

# User Guide P 65+ Digital Full-Frame back



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## 1.0 Introduction

Thank you for choosing Phase One P65+ digital camera back solution.

The Phase One P+ Series, provides you with the advantage of having the most powerful digital camera solution whether you are working portable in the field or tethered in a studio.

When shooting portrait, landscape, fashion, wedding, product or architectural photography you will always be able to find a Phase One digital back that fits your needs.

The Phase One P+ Series system gives you the absolute best solution when it comes to image quality and workflow.

Capture One is the RAW file processing software created to users of the P+, P, H Series as well as the Lightphase, and is available for either Mac OS X or Windows. The Capture One online user guide is the general manual for this software.

The P 65 + is a genuine revolution, for the first time in history a medium format full frame CCD has been released; proving Phase One to be the leading developer of digital photographic equipment.

For the first time you actually get 2 backs in one – no cheap sales trick, the P 65+ is a FULL-FRAME 60.5 megapixel AND a FULL-FRAME 15 megapixel digital back of world class quality.

This manual “P65 + Users guide” covers the specific P65+ features and functionality.

The P+ Series is ready to be used right out of the box.

At Phase One we are always committed to provide you with the best solution for the professional photographer.

We sincerely hope you will enjoy working with this new innovative product.

## 2.0 Unpacking the P65+

The suitcase contains all the necessary parts; Compact Flash card (CF card), CCD Cleaning Kit, digital back, batteries and charger. Suitcase and system contents may vary depending on purchase: Classic (basic components) or Value added (everything needed).

The Software package, this manual and the LCC calibration kit are included in the Phase One Leather binder and functions as a lid over the utility compartment.

In the utility compartment you will find the CF card reader, cables and international power adaptors. In daily usage the utility compartment can be expanded by pulling out the inside square-to-circle foam, making the space ideal for use as camera body compartment.

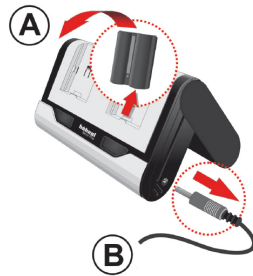
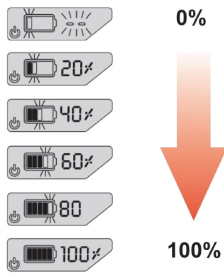
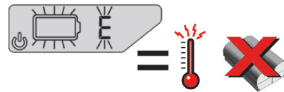
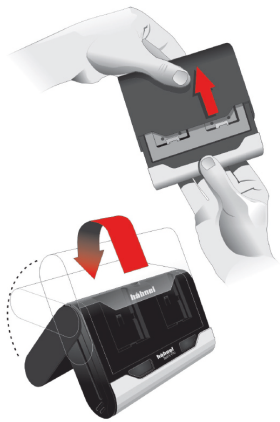
### Configuring the system suitcase to fit your needs

With the “Value Added” suitcase it is possible to pull out the entire foam insert and use the supplied dividers and double sided Velcro tape to configure your own system suitcase.

The Velcro tape can be cut out and bent around the edges of the dividers. This makes it easy to fixate these inside the suitcase.

4 dividers are supplied, use a large scissor or tool knife to cut out one of them into three or four smaller pieces, and use these for splitting the compartments into smaller sections.





## 2.1 Charging the batteries

When the system is unpacked the first thing to do, is to charge the batteries fully.

The Value Added Suitcase is delivered with two 7.2 volt Lithium-Ion batteries and a duo-charger.

Only one battery is used in the P+ back at a time, but it is recommended to charge both batteries fully before you start. While charging the batteries, you can still use the camera back if you connect it to the IEEE1394/ FireWire port on your computer using a 6-pin FireWire cable.

The battery charger can adapt to voltages within a range of 110 to 250 volts.

It comes with an international set of power adaptors (placed in the suitcase utility compartment), please select one that fits your outlet, and mount it by sliding it in from the top.

Connect the unit to the outlet and charge the batteries (approximately 2.5 to 3 hours).

After the first initial charge, the batteries can be charged when needed please notice, if you let the battery in the charger after fully charged, the duocharger will still see the battery as 100% even though power may have fallen, before usage it is recommended that the battery is dismantled and remounted.

## Purchasing extra batteries

The Phase One P+ back comes with two 2500mAh batteries. If you need to purchase extra batteries

Due to difference in the tolerances of some third party batteries, these may not fit into the digital back's battery compartment. Do not try to force a battery into the compartment. When pressing the battery release button it should slide in without problems.

### Warning!

- Only use the Charger to charge the specified batteries
- Do not allow charger to get wet or get exposed to moisture
- Keep the Charger out of reach of children
- Once charging is completed, unplug the charger from power source
- Only use the original mains adaptor 12V DC or car lead
- Never apply excessive force when connecting or disconnecting a battery or contact plate.
- Keep all contacts clean.
- Do not force down any of the contacts.
- Do not short-circuit the contacts.
- Never store the battery connected to the charger for an extensive period of time.
- Do not expose to excessive heat or naked flame.
- Do not dismantle or carry out any alteration to the product
- Do not attempt to eat or swallow the battery



## 2.2 FireWire in general

You will find several standards of FireWire solutions today, the Phase One backs can handle most standards, but you should be aware that the back is created for the 6-Pin technology. The different technologies of FireWire are usable when shooting on the Phase One digital backs.

**FireWire 400 “4-Pin”** will allow transport of image files or setting files from computer to Back, but can not provide power for the back.

**FireWire 400 “6-Pin”** will provide power for the back at the same time as images are transferred.

**FireWire 800 “9-Pin”** the latest generation of FireWire can be used if you use the 9-Pin to 6-Pin cable or an adaptor on the back, this cable will still provide power and transfer of files to and from the back. when using this cable you need a 6 to 9-pin converter.

**FireWire 800** will allow you to power your back using the cable and transfer images just like the 6-Pin

**4 to 6 pin converter** is needed when using a 4-pin cable; the adaptor allows you to plug-in the cable in the digital back. When using this – and the 4-pin cable you should force the back to get power from the battery.

**400 to 800 converter “6 to 9 pin converter”** is needed if your computer only accepts 9-pin cables, using this converter allows you to use the 9-Pin cable



### 2.3 Classic vs. Value Added

All parts of the value added kit is available as spare parts; should you need extra equipment, please consult your local dealer on different Phase One or third party solutions.

Most important for the professional photographer are securing the uptime of the camera and back, to be as safe as possible consult your dealer to get information on the best solution; most uptime solutions provided by Phase One can be purchased after acquiring the back or camera.



Features:	Classic	Value added
<b>Case</b>	Standard Hard Case	Carry on Stroller Case w. Room for laptop and accesories and lenses.
<b>Start Box</b>	USB Key with documentation Quick Guide -	USB Key with documentation Quick Guide QP Gray card
<b>Warranty</b>	1 Year	3 years
<b>Power</b>	Dual Battery charger US/EUR/ASIA adaptors 1 rechargable battery 1 cam battery handle (system only)	Dual Battery charger US/EUR/ASIA adaptors 2 rechargable batteries 2 cam battery handles (system only)
<b>Vievfinder</b>	Celoid mask (digital back only) Focusing screen (System only)	Celoid mask (digital back only) Focusing screen (System only)
<b>Cables</b>	Standard FireWire cable 4.5m - -	Standard FireWire cable 4.5m FireWire 400 to 800 cable 4.5m Multiconnector Sync cable
<b>Storage</b>	- -	Sandisk 4 GB Extreme IV CF card Sandisk FireWire Card Reader
<b>Software</b>	Capture One DB Software CD	Capture One PRO Software CD
<b>Accessories</b>	Lens back and front caps (Sys. Only) Phase One Camera strap (Sys. Only) - - -	Lens back and front caps (Sys. Only) Phase One Camera Strap (Sys. Only) Microfibe Lens cleaning cloth HB mount lens adapt. (System only) Digiclean CCD Cleaner kit LCC Calibration kit (Opal plate)



## 2.4 Classic vs. Value Added warranty

Before shipping, all Phase One digital backs undergo a thorough manual inspection and control procedure, our skilled technicians are checking:

- Sensor focus adjustment
- Luma/Chroma calibration & verification
- Illumination invariance verification
- Physical surface inspection
- Usability testing & capturing of images
- Visual inspection of images
- Final test cycle & more...



Besides this thorough and specialized test you have 2 different service choices.

Service	Classic	Value Added
Warranty period	1 years	3 years
Free repair of manufacturing defects	Yes	Yes
Shutter actuations covered	Unlimited	Unlimited
Product defect within first month	Repair	New Product
Free loan unit during repair	No	Yes
Free camera platform exchange*	No	Yes
24/7 online support forum and access to knowledge base articles	Yes	Yes
Guaranteed upgrade program	Yes	Yes

Ask your local dealer or consult [www.phaseone.com](http://www.phaseone.com) on extra campaigns and possibilities regarding securing your workflow and your daily assignments now and in the future.

\* Read the warranty policy

### 3.0 Introduction to the P65+

#### System overview

The Phase One P+ back is designed specifically to fit on one of several brands or models of medium format cameras.

This overview section will deal with generic features, available in all these different models: Tethered or untethered operation, preview display functions, menu system controls (the P+ backs have four buttons controlling the settings in the back), etc. Certain camera specific explanations are placed in sections later in this manual. These can be instructions on how to attach the P 65+ back on a camera, how to install the focusing mask provided if needed, special cable connections and other considerations.

You might want to look into the camera specific section before returning to the overview to learn about your specific configuration needs.

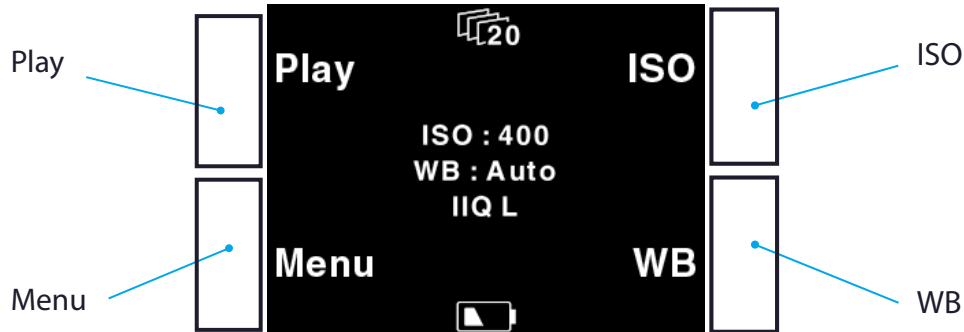
#### Full-Frame

P 65+ is the first digital back created to provide the full 645 format. This means that for the first time on medium format, your lens has the actual focal length that is intended. Using the P 65+ you do not need a mask to show the crop of your view that actually is your capture area.

#### Sensor+

P 65+ offers the largest CCD and the largest RAW files; large RAW files will need longer time to move from the buffer to the card. If you prefer smaller files Sensor+ will create files sized app. 25% of the same photographic area as default, at the same time; the CCD will offer significantly more sensitive ISO settings, lower noise ratio and an significantly increased speed.

[Read more on Sensor+.](#)



### 3.1 Tethered or untethered operations

**Untethered:** P65+ back can be operated as a fully portable unit powered by the embedded battery and shooting to a compact flash card or microdrive which is inserted in the CF-card slot on the left side of the camera back. The advantages of using it as a fully portable device are obvious, but operating tethered has advantages too.

**Tethered:** When operating in a studio, connected to a computer via FireWire you are not dependent on battery power or storage media.

The FireWire specification specifies 4.5 meter cable lengths as maximum, longer cables might require a third party power solution or FireWire hub. P 65+ matches FireWire 400 standard, if your cable or computer should only accept FireWire 800 standard, use the adaptor that are included in the kit.

When operating tethered you have the option of capturing the images to the CF-card using the Fire-Wire cable merely to provide power to the back.

When unplugging the P+ back from the FireWire or by closing Capture One, the P 65+ back will look for CF-card or microdrive®, and using the battery for power. Autodetect prioritizes FireWire/Capture One firstly and CF/external storage secondly.

Also when capturing tethered to laptop with 4 pin mini 1394/FireWire without power it will require a battery in the P 65+ back. Using the four menu buttons you can setup the preferences for all these operational features.

I.e. the display time of the images, time before backlight is dimmed, ISO, file format and white balance.

For more information on capturing tethered with the Phase One Capture One application please consult the online user guide available in the Capture One Help menu.



### 3.2 General Hardware Setup

The P 65+ back is designed to be used with medium format cameras which are created with digital backs in mind. Using your P 65+ on these cameras is possible without any cables attached between the P 65+ back and the camera body or lens. All timing and communication is handled in the electrical interface between the P+ back and the camera body.

Capturing images with the FlexAdaptor on large format or technical camera or a camera body without the digital interface is supported by connecting the special lens sync cable that comes with all P+ backs.

For a guide to a specific camera body, please consult the corresponding chapters later in this manual.

