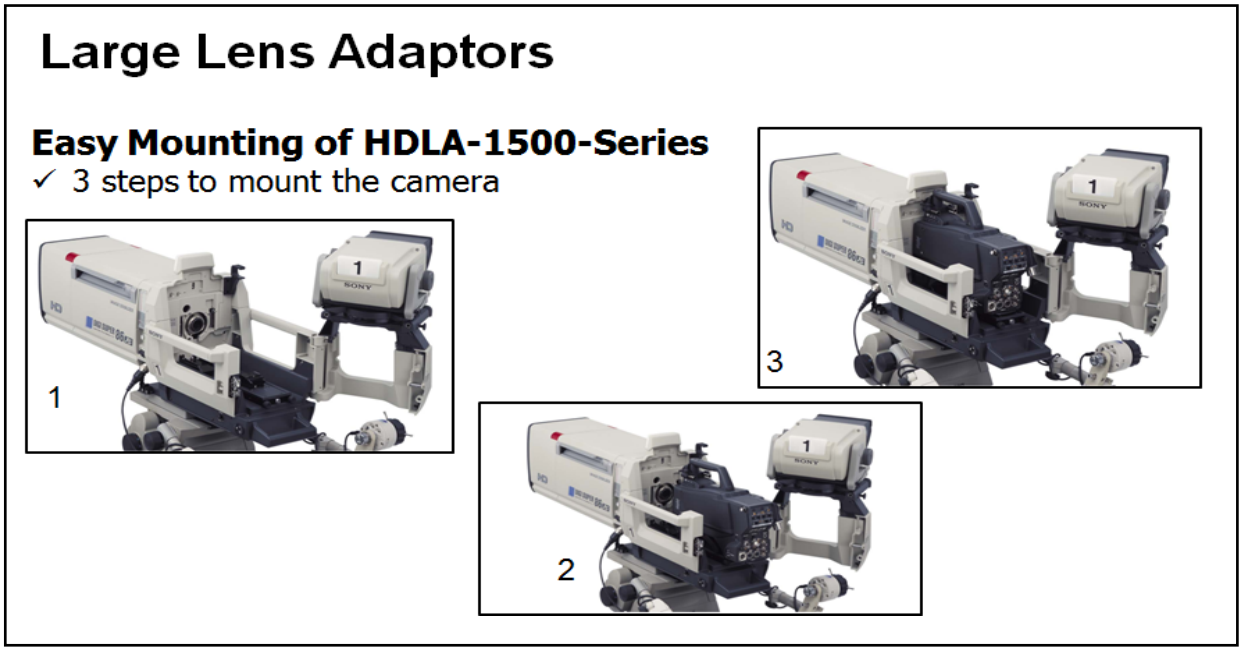
⇨ Studio Color Viewfinders

New

Product Name	HDVF-C550W	HDVF-C730W	HDVF-EL75 HDVF-EL70	HDVF-L770 HDVF-L750
Type	**Studio VF**	**Studio VF**	**Studio VF**	**Studio VF**
Panel	**LCD**	**TFT**	**OLED**	**LCD**
Picture Diagonal	5.0"	6.3"	7.4"	7.0"
Image Size [mm]	108.0 x 60.8	129.0 x 73.0	164.0 x 92.0	164.0 x 92.0
Pixel Resolution (RGB)	800 x 450	1024 x 576	960 x 540	1920 x 1080
Luminance	300 cd/m^2	230 cd/m^2	350 cd/m^2	300 cd/m^2
H-Resolution	400 TV-L	500 TV-L	500 TV-L	500 TV-L
Colour Temperature	6500 K	6500 K	6500 K	6500 K
Mounting	Camera direct (V-Mount)	Camera direct (V-Mount)	EL75: Camera direct (V-Mount) EL70: HDLA-15xx	Camera direct (V-Mount)
Power Consumption	8.2 W	14 W	19.5 W	14 W
Power Supply	AC / 10.5 ~ 17.0 V	AC / 10.5 ~ 17.0 V	AC / 10.5 ~ 17.0 V	AC / 10.5 ~ 17.0 V
Weight	1.2 kg	2.2 kg	EL75: 3.5 kg EL70: 3.8 kg	tba
Studio Hood	supplied	supplied	supplied	supplied
Sport Hood (long)	VFH-570	VFH-770	VFH-790	tba

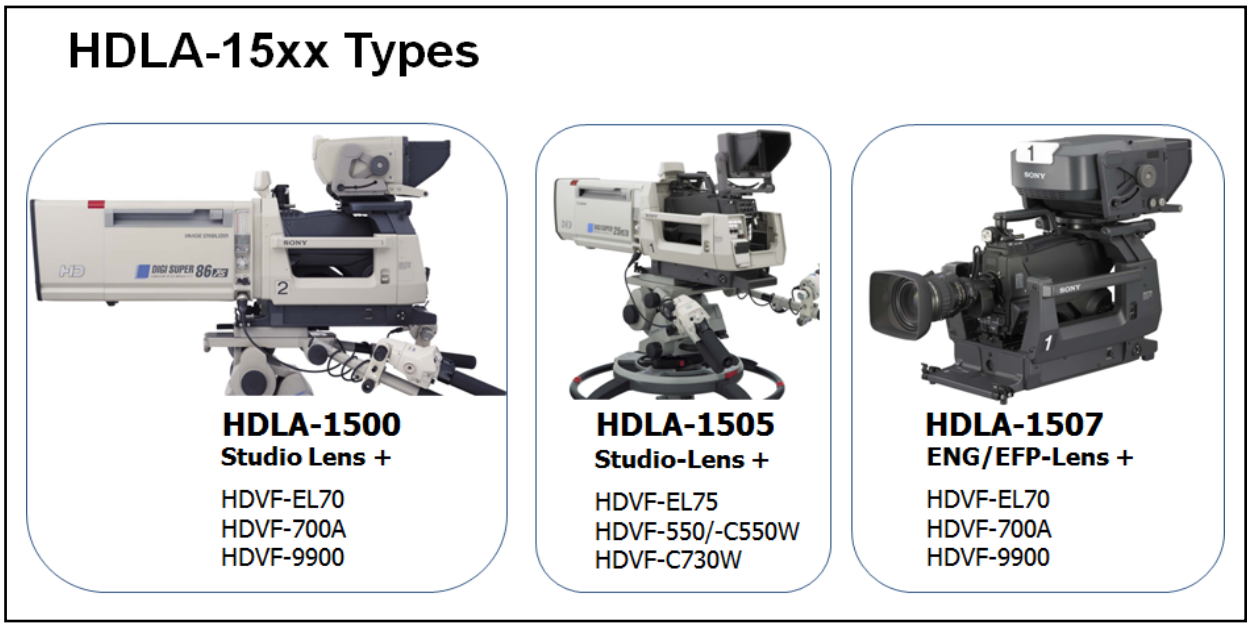
2.6.2. Large Lens Adaptors (HDLA-1500-series)

The famous HDLA-types can compatibly been used for the new HDC-2500/-1700 and HSC-300R/-100R-series.
Currently, Sony offers three different types of HDLA-15xx (HDLA-1500/-1505 and -1507). The HDLA-1500 and HDLA-1505 types are available in black and beige color.
The HDLA-15xx docks directly to the camera by using an internal connector at the bottom of camera head. Thus, no cables need to be connected and the camera can be mounted within a very short time (about 20 sec.).



Picture 19 shows how easy to mount the camera into the HDLA-1500 (Sony Large Lens Adaptor).

Another advantage: for transportation, the camera can rest inside the HDLA-15xx and the lens can be disconnected and stored away separately.



Picture 20 shows the configuration with the 3 different types of HDLA-15xx

The HDLA-1507 is a specific type of HDLA-adaptor designed to accommodate the portable camera head with ENG/EFP lens plus a big CRT studio viewfinder (e.g.HDVF-700).

All HDLA-adaptors are equipped with a separate DC-Power Out connector.
In case of using the HDLA-15xx in combination with the full-size ***HDCU-2000/-1000***, AC-power output is available as well (240V/ max. 1A).

Configuration Chart: HDLA-15xx Lens Adapter

Camera Type	Lens Type	HDLA-Type	Viewfinder Type
HDC-2500 HDC-2400/-DF HDC-2570 HDC-1700 HDC-3300/-R HSC-300R HDC-2550 * HDC-1500/-R * HDC-1550/-R * HDC-1400/-R * HDC-1450/-R * HSC-300 *	Studio/Box Lens	**HDLA-1500**	HDVF-700A/-B HDVF-9900 * HDVF-EL70 HDVF-EL100 *
		HDLA-1505	HDVF-550 HDVF-C550W HDVF-C730W HDVF-C950W HDVF-EL75 HDVF-L770 HDVF-L750
	ENG/EFP Lens	**HDLA-1507**	HDVF-700A/-B HDVF-9900 * HDVF-EL70 HDVF-EL100 *

** models already discontinued*

2.6.3. T-Adaptor (HKC-T1500)

The HKC-T1500 Adaptor kit consists out of 3 parts: the Interface box to fit into the HDC-2500/-1700-series camera body, the HKC-T1500 adaptor itself and a 12.5m multicore cable (standard accessory to HKC-T1500). The max. cable extension between HDC-2500-series camera head and HKC-T1500 adaptor is 50m (option).

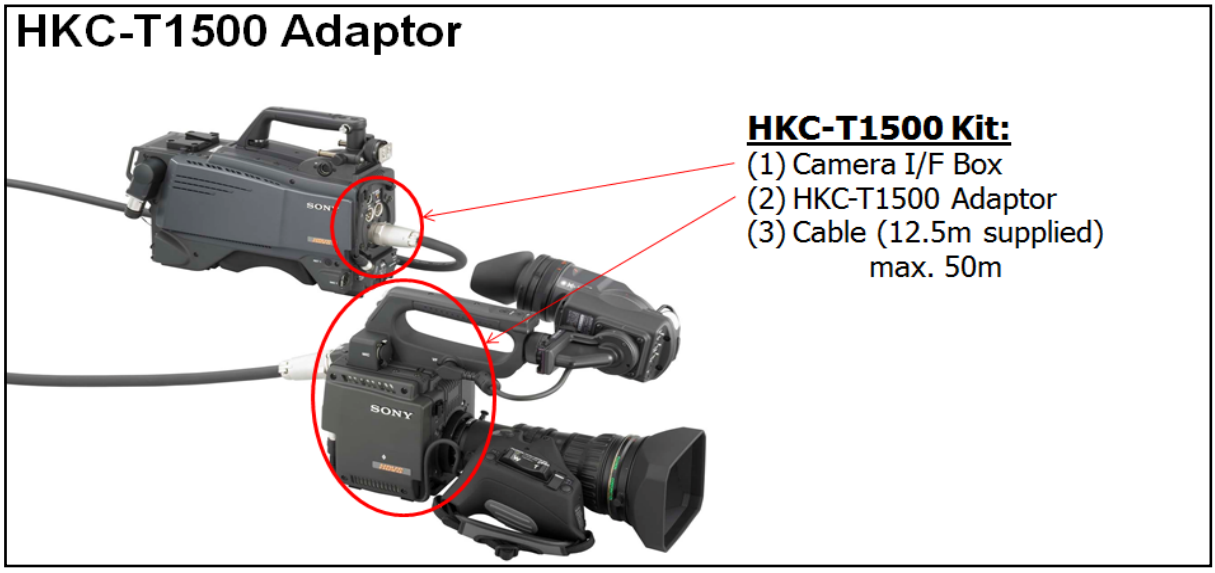
Cables between HKC-T1500 and Camera Head Block Adaptor:

Type *	Lengths	Part-No.	Remarks
HDCM-12	12.5 m	1-820-809-11	supplied with HKC-T1500
HDCM-25	25 m	1-820-810-11	optional available
HDCM-50	50 m	1-820-811-11	optional available

(*) this cable type is equipped with a 55-pin connector, not compatible to HDCZ-cable types.

To use the HKC-T1500 adaptor, a special software has to be installed into the HDC-2500-series camera head and the CCD-block has to be removed from the head and fit into the HKC-T1500 adaptor. The CCD-block can easily be removed by losing four screws. Instead of the CCD-block, the Interface Box has to be mounted into the camera head.

Intercom and Tally do work from the HKC-T1500 adaptor so that a small and lightweight camera head is obtained to suit various production applications (e.g. 3D shooting, Stage or Crane camera etc…).



Picture 21 shows the HKC-T1500 adaptor in use

Compatibility of HKC-T1500	
HKC-T1500	**HDC-2500-series** HDC-2500/-2400/-2400DF HDC-2570/-2550
	HDC-1700-series HDC-1700
	HDC-1500-series HDC-1500R/-1550R/-1400R/-1450R HDC-1500/-1550/-1400/-1450

2.6.4. Remote Control Panels (RCP) and Master Setup Panels (MSU)

The new HDC-2500-series employs the same 700-Remote-Protocol as its predecessors (HDC-1500-series) and as such, the identical panels can be used for remote control:

Application	Type	Remarks
Master Setup Unit	MSU-1000	Large Size
	MSU-1500	Compact Size
	MSU-900*	Large Size
	MSU-950*	Compact Size
Remote Control Panel	RCP-1500	Joystick
	RCP-1501	Poti
	RCP-1530	Joystick / slim size
	RCP-1000	Joystick / Basic Functions
	RCP-1001	Poti / Basic Functions
	RCP-920*	Joystick
	RCP-921*	Poti
	RCP-750*	Joystick
	RCP-751*	Poti
	RCP-700*	Joystick / Basic Functions
	RCP-701*	Poti / Basic Functions

(*) Panels already discontinued

MSU-1000/-1500

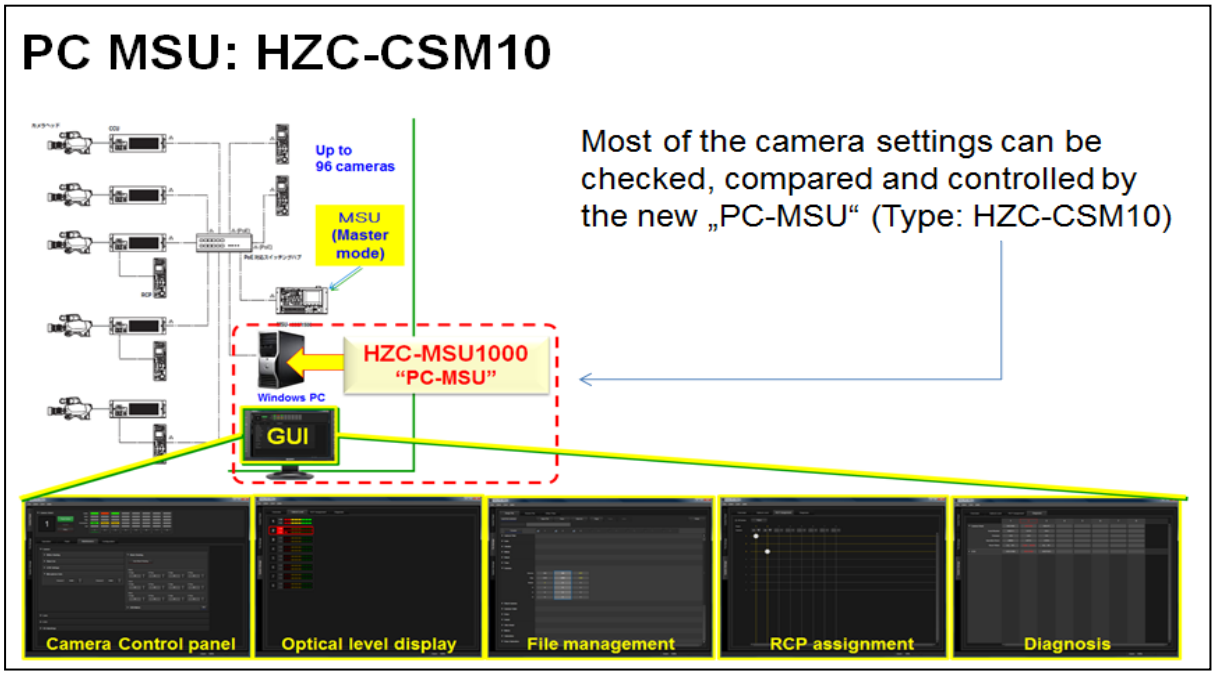
- High-Speed Master Setup Unit to control up to 96 cameras from one single MSU (24 cameras in direct access).
- Network control via Ethernet hub
- AC-/DC power supply possible
- Customized functions
- Zoom & Focus Control

Picture 22 shows the dimensions and outline of the new MSU versions

PC-MSU: HZC-CSM10

The optional software HZC-CSM10 allows emulating an MSU on the PC using a very special GUI. Thus, the vision engineer can easily control the setup of the entire system, can transfer files and store settings.

