



TECHNICAL CAMERA OVERVIEW

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Why use a Technical Camera

The main reason photographers use large format or technical cameras is to access the wide range of camera movements that are then available to them. The most common of these are explained in the following pages. The examples shown are created using a Hasselblad HTS 1.5 Tilt / Shift adapter but the principle and movements apply to view/technical cameras as well. These movements are possible due to the large image circles created by the lenses used, in conjunction with the ability to move the front plate holding the exposure unit (lens with combined shutter), or the rear plate with the capture unit (or film back) attached. Normally these two plates are joined via a bellows type arrangement. Modern designs of technical / view cameras may limit the movements to just the front plate and have a smaller bellows unit to keep the camera as compact as is possible to aid field use.

Movements

“Shift” is the moving of a lens, up and down or to the sides, from its central position while retaining its perpendicular orientation to the film plane. Simply put, the larger diameter of the projected image circle at the film plane allows for much greater freedom in “placing” the required image area within the now much broader circle before vignetting takes effect. And most importantly, all this happens without moving the orientation of the camera in relation to the subject. So if verticals, for example, are acceptable in the viewfinder, they will remain so whatever the amount of shift to include the “hidden” parts of the image. Simple but ingenious.



Image shows projected image circle(black circle) and the area covering the camera sensor (Red Rectangle). “Shifting” the lens allows the sensor box to be moved around the projected image circle.

“Tilt” differs from shift in that the normal perpendicular orientation of the lens to the film plane is changed resulting in a change in the plane of focus. This means that at any given aperture/focus setting, the depth of field in the subject will not remain as simply the space between two measured points from the camera as is normally the case, but increased or decreased. This amount is user controlled. Once again, simple but ingenious. By combining these two laws of physics, the doors of creative solutions are thrown wide open. The list of situations that could advantageously exploit tilt and shift is probably longer than it might first appear to be. For some professional photographers it could rapidly become an essential item for all work. But the story doesn’t end there. Large-format users have been using tilt and shift for many years, partly because they could, but partly because they had to. Some photographic solutions unfortunately, have also created problems, lens edge performance, for example, being one of them. The dilemma that arose forced photographers to find a compromise, between the “illness” and the “cure”.

USE OF SHIFT

For perfect parallel vertical lines in an image the camera needs to be parallel with the subject. Tilting the whole camera would produce converging parallel lines. By shifting the lens parallel to the image plane, you can raise or lower the view without tilting the camera. If the subject is a building as in this example, the camera should be placed level.

The example shown here demonstrates the shift movement using the HTS 1.5 Tilt / Shift adapter.



Camera positioned level with the ground. The top of the building is outside the area projected on to the sensor (HCD 28mm + HTS).



Camera tilted to include the top of the building resulting in converging verticals in the image.



Camera positioned level with the ground again, the lens shifted "up" 9mm to bring the top of the building into the image with converging verticals.

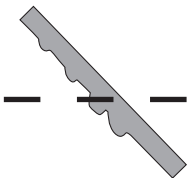


USE OF TILT

By tilting the lens in relation to the image plane, you can effectively tilt the plane of sharpness in the subject. Depending on your idea of the final image you can either use tilt to enlarge the apparent depth of field or reduce it.

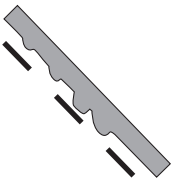


The full image

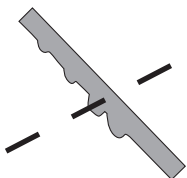


HCD28 + HTS 1.5 at f/11

No lens tilt produces some lack of sharpness in the foreground and background due to insufficient depth of field.



Lens tilted a few degrees to the right produces an image with perfect sharpness from the foreground to the background.



Lens tilted a few degrees to the left produces an image with an apparent shallow depth of field.

HTS 1.5 TILT/SHIFT ADAPTER SOLUTION

Digital photography has made it easier to use the tilt/shift features of technical cameras in order to achieve a particular photographic expression. Hasselblad solutions can play a large part in this area as all current professional digital solutions from Hasselblad are well adapted for technical camera operation to exploit the best from both worlds.

However, technical cameras can be awkward to work with in the field, and the controls to determine the desired focus are not optimal. So in addition to the use of Hasselblad sensor units, ground-breaking developments now allow for tilt/shift work using the HTS 1.5 tilt/shift adapter directly on an H system camera that offers a very user-friendly way to produce very high image quality results. The light and portable HTS 1.5 tilt/shift adapter for H system cameras enlarges the image circle to allow a +/- 18mm shift (half image height) and +/-10 degrees of tilt.

The adapter is compatible with six lenses: HCD 24mm, HCD 28mm, HC 35mm, HC 50mm, HC 80mm and HC 100mm and has a magnification factor that increases the focal length of each lens by 1.5 times.

With the introduction of Digital Lens Corrections where images processed in Phocus are automatically corrected regardless of HTS adapter setting, significant improvements strike the viewer immediately. All calculations and adjustments take place in the background monitored and governed by sensors in the adapter. The sharpness at the edge of the frame, despite the fact that the lens is pushed to its limits, remains stunning.