#### Powering up the P+ back

When the P 65+ is connected to a camera body, insert a battery or the IEEE1394/FireWire cable and P 65+ will automatically turn on.

The back is switched on/off by shortly pressing the “Power” button just below the P+ back display.

#### ISO Settings

Light sensitivity of the P 65+ back is per default set to ISO 50-800.

However, this setting can be changed using the menu system (when untethered) and from the Capture panel of the Capture One application (When tethered).

When Sensor+ is turned on the ISO range is between 200 from 3200.

### **Power management and shutter latency**

The CCD on the P65+ back needs to be cleared before an exposure. This requires some power consumption.

Default is Normal Latency, and this should be kept, under all “normal” situations.

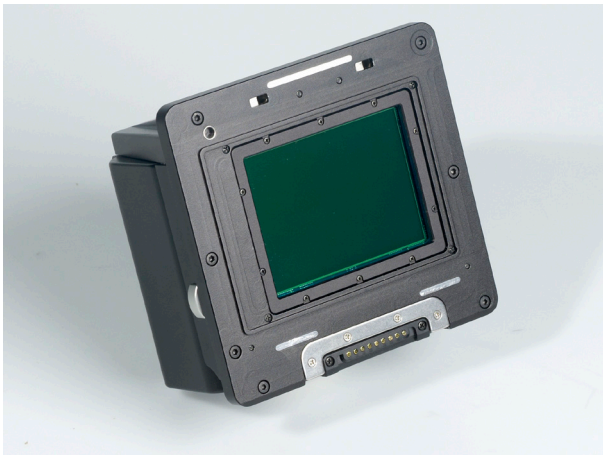
Change the latency to “zero latency” only if you work on technical cameras, large format cameras or certain manual cameras in special situations if using “one-shot” cable release. - Please see the section specific for your camera body for more information on what latency setting to select.

Zero latency will lead to a significantly increased power consumption, therefore it is highly recommended to use your computer as power source when running on Zero latency instead of using the battery.

### **Double exposure protection**

It is not possible to accidentally double expose the image by capturing one image quickly after another when the P 65+ back is used on i.e. Phase One 645AF, Mamiya 645 AFD/AFD II/AFDIII, Hasselblad 555 ELD (DIG mode), Hasselblad H or Contax 645.

The electronic communication with the body ensures that the P 65+ back is ready before allowing release of the next shot. On other camera bodies not using the electronic interface from the P 65+, the user has to wait for the ready beep signal before releasing the next shot.



### Indicator lights

Upon powering up the P+ back the green and red LED's on the right will flash shortly and you will hear a beep, which indicates that the P+ back is ready to capture. In general, if the LEDs are not illuminated the camera is ready.

### Green LED

When capturing an image the green LED is flashing rapidly to indicate that the P+ back is busy exposing the CCD or moving data from the CCD.

A steady green light indicates that the backlight of the LCD display is dimmed but that the camera is still ready to shoot. The timing of when the LCD backlight is dimmed can be set in the P+ back and is described later under "[Menu mode](#)"

### Red LED

The red LED indicates that the P 65+ back holds data not yet saved on the CF card or if tethered session, on the computer.

The red LED indicator located just beside the CF-cardslot under the cover on the left hand side indicates that P 65+ is handling data to or from the CF card.

NB! When the red light is on please do not remove the card from the card slot! This will damage the formatting of the card, resulting in corrupted data or lost images.

### IR filter on the CCD

The IR filter (Infrared reduction filter) is permanently mounted on top of the CCD.

- The filter may not be removed for several reasons:
- The focusing of the P+ back camera back will be damaged.
- It is only possible to remount the filter without dust in between the filter and the CCD if you have access to special clean room facilities.
- The Phase One Product Warranty is terminated.



## 4.0 Sensor+ in detail

Sensor+ is a new technology developed by Phase One based on the technology called binning, in practice the easiest way to explain this, is that you should regard your back as 2 digital backs.

Default is 60.5 megapixels; each pixel is sized 6x6 Micron. - Select Sensor+ and your P 65+ is 15 megapixels, each pixel sized 12x12 Micron.

Whereas 60.5 megapixel is capable of most assignments, you might a higher ISO, or faster capture rate in some situations, instead of bringing another digital back, you can select Sensor+ via menu>Capture Setup>Sensor+

### What is binning?

Binning is the technology behind patented Sensor+; this technology assembles the pixels on the CCD in a newly invented pattern creating the unique behavior that provides you a full-frame 15 megapixel back, with a significant increase in the sensitivity of the CCD and a noise ratio unseen on DSL cameras.

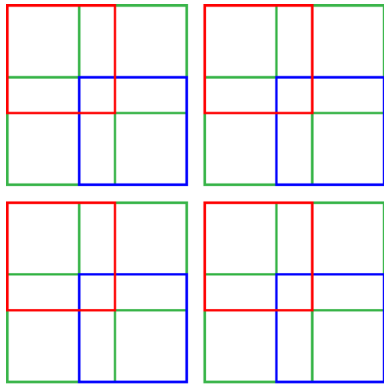
Binning allows you to do capture in 25% of the default resolution, the quality is still in top after processing in Capture One 4.5 PRO or later versions as the software is prepared to work on this specific type of file.

### Why use Sensor+

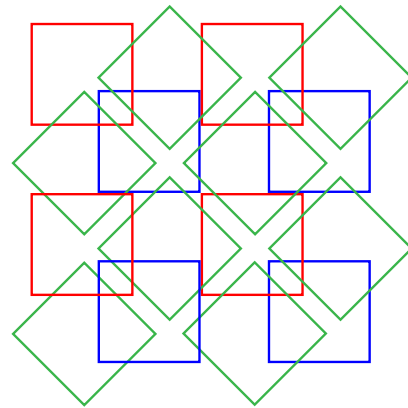
Not only will Sensor+ files be smaller in size and the workflow faster, but Sensor+ also provides a higher light sensitivity this changes the ISO scale from default 50-800 to Sensor+ scale 200-3200 ISO.

The noise you will find in any digital capture is also affected by Sensor+, noise origins in the single cell of the CCD, there will always be a small uncertainty of the value in the single cell, after binning the noise ratio will be significant lower, providing the possibility of higher ISO whilst the noise is kept low.

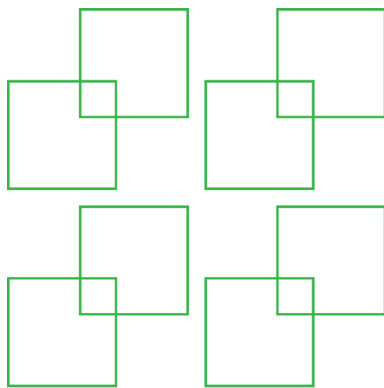
At the same time the back will increase the capture rate significantly - P 65+ can do up to 1.4 capture per second.



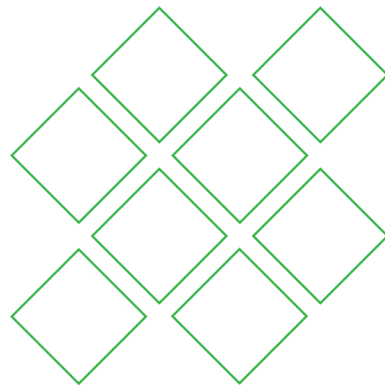
Traditional color binning Optical centers, all colors.



Sensor+ Optical centers, all colors.



Traditional color binning Optical centers, green only.



Sensor+ Optical centers, green only.

## 5.0 Quick Start

This is what it takes to get started

1. Charge the batteries (Described earlier)
2. Install the focusing Screen if needed
3. Consult the Camera specific section for special cabling requirements for your solution.
4. Insert Battery or connect IEEE1394/FireWire (for power) if capturing tethered to e.g. a laptop, that can't provide 10watt, you must force batterypower in the menu.
5. Insert CF-Card or connect IEEE1394/FireWire (To shoot tethered directly to the computer) if shooting tethered launch the Capture One Application
6. Otherwise Shoot the images to CF-card, import them using the Capture One Application and a card-reader.





## 5.1 Setting up time and date

The camera back's date and time is set to Central European Time GMT+1 as Phase One's production facility is located in Copenhagen, Denmark.

If the digital back has been without power for a longer period of time, it will automatically ask you to setup time and date when it is powered up.

Menu>Configuration>Time and Date will allow you to set the time and date using the four buttons on the P+ back.

Left side buttons will step through the hours, minutes and seconds fields, while the right up and down buttons can be used to set the value of the fields. The time and date is applied to all files captured with the P+ back.

## 6.0 CF Card Usage

When working with CF-cards, card readers and digital cameras it is very important to follow a few rules, to avoid loss of data.

Phase One recommends that you test-drive all new CF cards including the one enclosed. By doing an initial test to verify that the capture files are stored properly on the card and can be accessed on a computer you will avoid unpleasant surprises on location or when you return from a job. CF cards are manufactured by other suppliers, and Phase One cannot guarantee that the cards are not defective.

### Inserting and ejecting on the P+ back

The compact flash card or microdrive is inserted in the hidden slot located under the cover on the left hand side of the P+ back.

Insert the CF card with the brand label facing the display end of the digital back as shown in the image.

When the CF card is fully inserted no parts are sticking out and the cover can be closed.

To eject the card push the small button just above the card once, and an ejecting pin will come out.

Pushing this pin all the way back in will eject the card.

Microdrives are not recommended to be used with P 65+, as the speed and size of most microdrives by far is exceeded by a standard CF card today.



### **Secure Storage System (3S)**

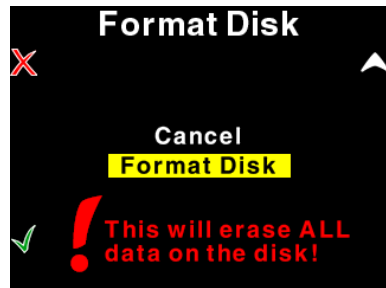
The Phase One Secure Storage system (3S) provides the industry's safest memory card handling ever.

When working with memory cards in a Phase One P+ back, you can always be sure that your data is safe.

The 3S technology automatically checks your cards file structure every time it is inserted to the P+ back.

If the disk check function finds errors on the card, it will prevent usage of the card until these are corrected or the card is formatted.

[Read a more detailed description in the chapter dedicated to Secure Storage Sytem.](#)



## 6.1 Formatting your Memory card

In General all CF-cards or microdrives are preformatted and ready for use in the P+ backs.

However to ensure the best performance from these cards it is considered best practice to always format them in the P+ back.

Please consult the [“Format Disk” explanation in chapter 9.3](#) of this users manual on how to format a memory card in the P+ back.

Formatting of the memory card is done in either FAT 16 or FAT 32 depending on card size, and if the formatting is done in the P+ back cluster sizes on the disk is set for best performance.

It is also possible to format the cards on either Mac or Windows; this is explained in the following sections of this chapter. FAT 16 only supports up to 2 GB of storage.

### **Please note!**

Ejecting the card while the P+ back is still writing to the card, when the red CF LED is on, will cause images that are still not written to the card, to be lost or damaged.

Also, removing powersource while the P+ back is still writing might result in loss of the data that is not yet written to the memory card.



**General handling guidelines**

Especially when using microdrives you have to be careful not to drop them on the ground or even on a table.

Compact flash cards are not as vulnerable as microdrives.

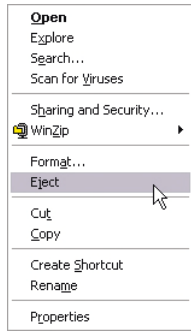
Please keep the card away from moisture and sand and don't bend it. Use the supplied jewel box as a storage container for the card.

Using cards or microdrives in the card reader

When inserting the card into the card reader on a Mac or PC, the card will be mounted as a removable drive on the computer.

Windows XP and Mac OS X have the required drivers for the CF-card reader.

For information on how to import the files to Phase One Capture One, please consult the Capture One online user guide available under "Capture One Help" in the Help Menu.



## 6.2 Mounting and dismounting on Windows XP and Windows Vista:

To avoid confusing the system or, worst case, end up with a CF-card that was unintentionally erased, it is required to safely eject the card by right clicking the icon in “My Computer” and select the “Eject” option.

On a Mac the card has to be un-mounted, by dragging it into the trash, or selecting eject (command-e) in the “File” menu, or ejecting from the Capture panel inside the Capture One software.

Just removing, and reinserting the CF card will confuse the system, possibly resulting in uncontrolled read or write errors. If this happens, restarting the computer can normally solve the problem.

### Preparing the CF-cards or microdrives

Most CF cards or microdrives are pre-formatted and ready to be used in the P 65+ back.