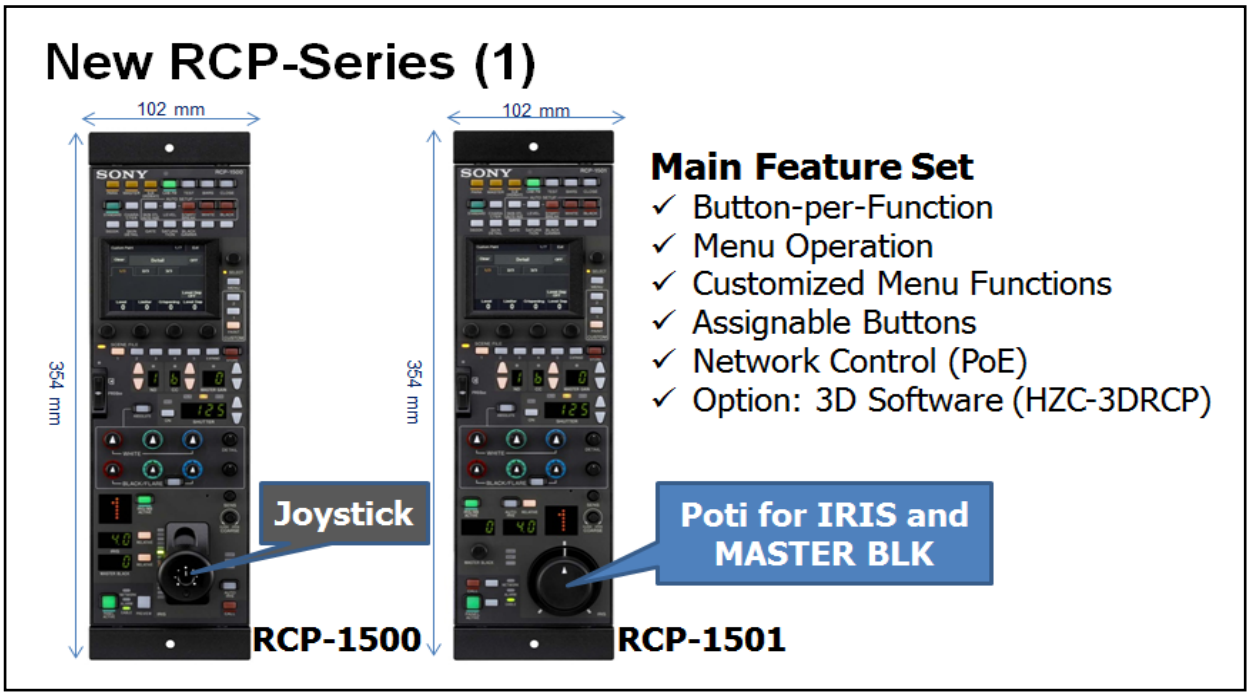
The HZC-CSM10 software is available for WINDOWS 7 OS and can only be used in combination with a hardware MSU. In this case, the hardware MSU takes the Master-function.
Instead of a hardware MSU, CAN-1 can be used in the network environment to take over the Master function.



Picture 23 illustrates the functionality of the PC-MSU software HZC-CSM10

RCP-1500/-1501/-1530

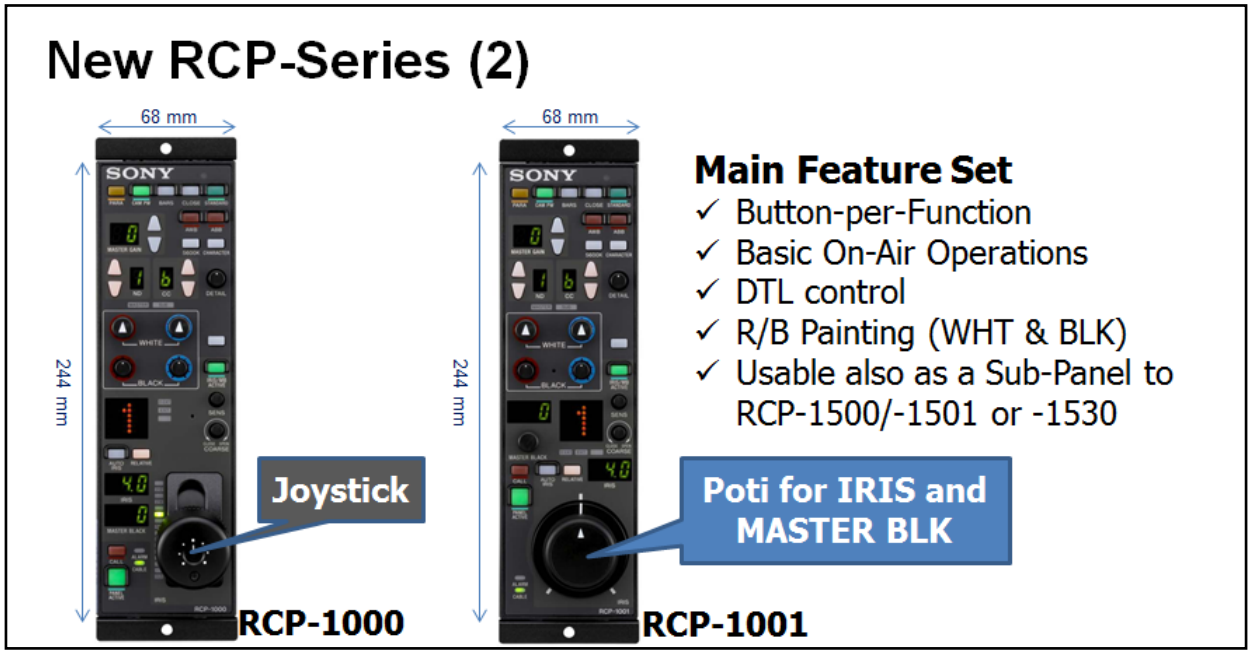
- Highly sophisticating remote control panels with access to almost all camera functions
- Button-per-Function for the important ON-AIR items
- Menu control via touch-screen
- Customized function for menu control
- Assignable buttons
- Zoom & Focus Control
- Network control with Power-over-Ethernet (PoE)
- RCP-1500: Joystick
- RCP-1501: Poti Version
- RCP-1530: Joystick / slim-line design (width = 80mm /same functions like RCP-1500)



Picture 24 shows the size and outline of RCP-1500/-1501

RCP-1000/-1001

- Basic Remote Control Panels for ON-AIR operations
- Button-per-Function Layout
- R/B Painting function
- Connection to HDCU via dedicated CCA-5-xx cable (available in 3m, 10m and 30m)
- Panel can also be used as a sub-panel within a greater operational system
- RCP-1000: Joystick
- RCP-1001: Poti Version
- No network connectivity / connection to CCU by CCA-5-xx cable only

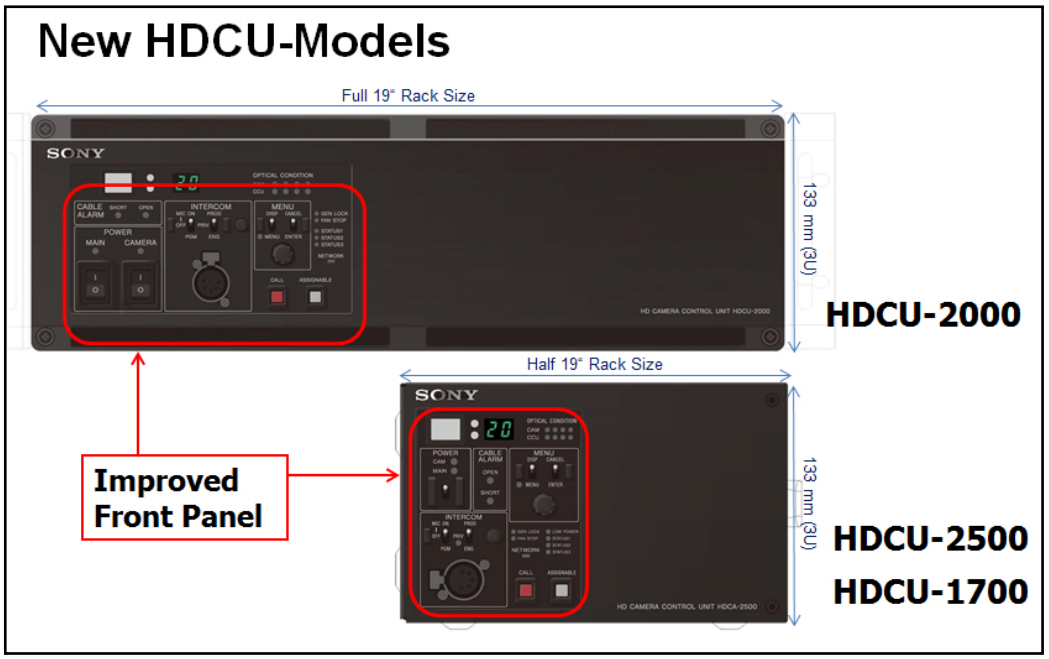


Picture 25 shows size and outline of the compact RCP-1000/-1001 panel

2.7. New HDCU-Models (HDCU-2000/-2500)

For the new HDC-2500-series, new HDCU-models were designed in order to meet the demands of the customers specifically for 3D productions and new feature sets.
The HDCU-2000 is the full 19”-rack-size CCU whereas the HDCU-2500 and HDCU-1700 are the half 19”-rack-size models.
All three HDCUs support 3G fibre transmission (HDCU-1700 from SW-Version V2.0 and higher) as a standard feature (SMPTE LEMO connector) and can detect 1.5G signals automatically coming from the previous HDC-1500-series.

The HDCU-1700 is an entry-level model and was introduced along with the HDC-1700 camera head. Earlier versions only feature 1.5G bandwidth on the fiber cable and were completely incompatible to the HDC-2xxx series. Starting from SW-version V1.45, full compatibility to the HDC-2xxx series was assured (1.5G bandwidth) and starting from SW-version V2.0, HDCU-1700 employs 3G bandwidth on the fibre cable.



Picture 26 shows the new HDCU-2000 and HDCU-2500/-1700 models with the improved front panel operation

Compared to the previous HDCU-models (HDCU-1000/-1500), the new types are equipped with a number of new features:

- ✓ CCU number display on front side of CCU
- ✓ Cable Condition Display for fibre connection
- ✓ Assignable Button
- ✓ Third Tally Light (Red / Yellow / Green)

The chart on the following page compares the new HDCU models and show their main characteristics and features.

2.7.1. Specifications & Signal Interfaces

	HDCU-2000	HDCU-2500	HDCU-1700
Size	19"-Rack Size 3 Units high	Half 19"-Rack Size 3 Units high	Half 19"-Rack Size 3 Units high
Weight	17.5 kg	6.7 kg	6.7 kg
Power Consumption	5.4 A (max)	4.1 A	4.1A
CAMERA connector	SMPTE LEMO		
Transmission System	3G over Fibre		3G over Fibre [2]
Max. Transmission Distance	4000m	2000m	
DC Power Out (HDC-2500-series only)	Yes		
AC Power Out (HDLA-15xx)	Yes	No	
Intercom/Tally/PGM	D-sub 25-pin (1x)		
RCP/CNU	8-pin (1x)		
Data Trunk (A)	12-pin (1x) RS-232C / 422x 2CH		
Data Trunk (B)	D-sub 9-pin (1x) RS-232C/422	-----	
LAN (Network trunk)	RJ-45 (1x)		---
LAN (RCP/MSU)	RJ-45 (1x)		
I/O port	D-sub 15-pin (1x)	-----	---
3G/HD/SD-SDI RET Input [SMPTE-425M Level A/B switch.][1]	BNC (4x) VBS return in: BNC (4x)	BNC (3x)	BNC (3x) HD-SDI/SD-SDI/VBS
Prompter VBS Input	BNC (2x) with loop thru	BNC (2x) with loop thru	
REF input	BNC (1x) with loop thru		
Audio Output	XLR 3-pin (2x) MIC Remote: D-sup 15-pin (1x)		
AES EBU Output	BNC (1x)	-----	-----
SYNC output	BNC (1x)		
CHARACTER Out	BNC (1x)		
3G/ Dual Link / HD-SDI Outputs	BNC (4x)	BNC (3x)	----- Option: HKCU-2007
HD/SD SDI Output	BNC (4x)		BNC (4x)
HD Trunk Output	BNC (1x)		-----
HD Prompter Input	BNC (1x)		-----
Option Slots	4 free slots	1 free slot	1 free slot

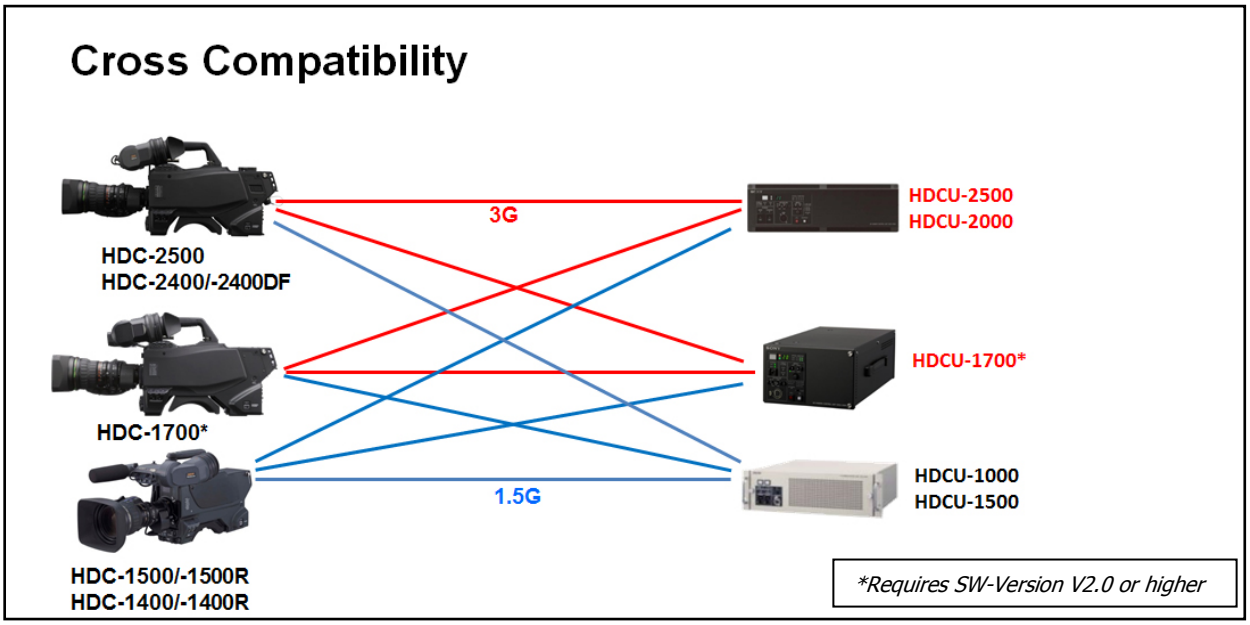
(1) *Level A/B switchable from SW-version V2.00 or higher*
(2) *Requires SW-version V2.0 or higher*

2.7.2. Optional Boards

Type	Provided Outputs
HKCU-1001 (*)	**SD Encoder Unit** • VBS Output (2x BNC) • PIX Output (1x BNC) • WF Output (1x BNC)
HKCU-1003 (*)	**Multi Interface Unit** **(1) VDA-A Board** VBS Output (2x BNC) PIX Output (1x BNC) WF Output (1x BNC) **(2) VDA-B Board** Frame REF Input (1x BNC) Frame REF Output (1x BNC) Pix Output (1x BNC) **(3) VDA-C Board** VBS Output (1x BNC) R/R-Y, G/Y, B/B-Y (3x BNC)
HKCU-2007	**3G HD SDI Output Expansion Board** (SMPTE-425M Level A/B) • 4x BNC • Selectable: 3G-SDI (2.967 Gbps) / HD-SDI (1.4835 Gbps)

(*) compatible board to HDCU-1000/-1500 series.