On the creative front, it has long been standard practice for photographers to break the rules in order to produce images that show something just a little different. Large-format users were well-acquainted with the imaginative possibilities that arose from making the “wrong” camera or lens movements. And now Hasselblad users can enjoy this stimulating freedom as well. Fascinating and captivating

images are easily conjured up and controlled with just a few slight movements. The combination of large sensors and razor sharp lenses – and now tilt and shift possibilities – Hasselblad has brought some of the creative aspect of former large-format world to the digital medium format. Take a look at this revolutionary accessory, and try it out yourself to see how this product could rapidly become an essential part of your photography toolkit.

The powerful combination of tilt, shift and Digital Lens Corrections can bring new perspectives to your photographic vision and provide a marked change in both the technical and creative aspects of your work.



H6D with the HTS 1.5 Tilt/Shift adapter and the HCD 28mm lens. For details, please refer to separate datasheet.

TECHNICAL CAMERA OPTIONS

Many companies manufacture specialist technical cameras. There are four major producers consisting of Alpa, Arca Swiss, Cambo and Linhof. The camera body itself tends to be fairly simple but with an emphasis placed on high tolerances of engineering. Lenses are normally supplied by Schneider and Rodenstock. Viewfinders are not through-the-lens types but simple optical constructions. More modern solutions have seen Apps used on smart phones for framing and composition in conjunction with the camera.

A summary of the four main companies is below.

ALPA

www.alpa.ch

From the Alpa Website

“All models of the ALPA range form a common, modular platform that ensures full compatibility. Part of the concept are integrated lenses from 23 to 250 mm focal length, adapters for digital backs, and directly attachable roll-film backs up to 6x9 as well as an extensive range of accessories.”



The Alpa 12 TC

ARCA SWISS

The first Arca Swiss models were made in the 1950's. They manufacture cameras from the traditional 4x5 and 10x8 models to the R, M and F line cameras.



The Arca Swiss Rm3di

CAMBO

www.cambo.com

Founded in the Netherlands in 1946, Cambo is now known for its popular Wide RS and DS series cameras.



The Cambo Wide DS

LINHOF

www.linhof.de

Linhof has been producing cameras for over 120 years. Their most recent offering, The Techno, is designed for Landscape and Architectural photographers.



The Linhof Techno

ATTACHING TO LARGE FORMAT CAMERAS

The sensor unit from the H3D, H4D, H5D, H6D and the 503 CWD can be removed and mounted on a technical camera platform. CF/CF-MS/CFV/CFH digital backs can also be mounted onto a technical camera platform.

Two options are available to attach sensor units to technical cameras. The first is called a 'Live Video Adapter' because the only method of composing and focusing the image is via Live Video controls in Phocus. The second is a 'Sliding Adapter' that allows the use of a conventional ground glass screen for composition with the ability to then slide the digital unit back in place.

These items are not supplied by Hasselblad but are easily obtainable from third party suppliers such as Silvestri. Some examples follow.



Example of Hasselblad V system Live Video adapter



Example of Hasselblad V system sliding back adapter

The 'Hasselblad V system sliding back adapter' is also available in H format mount. Both these adapters are available for popular technical cameras such as Linhof, Sinar, Arca Swiss and Rollei. Often the manufacturer of the technical camera will also be able to supply similar adapters.

All professional Hasselblad digital products can be used with large format cameras. All of our sensor units (except the CWD and CFV) have a sophisticated interface, and allow microprocessor controlled connections to electronic shutters for full control of aperture, shutter and exposure. Alternatively exposure can be triggered by a simple flash sync connection.

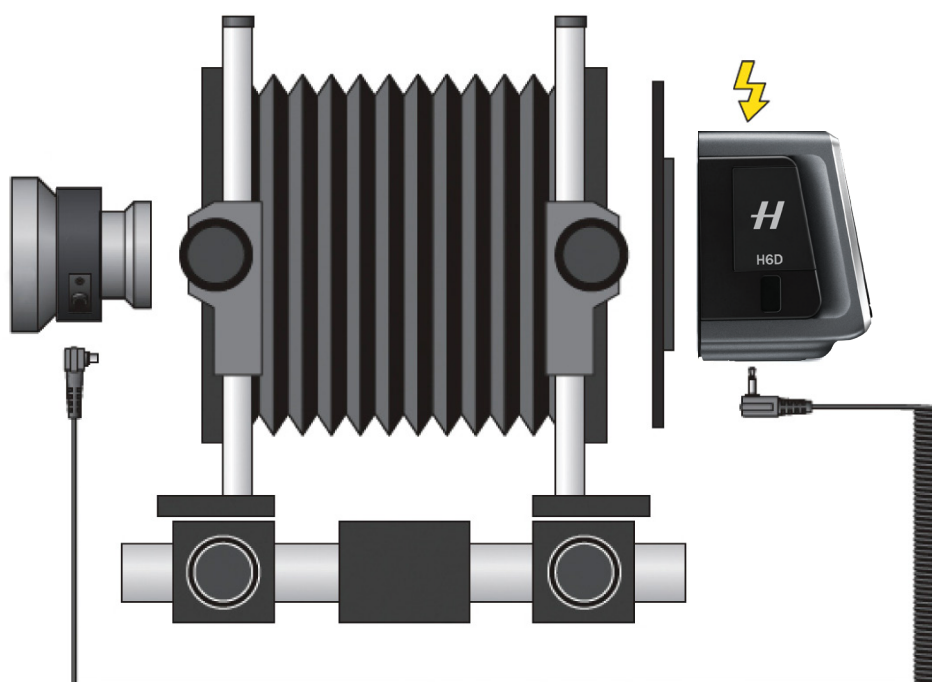
Hasselblad product	Connection type		
	Flash sync with Manual Shutter	Flash sync with Electronic Shutter ¹⁾	Electronic shutter with full control of Aperture and Shutter
H6D & CFV-50c	Yes	Yes	Yes
H5D & H5D-MS	Yes	Yes	Yes
H3DII & H3DII-MS	Yes	Yes	Yes
H4D & H4D-MS	Yes	Yes	Yes
CF & CF-MS, CFH	Yes	Yes	Yes
503 CWD & CFV	Yes	Yes	No
CFV-50	Yes	Yes	Yes