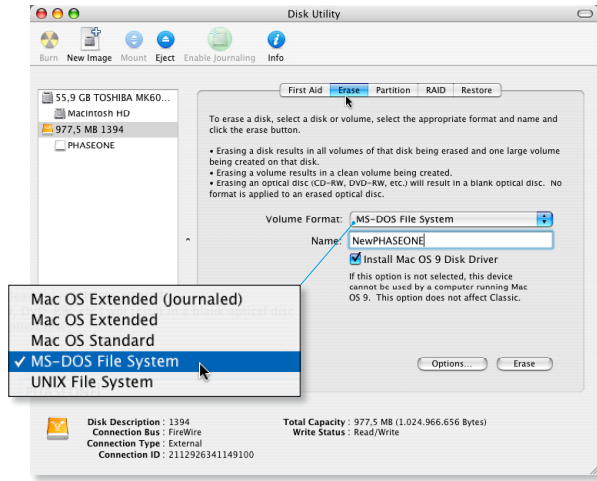
The P 65+ back supports CF cards formatted in either FAT 16 or FAT 32.

If your CF card is not recognized in the P 65+ back it is possibly due to a wrong file system formatting on the card.

Mac HFS, UNIX or NTFS file systems are not supported by the P 65+ back, and cards with these file systems will not be recognized.

Card formatted with any of the above written will have to be re-formatted in either FAT 16 or FAT 32 using a computer, Mac OS X or Windows.



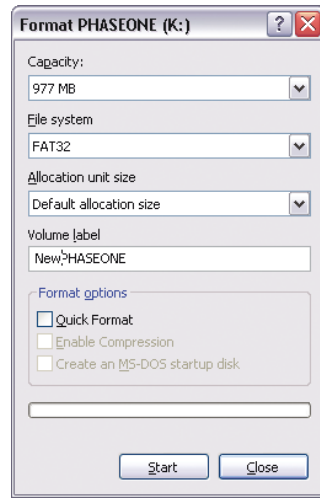


### 6.3 Formatting on a Mac OS X computer

On Mac OS X the formatting cannot be done directly in the finder but is easily done inside the Disk Utility located in the Applications > Utilities folder.

Open the Disk utility and select the Disk (not just the partition, but the entire disk). Select the Erase panel as shown above, and select MS-DOS File System. Give the disk a name and click on Erase to erase and format the entire disk for use with the P+ back.

Choose “Options” in the formatting dialog to specify a complete and thorough formatting of the media.



### 6.4 Formatting on a Windows computer

Insert the CF-card in the card reader, and select the drive when it mounts in “My computer” or in the Explorer. Right click on the drive and select “Format” from the pop-up menu.

Select FAT32 or FAT16 from the “File System” pop-up.

Provide the card a name and click Start to format the card.

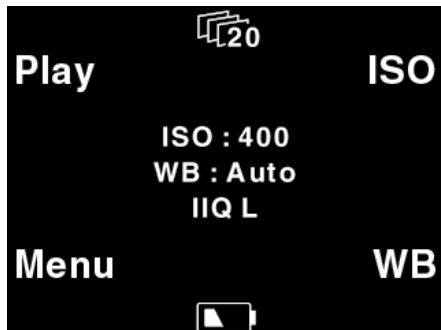
To specify a complete and thorough formatting of the media resetting all to zeros, do not enable the quick format option.



### 6.5 Disabling iPhoto Autostart (Mac OS X)

iPhoto Autostart can be disabled in the Mac system preference.

Select “CD’s & DVD’s” and change the setting for “Picture CD” to either “Ignore” or point it to the Capture One application you are using.



## 7.0 Navigating the menu system

When the P 65+ back is turned on, the screen will always be in its default position or “Main screen”.

Pressing and holding down the upper left button on the back is always your shortcut to the Main screen, regardless of where you are in the menu system.

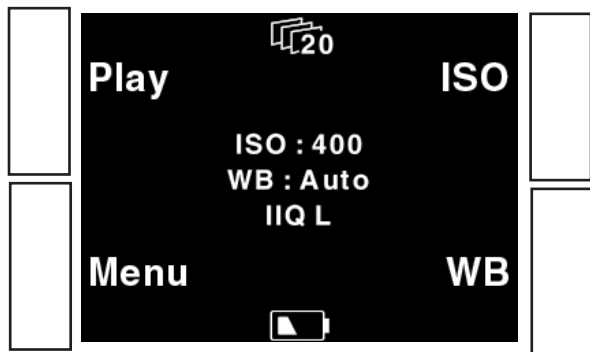
The Main screen has an indicator in the top showing remaining captures on the CF card or selected hard drive, and a power indicator at the bottom showing the remaining battery capacity or a FireWire icon if the P 65+ is connected to FireWire.

When either indicator reaches zero, it will start blinking, to indicate that either storage or battery needs replacement before capturing any more images.

The main screen also shows the current ISO setting, white balance setting and the selected IIQ Raw file format.

Right next to the fileformat indicator, you find the image technology indicator, if you select Sensor+ technology, you will see the S+ icon





## 7.1 Menu buttons

The Phase One P 65+ has four menu buttons to control the menu system on the display.

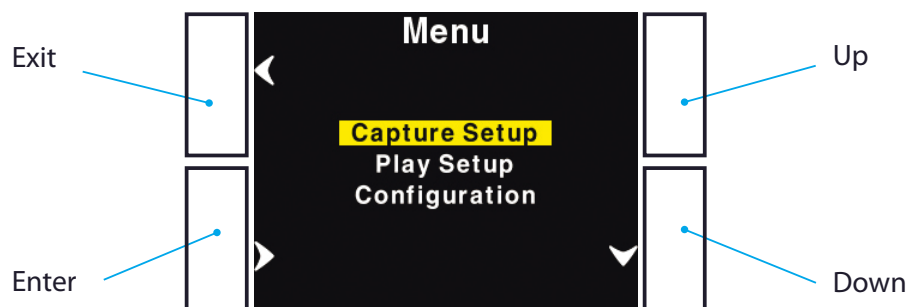
When the P 65+ is in its initial state or at the menu systems default position (Main screen), the four buttons each has a shortcut assigned. Play, Menu, ISO and WB.

Inside the menu system arrows will indicate the function of the four buttons, the two buttons to the left are used to enter and exit the selected menus. The two buttons to the right are used to go up and down in the menu system.

From the home position, pressing the “Play” button will bring up the image browser, where you can go up and down with the right hand buttons, to browse through images.

Selecting “Menu” will bring you to the different setup and configuration menus where you can scroll up and down in the menu system with the right hand buttons to select the menu options to set.

When the desired option is highlighted it can be selected by pressing the “Enter” button.



## 7.2 Shortcuts

### Home shortcut

Holding down the “Exit” button for a few seconds will always bring you to the default position or main screen immediately.

When a FireWire cable is inserted the P 65+ Back draws the power from FireWire this is shown with an icon in the bottom of the main menu.

When Capture One is started on the computer, this is indicated with a FireWire Icon in place of the cable icon.

P 65+ back can be forced to get power from the battery; this is indicated with an additional battery icon.

Force battery power is invoked from the “Menu > Configuration > Power Source” menu.

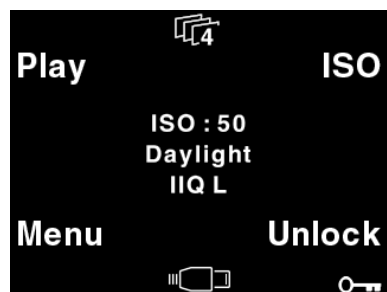
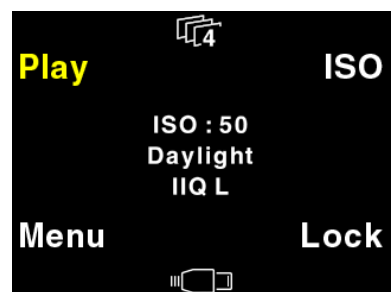
### Button Lock shortcut

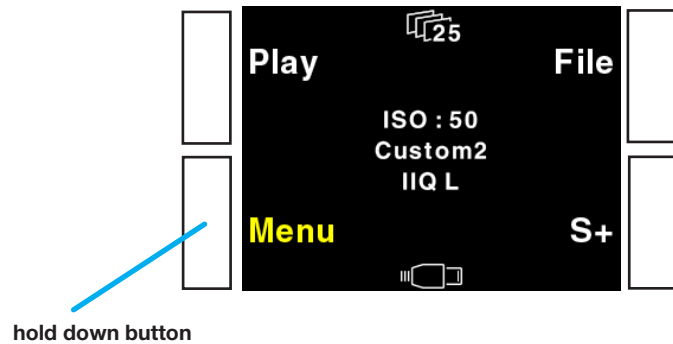
Holding down the “Play” button whilst in Home position colors the word “Play” in yellow and at the same time reveals a shortcut with the word “Lock” in the place where WB was.

Pressing the lock button twice when holding down the “Play” will lock operation of the four menu buttons. This is useful to avoid unintended button operation while carrying around the camera or shooting.

To unlock the buttons hold down the “Play” button again and press the “Lock” button twice.

When the buttons are locked, the key icon is displayed just below “WB”.



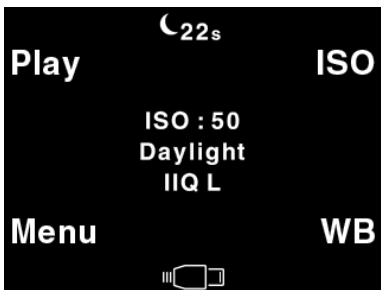
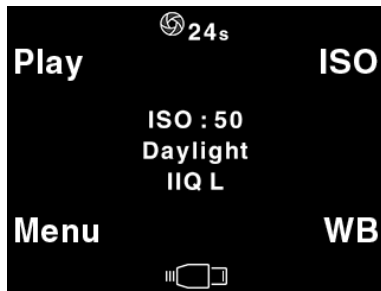


### File format shortcut

Holding down the menu button, will change the ISO button to a shortcut to the File selection menu, the file format is showed in the center of the main screen, you can choose between IIQ S and IIQ L.

### Sensor+ shortcut

Holding down the menu button, will change the WB button to a shortcut to the Sensor+ menu, if Sensor+ is selected, you will see a S+ after the file format e.g. [IIQ L, S+]



## 7.3 indicators

### Long exposure time indicator

If the camera is set to expose for more than 2 sec. the exposure time indicator will show up in the top of the display.

While the shutter is open this indicator will keep counting the seconds.

This indicator is very useful for timing long bulb exposures.

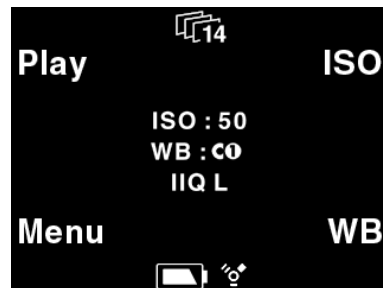
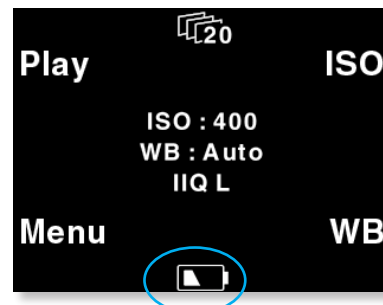
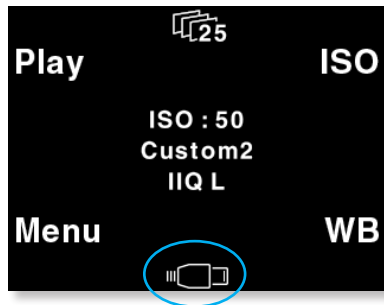
P 65+ provides a recommended maximum exposure time of 1 minute.

### Long exposure black reference

In order to capture noise free long exposures Phase One digital backs needs to capture a black reference when needed. This black reference requires the same amount of time as the exposure itself.

While the black reference is being captured this is indicated with a night symbol and a counter counting down the time left for black reference capture to complete.

This is done automatically.



## Power indicator

In the bottom of the main menu you find the power indicator –

**Battery:** when using battery power you will see the battery icon, indicating the approximate amount of power left on the battery.

**FireWire:** the FireWire icon will appear when a FireWire cable is connected to the back; this means that P 65+ now is powered through the cable even though the battery is still attached.

**Forced Battery:** though your back is connected to a computer, you can select the power source to be the battery, this comes in handy, if you are on location shooting to a laptop computer.

Please note, if you are selecting to only provide power from the battery, and at the same time are using Zero Latency, the expected battery lifetime per charge is significantly lower compared to Normal Latency.

## 8.0 Play mode

“Play mode” can be used to review, zoom and delete images.

From the “Main screen”, press the top left button of the P 65+ back to enter Play mode.

In Play mode the top of the screen will show a menu bar. In the right side of the menu bar the current image number and the number of images captured on the media is displayed.

In this example it shows number 12 out of 18 images.

Pressing the Up and Down buttons on the P 65+ back (right hand side) it is possible to browse through the images.

Holding down the “Enter” button while pressing the up and down icon will bring you to the first and last image accordingly.

Battery capacity and number of possible captures on the hard drive or CF card are also shown in the menu bar.

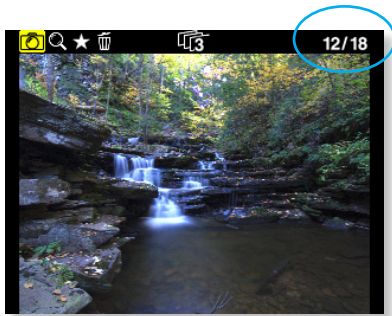
Pressing the Play button on the P 65+ back (top left hand button) will step through the options available in the menu bar.