2.7.3. Cross Compatibility



Picture 27 shows the cross compatibility of HDC- camera series

Cross Compatibility Chart: HDC-1500-Series / HDC-2500-Series

No.	Camera Type	CCU-Type	Features & Limitations
1	HDC-2000 HDC-2500 HDC-2400/-DF	HDCU-2000 HDCU-2500	**3G Fibre Transmission** All Frame Rates (incl. 1080i, 720P, 1080P, 2xSloMo) Full Feature Set (Ethernet Trunk, HD-SDI Trunk, etc…)
2		HDCU-1700[1]	**3G Fibre Transmission** Frame Rates (1080i, 720P, 1080P) No 2xSloMo, no Ethernet Trunk, no HD-SDI Trunk
3		HDCU-1000 HDCU-1500	**1.5G Fibre Transmission only** Frame Rates: 1080i, 720P,1080/23.98~30PsF No 2x SloMo, no Ethernet Trunk, no HD-SDI Trunk
4	HDC-1700[1]	HDCU-2000 HDCU-2500 HDCU-1700[1]	**3G Fibre Transmission** Frame Rates (1080i, 720P, 1080P) No 2xSloMo, no Ethernet Trunk, no HD-SDI Trunk
5		HDCU-1000 HDCU-1500	**1.5G Fibre Transmission only** Frame Rates: 1080i, 720P,1080/23.98~30PsF No Ethernet Trunk, no HD-SDI Trunk
6	HDC-1000/-R HDC-1500/-R	HDCU-2000 HDCU-2500	**1.5G Fibre Transmission only** Frame Rates: 1080i, 720P,1080/23.98~30PsF No Ethernet Trunk, no HD-SDI Trunk
7	HDC-1400/-R	HDCU-1000 HDCU-1500	

(1) Requires SW-version V2.0 or higher

Important notes:

- ☞ there is no compatibility to HDCU-900/-950 and HDC-900/-950
- ☞ there is no compatibility to HSCU-300RT or HSCU-300RF

2.8. HDC-2500-Series: Ordering Information

CHU [Camera Head Unit]*	
HDC-2000B	Studio Camera Head (black color) 3G Fibre Transmission / SMPTE LEMO Connector Dual Filter Wheel Multiformat Support
HDC-2000W	Studio Camera Head (beige color) 3G Fibre Transmission / SMPTE LEMO Connector Dual Filter Wheel Multiformat Support
HDC-2500//U	Portable System Camera Head 3G Fibre Transmission / SMPTE LEMO Connector Dual Filter Wheel Multiformat Support
HDC-2570//U	Portable System Camera Head Digital Triax Transmission / FISHER Connector Dual Filter Wheel 1080i / 720p (Option: all other frame rates except HZC-UG444)
HDC-2400DF//U	Portable System Camera Head 3G Fibre Transmission / SMPTE LEMO Connectors Dual Filter Wheel 1080i / 720p (all other frame rates are options)
HDC-2400//U	Portable System Camera Head 3G Fibre Transmission / SMPTE LEMO Connector Single Filter Wheel 1080i / 720p (all other frame rates are options)
HKC-DF20	Dual Filter Wheel (HDC-2400/-1700)
HZC-UG444 HZC-UG444M/-W[1]	Software Option (for HDC-2400/-2400DF) 1080i-4:4:4 (RGB) Framerate & User Gamma
HZC-DFR20 HZC-DFR20M/-W[1]	Software Option (for HDC-2400/-2400DF/-2570) 2xSloMo Framerates (2x 1080i / 2x 720P)
HZC-PSF20 HZC-PDF20M/-W[1]	Software Option (for HDC-2400/-2400DF/-2570) 1080i/23.98PsF, 24PsF, 25PsF, 29.97PsF
HZC-PRV20 HCZ-PRV20M/-W[1]	Software Option (for HDC-2400/-2400DF/-2570) 1080P/50 & 1080P/59.94
HKC-FB20	Side Cover for HDC-2550 3G Fibre Transmission / SMPTE LEMO Connector
HKC-TR27	Side Cover for HDC-2500/-2400/-2400DF Digital Triax Transmission / FISHER Triax Connector
HKC-CN20	Inner Connector Panel (for HKC-FB20 /-TR27)
CCU [Camera Control Unit]	
HDCU-2000//U	19”-Rack Size CCU 3G Fibre Transmission / SMPTE LEMO Connectors Max. 4000m cable extension
HDCU-2500//U	Half 19”-Rack Size CCU 3G Fibre Transmission / SMPTE LEMO Connectors Max. 2000m cable extension
HKCU-1001	Option Board (HDCU-2000/-2500/-1700): SD Encoder Unit
HKCU-1005	Option Board (HDCU-2000/-2500/-1700): Multi Interface Unit
HKCU-2007	Option Board (HDCU-2000/-2500/-1700): 3G HD-SDI Output
RMM-301	19”-Rack Mount Kit (HDCU-2500/-1500/-1500D/-1700)

[1] *These SW-Options are also available on a monthly (M) and weekly (W) basis*

2.9. HDC-1700 – Entry Level HDC-Model

On IBC 2012, Sony introduced the new entry level fibre system camera: HDC-1700. Although the camera design is based on the new HDC-2500-series, its feature set is focused on the main stream HDTV production application without compromise in picture quality. It is a model for those customers prioritizing financial budgets and can live with limited key features.

Along with the new HDC-1700 camera head, a new CCU model was launched, the HDCU-1700. The CCU design is based on the HDCU-2500 and as such shares the same options.

At the time of its introduction, HDC-1700 and HDCU-1700 featured only 1.5G fibre transmission and was completely incompatible to the new HDC-2500-series. After IBC 2013, full compatibility to the HDC-2500-series was assured (Software Version V1.45 or higher) and 3G fibre transmission was included (Software Version V2.0 or higher). Today, the HDC-1700 can be regarded as a full member of the growing HDC-camera family. The performance is on a comparable level (thanks to the same 2/3"-POWER-HAD-FX sensors and 16-bit A/D-converters used in the HDC-1700 series), but feature-wise there are some differences.

2.9.1. Specifications compared (HDC-1700 vs HDC-2500-Series)

Specification	HDC-2500	HDC-2400	HDC-1700	HDC-1400R *discontinued*
Optical Filter Wheels	2	1	1	1
Filter Wheel operation	Remote Control by RCP/MSU			
ND Filter	CLEAR 1/4ND 1/8ND 1/16ND 1/64ND	CLEAR 1/4ND 1/16ND 1/64ND CROSS		
CC Filter	CROSS 3200K 4300K 6300K 8000K	Option (HKC-DF20)		Option (HKC-DF14)
Pickup Device	2/3" POWER HAD-FX CCDs (3x)			
Native Resolution	1920 x 1080			
A/D Conversion	16 bit			14 bit
Sensitivity (3200K, 0dB, 89.9% Reflectance)	F=11/2000lx (1080/50i)			
SNR (w/o Noise Surpression)	60dB			56dB
SNR (Noise Surpression: MAX)	64dB		-----	64dB
V-Smear	-140dB		-135dB	
Depth of Modulation (@27.5MHz)	50% or more		45% or more	
Supported Framerates				
1080/50i + 59.94i	+	+	+	[1080/50i only]
720/50P + 59.94P	+	+	+	[720/50P only]
1080PsF/23.98,24,25,29.97	+	Option	Option	Option
1080/50P + 59.94P	+	Option	Option	-
1080i-RGB (12-Bit)	+	Option	-	-
1080i (2xSloMo)	+	Option	-	-
720P (2xSloMo)	+	Option	-	-

2.9.2. Key-Features compared (HDC-1700 vs HDC-2500-Series)

Key-Feature	HDC-2500	HDC-2400	HDC-1700*	HDC-1400R *discontinued*
Fibre Transmission	3G			1.5G
CCU cross compatibility **requires SW-Version V1.45 or higher*	HDCU-2000/-2500 HDCU-1000D/-1500D HDCU-1000/-1500 HDC-1700*			
Carbon Side Cover	+		-	
2 prompter ways	+		-	
Ethernet Trunk Channel	+		-	
Script Light Power Out	DC 12V / 0.5A			
Utility Power Output (Camera Head)	+ 12V DC (40W max)		-	
Noise Surpression Mode	+		-	+
Natural Skin DTL	+			-
OPAC Function	+		-	
ALAC Function	ALAC-2 (H+V)			ALAC (H)
Horizontal Level Indication (Spirit Level)	+			-

** requires SW-Version V2.0 or higher for 3G fibre transmission*

2.9.3. Accessories for HDC-1700

As the HDC-1700 camera was developed based on the concept of the famous HDC-camera series, most of the accessory items available for the HDC-series do compatibly fit to the new HDC-1700 camera: all HDVF-viewfinders, the large lens adaptors (HDLA-15xx series), the remote camera head (HKC-T1500), the remote control panels (RCP-series) as well as the Master Setup Units (MSU-series).

⇨ For more details, please refer to Appendix ***7.3. Compatibility Chart / Peripheral Equipment.***

2.9.4. HDC-1700-Series: Ordering Information

CHU [Camera Head Unit]*	
HDC-1700//U	Portable System Camera Head 3G Fibre Transmission / SMPTE LEMO Connector Single Filter Wheel 1080i / 720P
HKC-DF20	Dual Filter Wheel (for HDC-2400/-1700)
HZC-PSF20 HZC-PSF20M/-W[1]	Software Option (for HDC-2400/-2400DF/-2570/-1700) 1080i/23.98PsF, 24PsF, 25PsF, 29.97PsF
HZC-PRV20 HZC-PRV20M/-W[1]	Software Option (for HDC-2400/-2400DF/-2570/-1700) 1080P/50 & 1080P/59.94
CCU [Camera Control Unit]	
HDCU-1700//U	Half 19"-Rack Size CCU 3G Fibre Transmission / SMPTE LEMO Connectors Max. 2000m cable extension
HKCU-1001	Option Board (HDCU-2000/-2500/-1700): SD Encoder Unit
HKCU-1005	Option Board (HDCU-2000/-2500/-1700): Multi Interface Unit
HKCU-2007	Option Board (HDCU-2000/-2500/-1700): 3G HD-SDI Output
RMM-301	19"-Rack Mount Kit (HDCU-2500/-1500/-1700)

[1] *These SW-options are also available on a monthly (M) and weekly (W) basis*

3. HDC-P1/1 – Enhanced Point-of-View System Camera

Content of this Chapter:	3.1.	Basic Concept of HDC-P1
	3.2.	Specifications
	3.3.	Feature Set
	3.4.	Interfaces on HDC-P1/1
	3.5.	HDC-P1/1: Ordering Information

3.1. Basic Concept of HDC-P1/1

The HDC-P1/1 PoV system camera is the successor to the famous HDC-P1 which is in the market since 2007. The new type is based on the HDC-P1 but now giving a wider approach into the future of the HD system camera family of the HDC-2500-series.

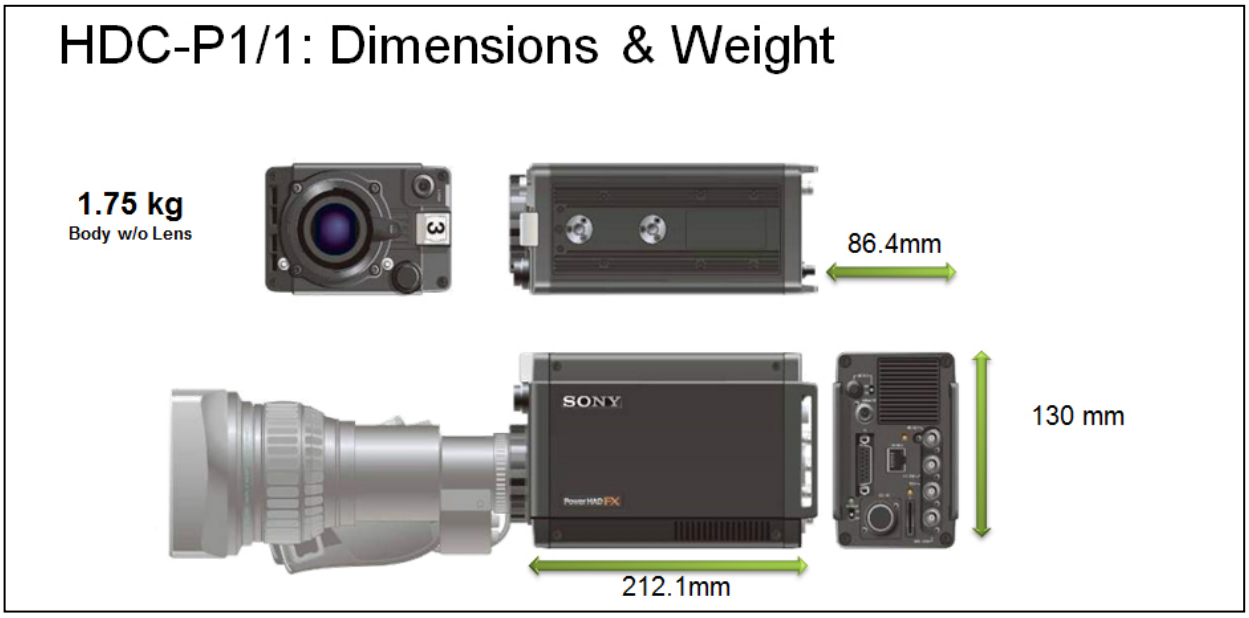
Its concept is still based on the same compact and lightweight camera body making the camera an ideal choice for all production applications where a portable camera head is too bulky or heavy but a high-quality HD signal is required which perfectly matches to the HDC-camera range (e.g. crane camera or camera on a robotic head).

As such, HDC-P1/1 comes equipped with the same 2/3"-POWER-HAD-FX sensors to provide a picture quality being close to that of the HDC- and new HSC-camera series. The HDC-P1/1 allows all current HDTV frame rates to be selected via menu (1080i / 720P) with 1080PsF frame rates and 1080P frame rates as an upgradeable option.

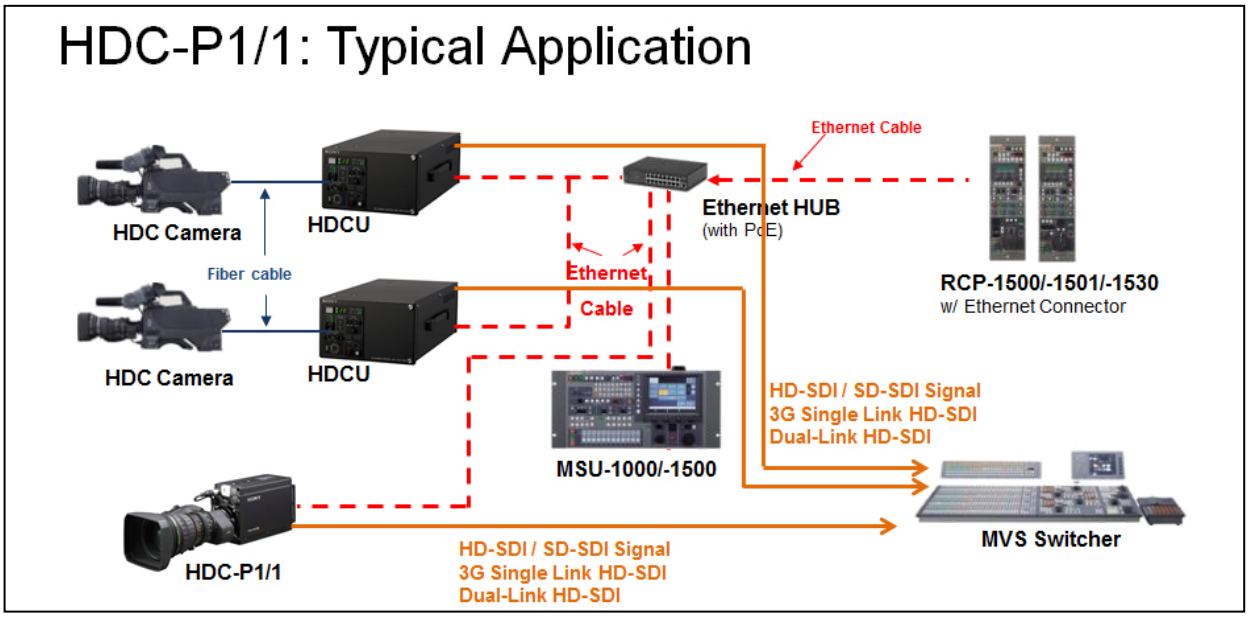
3.2. Specifications

Imager	2/3"-POWER-HAD-FX CCDs (3x)	
Effective number of pixels	1920x1080	
Optical Filters	2 motorized filter wheels	
	A: Starlight B: 3200K C: 4300K D: 6300K	1: Clear 2: 1/4ND 3: 1/16ND 4: 1/64ND
Std. Sensitivity (0dB gain, 3200K, 89.9%Reflection)	F=11/2000lx (1080/50i mode)	
Signal-to-Noise Ratio	-55dB	
H-Resolution	1000 TV-lines	
Standard Frame Rates	1080/50i and 59.94i 720/50P and 59.94P	
Optional Frame Rates	HZC-PSFP1: 1080PsF (23.98, 24, 25, 29.97) HZC-PRVP1: 1080/50P and 59.94P	
Weight	1.75 kg	
Dimensions (WxHxD)	212.1 x 130.0 x 86.4 [mm]	
Power Consumption	24W (12V DC)	

Please refer to picture 28 on the following page.