SHUTTER	MANUAL COPAL SHUTTER	SCHNEIDER SHUTTER CONTROL S	SCHNEIDER SHUTTER CONTROL ES	ROLLEI LENS CONTROL S	ROLLEI eSHUTTER LENS CONTROL S	SCHNEIDER ELECTRONIC SHUTTER	SCHNEIDER E-SHUTTER USB	RODENSTOCK eSHUTTER
CAMERA/BACK								
H3DII & H3DII-MS	YES	YES	YES	YES	YES	YES	YES	TBC
H4D & H4D-MS	YES	YES	YES	YES	YES	YES	TBC	TBC
H5D	YES	YES	YES	YES	YES	YES	TBC	YES
H5D-MS	YES	NO	NO	NO	NO	NO	NO	TBC
H6D	YES	NO	NO	NO	NO	NO	NO	YES
H6D-MS	YES	NO	NO	NO	NO	NO	NO	TBC
CF & CF-MS, CFH	YES	YES	YES	YES	YES	YES	YES	TBC
503 CWD & CFV	YES	YES	YES	YES	YES	YES	YES	TBC
CFV-50	YES	YES	YES	YES	YES	YES	YES	TBC
CFV-50c	YES	YES	YES	YES	YES	YES	YES	TBC

CONNECTION OPTIONS

MANUAL FLASH SYNC

A method is required to physically trigger the lens shutter and the sensor unit simultaneously. This can be done via a very simple flash sync connection or via a sophisticated electronic interface. Using a manual copal type lens, connection is made from the lens flash sync post to the Sync In port on the digital unit. Therefore when the exposure is manually triggered on the lens, the digital unit receives a signal to expose simultaneously. If flash lighting is required then connection is made from the Sync Out port on the digital unit to the flash equipment. This applies to ALL models. For this mode to operate successfully, change 'Camera' type on the sensor unit menu to 'Flash Sync'.



Some Copal type shutters may display varying synchronization times which could result in magenta streaking and inaccurate exposure. This is especially visible with shorter exposure times.

A wake-up cable such as the unit below will ensure that the sensor unit is ready to integrate the image at the time of the capture.



For ALPA cameras it may be necessary to use the ALPA Sync Release, item no. 170.800.010 and ALPA Hasselblad sync chord ASC-HAS-L to ensure correct sync with Copal shutters.

FLASH SYNC WITH ELECTRONIC SHUTTERS

The use of an electronic shutter with a flash sync connection may be more convenient as it prevents the user disturbing the lens to adjust exposure settings or allow easier access to make these adjustments. Please note that using an electronic shutter in this way requires a control panel from the manufacturer to allow aperture selection, shutter Speed and capture control.

Three systems are supported by Hasselblad, from Schneider, Rollei and Rodenstock.