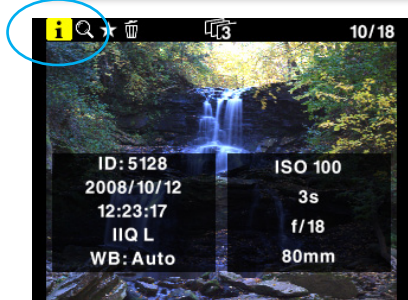
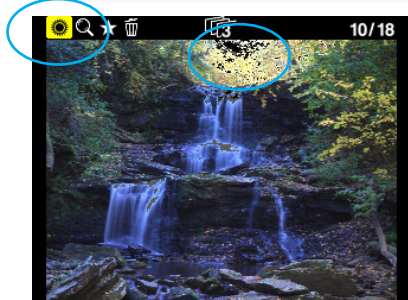
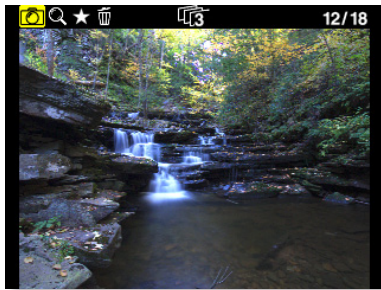
From left to right these are: Review, Zoom, Rate and Delete.

Pressing the “Enter” button on the P 65+ back (bottom left hand button) selects the option.

If the image was shot vertical the capture showed on the LCD display will be automatically rotated.

To view such an image in full view rotate the digital back and the image will be automatically rotated.





## View modes

Play mode has four view modes, or review modes; Normal image display, Exposure warning overlay, Histogram overlay or File Info overlay.

After entering the Play mode, press the “Enter” button to shift to the view mode you want.

Exposure warning overlay will display the highlight areas as a flashing color, to warn about over exposed areas in the image.

Histogram overlay will show a transparent Histogram over the image.

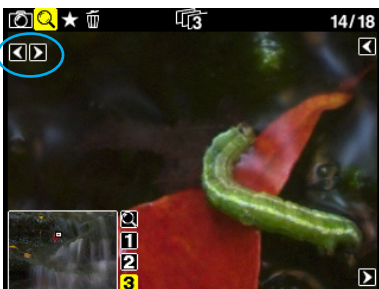
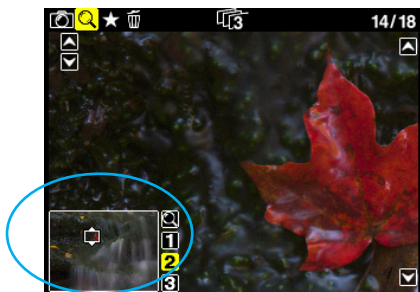
File Info overlay will show detailed capture information like capture number, capture time, date, ISO, WB, file format and shutter speed, etc.

The view that Play mode is left in will be the setting used for review of images while shooting.

This means, that if the Play mode is set to show images with a histogram, and you then exit to the Main screen, all subsequent captures will be shown on the display with a histogram over the image.

Use the various grids to assist your evaluation of the composition. Especially photographers working on large format, technical cameras or just photographing architecture will find great benefits in having the grid to assist in adjusting the lines of your capture.

[Read more about setting Grids here...](#)



## 8.1 Zoom

After entering Play mode, advance to the eyeglass icon by pressing the button again and press the “Enter” button to select it.

It is now possible to zoom in the image with the “Enter” button.

The zoom has four steps, Normal, enlargement 1, enlargement 2 and enlargement 3.

When zoomed into enlargement 1, 2 or 3 the insert view in the lower left corner can be used to navigate around in the image.

A small rectangle will show the current position and the up and down buttons can be used to scroll up and down.

An icon just beside the Play button (top left hand button) will show the direction of scroll as either vertical or horizontal.

Pressing the “Play” button once will change this from horizontal to vertical scroll when using the up and down buttons. (Left side)

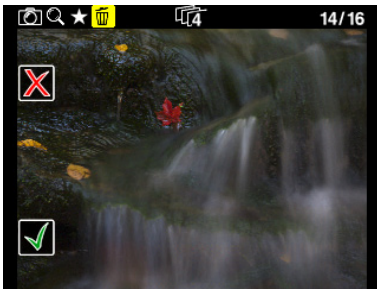
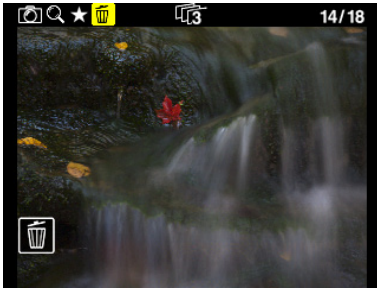
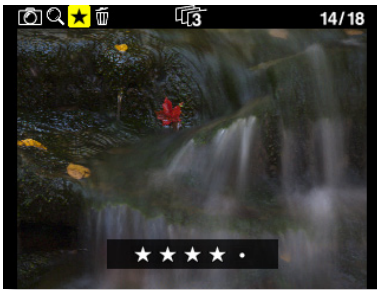
To exit the zoom function use the enter key to navigate to the eyeglass icon in the pan view and press the Play button to step to the next icon in the menu bar. Or hold down the “Exit” button for more than 1 second.

### Browsing inside Zoom

While in the Zoom tool (enlargement 1, 2 or 3) holding down the “Enter” key, will hide the two up and down indicators. It is now possible to browse through the images by pressing the Up and Down buttons without leaving the Zoom functions.

This means that the exact same focus point can be evaluated on several pictures in a row by pressing “Enter” - “Up” or “Enter” - “Down”.





## 8.2 Rating



If you want to rate while viewing, select the Rating feature, now the Exit button will provide rating, 0-5, whilst the right buttons still allows you to browse forward and backward in your captures.

When shooting to a CF card and rating the images, the ratings will be recognized by in Capture One upon import of the rawfiles.



## 8.3 Delete

Navigate to the delete function by pressing the play button.

When in the delete view press the Up and Down buttons to browse through images.

Pressing the Enter button brings up an  or a . Pressing “Enter” again will select and delete the image.

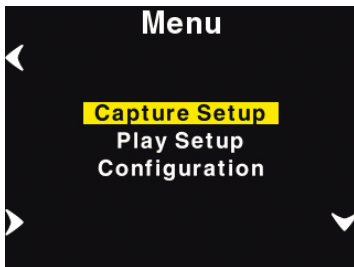
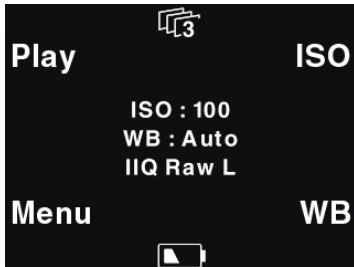
Pressing the exit button will select and cancel the deletion.

If “Confirm Delete” is set to “Off” in the “Play Setup”, the  and  confirmation will be skipped, and the image deleted immediately when pressing “Enter” while on the delete menu.

## 8.4 Exit the Play mode

Exit the Play Setup at any time by holding down the Play button for two seconds.





## 9. Menu mode

Pressing the lower left button sets the P+ back in “Menu mode”

Entering Menu mode by pressing the lower left button allows you to set up the preferences of the P+ back.

Menus are navigated to by following the Enter, Exit, Up and Down arrows and pressing the corresponding buttons on the P+ back.

Whenever you want to exit to the main screen hold down the exit button (upper left button) for more than two seconds, and you will be back at the main screen.

When entering the menu mode you have three options: Capture Setup, Play Setup and configuration.

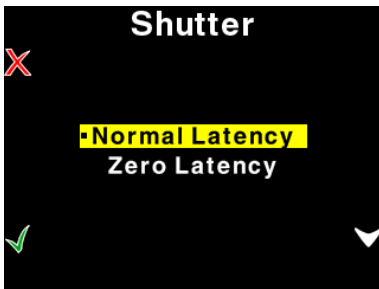
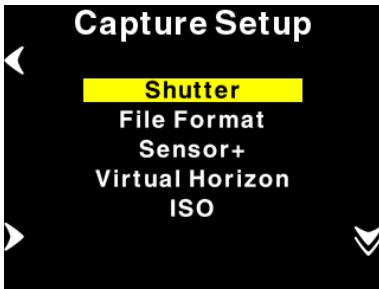
### 9.1 Capture Setup

Capture Setup is where you setup preferences for the capture.

Enter Capture Setup by pressing the enter button (lower left button)

In the Capture Setup you can select Shutter (latency), File Format, Sensor+, Virtual Horizon, ISO or WB.

By scrolling down with the down button you can select the options.



## Shutter

Shutter refers to the shutter of the camera the P+ back resides on.

Due to the sleeping architecture of the P 65+, where the CCD is put to sleep to reduce power consumption, the P 65+ needs to wake up before shooting. The timing of this wake up signal is referred to as the latency.

In general, if the camera is used with 645 format cameras with digital interface the recommended setting is “Normal latency”.

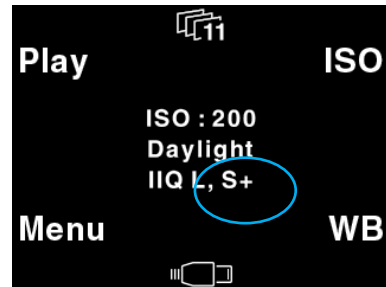
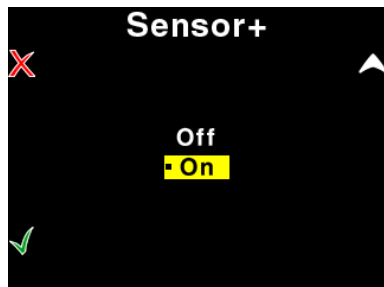
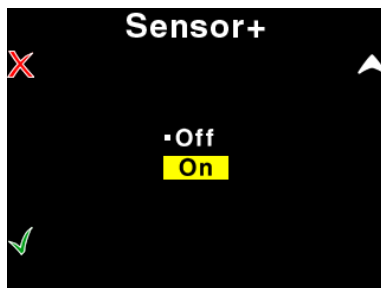
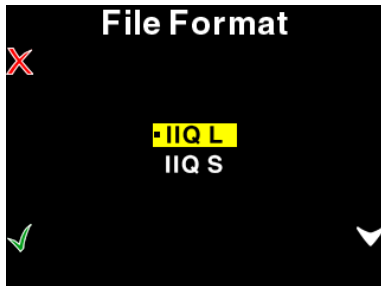
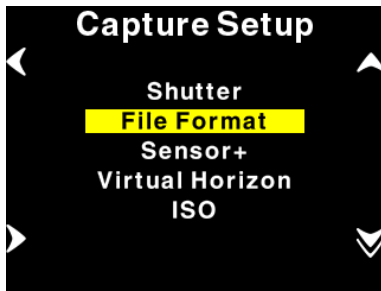
Zero latency has a shorter response time, but higher power consumption, so when preserving battery life is a priority you should select “Normal latency”.

If the P 65+ back is used in “two shoot mode” on a large format camera with i.e. a copal shutter or other mechanical shutter where the shutter is released one time for waking up the back, and another time for making an exposure, then the shutter setting in the P 65+ must be set to “Normal latency”.

Using “one-shot” cable and Zero latency P 65+ will respond immediately triggering the camera.

Though Zero latency has a higher power consumption, the back will still go to “power-down” mode when no media, cf-card, microdrice® or computer, is available.

In general you should only use normal latency if you are using the so-called two-shot release cable. If you are using Zero latency on a two-shot release cable, you can very well end up having double-exposures.



### File Format

In “File Format” you can select two options “IIQ Raw L” and “IIQ Raw S”.

“IIQ” is a short term for Intelligent Image Quality - Raw.

“IIQ L” is set as the default and is the lossless capture format of the P+ back.

“IIQ S” is a smaller file, and not totally lossless in the format. The “IIQ L” is approximately half file size of the processed TIFF file. “IIQ S” is approximately one third of the processed TIFF.

Most users will use the “IIQ S” as there is virtually no quality difference between the two settings.