Picture 28 shows the dimensions of the HDC-P1/1 camera



Picture 29 illustrates a typical HDC-P1/1 application within an HDC-environment

3.3. HDC-P1/1 compared

	HDC-2500	HDC-1700	HDC-P1/1
Lens Mount	Sony B4 Mount		
Filterwheel	2x motorized 5 positions/each	1x motorized 5 positions Option: Dual Filter wheel	2x motorized 4 positions/each
Imager	2/3"-POWER HAD FX CCDs (3x)		
Pixel Resolution	1920 x 1080		
Std. Sensitivity	F=11/2000lx (1080/50i mode)		
A/D-conversion	16 bit		14 bit
SNR	-60dB		-55dB
1080P compatible	+	+	+
Multi Matrix User Matrix Preset Matrix	+	+	+
7x Std.-Gamma 4x Hyper Gamma	+	+	+
ALAC-2	+	+	+
Skin-Tone DTL	+	+	+
Focus Assist	+	+	+
Color-DTL edges	+	+	+
H-Level indication	+	+	+

3.4. Interfaces on HDC-P1/1

Function	Connector	Remarks
Lens	12-pin	Sony B4-mount
SDI Out	2x BNC	Dual Link HD-SDI (1.5G) Single Link 3G HD-SDI (Level A/B) SD-SDI switchable
VBS Out	1x BNC	
Genlock In	1x BNC	
EXT I/O	1x D-Sub (15-pin)	Tally In/out, DC Out, Power Control, VBS Out
LAN	1x RJ-45	for network connection to RCP/MSU
Remote	1x Hirose 8-pin	for CCA-5-xx cable and direct connection to RCP/MSU
DC In	XLR-4pin	For external power supply DC 10.5~17V

3.5. HDC-P1/1: Ordering Information

HDC-P1/1	PoV System Camera Head HD-SDI outputs (3G / Dual-Link / SD-SDI switchable) Dual Filter Wheel 1080i / 720P
HZC-PSFP1	Software Option (for HDC-P1 and HDC-P1/1) 1080i/23.98PsF, 24PsF, 25PsF, 29.97PsF
HZC-PRVP1	Software Option (for HDC-P1 and HDC-P1/1) 1080P/50 & 1080P/59.94

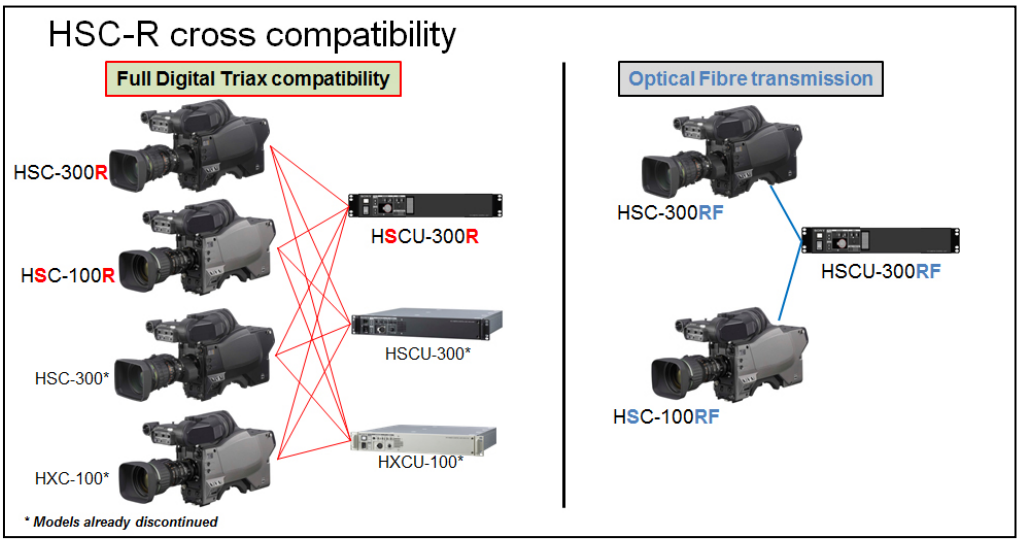
4. The new HSC-300R and HSC-100R Series

Content of this Chapter:	4.1.	The Basic Concept of the new HSC-Series
	4.2.	Specifications & Features compared
	4.3.	Typical System Configurations
	4.4.	Signal Transmission: Camera Head to CCU
	4.5.	CCU Operation: HSCU-300RT /-300RF
	4.6.	HSCU-300R: Signal Interfaces
	4.7.	HSC-300R/-100R: Ordering Information

4.1. The Basic Concept of the new HSC-Series

HSC-300R and -100R are two newly developed HD system cameras based on the concept of their predecessor models, HSC-300 and HXC-100. Both new R-models were introduced on IBC 2013 and feature the latest technology for enhanced picture quality and system flexibility.
Both camera models share exactly the same chassis and specifications but show some major differences in their operational features. Most important new feature with this new R-series is the choice between digital triax or digital fibre transmission. As both models are based on a single-piece design concept, the transmission method cannot be changed, it is either triax or fibre. Along with the newly designed camera heads, a newly developed CCU was introduced to the market, HSCU-300R. This unique CCU model is available in triax and fibre version (and again, like the new camera heads, is either a digital triax or a fibre version).

The performance and feature set of this new HSC-camera family makes it an ideal choice for all mainstream broadcast applications, be it in studio or OB van use. The transmission system (digital triax or fibre) is limited to a bandwidth of 1.5G so that all major HDTV frame rates can be made available at the output of the HSCU-300R (1080i, 720P / 1080PsF as an option). Like the predecessor models (HSC-300 and HXC-100), the new HSC-R series utilizes the advanced LLVC (Low Latency Video Codec) for triax transmission so that full compatibility to the previous models is assured.



Picture 30 shows the compatibility of the new HSC-Series

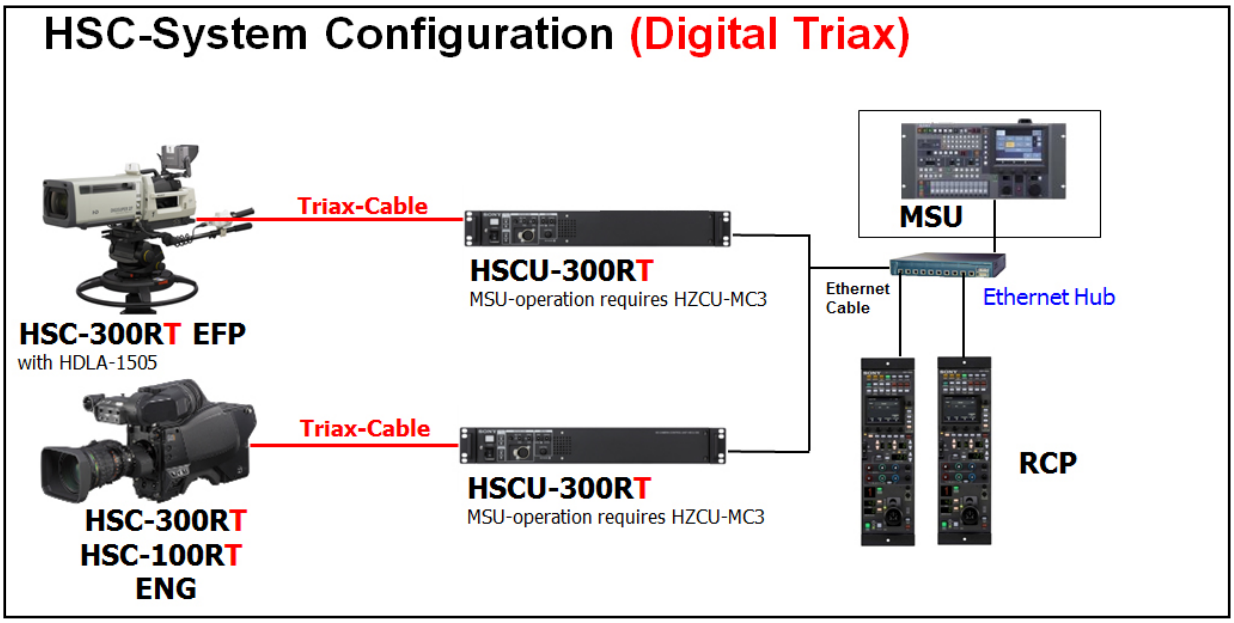
4.2. Specifications & Features compared

	HSC-300RT	HSC-100RT	HSC-300RF	HSC-100RF
Number of Filter Wheels Filters/Wheel	**2 motorized** 4 Positions/each	1 manual 4 Positions	**2 motorized** 4 Positions/each	1 manual 4 Positions
A/D conversion	16 bit			
S/N-Ratio (typical)	-60dB			
Sensitivity [3200K, 0dB, 89.9% Refl.]	F=11/2000lx			
Depth of Modulation	45% (@27.5 MHz)			
Signal Transmission	**Digital Triax**		**Fibre**	
Max. Cable Extension (incl. power to CHU)	**1800m** (14.5mm Triax)	**1200m** (14.5mm Triax)	**2000m** (SMPTE Fibre-Hybrid Cable)	
Compatible CCU models	**HSCU-300RT** HSCU-300 / HXCU-100		**HSCU-300RF**	
1080/50i; 59.94i 720/50P; 59.94P 1080/23.98~30PsF 1080/50P, 59.94P 1080/50i;59.94i RGB 1080i/100; 120 720P/100; 120	Yes Yes **Option** (HZC-PSF3) ---- ---- ---- ----			
ALAC-2 Function	Yes			
Digital 2x Extender	Yes			
DC-Power Out from CHU (12V/2.5A)	Yes			
Focus Assist Function	Yes			
MSU Multi Camera Operation	**Option** (HZCU-MC3) for HSCU-300RT/-300RF			
Camera Head Color	Black			
HDLA-15xx Compatibility	**Yes**	No	**Yes**	No
Weight (camera head only)	4.5 kg		4.1 kg	

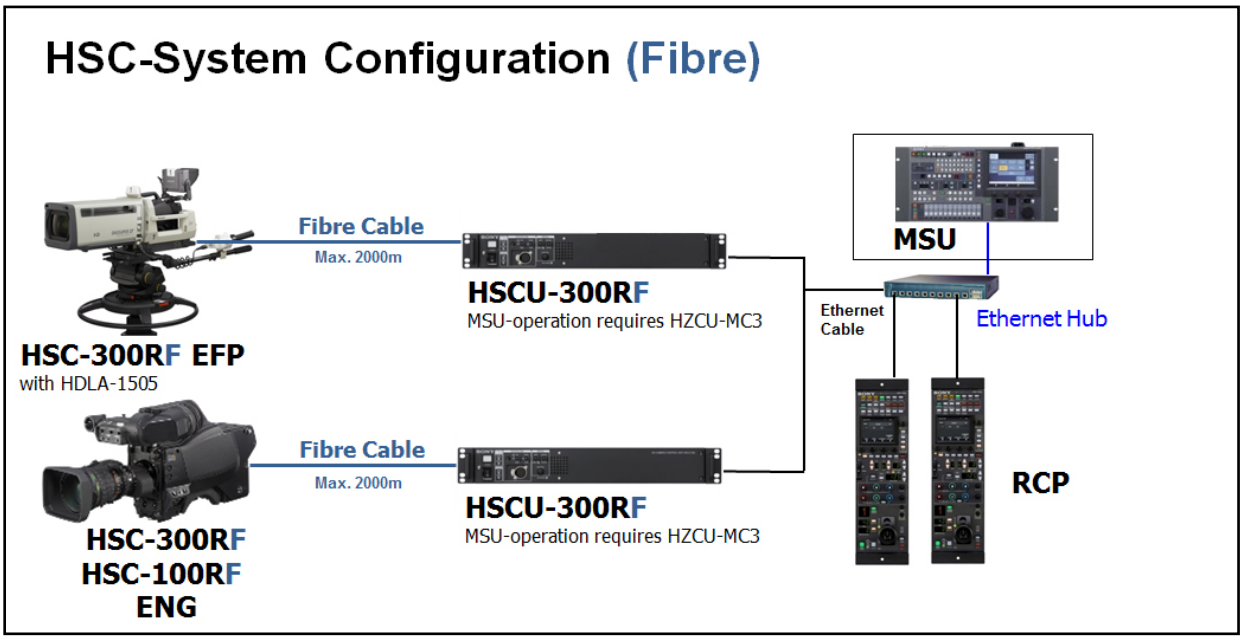
4.3. Typical System Configurations

The typical system configuration of HSC-300R/-100R is very similar to the HDC-2500-series. Accessory items (e.g. Remote Control Panels, Master Setup Units and all viewfinders) can compatibly be used for the HSC-300R/-100R. Only a remote camera head (i.e. HKC-T1500 for HDC-series) is not available and HSC-100R cannot be used in combination with the HDLA-15xx type for large lens support. In case of a large lens to be connected to the HSC-100R camera, we recommend to utilize the large lens supporter from the lens manufacturer.

Picture 31 and 32 show typical system configurations using modern Ethernet connection for remote control operation (traditional wiring with CCA-5 cables is also possible).



Picture 31: typical system configuration of the new HSC-series (triax)



Picture 32: typical system configuration of the new HSC-series (fibre)

HSC-Series: Viewfinder Compatibility Chart

Portable Viewfinder	**HDVF-20A**	2″-Monochrome CRT	all Sony HD system camera models (except HXC-D70)
	HDVF-200	2″-Monochrome CRT	
	HDVF-C30WR	2,7″-Colour LCD	
	HDVF-C35W	3.5″-Colour LCD	
Studio Viewfinder	**HDVF-C550W**	5″-Colour LCD	
	HDVF-C730W	6.3″-Colour LCD	
	HDVF-C950W*	9″-Colour LCD	
	HDVF-550	5.5″-Monochrome CRT	
	HDVF-EL75	7.4″-OLED Colour	
	HDVF-L750	7″-LCD Color	
	HDVF-L770	7″-LCD Color	
	HDVF-EL70	7.4″-OLED Colour	only for HSC-300R, HDC-1500 and HDC-2500-Series [to be mounted via HDLA-1500/ -1507]
	HDVF-EL100*	11″-OLED Colour	
	HDVF-700A/-B	7″-Monochrome CRT	
	HDVF-9900*	9″-Colour CRT	

) these products are already discontinued

HSC-Series: Remote Controller Compatibility Chart

Remote Control Options	**RCP-1000** **RCP-1001**	Remote Control (Joystick) Remote Control (Poti)	Compatible to all Sony HD system camera models (HDC-/HSC-/HXC-Series)
	RCP-1500 **RCP-1501**	Remote Control (Joystick) Remote Control (Poti)	
	RCP-1530	Remote Control (Joystick)	
	MSU-1000 **MSU-1500**	Master Setup Unit	HZCU-MC3 to be fitted into HSCU-300R CCU

4.4. Signal Transmission: Camera Head to CCU

Whereas the predecessor models (HSC-300 and HXC-100) were only available with digital triax transmission, with the new HSC-R series, customer has the choice between fibre and triax transmission. The triax transmission path of the new HSC-R series is exactly the same as for the previous models, so full compatibility is assured. The fibre transmission models utilize the standardized LEMO-SMPTE connector and a hybrid fibre cable. The bandwidth of the transmission is limited to 1.5G, so that all standard HDTV-frame rates are supported (1080i and 720P as standrard, 1080PsF as an option).

The new HSC-R series is available in 6 different models:

Signal Transmission	Model	Connector
Digital Triax	**HSC-300RT**	FISHER
	HSC-300RTL	LEMO 3T
	HSC-100RT	FISHER
	HSC-100RTL	LEMO 3T
Fibre	**HSC-300RF**	SMPTE LEMO
	HSC-100RF	SMPTE LEMO

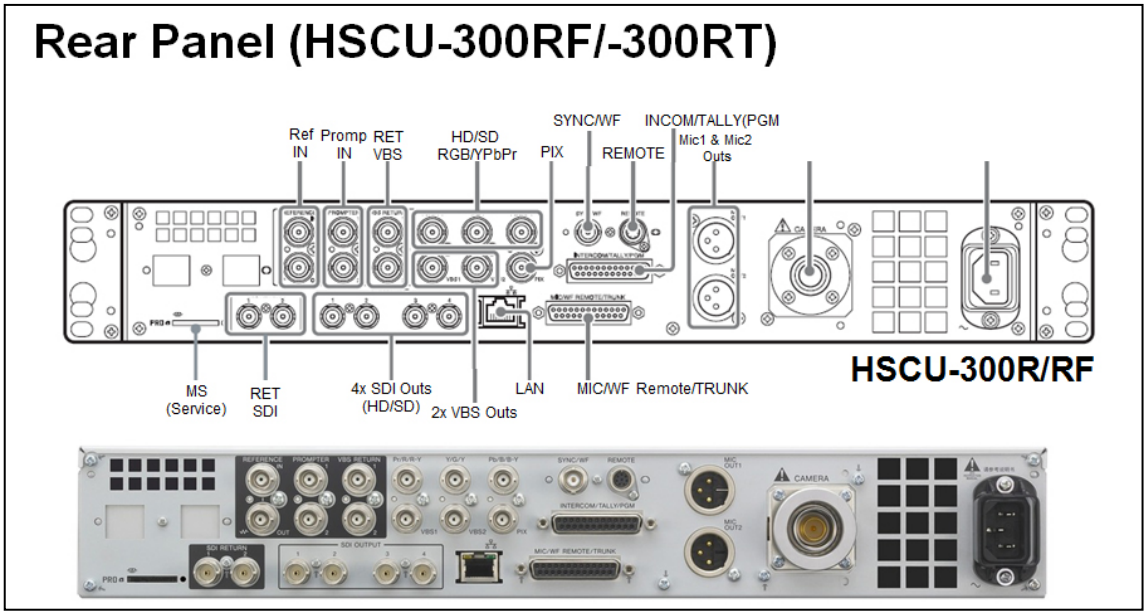
Maximum Cable Extensions: HSC-R Series*

Transmission	Brand	Cable Diameter	HSC-300RT HSC-300RF Max. Extension	HSC-100RT HSC-100RF Max. Extension
Triax	Fujikura	8.5 mm	900 m	600 m
		14.5 mm	1800 m	1200 m
	Belden	8.0 mm	800 m	500 m
		12.0 mm	1600 m	1050 m
	Draka	10.9 mm	1250 m	800 m
Fibre	Lemo	8.5 mm	2000 m	2000

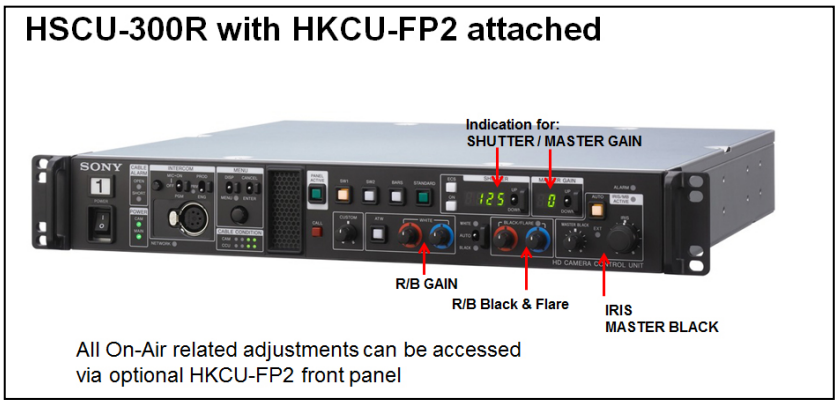
max. cable extension depends on the cable condition, number of connections and the camera configuration

4.5. CCU Operation: HSCU-300RT/-300RF

The HSCU-300R models are available with triax and fibre transmission system and come equipped with a wide variety of interfaces to meet the increasing demands of the broadcast production community. 4 HD-SDI outputs are a standard to this CCU series and these SDI outputs can be switched between HD-SDI and SD-SDI. 2 of the 4 SDI output connectors can be configured to a character output via menu.
The HSCU-300R is only 1.5U high in a 19”-rack so that it is the ideal choice for all applications where space is limited (e.g. OB-vans…).