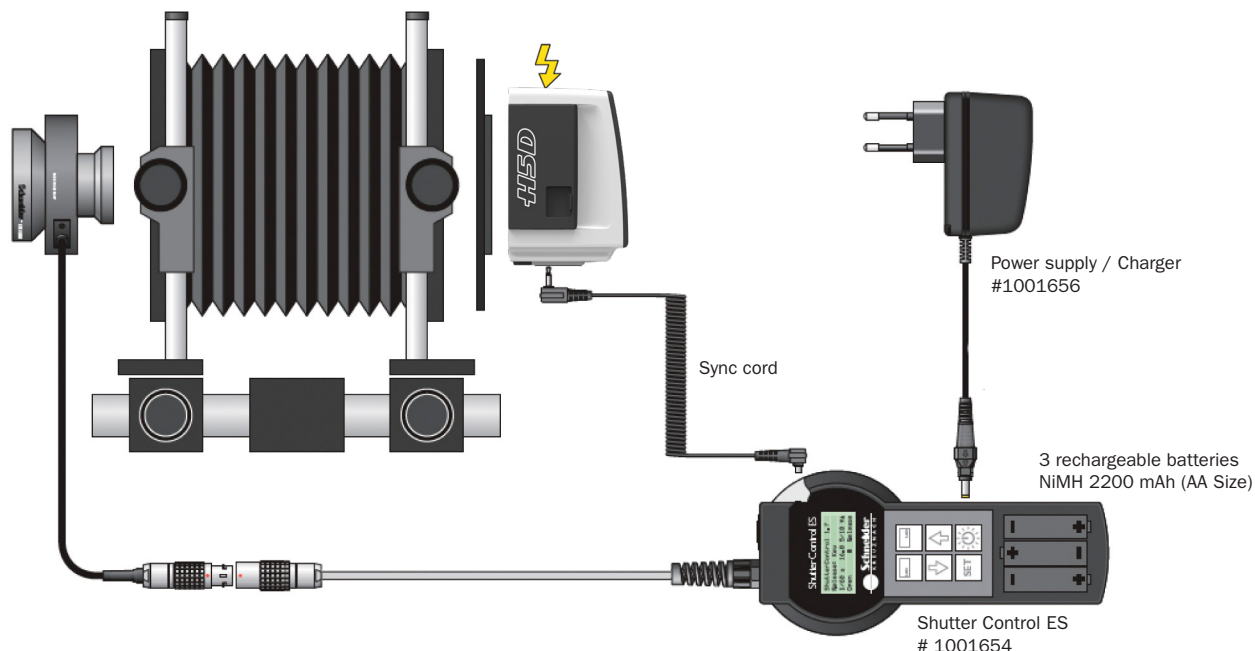
These systems comprise a battery, USB or mains powered control unit, connection interface to the electronic shutter / lens, connection interface to a digital capture unit (not used in this case) and flash synchronisation output. The control unit or App will allow the user to select aperture value, shutter speed and trigger the exposure.

The following pages contain connectivity diagrams for Schneider, Rollei and Rodenstock using Flash Sync connections. These use the Shutter Control ES, LensControl S and eShutter 0 respectively. The yellow flash symbol shows where external flash should be connected if needed (the Sync Out port on the sensor unit).

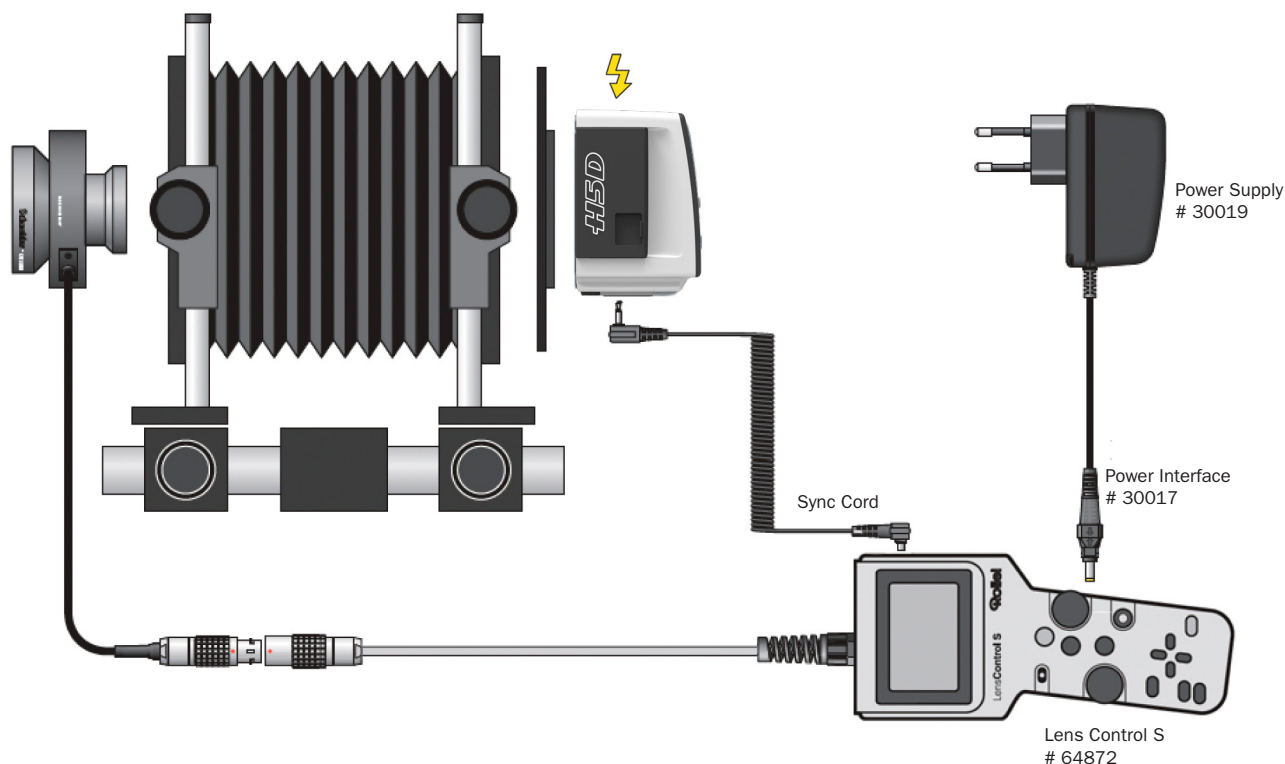
In this case the HxD digital unit is shown, but the same applies for the CF, CFV and CWD products.