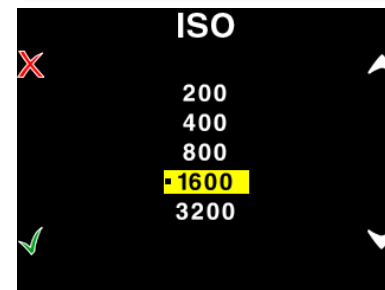
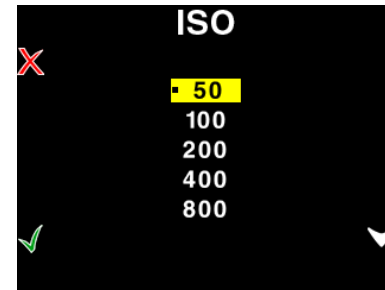
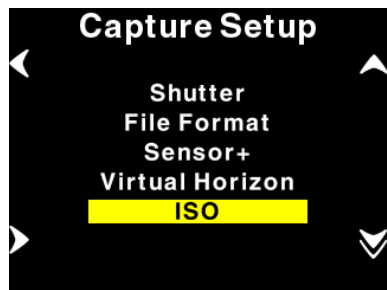
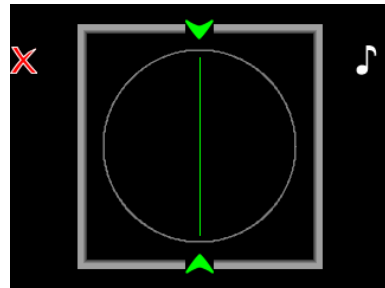
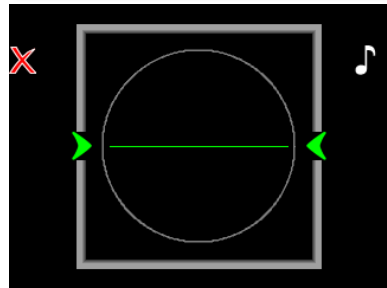
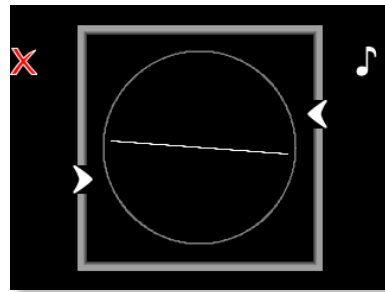
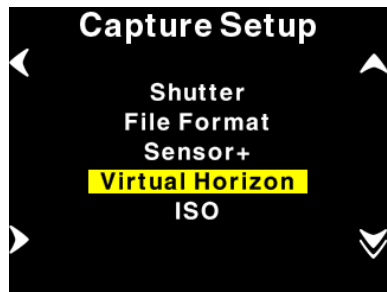
When the camera back is used tethered to a computer this setting is set from within Capture One.

### Sensor+

In the Sensor+ submenu you choose between on and off, when the setting is “On” - you will capture files in Sensor+ technology 15 megapixels on the same photographic area, creating files of app 15MB if IIQ-L, each “Super pixel” will be 12x12 micron, in other words you get a file of lower resolution, but you achieve a substantial increase of capture rate.

If Sensor+ is set to “off” you will capture files as full-frame 60.5 megapixels, in an extremely high quality, each pixel will be 6x6 Micron providing the finest resolution on the market.

[Read more on Sensor+ technology](#)



### Virtual Horizon

The Virtual Horizon is your guide to keeping your camera in perfect horizontal or vertical position, the menu disappear and you will see the virtual horizon guiding you to level you capture perfectly, the line will be green, when in level.

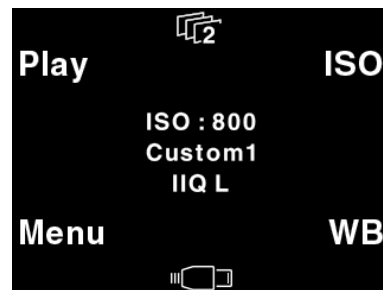
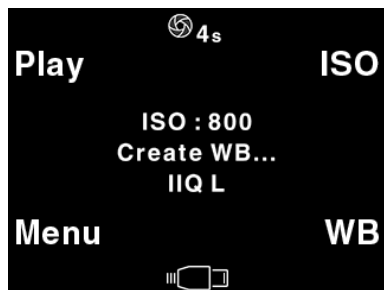
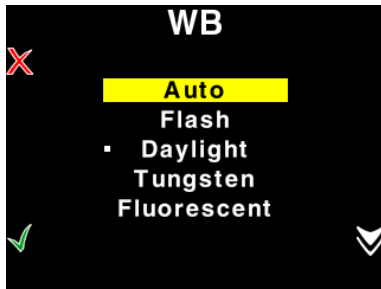
You can choose to get a sound when the horizon is precisely on target.

### ISO settings

In the ISO Menu, choose from ISO 50 to ISO 800 depending on the conditions you want. if you are working in Sensor+ mode you can choose between ISO 200-3200.

In general the higher the ISO value, the more noise in the image. This means that for optimal image quality, it is a better strategy to have more light in the scene, or adjusting the f-stop on the camera, than just turning to a higher ISO.

When the preferred ISO setting is set press the “Enter” button to confirm the choice (green check-mark).



### White Balance

Setting Auto WB will calculate a white balance based on the information in the image. Auto WB is good for most applications.

If you are using a specific light source you can choose that option here.

If the camera back is tethered to a computer, and white balance is set from within Capture One it is indicated with the C1 icon in place of the WB indicator on the main screen.

When the camera back is used tethered to a computer this setting is set from within Capture One.

### Custom White Balance on P 65+

P 65+ back allows you to create up to 3 custom white balances.

Custom WB is available when pressing the WB button at the main menu.

When scrolling to the bottom of the WB options four options are available:

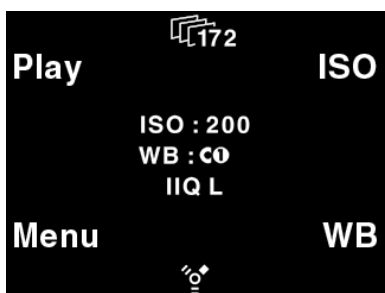
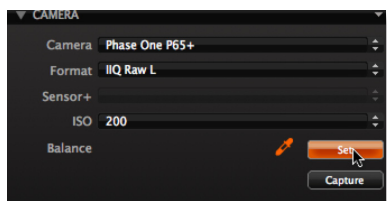
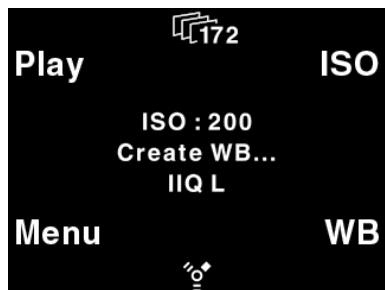
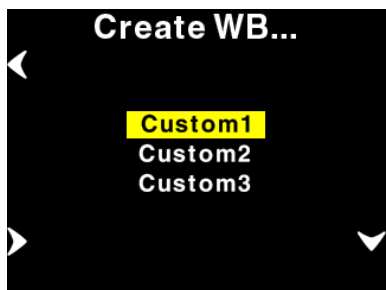
“Custom1”, “Custom2”, “Custom3” and “Create WB...”

To make a new custom white balance select Create WB... and choose which one from the following: “Custom1”, “Custom2” or “Custom3”

When one of the options is selected the “Make Custom WB” will be blinking.

Now you are ready to capture the image that should be used for white balancing. Place the viewfinder center circle on an area (gray card or neutral white surface) and capture the image.

You have now made the custom white balance and it has been set as the current capture white balance.



All subsequent captures will now have the new custom white balance applied.

3 different custom white balances can be defined and used as shooting white balances.

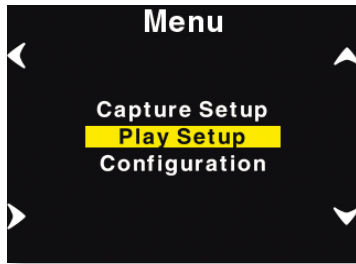
### Custom white balance from Capture One

You can also choose to easily transfer a white balance from Capture One to the P+ back:

1. Create a custom white balance inside Capture One.
2. While tethered to the computer select WB from the lower right button on the P+ back.
3. Select "Custom1", "Custom2" or "Custom3" on the P+ back depending on where you want to store the new white balance. now the back is ready to receive the WBinfo from Capture One 4
4. Finally Click the "Set as capture white balance" button inside Capture One.
5. Now the selected custom WB will be shown

P 65+ will beep, confirming that the custom white balance is now uploaded, will be applied when the P+ back has been disconnected.

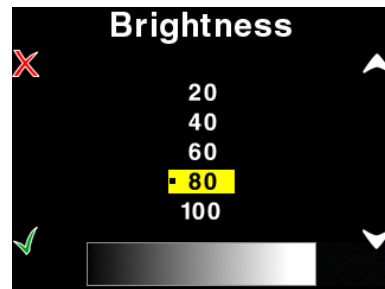
This technique is useful because you can bring up to three predefined custom white balances taken in the studio to your location shoot. Please be aware that when shooting tethered to the computer, the white balance must still be set in the Capture One application. White balance cannot be set on the P+ back while tethered.



## 9.2 PLAY SETUP

The second option in the menu mode is Play Setup.

Inside “Play Setup” you can adjust and select Brightness, Auto Preview, Delete options, Display Style and Grid.



### Brightness

In the Brightness setup, you can set the brightness of the preview LCD screen.

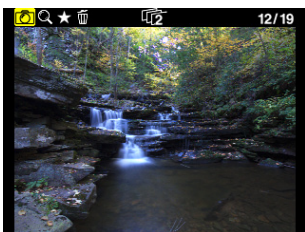
Default setting is 80.

Only the Brightness of the display is affected. Exposure warning, histogram and final capture are not affected by this setting.

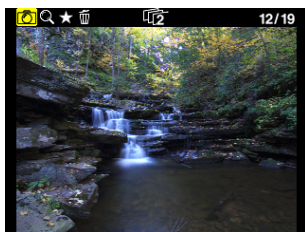
Default Brightness is 80.

Especially when working outside or in bright surroundings, the brighter settings might be useful.

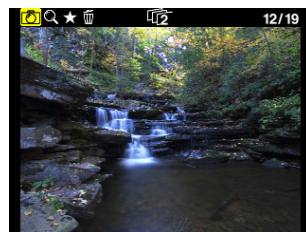
In studio environments it might be useful to set the brightness at the lower value.



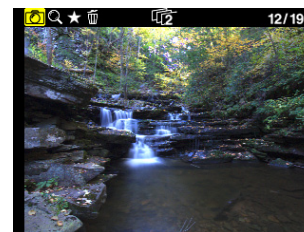
20



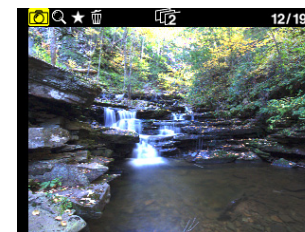
40



60

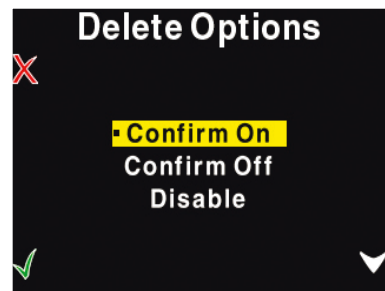
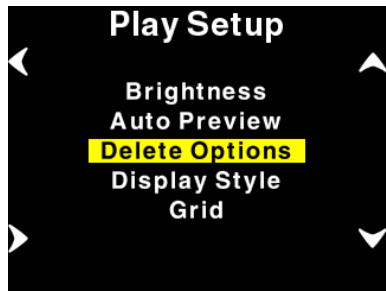
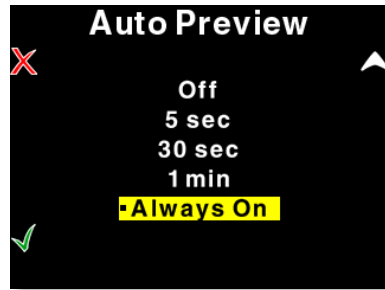


80



100





### Auto Preview

The second option in Play Setup is Auto Preview.

Auto Preview refers to the amount of time the image remains on the screen after capture.

Default setting is 5 seconds allowing a quick look at the capture.

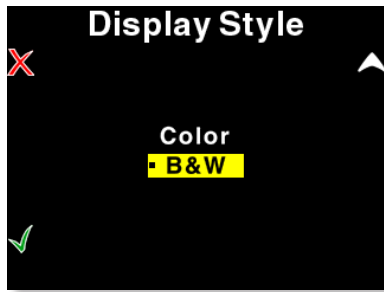
If Auto Preview is set to “Off” the preview will not be shown automatically after capture.

Note - If a button is touched during the auto preview period, the preview will remain on and the time-out will be disabled until next capture.

### Delete options

There are three delete options: “Confirm On”, “Confirm Off” and “Disable”.

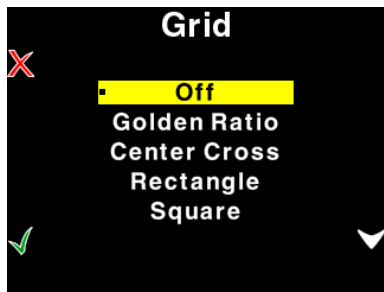
In Delete options you can setup whether you want an extra confirmation when you delete images (Confirm On - Default), delete images immediately (Confirm Off ), or you can disable deleting of images on the P+ back to avoid unintended loss of images.



### Display Style

Display Style allows you to switch the captures showed on the display to Black and White, instead of the color RGB signal.