Picture 33 shows the rear side of the HSCU-300R models



Picture 34 schows the HSCU-300 with HKCU-FP2 attached

4.6. HSCU-300RT/-300RF: Signal Interfaces

	HSCU-300RT	HSCU-300RF
Camera	**Triax (1)** HSCU-300RT: FISHER Connector HSCU-300RTL: Lemo 3T	**Optical Fibre (1)** SMPTE LEMO
Intercom / Tally / PGM	D-Sub 25-pin female (1) - INCOM (Prod/Eng) - Tally (R/G) - PGM 2 systems	
Remote	8-pin Multi CN (1)	
MIC/WF Remote / Trunk	D-Sub 25-pin female (1)	
Ethernet (LAN)	RJ-45 8-pin (1)	
AC Input	100 ~ 240V	
SDI Return Input	BNC (2) HD-SDI: SMPTE 292M / 0.8V_{p-p}, 75Ω SD-SDI: SMPTE 259M / 270 Mbps HD-SDI / SD-SDI selectable	
VBS Return Input	BNC (2) VBS: 1.0V_{p-p}, 75 Ω	
Reference Input	BNC (2) HD: SMPTE 274M, tri-level sync (0.6V_{p-p}, 75 Ω) SD: Black Burst	
Prompter Input	BNC (2) VBS-signal (loop through) / 1.0Vp-p, 75 Ω	BNC (1) VBS-signal (loop through) / 1.0Vp-p, 75 Ω
MIC Output	XLR 3-pin, male (2) [0/-20 dBU]	
Intercom	XLR-5pin (1)	
HD-SDI / SD-SDI Output	BNC (2) HD-SDI: SMPTE 292M / 0.8V_{p-p}, 75Ω SD-SDI: SMPTE 259M / 270 Mbps HD-SDI / SD-SDI selectable	
HD-SDI / SD-SDI Monitor Output	BNC (2) HD-SDI: SMPTE 292M / 0.8V_{p-p}, 75Ω SD-SDI: SMPTE 259M / 270 Mbps HD-SDI / SD-SDI selectable	
RGB / Component Output (analog)	HD Component Video / Y, Pr,Pb HD RGB Video SD Component Video SD RGB Video	
VBS Output	BNC (2) 1.0V_{p-p}, 75 Ω	
PIX Output	BNC (1) VBS/R/G/B (1.0V_{p-p}, 75 Ω)	
SYNC / WF Output	BNC (1) • SYNC HD Sync / SD Sync selectable • WF VBS/SEQ/R/G/B (1.0V_{p-p}, 75 Ω)	

4.7. HSC-R series: Ordering Information

CHU [Camera Head Unit]*	
HSC-100RT//U	HSC-100R Camera Head with FISHER Triax Connector Number Plates (1 set) / Operation Manual
HSC-100RTL//U	HSC-100R Camera Head with LEMO 3T Triax Connector Number Plates (1 set) / Operation Manual
HXC-100RF//U	HSC-100R Camera Head with LEMO Fibre Connector Number Plates (1 set) / Operation Manual
HSC-300RT//U	HSC-300R Camera Head with FISHER Triax Connector Number Plates (1 set) / Operation Manual
HSC-300RTL//U	HSC-300R Camera Head with LEMO 3T Triax Connector Number Plates (1 set) / Operation Manual
HSC-300RF//U	HSC-300R Camera Head with LEMO Fibre Connector Number Plates (1 set) / Operation Manual
HZC-PSF3	Optional Frame Rate: 1080PsF/ 23.98, 24, 25, 29.97
CCU [Camera Control Unit]	
HSCU-300RT//U	Camera Control Unit for HSC-100RT/-300RT
HSCU-300RTL//U	Camera Control Unit for HSC-100RTL/-300RTL
HSCU-300RF//U	Camera Control Unit for HSC-100RF/-300RF
HZCU-MC3	Optional MSU Control for HSCU-300R models
HKCU-FP2	Front Operational Panel for HSCU-300R models

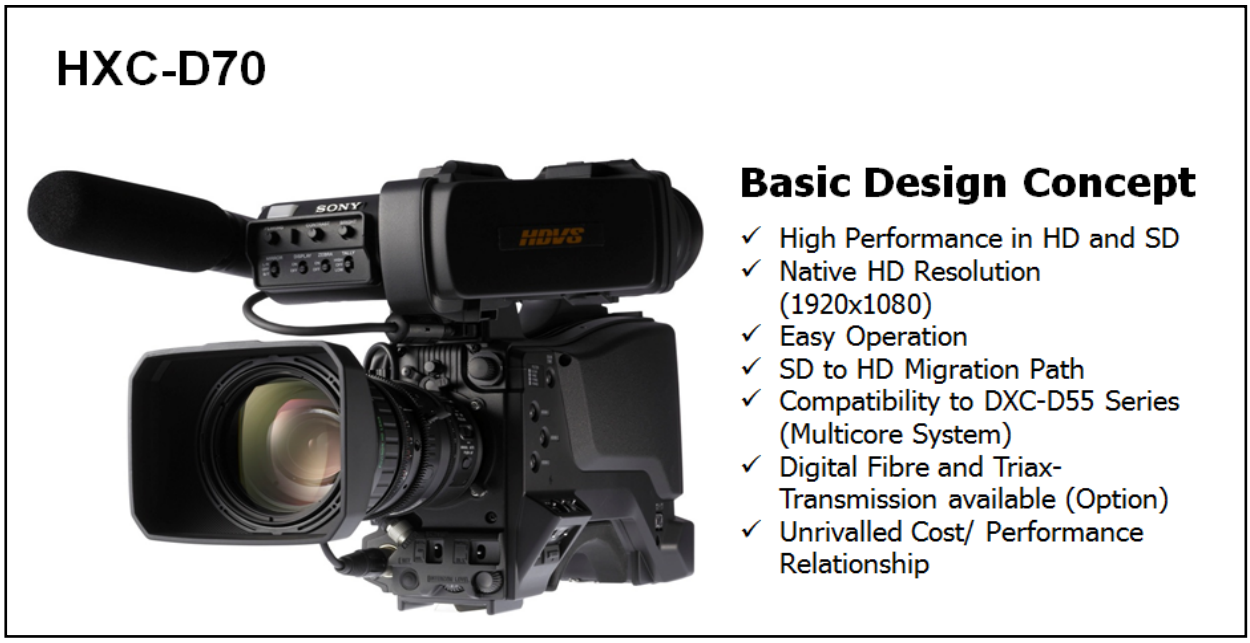
(*) Tripod Mount Plate is always an option (Type: VCT-14)

5. HXC-D70
The New Entry Level HD System Camera

Content of this Chapter:	5.1.	The Basic Concept of the new HXC-D70 System
	5.2.	Migration Path (SD to HD)
	5.3.	Basic Specifications
	5.4.	Key Features
	5.5.	HXC-D70: Ordering Information
	5.6.	HXCU-D70: Signal Interfaces
	5.7.	HXC-D70: Fibre Transmission
	5.8.	HXC-D70: Digital Triax Transmission
	5.9.	Peripheral Equipment

5.1. The Basic Concept of the new HXC-D70 System

The new HXC-D70 entry level HD system camera was launched on IBC 2011 to match the increasing demands of the corporate and professional video market for a high quality but affordable HD system camera.
Sony has a very long experience in manufacturing affordable SD system cameras. The DXC-D55-series is a good example and was sold in high quantities all over the world. It´s operational concept is well accepted and Sony has taken this into consideration for the design of the new entry level HD camera system.



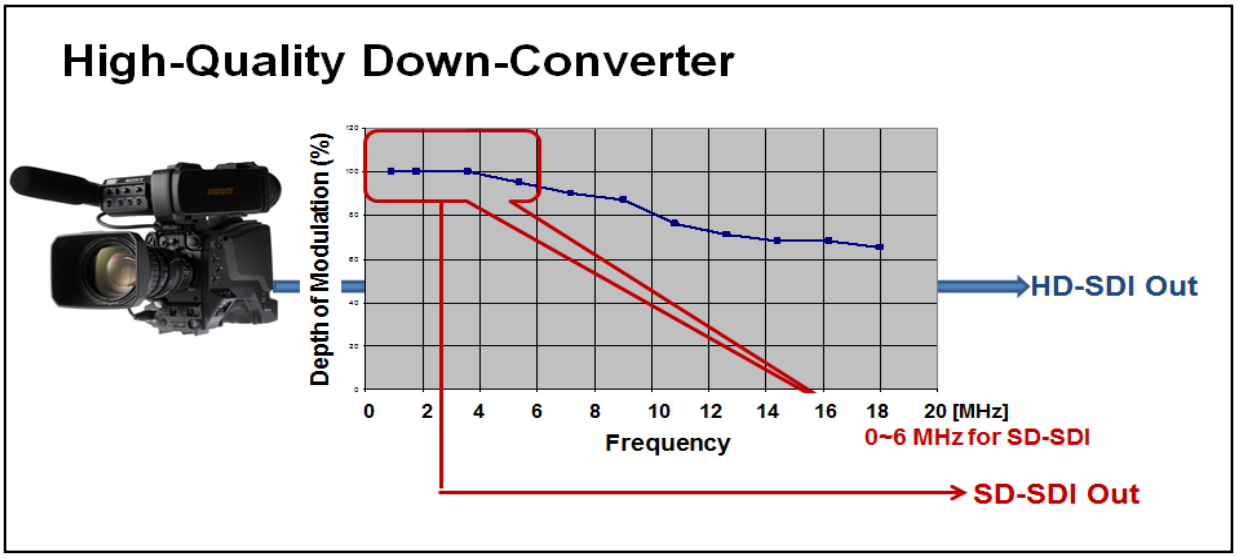
Picture 35 shows the new HXC-D70 camera and its basic design concept

Like all other HD system cameras, the HXC-D70 was designed as a single-piece camera and as a result, the HXC-D70 is the most light-weight system camera in the market. But not only the weight is an issue, also reliability and robustness are further aspects which can best be served by a single-piece design.

5.2. Migration Path (from SD to HD)

Most of the customers looking for an affordable, entry level HD system camera still produce their footage in SD quality. But the demand for HD productions is clearly coming up and it is mandatory that such a long-term investment must feature HD quality to be prepared for the future.

Sony has taken this customer request into consideration and has equipped the HXC-D70 camera head with a high-quality down-converter. Thus it is possible to benefit from the high frequency response of the HD camera head and generate a state-of-the art SDTV signal.
Picture 33 illustrates the benefit of generating the SD signal from the high-quality HD signal, as the frequency response of the HD signal is almost flat until 6MHz so that only very few DTL correction on the SD signal is required (if any).



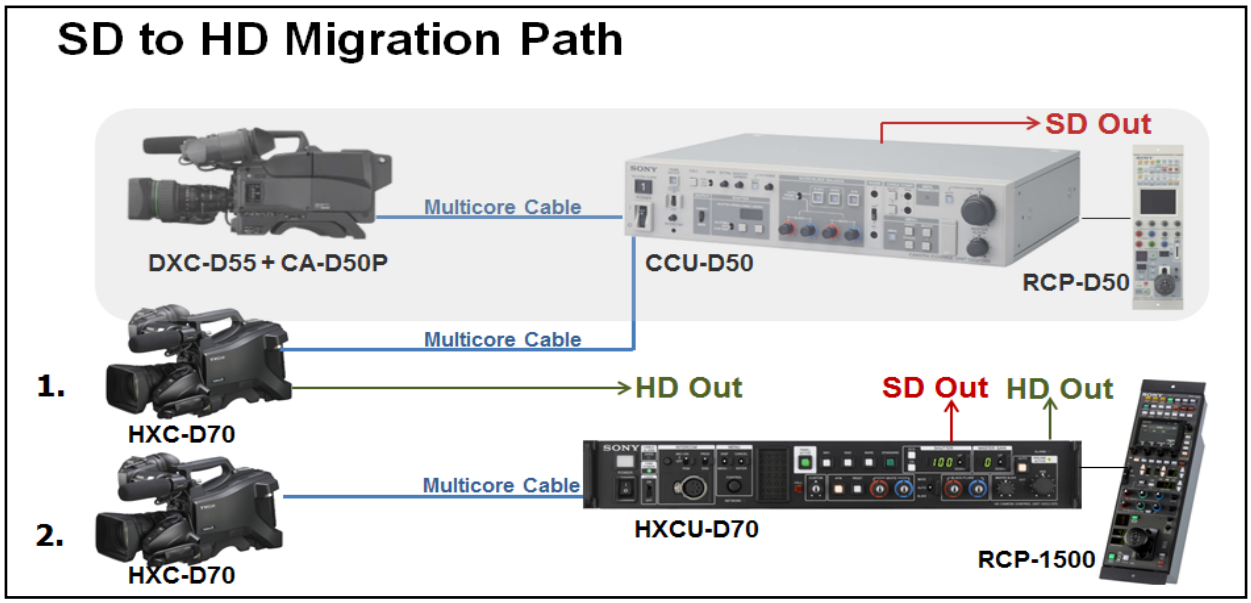
Picture 36: high quality SD signal generation by HXC-D70

Furthermore, Sony had a very close look to the SD systems (i.e. DXC-D55/-D50/-D35 and –D30) which are widely spread in the market for SDTV productions. Many of these customers are currently using the multicore transmission system (DXC-camera head in combination with CA-D50P and CCU-D50) and will be happy to hear that they may continue using their CCU-D50 in combination with the new HXC-D70 camera.

Migration Step 1: in this case, the CCU-D50 outputs an SD-SDI signal whereas an HD-SDI signal can directly be taken from the new HXC-D70 camera head. Thus, HD as well as SD productions are possible by a minimum investment (only camera head needs to be replaced by HXC-D70).

Migration Step 2: in a next step, the customer can then replace the CCU-D50 by the new HXCU-D70 which provides 4 HD-SDI outputs from the CCU directly.

⇨ Picture 37 on the next page illustrates the SD to HD migration path.



Picture 37: migration from SD (DXC-D55 Multicore) to HD by HXC-D70 technology

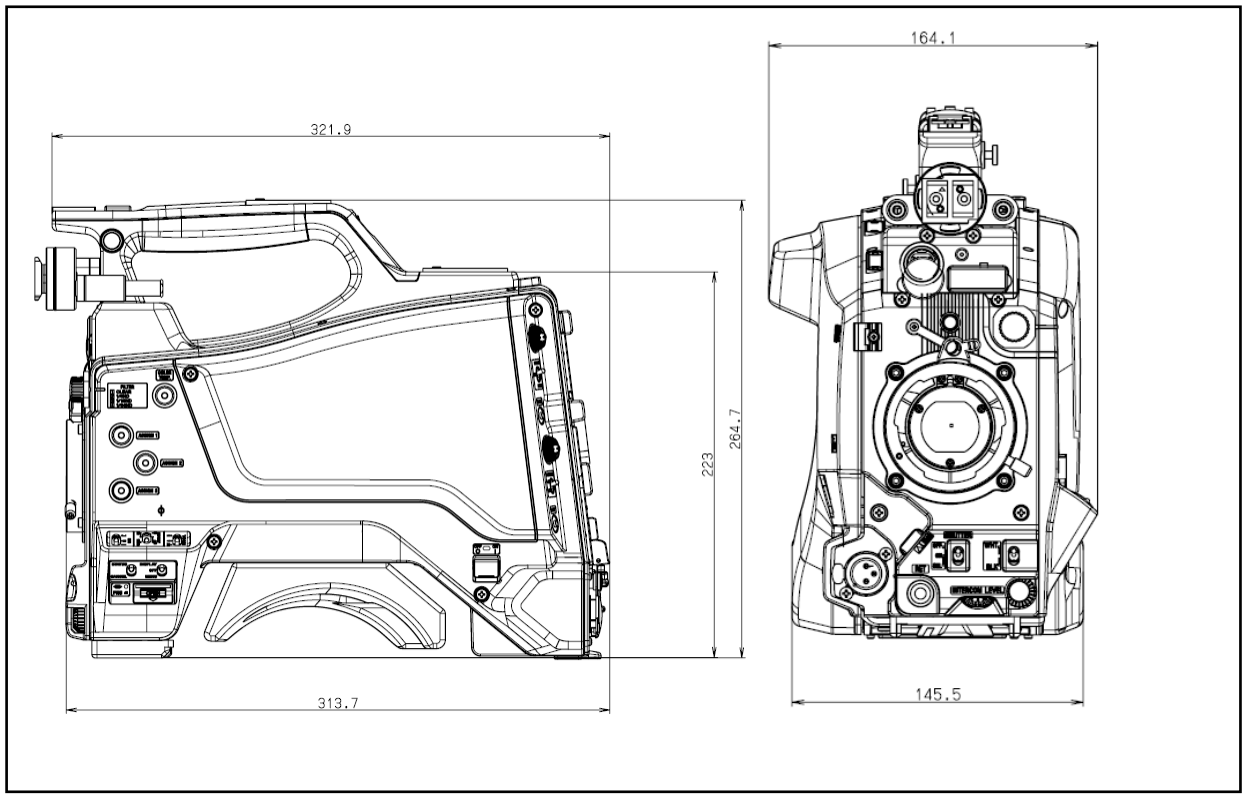
In case of using CCU-D50, the multicore cable carries an analogue signal and the max. cable extension is 300m.
In case of using HXCU-D70, there is a digital signal transmission over the multicore cable and the max. extension is 100m.