Schneider, Rollei and Rodenstock (with the exception of the sync cord) supply all cables and equipment. A summary of all parts needed is at the end of this document.

SCHNEIDER – SHUTTER CONTROL ES

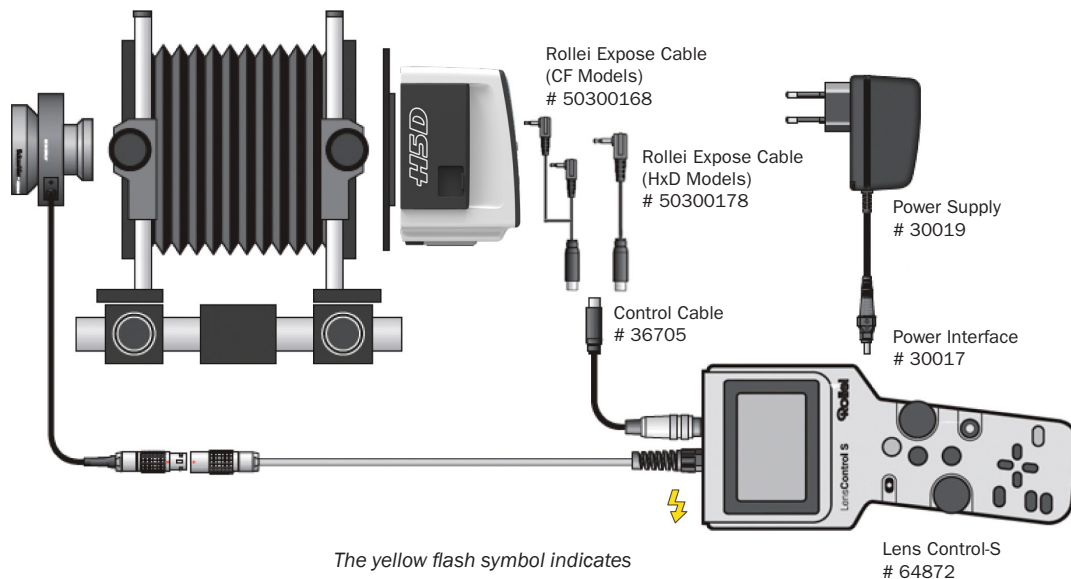


ROLLEI- LENS CONTROL S



ROLLEI ELECTRONIC SHUTTER CONNECTIONS - ROLLEI LENS CONTROL S

Unlike the Schneider system, the Rollei Lens Control - S must be used in conjunction with a control panel. This will allow use of a Hasselblad sensor unit in a studio or portable situation, either working tethered to a computer with Phocus running or working untethered capturing to Compact Flash media.

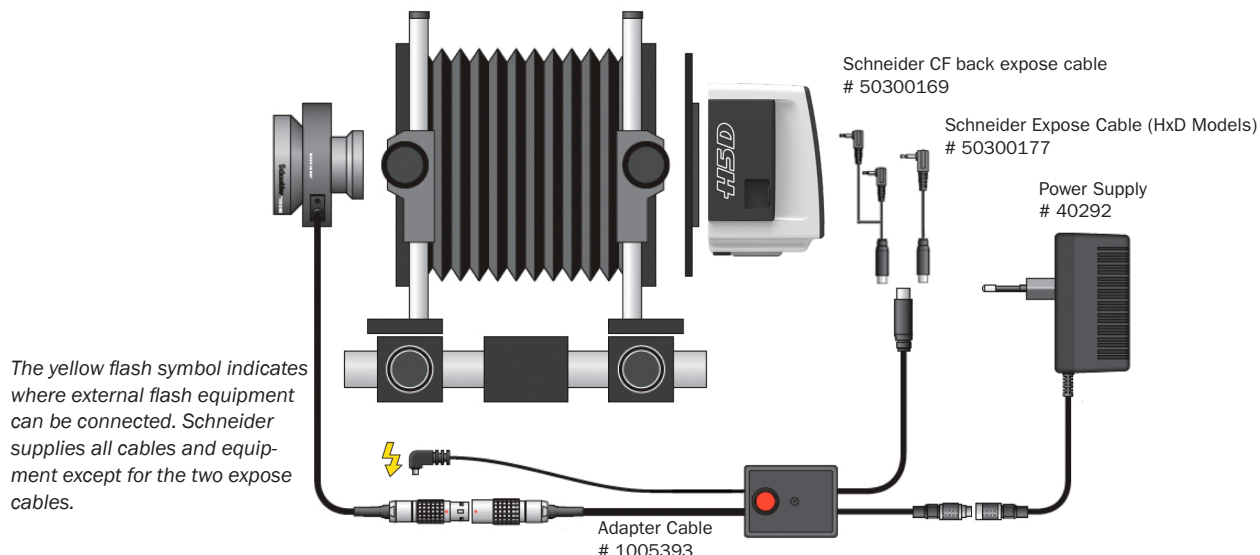


The yellow flash symbol indicates where external flash equipment can be connected.