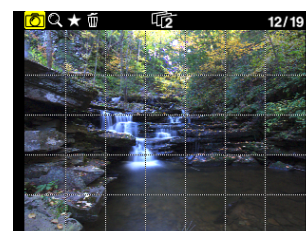
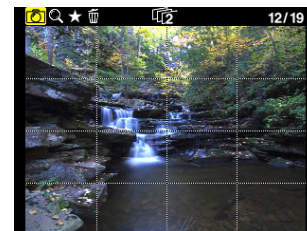
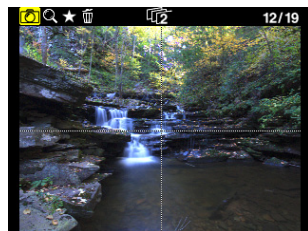
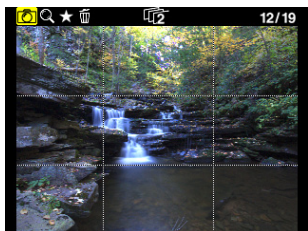
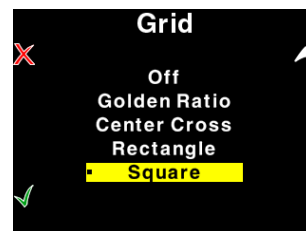
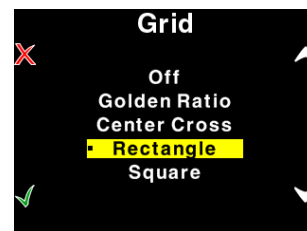
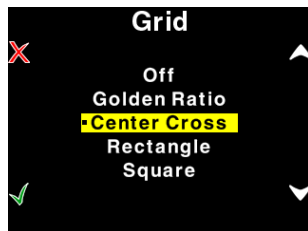
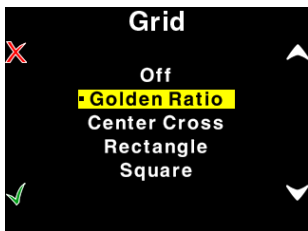
It is important to emphasize that P 65+ while showing BW on the LCD display, the captures are still RGB.

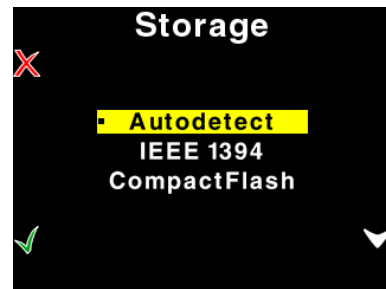
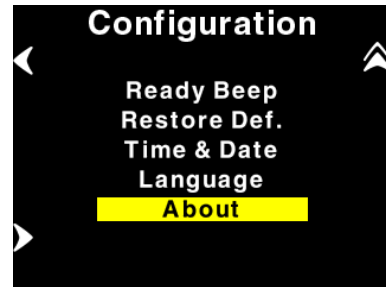
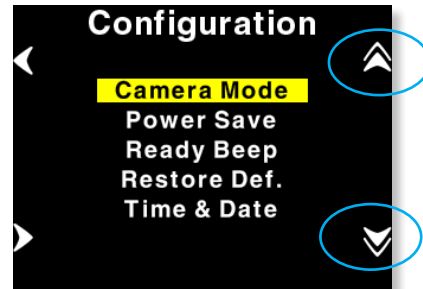
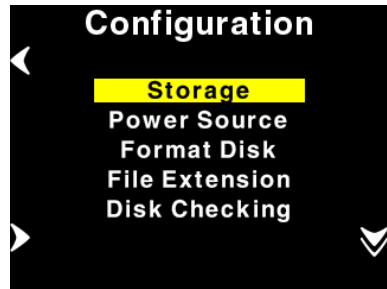


### Grid

You can add grid to the viewed captures, especially architectural photographers will find great benefit in this feature.

Choose between Off, Golden Ratio, Center Cross, Rectangle and Square.





### 9.3 Configuration

Configuration is used to setup general settings and perform general tasks on the P 65+ back.

Configuration contains more menu entries than can be displayed on one screen. This is indicated by a double arrow pointing down on the right side.

As shown here, scrolling past the last menu entry will reveal the next entry. Now the arrow in the top right side will turn into a double arrow, to indicate that there are hidden entries at the top.

#### Storage

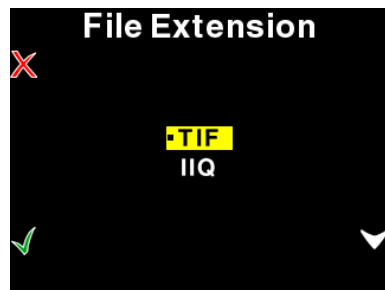
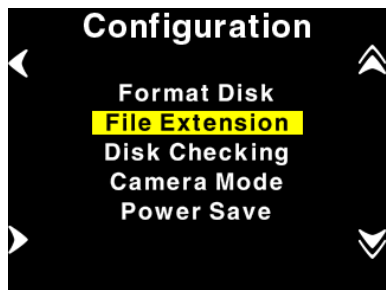
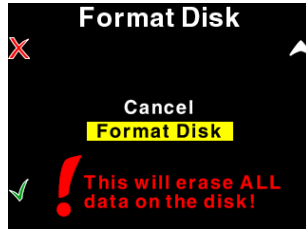
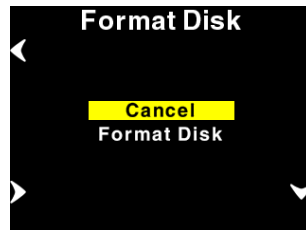
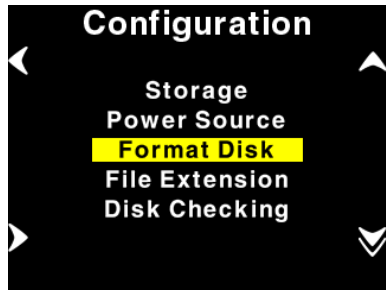
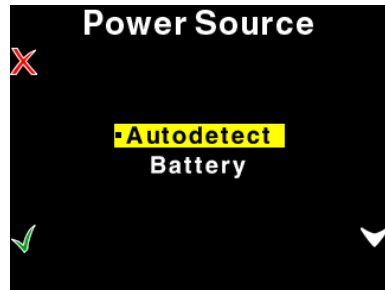
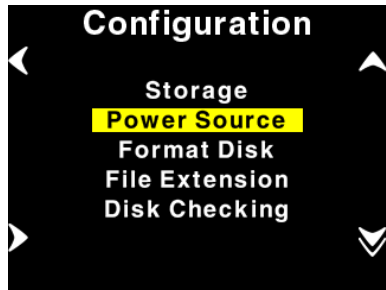
Storage allows you to configure how P 65+ should store the captures created.

Autodetect is the default setting of Storage.

If a card is inserted in the P 65+ back while on autodetect mode P 65+ will still prioritize the FireWire (Capture One connection) and then secondarily use the memory card

If this option is set to Autodetect and both FireWire and CF-card are available, FireWire will be chosen as default.

P 65+ can also be forced to shoot to either Compact Flash or IEEE 1394/FireWire by selecting the options inside Storage.



## Power Source

Power source has two options, “Autodetect” or “Battery”.

Default is Autodetect, the P+ back will detect if an IEEE 1394/FireWire connection is supplying power, and automatically shut off the battery power.

If Power Source is set to “Battery” the power source is forced to come from the battery, and the digital back will not consume power from the FireWire connection.

It is recommendable when using technical or large format cameras, that you force the power source to be battery power.

Do this to avoid draining the battery in a MacBook or PowerBook.

## Format disk

Selecting “Format disk” will erase the CF-card in the P 65+ back. The CF-card will be formatted as FAT-32. ALL DATA WILL BE LOST!

Please see CF-card section for troubleshooting if your card is not recognized.

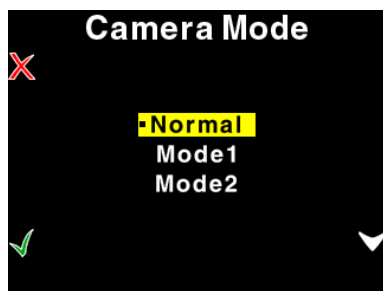
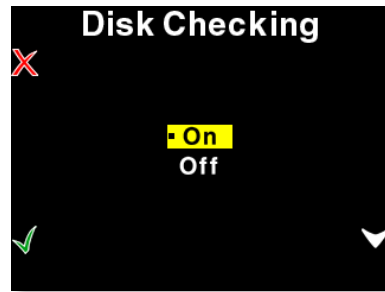
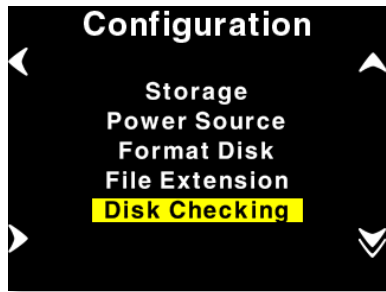
## File Extension

Select the file extension; this does not change the format, only the extension.

Default is .TIF

Choose between .TIF and .IIQ

Some operating systems and certain applications might not support files holding the .IIQ extension; this is solved by changing the extension from .IIQ to .TIF



### Disk Checking

Disk Checking is done per default on every card inserted to the P 65+.

If for some reason this check is not wanted the feature can be turned off in this menu.

Phase One recommends leaving Disk Checking turned on, to maximize data security on the memory cards.

Read more about the Phase One Secure Storage System in Chapter 5 of this manual.

### Camera Mode

Camera mode is used in special applications only. This could be in combination with a specific electronic shutter or in an industrial application, where the timing differs from a normal photographic application.

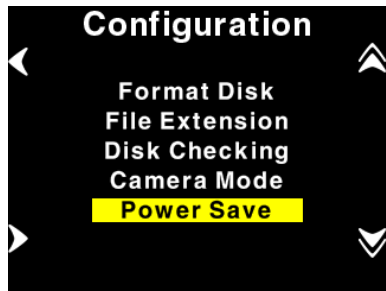
Please consult the documentation included with these solutions, to find out which mode to use.

If you are using the P 65+ back in a normal photographic application using medium format camera or technical camera as described in this manual, please leave this setting in "Normal" position.

**Mode 1** = Electronic shutter option

**Mode 2** = Aerial setup; - You will be asked to use it by the manufacturer of your aerial solution if this mode is needed. It makes it possible to disable black calibration with an electric signal on the multi-connector port, and also to disable auto rotation in the same way.

**Mode 3** = Available on V model; this is a specialized industrial mode, not for usage on regular photographic equipment - request information separately.



### **Power Save**

Power Save has two options "Backlight" and "Auto Shutdown".

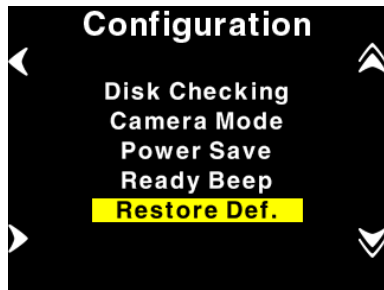
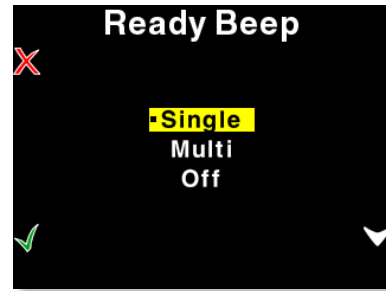
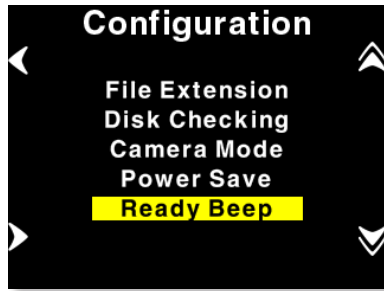
Backlight is used to control the duration of backlight illumination.

If no action is detected the backlight will, by default, dim after 5 minutes.

This can be changed to 1 min, 20 sec. or 5 sec. using the backlight menu.

Auto Shutdown determines the amount of time before the P+ back shuts down, when there is no activity.

If the P 65+ back automatically shuts down it can only be woken up by pressing the "Power" button.



### Ready beep

“Ready beep” is the small beep that sounds from the camera after a capture is taken.

The “Ready beep” signals that the capture has been taken, and the P+ back is ready for next capture.

“Ready beep” can be either “Single”, “Multi” or “Off”. Default is “Single”

“Multi” is for use in noisy surroundings, i.e. where it can be difficult to hear if it was the back or the flash that made the ready beep.

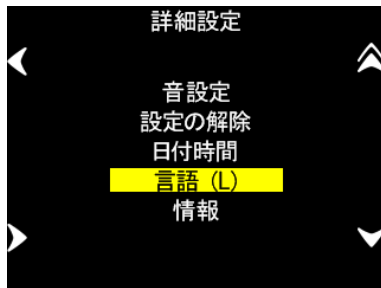
### Restore def. (Defaults)

Selecting restore defaults will restore the settings of the P+ back to its default settings. Be careful before using this option as all settings made in the P+ back will be reset to factory settings.