Note: for CCU-D50, the specific RCP-D50 /-D51 has to be employed. For the HXCU-D70, all current RCPs of the HDC-, HSC- and HXC-Series can compatibly been used.

5.3. Basic Specifications

Talking about a camera it is always helpful to have a closer look at the specifications to better value the performance of the camera. Here are the specs for the HXC-D70 system camera:

	HXC-D70 Camera Head
Optical Filter	1 Filter Wheel (manual) 4 Positions Clear; ¼-ND; $^1/_{16}$-ND; $^1/_{64}$-ND
Pickup Device	2/3-Inch CMOS Sensor [EXMOR]
Number of Pixels	1920 x 1080
Std. Sensitivity	F=13@ 2000lx (3200K, 0dB, 89.9% Reflection, 50i format)
Signal-to-Noise Ratio	-59dB (HD) -65dB (SD)
Resolution	HD: >1000TV-Lines
Frame rates	1080/50i; 59.94i 720/50P; 59.94P Down-Converted: PAL / NTSC
Weight (camera head)	3.4 kg



Picture 38: Dimensions of HXC-D70 camera head

5.4. Key Features of HXC-D70

5.4.1. Digital Extender

The extender function became famous by the lens manufacturers who included a 2x extender into their lenses to double the focal lengths.
As a drawback, the weight of the lens was increased and the sensitivity was reduced by 50%. Finally, a 2x extender has always been quite expensive.

Due to the above mentioned drawbacks, Sony has integrated a digital 2x extender function into the HXC-D70 camera. This function does allow to double the focal length of the lens (same as the lens extender), but does not increase weight, does not have any impact on the sensitivity and, most important, comes free of charge with the camera. The only drawback is the reduction in resolution. However, if the camera is used for SDTV productions, the loss in resolution is almost invisible.

5.4.2. Variety of Gamma Curves

Like the big sister cameras, HXC-D70 is equipped with a wide variety of factory pre-installed gamma curves. Thus, the user can match the look of the picture exactly to the needs of the individual production, be it for TV, drama, movie or commercials.

The desired gamma curve is selectable from the camera menu:

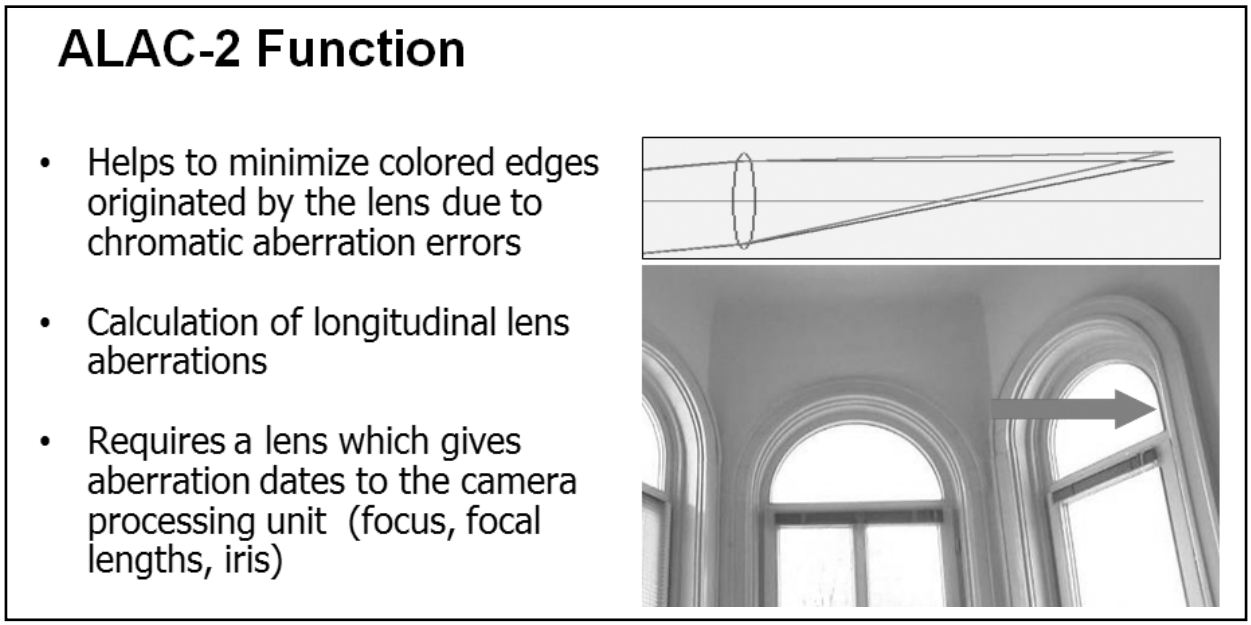
P04 <GAMMA>
- TABLE
  - STANDARD GAMMA
    1 / 2 / 3 / 4 / 5 / 6 / 7
  - HYPER GAMMA
    1 / 2 / 3 / 4

The standard curves (1~7) are for conventional broadcast applications (incl. ITU-709, SMPTE-240M…) whereas the Hyper-Gamma curves (1~4) offer a more smooth highlight reproduction and were designed to match drama and cinematography applications. Hyper-Gamma is usually selected if a post-production process is involved.

5.4.3. ALAC-2 Function

The new HXC-D70 is equipped with the latest generation of the ALAC function. ALAC is the abbreviation for **A**uto **L**ens **A**berration **C**orrection and can minimize chromatic aberration effects in the picture, usually visible at high contrast edges.
Each lens shows chromatic aberrations due to the different wavelength of the colours. Especially zoom lenses suffer from chromatic errors which cannot be avoided.

HXC-D70 is equipped with the improved 2nd generation ALAC function, which can correct chromatic errors in horizontal and vertical direction.
To make use of the ALAC functionality, a lens which supports ALAC function has to be employed. All modern zoom lenses do support this function and in case of any doubt please contact the lens manufacturer.



Picture 39: Impact of ALAC-2 function

The ALAC-2 function minimizes chromatic aberration effects but cannot compensate to 100%. This is not a malfunction but a technical limitation.

5.4.4. Autofocus Function

The HXC-D70 camera head features an autofocus function when used in combination with a lens supporting this functionality.
When ordering the **HXC-D70K** package, the camera will be delivered with an autofocus zoom lens:

Lens Specifications	
Lens Mount	$^2/_3$" Sony Bayonet
Zoom Ratio	16x (optical)
Focal Length	8mm ~ 128mm
Max. relative Aperture	F=1.9 (Wide) ~ F=3.0 (Tele)
Iris Opening	F=1.9 ~ F16 + CLOSE Auto/manual iris selectable
Focus Modes	AF / MF switchable (Ring slide style for switching AF/MF) MACRO on/off switchable
Image Stabilizer	Yes on/off switchable
Filter Diameter	M82mm (pitch =0.75mm)
Weight	1.6 kg (incl. Hood)
Zoom/Focus Control Kit * (optional accessory)	MS-01/X1 Consists of the following parts: SRD-92B: Zoom Demand CFH-3: Manual Focus Handle FMM-X1: Focus Manual Module CFC-990: Flex Cable

*) available from Fujifilm

5.5. HXC-D70: Ordering Information

The HXC-D70 is available in 3 different packages:

Package	Content
HXC-D70H//U *	**HXC-D70 Camera Head** Supplied accessories: Lens Mount Cap Flange Back Adjustment Chart Cable Clamp Belt Hexagonal Wrench Fitting Shoe for DXF-801 viewfinder Operating Instructions (English) CD Rom Warranty
HXC-D70L //U*	**HXC-D70H Package +** **CBK-VF01 Colour Viewfinder** **Microphone** **Windscreen**
HXC-D70K //U*	**HXC-D70L Package +** **16x AF Zoom Lens**

*) Tripod Mount Plate is optional available (Type: VCT-U14 or VCT-14)

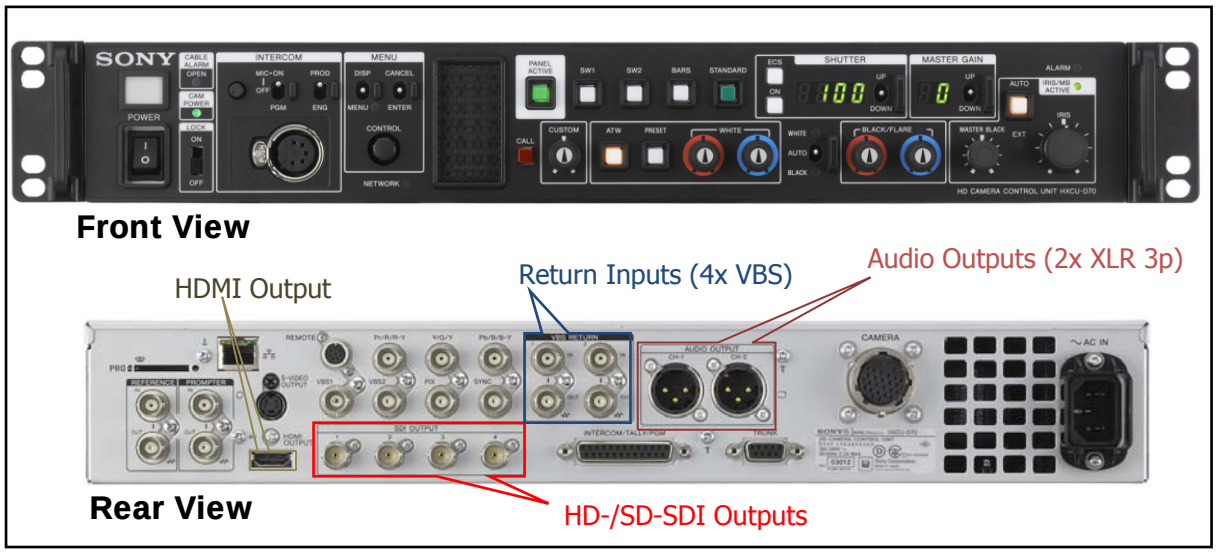
5.6. HXCU-D70 & Signal Interfaces

The HXCU-D70 is the new multicore CCU for the HXC-D70 camera head.
Apart from its compact design (only 1.5U high in a 19”-Rack), it features all standard broadcast interfaces to be easily integrated into a broadcast or professional environment. Not only does it offer the broadcast interfaces, but it offers consumer interfaces, too (e.g. HDMI) so that low-price equipment can be integrated thus keeping the entire system costs on a very economical level.

Key outputs are the 4 HD-/SD-SDI interfaces (BNC) which can be switched from HD-SDI to SD-SDI (per pair).
One prompter channel and return channels are available as a standard and the 8pin remote connector allows to connect the remote panels being compatible to the HDC- and HSC-series of cameras. The customer can select from a wide variety of remote panels to match every application and budget.

The front panel operation comes as a standard feature so that basic camera remote functions can be controlled directly from the front panel without having to invest in peripheral RCP equipment.

Another cost-effective way of controlling up to 5 cameras remotely from a PC is the new software option **(HZC-RCP5)**, exclusively designed for the HXC-D70-series of cameras. This software emulates 5 RCPs on a specific GUI (incl. joystick control for Iris) with all access to the camera settings via mouse click. It is a very economical way of controlling up to 5 HXC-D70 cameras in a small studio environment.



Picture 40: Multicore CCU for HXC-D70 (HXCU-D70)

HXCU-D70: Basic Specifications / Inpouts & Outputs

General	
Power supply	AC 100 to 240 V, 50/60Hz
Operation temperature	+5℃～＋40℃
Storage temperature	-20℃～＋60℃
Dimensions (W x H x D)	482mm x 66mm x 360mm / 1.5U high
Mass	6.4Kg
Inputs/Outputs	
Camera	CCZ 26-pin
SDI outputs	BNC (x4) *HD/SD selectable at each pair of two outputs
Analog video outputs	BNC (x3) *Selectable from HD (Y/Pb/Pr or R/G/B) or SD (Y/Cb/Cr or R/G/B)
S-Video (Y/C) output	Mini DIN 4-pin (x1)
VBS ouputs	BNC (x2)
HDMI monitor output	8-pin (x1)
PIX (monitor, VBS) output	BNC (x1)
Audio outputs	XLR 3-pin (x2)
Return inputs and loop-through (VBS)	BNC (x4)
Prompter input and loop-through (VBS)	BNC (x2)
Reference input and loop-through	BNC (x2) HD: SMPTE-274M, tri-level sync, 0.6 Vp-p,75Ω SD: Black burst (NTSC: 0.286 Vp-p, 75Ω/PAL: 0.3 Vp-p, 75Ω)
Trunk I/F (RS-232C)	D-sub 9-pin, female (x1)
Intercom/Tally/PGM	D-sub 25-pin, female (x1) Intercom (PROD and ENG), 4W/RTS/CC, 0 dBu Tally (R and G) PGM x 1 system, -20/0/+4 dBu
Intercom headset	XLR 5-pin (x1)
Remote	8-pin (x1)
LAN	RJ-45 8-pin (x1) *Control

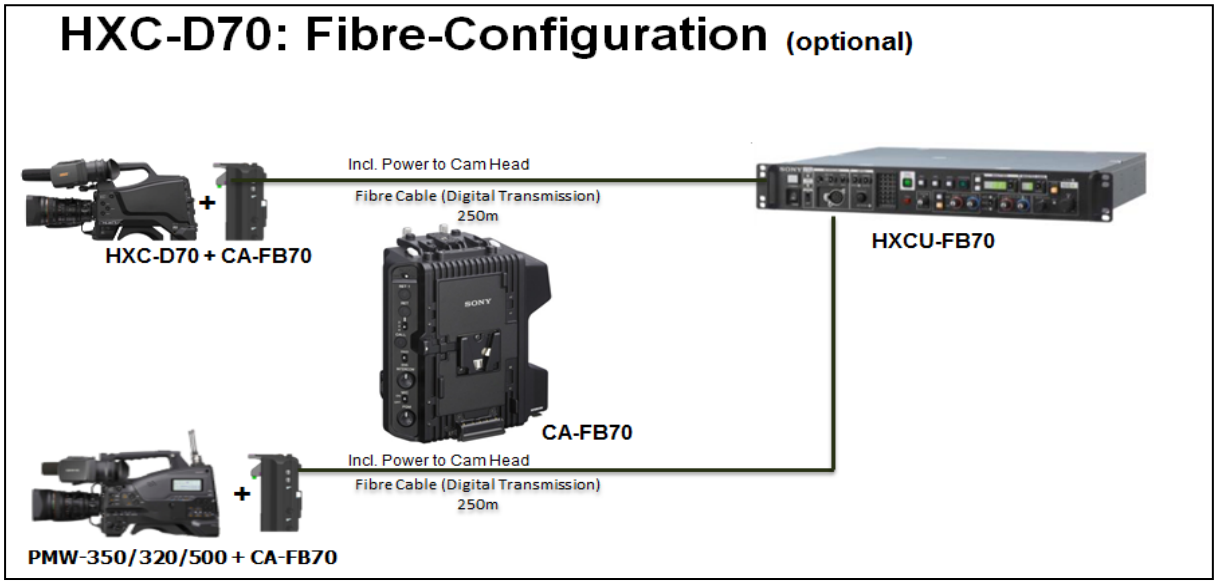
5.7. Fibre Transmission System

The optional Fibre Adaptor **CA-FB70** allows operating the HXC-D70 camera head by a hybrid fibre cable. It is a very cost-effective yet high-quality alternative to the multicore transmission system which comes as a standard for HXC-D70. Cable extensions of 250m (incl. power to the camera head) or up to 10 km (in case the camera is powered separately) are possible using a very lightweight and flexible SMPTE-311 fibre cable. The CA-FB70 only adds 0.8 kg to the camera head.

Along with the CA-FB70 camera adaptor, a new fibre CCU has to be employed, the **HXCU-FB70**. It comes in as very compact shape and offers all necessary interfaces for a real HD broadcast production.
The standard fibre connector is a NEUTRIK CON DUO connector mounted on a standard SMPTE 311 fibre hybrid cable. Sony offers various lengths of this cable:

Type	Description
CCFN-25	25m fibre hybrid cable with NEUTRIK CON DUO connectors
CCFN-50	50m fibre hybrid cable with NEUTRIK CON DUO connectors
CCFN-100	100m fibre hybrid cable with NEUTRIK CON DUO connectors
CCFN-JC1	Cable joint adaptor to merge 2 cables for extension

The CA-FB70 does not only fit to the HXC-D70 camera head but can compatibly be used also for all PMW-Camcorders (PMW-320/-350/-500). Thus, it will easily be possible to build up a complete studio system by integrating existing PMW-camcorders.