Rollei supplies all cables and equipment with the exception of the Rollei Expose Cable # 50300168.

SCHNEIDER ELECTRONIC SHUTTER CONNECTIONS

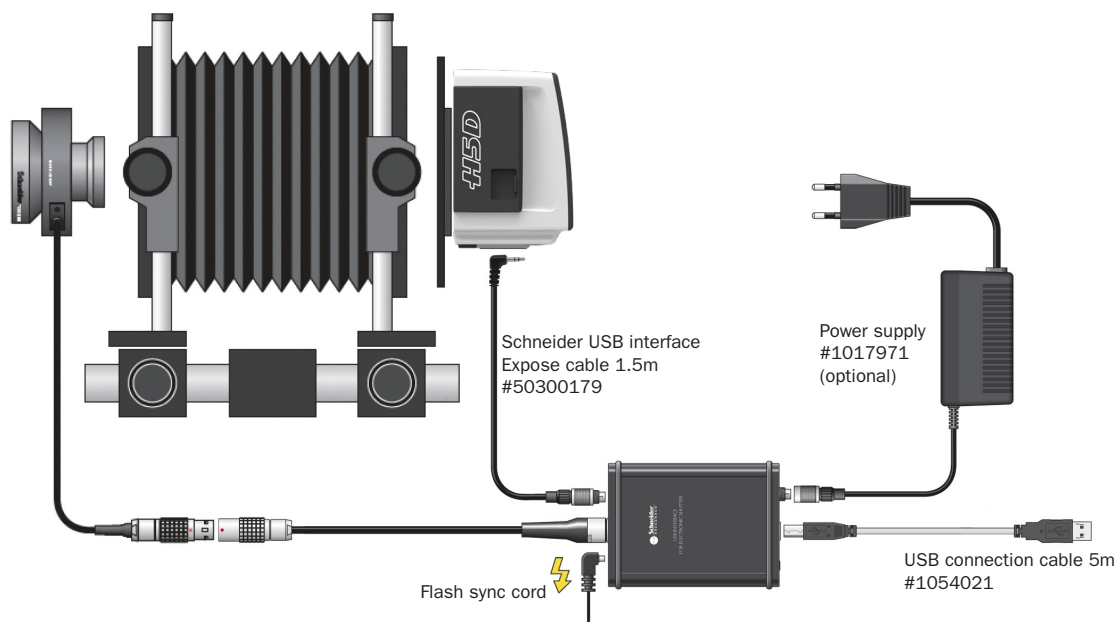
This system works with a simple cable connection and small control box. This has a single red button that is only used for opening and closing the shutter for focus and composition. All aperture settings, shutter speeds and triggering capture are made from Phocus.



SCHNEIDER – USB INTERFACE

The Schneider USB adapter is supported via a single cable connected to the Hasselblad sensor unit.

Aperture, shutter speed settings and capture are controlled via the Schneider software with 'Camera' on the sensor back menu set to 'Pinhole' mode. The exposure is then initiated via Phocus software. This also allows for multi-shot captures.



RODENSTOCK eSHUTTER

With this shutter connected via USB you will now be able to control it's aperture and shutter setting from within Phocus (3.1.15 or later). The camera should be configured as "Pin-hole" and a trigger cable connected from camera flash sync socket to eShutter.