### Time & Date

In “Time & Date” you can set the time and date using the four buttons on the P+ back. Left side buttons will step through the hours, minutes and seconds field, while the right up and down buttons can be used to set the value of the fields. The time and date is applied to all files captured with the P+ back.





## Language

The “Language” option in the “Configuration” Menu can be used to select preferred language of the user interface.

Expressions in the main menu like: ISO, WB, Play and Menu are not translated.

These are regarded as icons, and also understood widely as expressions used to navigate even on the Japanese, or Chinese interface.

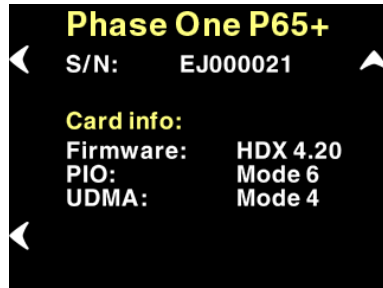
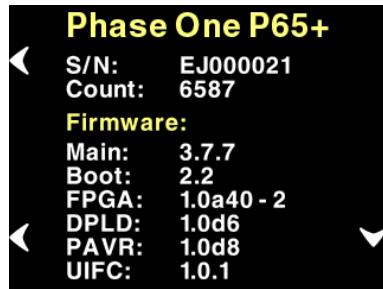
However switching to an unknown language unintentionally can be frustrating and the user can have difficulty getting it back to the native language back on the menu.

Phase One have made this easy by incorporating a large “L” in a parenthesis after the Language menu.

Finding this “L” will help the user get the native language back.

At the time of writing the following languages are supported on the P+:

- English (default)
- Japanese
- Chinese (Simplified)
- French
- Italian
- German
- Spanish.



### About the P+ Back

The “About” option in the “Setup Menu” displays technical information about the hardware and embedded software (“Firmware”) in the camera. This is especially useful if support is needed or if you want to check if Phase One is offering a newer firmware for your camera.

Firmware might be made available in the download section at [www.phaseone.com](http://www.phaseone.com)

Before contacting your dealer or Phase One Support please make sure to have access to the “About “box or write down the entire contents of the “About” box.





## 10.0 P 65+ Phase One 645AF & Mamiya 645 AFD series

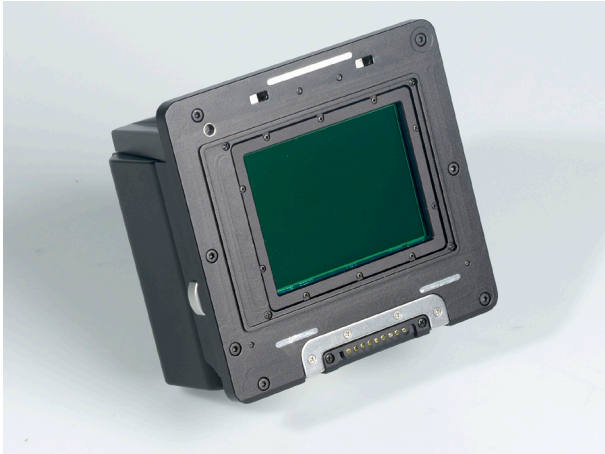
The functionality of the P 65+ back is well integrated with the Phase One 645 AF and the Mamiya 645AFD series. The P 65+ back communicates with the cameras through a fast internal electrical computer interface. In addition adaptors are available for the Mamiya RZ PRO IID.

### Shutter latency settings

Both the Phase One 645 series and the Mamiya 645 AFD series can be used with both normal and zero latency.

On these camera bodies response time is independent of the shutter latency setting, it is therefore recommendable to keep the latency on default, Normal Latency, as this will provide longer battery life time.

[To learn how to setup latency please consult the Menu mode Section.](#)



## 10.1 Mounting P 65+ back on the Phase One 645 AF & Mamiya 645AFD Series

The P+ back is fully integrated with the camera body and acts as a part of the whole camera system.

When no cassette is attached to the body the mirror is up and the shutter is open.

When attaching a powered P 65+ back to the camera body the shutter will close and the mirror comes down.

It is important to ensure that the bottom part of the P+ back camera back is pressed correctly into the bottom locking mechanism before the upper locking mechanism is pressed together. - Failure to do this can cause an error with the camera body. The error is a state of continuously opening and closing the shutter. If this occurs, remove the P+ back immediately.

Please be aware that the shutter should be in the correct starting position (shutter open), if this is not the case, attach and remove the P+ back again to make sure that the camera body gets in the correct starting position. (The same procedure is recommended by Mamiya for all film cassettes)

## 10.2 About Viewfinder Masks

The image area of the Phase One & Mamiya 645 is approximately 56 mm x 42 mm.

The light sensitive CCD in the P 65+ measures 53.9x40.4 mm, this means that viewer masking is not necessary, hence is the lens factor now 1.0.

If a mask is already attached in the body, remove the mask according to the relevant users guide.



### 10.3 Phase One 645AF & Mamiya 645AFD series more details

#### Image orientation

The CCD in the P+ back is positioned in landscape orientation.

Whenever an image is captured in portrait position, by rotating the camera, an internal sensor detects this new position and the image will appear as a correctly oriented image on the LCD display and in the Capture One application.

**Camera orientation:** Images can be captured in all three positions – and will appear with the correct orientation on the LCD or in the Capture One software.



#### Studio flash sync on the camera body

When using the P 65+ back on Phase One 645 AF, Mamiya AFD, AFDII or AFDIII body, the flash sync should be connected to the camera body.

Always use flash cables and equipment that provides grounding for the flash.





### T-mode on the Mamiya 645AFD

T-mode is not supported for digital backs on the Mamiya 645 AFD or AFD645II. This is usually not a problem as the Mamiya can use exposure times as long as 16 minutes.

Recommended max exposure time on P 65+ is 1 minute.

On Phase One 645AF and Mamiya AFDIII you can set bulb function to work as the T Mode, using the Custom Functions, please consult the relevant userguide on this.



### Mirror Up

When using mirror up the mode selector should be placed in M (Manual mode) and the focus type selector should also be in the M position.

It is not possible for the camera to measure light or focus when the mirror is up. Please consult the Mamiya 645 Instruction manual to learn how to use Mirror Up.







## 11. P 65+ back for Mamiya RZ

### 11.1 About Viewfinder masking

The actual image area of Mamiya RZ67 is 56x69.5 mm; as the size of the CCD in P 65+ is 53.9x40.4 the CCD is smaller than the actual image size.

Dismount the viewfinder, and let the mask lie on top of the focus screen, then re-mount the viewfinder again, and you have placed the mask.

Please read the relevant manual on the Mamiya RZ67 regarding dismounting the view finder.

### 11.2 Mamiya RZ other details

As Mamiya RZ is fully manual, you should always set your P 65+ to Zero Latency, this will keep the back ready for exposure at any time.

It is not possible to do double exposure, unless you have chosen the Hasselblad V mount plate – if you have chosen the Hasselblad V mount plate you must wait for the “ready-beep”.

### image orientation detection

The CCD in the P 65+ is positioned in landscape orientation. Whenever an image is captured in portrait position, when the back is rotated on the camera, an internal sensor detects the new position and the image will appear as a correctly orientated images on the LCD display and in the Capture One application

### IR filter on the CCD

The IR filter (Infrared reduction filter) is permanently mounted on top of the CCD.

- The filter may not be removed for several reasons:
- The focusing of the P+ back camera back will be damaged.
- It is only possible to remount the filter without dust in between the filter and the CCD if you have access to special clean room facilities.
- The Phase One Product Warranty is terminated.

### **Mirror Up**

Mirror up operation is only recommended if using Mamiya's own double cable release.

The adaptor plate connects to the Mamiya body, and the switch underneath is set to the L position (locked).

If you are using the Mamiya RZ Pro II adaptor you should set the Shutter latency to "Zero latency"

It is possible to use Normal latency on this camera, but only when shooting tethered from the Capture One application using the capture button.

P+ back for Hasselblad V mounted on the Mamiya RZ67 PRO II with a Phase One adaptor.

For further information on the mirror-up on Mamiya RZ please consult the relevant camera users guide.





### 11.3 Mamiya RZ67 PRO IID

The P+ back for Mamiya 645 AFD series also supports the Mamiya RZ67 PRO IID via the 645 AFD adaptor plate available from your Phase One dealer (Part# 70994).



The mode selector on the trigger button should be turned to the white dot when used with the P+ back.



When the P+ back is placed on the body and not in use, the selector should be set to the orange dot, to avoid draining the small battery. Even if the P+ back is turned off, the battery will drain slowly if the orange dot is not selected



### 11.4 Studio flash sync on the RZ lens shutter

When using P 65+ on a Mamiya RZ67 PRO IID, the flash sync should be connected on the Mamiya lens shutter.

The flash sync connector on the P+ back is for use with Large format cameras where no digital interface is available.

#### Shutter latency settings

The Mamiya RZ PRO IID should be used with Zero latency.

Default setting on the P 65+ back is Normal latency.

[To learn how to setup latency please consult the Menu mode section.](#)

Note: This adaptor does not support capturing from the computer - this is only possible with the Phase One adaptor and a P+ back for Hasselblad V or a modification of the backplate on the Mamiya body, can allow usage of P mount.

Cables shipping with P+ back for Mamiya 645 AFD (Value added purchase only)

The P+ backs for Mamiya 645 AFD is shipping with the following cables:  
(Value added purchase only)

**Part# 50300143** Multi connector to Lens sync (for use with Large format - in two shot mode)

**Part# 50300144** From multi connector to mini jack female (for use with Large format wakeup cable or Kapture Group one shot adaptor cable)







## 12.0 P 65+ back for Hasselblad V

The Phase One P 65+ back can be mounted on a wide range of Hasselblad cameras including Hasselblad 555 ELD, 553 ELX, 501 CM, 503 CW as well as and 4" x 5" view cameras via optional Phase One adaptors.

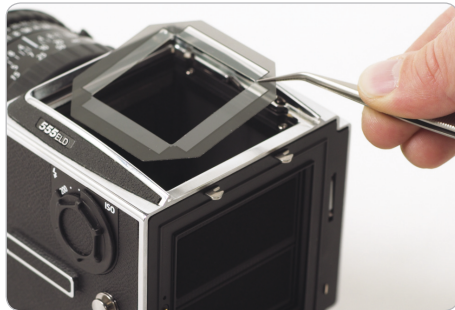
### 12.1 Mounting the viewfinder mask on Hasselblad V

The image area of the Hasselblad camera body is app. 6 cm x 6 cm, whereas the image area of the P 65+ back is app. 53.9x40.4 mm. Therefore, it is necessary to use the P 65+ back viewfinder mask.

Remove the protection tape from the mask and mount it beneath the original focusing screen.

The viewfinder mask is positioned in the bracket that holds the focusing screen. Please refer to the Hasselblad camera manual instructions before the focus screen is removed.

After the Phase One viewfinder mask is positioned in the bracket, place the Hasselblad focusing screen on top of the mask and slide the viewfinder back into place.



## 12.2 Mounting the P+ back on Hasselblad V

The P+ back is fully integrated with the camera body and acts as a true part of the whole camera system.

It is important to ensure that the bottom part of the P+ back camera back is pressed well into the locking mechanism before the upper locking mechanism is pressed together.



Place the Bottom of the P+ back in the locking mechanism.



Press the metal button in the top with your thumb and tip the upper end in place.



### Mounting the P 65+ back vertically

The P 65+ back can be rotated to the left and mounted vertically on the Hasselblad body for use in portrait mode.

In this case the lock button on what is now the top should be slid to the left before tipping the P 65+ back in place on the body.

Images will be rotated automatically on both the LCD screen and in the Capture One application.



Flash cable connects directly to the P 65+ back



### 12.3 Camera body specifics

Regardless of which Hasselblad V type camera used, a sync cable is always connected from the lens to the small connector in the front plate on either the left or right side of the P+ back.

The flash cable is then connected to the F-connector on the camera back.

Sync cable connects to one of the two small connectors in the front plate.

For tethered capture to a computer - plug in a IEEE1394/FireWire cable in the back.

#### Mirror Up

if you need to do captures in Mirror Up function on Hasselblad 500, 903 CW and 905 CW, set the Latency to Zero Latency as these bodies are very quickly ready for next exposure



## 12.4 Hasselblad 555 ELD

When using the Phase One P 65+ back with a Hasselblad 555 ELD, the shutter release on the front of the Hasselblad must be in the “DIG” position.

If, of any reason, you have to use the shutter release in “Film” position (hardware defect on the DIG button, etc.) You must make sure that the Shutter latency is set to “ZERO latency” in the P 65+ back or in the Capture One application.

### Shutter latency settings

On the Hasselblad 555 ELD the P 65+ back can be used with both Normal and Zero latency.

P 65+ back is default set to Normal latency and should be kept at default when used with a hasselblad 555 ELD.

[To learn how to setup latency please consult the Menu mode section.](#)

### No Motor cable on 555 ELD

A motor cable is not required when using P 65+ on a Hasselblad 555 ELD body.