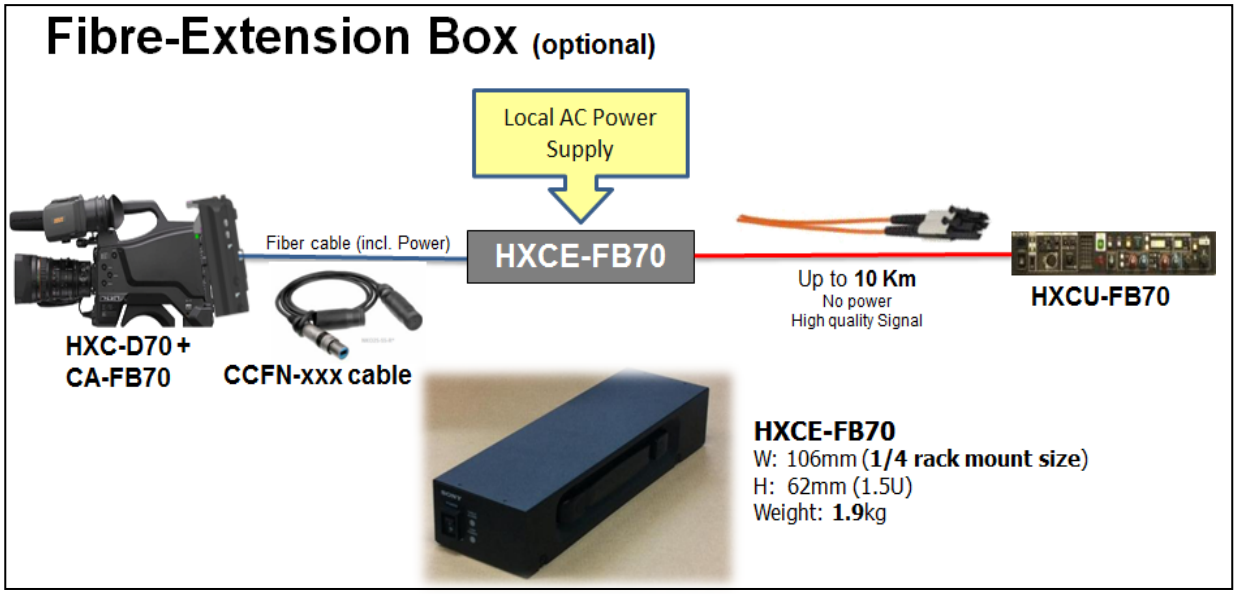
Picture 41: HXC-D70 and PMW-Camcorders in Fibre configuration

For PMW-500 it is mandatory to integrate CBK-HD02 and for PMW-320/-350, CBK-CE01 has to be installed to allow CA-FB70 connection.

In case the CA-FB70 is used in combination with a PMW-camcorder, the following limitations apply:

- No **TC output** from HXCU-FB70.
- No **23.98P** format is supported on the system.
- No **REC trigger** output from CCU (SDI output).

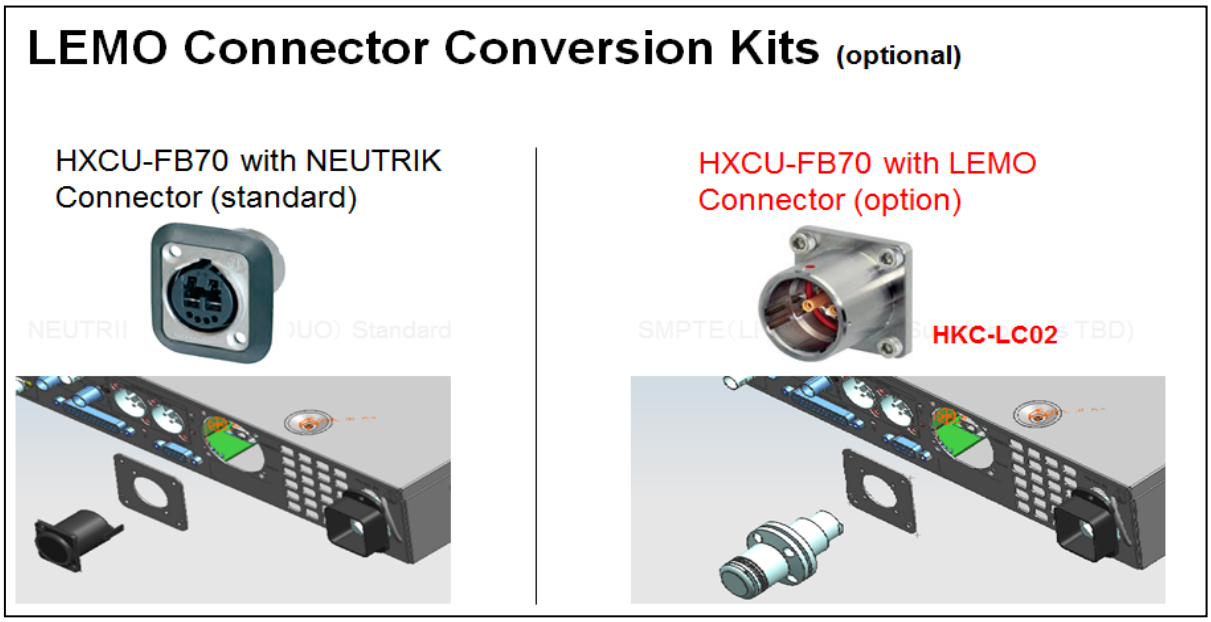
If the 250m cable extension is not sufficient, an optional extension box (HXCE-FB70) enhances the distance of up to 10,000m by a conventional single mode fibre cable.



Picture 42: functionality of the HXCE-FB70 extension box

LEMO connector conversion kits for CA-FB70, HXCU-FB70 and HXCE-FB70 are available as option allowing the customer to use exactly the same cables as with the HDC-Series:

- ☞ Conversion Kit for CA-FB70/HXCE-FB70: HKC-LC01
- ☞ Conversion Kit for HXCU-FB70/HXCE-FB70: HKC-LC02



Picture 43: LEMO conversion kit for HXCU-FB70

HXCU-FB70: Fibre CCU

The HXCU-FB70 comes equipped with a front remote panel allowing to control all important ON AIR items of the camera.
For a more convenient remote operation, all Sony RCPs which support the 700-command protocol can be used (e.g.: RCP-1500 or -1000-series).

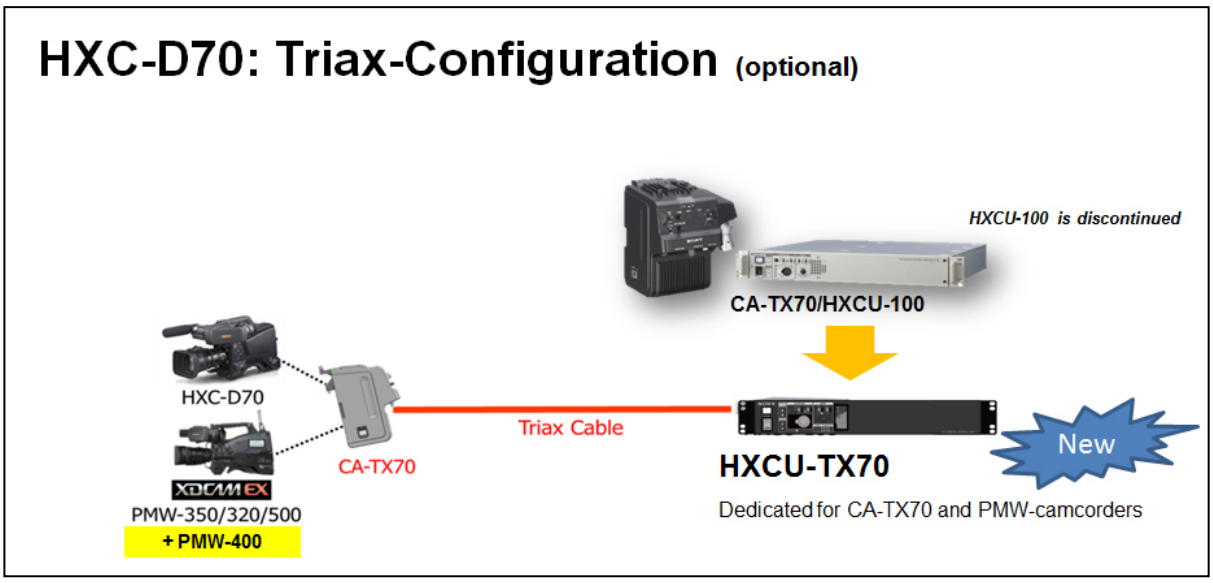
Picture 44: Front Panel of HXCU-FB70

Specifications & Interfaces

General	
Weight	6.5 kg
Operating temperature	5°C ~ 40°C
Power Supply	AC 110V ~ 240V (50/60 Hz)
Inputs/Outputs	
Camera	Optical Connector (1x NEUTRIK CON DUO) Option: LEMO connector
Intercom/Tally/PGM	D-sub 25-pin female (1x) Intercom (PROD/ENG), 4W, 2W, RTS Tally (R / G) PGMx1 (-20/0/+4dBU)
Remote	8-pin (1x)
Trunk	D-sub 9-pin (1x) RS-232 (only for HXC-D70)
LAN	RJ-45 (1x)
SDI output	BNC (4x) / HD-/SD-SDI switchable
Analogue Video output	BNC (3x), selectable HD or SD
S-Video output (Y/C)	Mini DIN 4-pin (1x)
VBS output	BNC (2x)
HDMI monitor output	BNC (1x)
PIX monitor output	BNC (1x)
SYNC output	BNC (1x)
Audio Output	XLR 3-pin (2x)
RETURN input (VBS)	BNC (2x)
RETURN input (SDI)	BNC (2x) / HD/SD selectable
PROMPTER input	BNC (1x)
REF input	BNC (1x) SMPTE-274M trilevel sync or blackburst
INTERCOM headset	XLR 5-pin (1x)
Supplied Accessories	Operation Instructions, Number plates (1 set) Warranty booklet, CD-ROM

5.8. Digital Triax Transmission System

Another interesting alternative for signal transmission from camera head to CCU offers the new digital triax adaptor, the CA-TX70. This adaptor is docked to the HXC-D70 in exactly the same way as the CA-FB70 (via V-mount shoe) and can also be compatibly be used in combination with the PMW-320/-350/-500 series of camcorders.
The triax transmission system employed in the CA-TX70 is exactly the same as in the HSC-100RT/-300RT series so that the HXCU-100 can serve as a compatible CCU. Furthermore, it allows the integration of HXC-D70 cameras within an HSC-environment.



Picture 45 shows the triax transmission system and its compatibility

The CA-TX70 triax adaptor employs a digital transmission technology. Thus, the signal quality remains on a very high performance level, no matter which cable extension is used. The maximum cable extension is 1,200m (using a 14.5mm triax cable). As a standard connector, CA-TX70 employs FISHER connectors.
Other types of triax connectors are available as a chargeable option.

The **HXCU-TX70** is a new digital triax CCU and is the successor to the HXCU-100 which is already discontinued.

In case the CA-TX70 is used in combination with a PMW-camcorder, the following limitations apply:

- No **TC output** from HXCU-100.
- No **23.98P** format is supported on the system.
- No **REC trigger** output from CCU (SDI output).

5.9. Peripheral Equipment

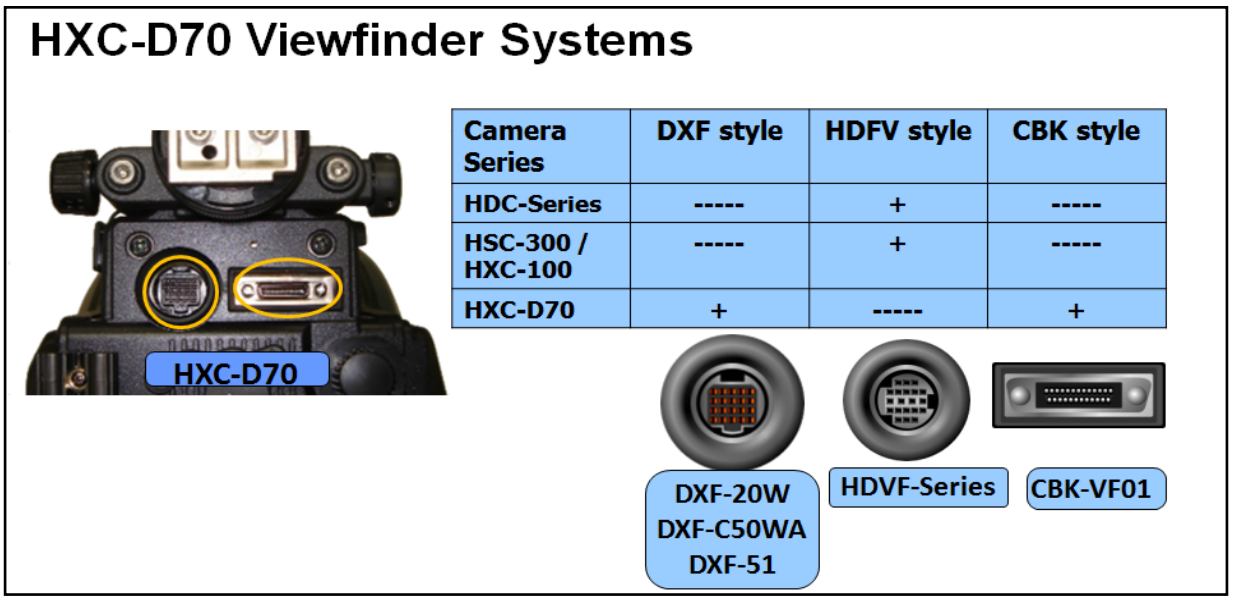
5.9.1. Viewfinder Systems

Unlike the HDC-2500-/HSC-300 and HXC-100-series, HXC-D70 features its own viewfinder system. The HXC-D70 series was developed with due regard to keep the system costs as low as possible by obtaining a high performance level so that a new series of HD-viewfinders was launched.

The HXC-D70 camera head features 2 kinds of viewfinder connections:

(A) DXF-Style connector: to connect DXF-C50WA, DXF-20, DXF-51…

(B) CBK-Style connector: to connect the new CBK-VF01 & HDVF-L750 viefwinders



Picture 46: compatible viewfinders for HXC-D70 camera series

- **CBK-VF01**
  - new 3.5" Color-LCD Viewfinder for HXC-D70 (and PMW-320/-350)
  - CBK-VF01 is standard accessory for HXC-D70L and HXC-D70K package

CBK-VF01	
Screen Size	8.8 cm diagonal (3.5")
Aspect Ratio	16:9
Picture Elements	640 (H) x 480 (V) x RGB

- **DXF-C50WA**
  - New 5" Color-LCD Studi Viewfinder for HXC-D70 series
  - Improved performance compared to DXF-C50W predecessor

DXF-C50WA	
Panel Type	5" LCD Color
Effective Screen Size	108.0 x 60.8 [mm]
Aspect Ratio	16:9
Pixel Raster	800 (H) x 450 (V) x RGB
Brightness	300 cd/m^2
Resolution	400 TV-Lines or more

Note: DXF-C50WA is exclusively compatible to the HXC-D70 series

5.9.2. CCU System Compatibilities

- **Multicore CCU (HXCU-D70)**
  As already indicated in chapter 4.2., the HXC-D70 camera head can be connected either to CCU-D50P (output only SDTV signals) or to the new HXCU-D70 (HD- and SD-SDI outputs are available).
  In case the CCU-D50P is connected to HXC-D70 via multicore cable, the transmission is analogue (max. 300m).
  In case the HXCU-D70 is utilized, the signal transmission is digital and the max. multicore extension is 100m.

- **Fibre CCU (HXCU-FB70)**
  HXCU-FB70 can only be used in combination with the CA-FB70 camera adaptor.
  LEMO connectors are available as an option for HXCU-FB70 and CA-FB70, however, there is no compatibility to the HDCU-series (HDCU-2000/-2500/-1000/-1500). Only the SMPTE-Fibre Hybrid cable itself is compatible.
  ☞ All CCUs of the HDC-2500/-1500 series cannot be used in combination with the HXC-D70 series.

- **Triax CCU (HXCU-100 / HSCU-300 / HXCU-TX70)**
  There is a new digital triax CCU type for the CA-TX70 camera adaptor, the HXCU-TX70. HXCU-100 and HSCU-300 can compatibly be used in combination with the CA-TX70 adaptor.
  ☞ The triax system of the DXC-D50/-D55 does not fit to the HXC-D70 camera (i.e.: CA-TX50 and CCU-TX50).
  ⇨ Please also refer to Appendix (7.3.)