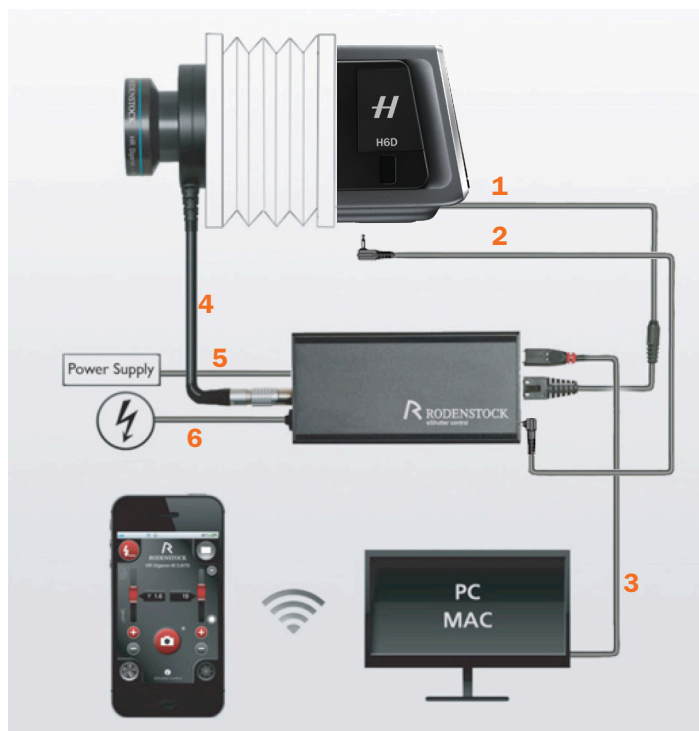


Image courtesy of Rodenstock

1. DIGITAL BACK FLASH IN CONNECTION(2.5MM) TO READY/OEM CONNECTOR ON SHUTTER CONTROLLER
2. DIGITAL BACK FLASH OUT (3.5MM) CONNECTOR TO CONTROLLER RELEASE CONNECTION (2.5MM).
3. USB CONNECTION FROM COMPUTER TO SHUTTER CONTROLLER
4. LENS SHUTTER CONNECTION
5. POWER SUPPLY UNIT CONNECTION
6. FLASH UNIT SYNC LEAD CONNECTION

The Rodenstock eShutter is a modern, electronically controlled shutter solution. The shutter can be fully controlled from your computer, as well as by iPhone, iPod Touch or iPad and transferred via Wi-Fi or WLAN to the computer. Full information on configuring the eShutter can be found here:

http://www.rodenstock-photo.com/Archiv/Rodenstock_eShutter.en_10383.pdf

PORTABLE BATTERY SOLUTIONS

EXTERNAL POWER SOLUTION H6D

When the Sensor Unit is detached from the H6D camera body, external power will have to be provided to the DC input (A). The input voltage range is 12 to 24 VDC.

A good external power solution is a Laptop Powerbank. This has normally an adjustable output voltage and sufficient power for extended use. One model that has been tested and qualified to work is the “XT-20000QC2 Power Bank” from XTPower. See “<https://www.xtpower.de>”.

Hasselblad will on request and free of charge supply a DC Cable between the Power Bank and the Camera (Item number 3054180). Please contact your dealer.

An alternative power source for US customers is the “GBTIGER 50000mAh Power Bank” (model: B01N1SHRB1) available from Amazon.com. If using the supplied cables and tips an additional 3.5mm x 1.35mm male plug to 5.5mm x 2.1mm female socket DC power cable will be required.

Note!

When using power banks other than the XT-20000QC2, please make sure that the minimum output power before automatic shut-off is equal to or lower than 2.5W. A higher value can turn off the battery when the camera goes to standby mode.

BATTERY ADAPTER FOR H4D-60 & H5D

Tested for all H4D-60 & H5D digital capture units, this battery adapter kit supplies power when used on a technical camera and whenever Firewire power is not available. It uses a Sony™ InfoLithium L type rechargeable battery and includes ports for flash sync in and out.



XT-20000QC2



GBTiger-50000 mAh



The Hasselblad portable battery pack in place with sync leads attached.

Parts Summary

ITEM	ITEM NO.	SUPPLIER
FLASH SYNC CONNECTION WITH MANUAL / COPAL SHUTTERS		
Camera Sync Cable from lens to digital capture unit	50300122	Hasselblad
Flash generator Sync Cable with protecting fuse	50300136	Hasselblad

FLASH SYNC CONNECTION WITH ELECTRONIC SHUTTERS – SCHNEIDER		
Power Supply / Charger	1001656	Schneider
Shutter Control ES	1001654	Schneider
Camera Sync Cable from lens to digital capture unit	50300122	Hasselblad
3 x NiMH 2200mA (AA size)	N/A	By user

FLASH SYNC CONNECTION WITH ELECTRONIC SHUTTERS – ROLLEI		
Power Supply	30019	Rollei
Power Interface	30017	Rollei
Camera Sync Cable from lens to digital capture unit	50300122	Hasselblad
Lens Control SKL	64872	Rollei

FULL CONTROL WITH ELECTRONIC SHUTTERS – SCHNEIDER		
Adapter Cable	1005393	Schneider
Power Supply	40292	Schneider
HxD Expose Cable	50300177	Hasselblad
CF back Expose Cable	50300169	Hasselblad
Schneider USB Interface Expose cable	50300179	Hasselblad

FULL CONTROL WITH ELECTRONIC SHUTTERS – ROLLEI		
Lens Control-S	64872	Rollei
Power Supply	30019	Rollei
Power Interface	30017	Rollei
Control Cable	36705	Rollei
H3D Expose Cable	50300178	Hasselblad
CF back Expose Cable	50300168	Hasselblad

FULL CONTROL WITH RODENSTOCK eSHUTTER		
eShutter Control Unit	I029-004-000-20	Rodenstock
USB Cable	I029-006-000-20	Rodenstock
X-Flash Cable	I029-005-000-20	Rodenstock
3.5mm Jack to 2.5mm Jack cable (0.5m)	N/A	By User
eShutter connection to 2.5mm Jack	N/A	By User



1.1 VIEW CAMERA OPERATION

The Sensor Unit of the H6D camera can be detached and used on other types of cameras, e.g. View Cameras, with an H System magazine interface. This will enable the use of additional functionality such as extended Tilt and Shift using lenses with large image circle.

The current firmware of the H6D camera enables the following modes of operation:

- 1 Flash Sync Mode
- 2 Pinhole Mode

POWER SOLUTION

When the Sensor Unit is detached from the H6D camera body, external power will have to be provided to the DC input (A). The input voltage range is 12 to 24 VDC.

For those working within a studio environment a DC power supply will give the most satisfactory results. The power supply should deliver between 12 and 24VDC and be able to supply at least 40W (20VDC, 2.0A). It will need to have a 3.5mm x 1.35mm Male plug fitting for connection to the sensor unit.

A good external power solution for field use is a Laptop Powerbank. This has normally an adjustable output voltage and sufficient power for extended use. One model that has been tested and qualified to work is the “XT-20000QC2 Power Bank” from XTPower. See “<https://www.xtpower.de>”.

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Note!

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Power Connection



External Power solution



XT-20000QC2



GBTiger-50000mAh

PINHOLE MODE

Pinhole mode can be used when the optical system does not have a flash sync terminal.

Procedure:

- 1 Detach the Sensor Unit from the H6D camera body. Be careful not to damage the IR filter in front of the sensor.
- 2 Attach the Sensor Unit to the Camera. Follow instructions from the manufacturer.
- 3 Connect external power to the DC input socket (A). The Sensor Unit will automatically start.
- 4 From the Camera Menu, select Camera Body. In the pop-up, select "Pinhole". Press Menu button or tap outside pop-up to save and close.
- 5 Exposure time is set on the Control Screen.

Control Screen

In Pinhole Mode, the Control Screen has fewer items than when used on an H camera. From this screen you can change:

- White Balance
- ISO
- Exposure Time
- Exposure Mode (Manual or Video)

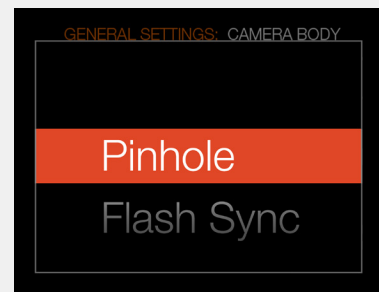
An exposure is triggered by pressing the orange button (B). It can be made both from the Control Screen and from the Live View screen.

You can also activate Live View by tapping the "LV" icon (C). When Live View is active, an orange exposure button is shown.

Note!

The button in Live View can be dragged to any location by pressing and holding.

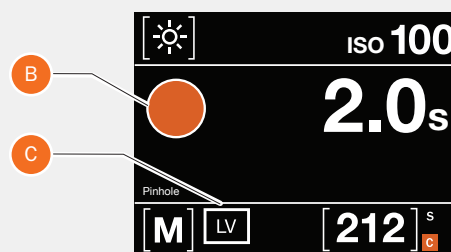
Camera Body Settings Menu



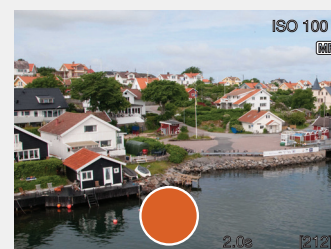
Power Connection



Control Screen in Flash Sync mode



Live View in Pinhole mode

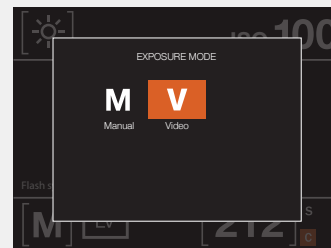


VIDEO

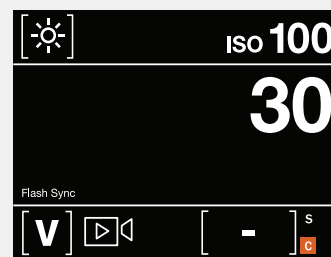
Video can be recorded onto the storage media in the Sensor Unit when attached to the View Camera. Follow the procedure below.

- 1 Open the Control Screen by swiping down from the top on the Main Menu screen.
- 2 Tap the Exposure Mode and tap the “V” icon to activate Video Mode.
- 3 From the Control Screen you can change:
 - White Balance
 - ISO
 - Shutter Speed (1/30 to 1/8000)
 - Exposure mode
- 4 Make sure that the lens is open.
- 5 To start Video Live View, tap the icon (A)
- 6 In Video Live View you can set Shutter Speed by pressing the corresponding buttons under “-” and “+”.
- 7 Double tap the screen to zoom in to 50% or 100% (depending on setting) for critical focusing.
- 8 Start video recording by tapping the button (B)
- 9 Stop video recording by tapping the button (C)

Exposure Mode selection



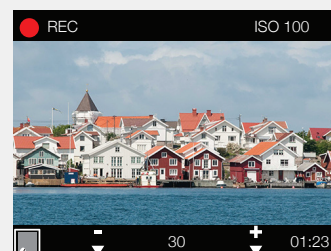
Control Screen in Flash Sync/Pinhole Mode



Video Live View Screen



Video recording



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