5.9.3. Remote Control Options

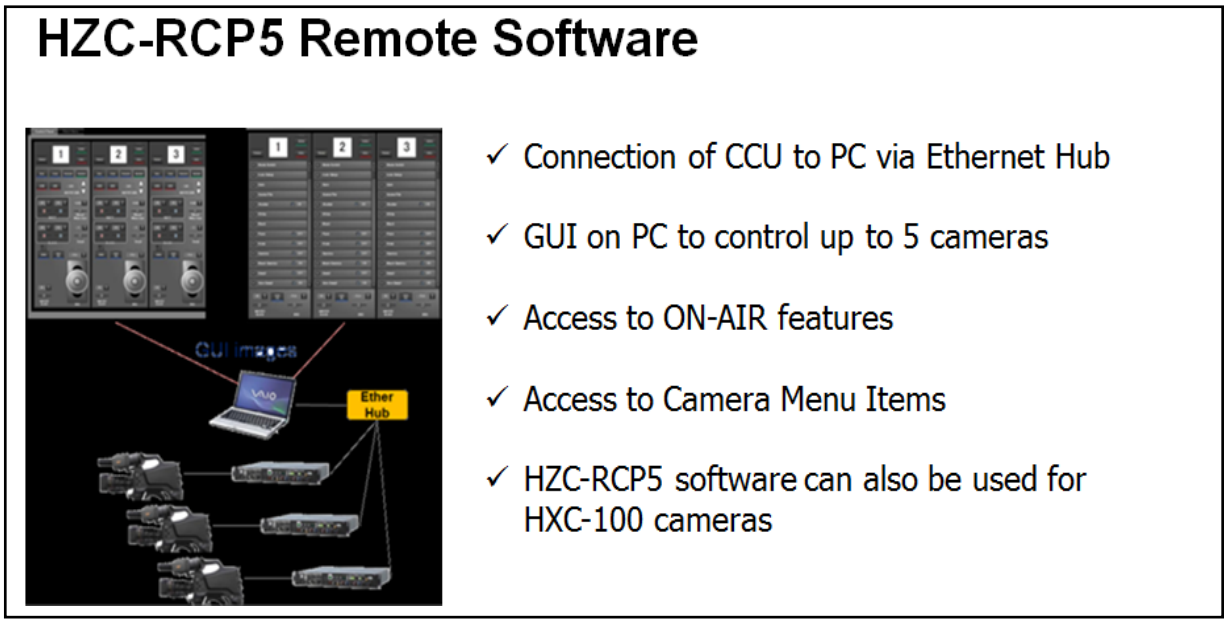
The new HXCU-D70 is compatible to the 700-command-protocol and as such, all remote control panels of the HDC-/HSC-series can compatibly been used. In peer-to-peer operation, even MSU-1000/-1500 control is possible.

Exclusively for the use in combination with the HXC-D70 series, Sony developed the new PC software (HZC-RCP5), to control up to 5 cameras via a very sophisticating GUI from a PC.

⇨ Please refer to picture 47 (next page)

In this case, the HXCU-D70 CCUs are connected to the PC via an Ethernet Hub.

⇨ Please also refer to Appendix (7.3.)



Picture 47: PC-Remote Control software for HXC-D70 series

6. Prime Support Offerings

6.1. Standard Support for Sony HD System Cameras

Support for B-2-B products is a very important and essential issue. The customer is working day by day with the equipment, sometimes even 24 hours a day and 7 days a week, and has to rely on its functionality as it is the technical source of his revenues.
Modern camera systems are very reliable and the failure rate is quite low. However, no one can deny that even the highest quality equipment may fail or show a malfunction … and this usually happens in a moment when it is absolutely not convenient (On-Air situation etc.).
A customer who purchases Sony HD system cameras from the beginning enjoys a very high level of support as a standard feature, much more than is legally mandatory. He can rely on a certain level of after sales support which comes bundled with the product at no additional costs.
However, there is much more support possible for each product and, therefore, Sony has tailored a specific PRIME SUPPORT program which matches the major requirements of our broadcast customers for a very reasonable price. It consists of several support modules which can individually be added to the product.

For those customers who even need more support, our service team will be more than happy to tailor an individual support package according to the budgetary and practical requests of the customer. Sony provides a field engineering team who can do support on location and if "reaction time" is a critical issue, just ask our support team what can be done to satisfy you.

The following chart gives a first overview about the support which comes bundled with the product (no additional costs) compared to the legal warranty (as provided by our competitors):

Overview: Support Offerings for Sony HD System Cameras

HDC-2500 Series **HDC-1700** **HSC-300R/-100R** **HXC-D70**	**Legal Warranty** (Sony Competitor)	**Prime Support Pack 2** (Standard feature) ***-no additional cost-***
Duration	1 year	**2 years**
Helpdesk	No	**Yes** (8h x 5 days)
Specialist Help	No	**Yes** (8h x 5 days)
Repair	**Yes**	**Yes**
Logistics	No	**Yes**
Guaranteed TaT (Turn-around-Time)	No	Option (refer to 6.2.)
Loan Unit	No	Option (refer to 6.2.)
Advance Parts	No	Option (refer to 6.2.)
Onsite Support	No	Option (refer to 6.2.)

6.2. Modular PRIME SUPPORT Packages

In addition to the Prime Support Pack 2, the customer has the choice to individually select the following pre-configured PRIME SUPPORT modules as an option:

No.	Type	Description	Duration	SAP Order Code
1.	**Initial Set Up**	**9:00 – 18:00 CET, Mon- Fri:** Excludes local holidays **1 x Day Visit** On site set up & adjustments for **up to 5 cameras and associated chains (HDCU and RCP only)** in the same visit and at the same location.	n.a.	PS.INSTALLATIONHDC
2.	**Software & Preventative Maintenance**	**9:00 – 18:00 CET, Mon- Fri:** Excludes local holidays **1 x Day Site Visit per anno** Inspect & **install latest Software** plus **annual preventative maintenance**, covering up to **5 camera heads & associated chains (HDCU and RCP only)** at the same location, incl. travel	3 Years 5 Years	PS.SWPREVENTMAHDC3 PS.SWPREVENTMAHDC5
3.1.	**Tech Support**	**9:00 - 21:00 CET**, **Mon-Fri**: Excludes local holidays Exclusive access to **specialist engineers**. Call back < 60 mins. **covering 1 camera head & associated chain (HDCU and RCP only)**	3 Years 5 Years	PS.TECHSUPP1HDC3 PS.TECHSUPP1HDC5
3.2.	**Tech Support** Volume Discount for 6+ units	**9:00 - 21:00 CET**, **Mon-Fri**: Excludes local holidays Exclusive access to **specialist engineers**. Call back < 60 mins. covering **up to 6 camera heads & associated chain (HDCU and RCP only)**	3 Years 5 Years	PS.TECHSUPP6HDC3 PS.TECHSUPP6HDC5
4.1.	**Extended Tech Support**	9:00 - 21:00 CET, **Mon-Sun**: Exclusive access to **specialist engineers**. Call back < 60 mins. covering **1 camera head & associated chain (HDCU and RCP only)**	3 Years 5 Years	PS.EXTECHSUPP1HDC3 PS.EXTECHSUPP1HDC5
4.2.	**Extended Tech Support** Volume Discount for 6+ units	9:00 - 21:00 CET, **Mon-Sun:** Exclusive access to **specialist engineers**. Call back < 60 mins. Covering up **to 6 camera heads & associated chain (HDCU and RCP only)**	3 Years 5 Years	PS.EXTECHSUPP6HDC3 PS.EXTECHSUPP6HDC5
5.	**Camera Loan Unit**	10:00 – 18:00 CET, Mon – Fri: **Next Business Day *,** Excludes local holidays During repair, **supply of a HDC camera**, or similar configuration. Covering **1 camera head & associated chain (HDCU and RCP only)**	3 Years 5 Years	PS.LOANUNITHDC3 PS.LOANUNITHDC5
6.1.	**Express Parts**	10:00 – 18:00 CET, Mon – Fri**:** **Next Business Day*,** Excludes local holidays Exclusive access to and the **supply of critical parts,** covering **1 camera head & associated chain (HDCU and RCP only)**	3 Years 5 Years	PS.EXPRESPART1HDC3 PS.EXPRESPART1HDC5
6.2.	**Express Parts** Volume Discount for 6+ units	10:00 – 18:00 CET, Mon –Fri: **Next Business Day*,** Excludes local holidays Exclusive access to **critical parts,** covering for **up to 6 camera heads & associated chain**	3 Years 5 Years	PS.EXPRESPART6HDC3 PS.EXPRESPART6HDC5

* Only available in the EU, Norway and Switzerland. Must be purchased with a Tech Support option above.

Our service & support team will be happy to assist you and tailor an individual support package for you according to your specific needs and requirements.

Please contact the Support Team in your country to learn more about the wide variety of support options we can individually tailor according to your specific requirements and budget.

Space for personal notes

7. Appendix

7.1. Comparison Chart Specifications	HDC-2000 HDC-2500	HDC-2400DF HDC-2400	HDC-2570	HDC-1700	HSC-300R	HSC-100R	HXC-D70
Optical Filters	5	5	5	5	4	4	4
Filterwheels	2 servo	2(DF) / 1 servo	2 servo	1 servo	2 servo	1 manual	1 manual
Pick Up Devices	3x CCDs Power HAD FX Type						3x CMOS EXMOR
Pixel Resolution (native)	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080
A/D Conversion	16 bit	16 bit	16 bit	16 bit	16 bit	16 bit	n.a.
Sensitivity (2000lx, 3200K, 0dB, 89.9%R., 50i)	F=11	F=11	F=11	F=11	F=11	F=11	F=13
Signal-to-Noise Ratio	60dB	60dB	60dB	60dB	60dB	60dB	59dB
V-Smear Level	-140dB			-135 dB			n.a.
Depth of Modulation	50% or more			45% or more			
Frame Rates							
1080/ 50i + 59.94i	+	+	+	+	+		+
720/50P + 59.94P	+	+	+	+	+		+
1080/23.98, 24, 25, 29.97 PsF	+	Option	Option	Option	Option		---
1080i (4:4:4-RGB)	+	Option	---	---	---		---
SloMo: 1080ix2 or 720Px2	+	Option	Option	---	---		---
1080/50P + 59.94P	+	Option	Option	Option	---		---
Signal Transmission (CHU ⇔CCU)	3G Fibre (digital)		Triax (digital/ 3G)	3G Fibre (digital)	Triax (digital/ 1.5G)		Multicore (digital)
Max. Cable Extension	Max. 4000m SMPTE Fibre Hybrid Cable SMPTE LEMO Connectors		Max. 1400m (14.5mm) FISHER	Max. 2000m SMPTE Fibre Hybrid Cable SMPTE LEMO Connectors	Max. 1800m (14.5mm) FISHER	Max. 1200m (14.5mm) FISHER	Max. 100m 50pin Multicore
Weight (Camera Head only)	4.5 kg				4.5 kg	4.1 kg	3.4 kg
Dimensions (WxHxD) / [mm]	363.0 x 135 x 268				363.0 x 136 x 263		322 x 144 x 265
Operating temperature	-20° ~ +45° C				-20° ~ +45° C	-20° ~ +45° C	-10° ~ +45° C
Power requirements (camera head unit)	DC 12V / 7A max.				DC 12V / 7A max.		DC 12V / 1.92A

7.2. Comparison Chart Key Features	HDC-2500	HDC-2400DF HDC-2400	HDC-2570	HDC-1700	HSC-300R HSC-100R	HXC-D70
Prompter Channels	2	2	1	1	1 (Fibre) 2 (Triax)	1
Ethernet trunk Channel	+	+	---	---	---	---
Data Trunk Channel	RS-232C/RS422	RS-232C/RS422	RS-232C/RS422	RS-422	RS-422	RS-232C
Utility Power Out (Camera Head)	DC 12V/2.5A	DC 12V/2.5A	DC 12V/2.5A	DC 12V/0.5A	DC 12V/2.5A	DC 12V/0.5A
Large Lens System Adaptor HDLA-1500/-1505/-1507	+	+	+	+	***Only HSC-300***	---
Utility Power Out (HDLA-xxxx) - with big CCU (HDCU-2000/-1000) - with small CCU (HDCU-2500/-1500)	 AC 220V/1A DC 12V/5A	 AC 220V/1A DC 12V/5A	 --- DC 12V/5A	 --- DC 12V/5A	***Only HSC-300R*** --- DC 12V/5A	---
Multi Camera Operation by MSU	+	+	+	+	Option (HZCU-MC3)	---
Noise Surpression Mode	+	+	+	---	---	---
Hyper Gamma Curves (pre-installed)	+ (4)	+ (4)	+ (4)	+ (4)	+ (4)	+ (4)
Skin Tone DTL	+ (3 CH)	+ (3 CH)	+ (3 CH)	+ (3 CH)	+ (3 CH)	+ (1 CH)
Natural Skin Tone DTL	+	+	+	+	---	---
Multi Matrix Function	+	+	+	+	+	---
Digital 2x Extender	+	+	+	+	+	+
VF DTL (Color + Monochrome)	+	+	+	+	+	+
Focus Assist Function	+	+	+	+	+	+
Adaptive Matrix	+	+	+	+	+	---
OPAC (Optical Axis Compensation)	+	+	+	---	---	---
ALAC 2 (Lens Aberration Correction H+V)	+	+	+	+	+	+
User Gamma (editable)	+	option	option	option	---	---
Knee Saturation	+	+	+	+	+	+
Low Key saturation	+	+	+	+	+	+

7.3. Compatibility Chart Peripheral Equipment		HDC-2000	HDC-2500 HDC-2400 HDC-2400DF	HDC-2570	HDC-1700*	HSC-300R	HSC-100R	HXC-D70
Monocular Viewfinder	***HDVF-200***	-	+	+	+	+	+	-
	HDVF-20A	-	+	+	+	+	+	-
	HDVF-C30WR	-	+	+	+	+	+	-
	HDVF-C35W	-	+	+	+	+	+	-
	CBK-VF01	-	-	-	-	-	-	+
	DXF-20W	-	-	-	-	-	-	+
Studio Viewfinder	***HDVF-550***	-	+	+	+	+	+	-
	DXF-C50WA	-	-	-	-	-	-	+
	HDVF-C550W	-	+	+	+	+	+	-
	HDVF-C730W	-	+	+	+	+	+	-
	HDVF-L750	-	+	+	+	+	+	+
	HDVF-L770	-	+	+	+	+	+	-
	HDVF-EL70	-	+	+	+	+	-	-
	HDVF-EL75	+	+	+	+	+	+	-
	HDVF-700A/B	+	+	+	+	+	-	-
CCUs	***HDCU-2000/-2500***	+	+	+	+	-	-	-
	HDCU-1000/-1500	+	+	+	+	-	-	-
	HDCU-1700*	+	+	+	+	-	-	-
	HDTX-200	+	+	-	+	-	-	-
	HDFX-200	+	+	+	+	-	-	-
	HSCU-300R	-	-	-	-	+	+	-
	HXCU-D70	-	-	-	-	-	-	+
	CCU-D50P	-	-	-	-	-	-	+
Large Lens	***HDLA-1500/-1505/-1507***	-	+	+	+	+	-	-
Remote Control	***RCP-1000/-1001***	+	+	+	+	+	+	+
	RCP-1500/-1501	+	+	+	+	+	+	+
	RCP-1530	+	+	+	+	+	+	+
	HZC-RCP5	-	-	-	-	-	-	+
	MSU-1000/-1500	+	+	+	+	Option	Option	-
Various	***HKC-T1500***	-	+	+	+	-	-	-
*Requires SW-Version V1.45 or higher								

7.4. Compatibility Chart: HDC-2500-/-1700 Series vs. HDC-1500R-Series

Camera Head Type	HDC-2000 2500	HDC-2400 2400DF	HDC-2750	HDC-1500RD	HDC-1500R	HDC-1700*	HDC-2000 2500	HDC-2400	HDC-1500RD	HDC-2000 2500	HDC-2400	HDC-1500R 1400R
CCU Type	HDCU-2000 / HDCU-2500 HDCU-1700*						HDCU-1000D HDCU-1500D			HDCU-1000 HDCU-1500		
1080/50i	+	+	+	+	+	+	+	+	+	+	+	+
1080/59.94i	+	+	+	+	+	+	+	+	+	+	+	+/-
720/50P	+	+	+	+	+	+	+	+	+	+	+	+
720/59.94P	+	+	+	+	+	+	+	+	+	+	+	+/-
1080/23.98P, 24P, 25P, 29.97P	+	Option HZC-PSF20	Option HZC-PSF20	+	+	Option HZC-PSF20	+	+	+	+	+	+ Option* HZC-PSF14
1080i / 4:4:4-RGB (10-Bit)	+	Option HZC-UG444	-	Option HZC-UG444	-	-	+	Option HZC-UG444	Option HZC-UG444	-	-	-
1080i / 4:4:4-RGB (12-Bit)	+	Option HZC-UG444	-	-	-	-	+	Option HZC-UG444	-	-	-	-
1080/50P + 59.94P	+	Option HZC-PRV20	Option HZC-PRV20	+	-	Option HZC-PRV20	+	Option HZC-PRV20	+	-	-	-
1080/100i + 119.94i	+	Option HZC-DFR20	Option HZC-DFR20	-	-	-	-	-	-	-	-	-
720/ 100P + 119.94P	+	Option HZC-DFR20	Option HZC-DFR20	-	-	-	-	-	-	-	-	-
Ethernet Trunk Channel	+	+	-	-	-	-	-	-	-	-	-	-
3D / Second Camera Transmission via single 3G fiber cable	+	+	-	+	-	-	+	+	+	-	-	-

*Requires SW-Version V1.45 or higher

7.5. Contacts in Sony PSE

For technical information on System Cameras contact to:

- Senior Marketing Manager – **NORTH** (Basingstoke)
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  We will be happy to help you.