## 12.5 Hasselblad 553 ELX

When using the P 65+ back on some Hasselblad motorized bodies (i.e. Hasselblad ELX or Hasselblad ELM series), a motor cable is supplied to enable capture from the computer.

The cable is connected between the multi-connector on the P 65+ back and the DIN connector on the Hasselblad.

Avoid using A or AS mode.

Please also note that the Phase One P+ back should not be mounted while the camera is set to mirror up (S or RS modes). Make sure that the lens is not jammed or locked open on the “B” setting when connecting the flash sync cable to the Phase One P+ back.

While using the Hasselblad 553 ELX you should set the Shutter latency to “Normal latency” - do only change to Zero Latency setting when using mirror up function.

It is even possible to use “Normal latency” mode on this camera when using a motor cable and doing the exposure by using the capture button inside the Capture One Application.





## 12.6 Hasselblad 501 CM and 503 CW without winder

The Phase One P 65+ back also supports mechanical Hasselblad cameras such as the 501 CM and 503 CW. These cameras are operated in single shot mode via the shutter release button or a standard cable release.

Please note that the Phase One P 65+ back should not be mounted while the camera is set to mirror up.

Also make sure that the lens is not jammed or locked open on the “B” setting when connecting the flash sync cable to the Phase One P 65+ back.

When using mirror-up function, shutter latency should be set to Zero latency. In all other cases you should use Normal Latency.

To ensure capture reliability, it is recommended that you look at the green LED on the back of the camera back while you slowly press the mechanical trigger on the camera body.

You can safely press the button all the way in the moment the LED flashes.

When using “Mirror Up” it is necessary changing shutter latency to “Zero Latency”.



### **12.7 Hasselblad 503 CW with Winder CW**

Please note that the Phase One P 65+ back should not be mounted while the camera is set to mirror up.

Also make sure that the lens is not jammed or locked open on the “B” setting when connecting the flash sync cable to the Phase One P 65+ back.

If you are using a 503 CW with winder you could set the Shutter latency to “Normal Latency”.

When using “Mirror Up” it is necessary changing shutter latency to “Zero Latency”.

### **12.8 Hasselblad 903CW and 905CW**

These Hasselblad models have no options of communicating to a digital back; hence you must at all time keep the latency settings at Zero Latency.

The winder allows optional syncro-cable from the multi connector of the back, this will make allow the back to control winding of the shutter, this have no effect on the latency setting.



## 12.9 Cables shipping with P+ back for Hasselblad V (Value Added purchase only)

The P 65+ backs for Hasselblad V is shipping with the following cables (Value Added purchase only):

**Part# 50300145** Motor cable for Hasselblad ELX. (Used for host capture when the P+ back is used on a Hasselblad ELX body).



**Part# 50300148** Sync cable short (For use with all Hasselblad medium format bodies)



**Part# 50300143** Multi connector to Lens sync (for use with Large format - in two shot mode)



**Part# 50300144** From multi connector to mini jack female (for use with Large format wakeup cable or Kapture Group one shot adaptor cable).



### **13.0 P 65+ back for CONTAX 645**

The functionality of the P+ back is well integrated with the CONTAX 645 camera. The P+ back communicates with the CONTAX camera through a fast internal electrical computer interface.

#### **Auto exposure**

The CONTAX 645 can work in different auto exposure modes.

This is fully supported by the P+ back, which communicates the equivalent film speed of the digital back to the CONTAX 645 camera.

When capturing with auto exposure modes, exposure times between 1/4000 sec. and app. 32 sec. can be obtained in the highest possible quality. Please note that you can merely use the predefined shutterspeeds on the Contax.

The auto exposure of the CONTAX 645 camera uses the ISO value set in the P+ back, or when shooting tethered, in the Capture One application. The ISO can be set to 50-800 or if using Sensor+ 200-3200.

Bulb function is not supported on Contax platform

#### **Latency settings.**

P 65+ should be set to Normal latency if used on the Contax 645.

P 65+ can be used on Contax 645 using Normal or Zero Latency, it is however recommended using Normal Latency, as this preserves power, capture rate on the Contax camera is not affected by the latency settings.



**Camera orientation:** Images can be captured in all three positions – and will appear with the correct orientation on the LCD or in the Capture One software.

### **Image orientation detection**

The CCD in P+ back is positioned in landscape orientation.

Whenever an image is captured in portrait position by rotating the camera, an internal sensor detects this new position and the image will appear with the correct orientation in the Capture One application.

Camera orientation: Images can be captured in three shown positions – and will appear with the correct orientation in the Capture One application.

### **IR filter on the CCD**

The IR filter (Phase One TG1 Infrared cut-off filter) is placed on top of the CCD.

The filter may not be removed for several reasons.

- The focusing of the P+ back will be damaged.
- It is only possible to remount the filter without dust in between the filter and the CCD if you have access to special clean room facilities.
- The Phase One Product Warranty is terminated.

**Mounting or dismounting the focusing screen**

The image area of the P 65+ matches the Contax image area, and thereby the viewfinder area, this means you do not need a viewfinder mask.

If a mask is already attached in the body, remove the mask according to the relevant users guide.

This viewfinder mask has to be mounted underneath the CONTAX focusing screen.

Refer to the CONTAX 645 Instruction Manual “Replacing Focusing Screen” before the focusing screen is dis-mounted.



### **13.1 Mounting P 65+ back to the CONTAX 645**

P 65+ back for Contax is fully integrated with the camera and acts as a true part of the whole camera system.

When attaching P 65+ back to the camera it is important to ensure that the bottom part of the back is pressed well into the locking mechanism before the upper locking mechanism is pressed together.

To avoid that P 65+ is released by mistake from the camera house, the lock button on the side of the P+ back can be used to lock the C645 locking mechanism.

#### **Operating the camera from the host computer**

The supplied release cable must be connected between the multiple-pin connector on the P+ back and the mini-jack connector placed at the bottom of the handgrip on the CONTAX camera house.

Bulb capture is not supported on Contax.

## 13.2 Flash photography on Contax 645

### Use of flash sync cable

No cables are required between the P+ back and the CONTAX 645. Flash sync cable must be connected to the CONTAX 645 camera.

The flash sync cable must NOT be connected to the P+ back. This connector is only to be used when operated on a Large format camera with the Phase One FlexAdaptor.

### TTL flash

Because the CCD element reflects light different than film, and this cannot be communicated to the Contax. Using TTL flash with the CONTAX 645 camera and P 65+ back, will result in a 2 f-stop overexposure. When using TTL flash, the exposure compensation on the flash unit must therefore be set to -2 f stops.

Cables shipping with P+ back for Contax 645 (Value added Purchase only)

The P+ backs for Contax is shipping with the following cables (Value added Purchase only):

**Part# 50300143** Multi connector to Lens sync (for use with Large format - in two shot mode)

**Part# 50300144** From multi connector to mini jack female (for use with Large format wakeup cable or Kapture Group one shot adaptor cable)

**Part# 50300154** From multi connector to mini jack on the Contax handgrip (used to enable Host Capture from Computer)



## 14.0 H 101 - P 65+ for Hasselblad H1/H2 & FUJI 645 GX

*This chapter also covers the FUJI 645GX, though “only” the Hasselblad H1/H2 is mentioned.*



The Phase One H 101 – P 65+ back is a single shot digital camera back designed specifically for the Hasselblad H1/H2 & FUJI 645 GX camera.

The Hasselblad H1/H2 with a Phase One H 101 – P 65+ back encourages all kinds of photographic uses from portraiture and wide-angle photography to high speed shooting to capturing fast action with telephoto lenses.

The functionality of the Phase One H 101 – P 65+ back is well integrated with the Hasselblad H1 camera. The H 101 – P 65+ back camera back communicates with the H1/H2 camera through a fast internal electrical computer interface.





*For a general description of the viewfinder information please consult the relevant User manual.*

### 14.1 Camera LCD display

The Hasselblad H1 incorporates a display which details information of the actual condition of the camera. It shows flash method, lens use, AF mode, f-stop value, shutter speed etc.

The Hasselblad H1/H2 will also display some camera back specific conditions in this display.

Camera back ISO setting is displayed. ISO is default 50 and can be set on the camera back and/or in the Capture One application if shooting tethered.

Error messages like "Storage media full" will also be displayed in the LCD, if for example the P+ back CF card is full.

### Viewfinder information

The icon on the second position from the right shows the actual captures left on the storage media, an "E" indicates that storage media is full, you will need to free some space or replace the CF card before continuing.

**Auto exposure**

The Hasselblad H1 can work in different auto exposure modes. This is fully supported by the H 101 - P+ back, which communicates the equivalent film speed of the digital back to the Hasselblad H1 camera.

The default film speed of the H 101 – P 65+ back is ISO 50. However, this setting can be changed to 100, 200, 400 or 800, 1600 or 3200 ISO, please consult chapter 9 of this manual for details on setting the ISO in your camera back.



## 14.2 Image orientation detection

The H 101 – P 65+ back CCD is positioned in landscape orientation. Whenever an image is captured in portrait position by rotating the camera, an internal sensor detects this new position and the image will appear correctly oriented on the LCD and in the Capture One application.

### Camera orientation:

Images can be captured in the three shown positions - and will appear with the correct orientation on the LCD and in the Capture One software.

### IR filter on the CCD

The IR filter is placed on top of the CCD.

The filter may not be removed for several reasons.

- The focusing of the H 101 - P 65+ back camera back will be damaged
- It is only possible to remount the filter without dust in between the filter and the CCD if you have access to special clean room facilities.
- The Phase One Product Warranty is terminated!

### About viewfinder mask on H1/H2

The image area of the Hasselblad H1/H2 is app. 56 x 41.5 mm.

The image area of the H 101 – P 65+ is app 53.9x40.4 mm.

This is why H 101 – P 65+ back does not need a viewfinder mask. If the H1 has already a mask mounted in the viewfinder, remove this, check the relevant users guide for facts on this.



### 14.3 Mounting the H 101 - P+ back on the Hasselblad H 1

The H 101 – P 65+ back integrates fully with the H1 camera and acts as a part of the whole camera system.

When no cassette is attached to the Hasselblad camera, the mirror is up and the shutter is open. This is the correct position.

When attaching the H 101 - P+ back to the camera, the shutter will close and the mirror comes down.

It is important to ensure that the bottom part of the H 101 - P+ back camera back is pressed well into the locking mechanism before the upper locking mechanism is pressed together.

#### Use of cables

No cables are required between the H 101 - P+ back and the Hasselblad H1.

Flash sync cable must be connected to the Hasselblad H1 camera house.

The flash sync cable must NOT be connected to the camera back when used on a Hasselblad H 1.

The flash sync connector on the Camera back is only intended for use with a Phase One FlexAdaptor, or other large format/technical adaptors.

Cabling Cables shipping with H101 – P+ backs (Value Added purchase only)

The P+ backs for Hasselblad H1/H2 are shipping with these cables (Value Added purchase only):

**Part# 50300143** Multi connector to Lens sync (for use with Large format – in two shot mode)

**Part# 50300144** From multi connector to mini jack female (for use with Large format wakeup cable or Kapture Group one shot adaptor cable)



## 15.0 View camera and technical photography

The Phase One P 65+ back can be used with most wide angle cameras, technical view cameras or large format cameras via camera interface adaptors. The P 65+ back supports most mechanical shutters and some electronic shutters from Horseman, Schneider and other vendors.

To enable noise free exposures without the use of active cooling of the CCD, Phase One has developed the “Phase One Sleeping Architecture”. The sleeping architecture ensures minimum heat build up inside the back, by putting all the unused circuits to sleep, and only powering the circuits that are actually needed at any given time.

Using Zero latency removes the need to wake up the back prior to the actual exposure, hence you just need to connect the standard flash sync cable to the digital back and the lens, and shoot. The Zero Latency will however increase your power consumption significantly, and this power consumption should be on your mind if creating outdoor photography, not having other power source than battery.





1-shot cable



2-shot cable



push button to "wake up" the camera back.

Wake Up sync cable Part # 50300131

## 15.1 1-shot release

**1-shot release:**The new 1-shot release cable is created to simplify your studio workflow. Connect the flash exit on the shutter, with the multipin entrance on P 65+; let the P 65+ be connected to your flash.

Close the shutter if necessary.

Select Menu>Capture Setup>Shutter>Zero Latency.

Using FlexAdaptor or not you are now ready to do exposure; often this setup will be tethered and though the FireWire is connected in the back you cannot

On fully manual cameras you can not control the exposure from Capture One, neither will e.g. the shutter speed and aperture value be recorded, P 65+ will however add a calculated approximate shutter speed.

when using the 1-Shot release cable you should keep Latency settings at Normal Latency.

**2-shot release:**Phase One P 65+ can be used with mechanical shutters that can be fired twice within four seconds. The first release of the shutter activates the digital back; the second release takes the exposure. If the time limit of four seconds is exceeded, the camera gives a warning "beep" followed by a "two shoot error" dialog displayed on the LCD.

also when using 2-shot cable you should keep shutter latency settings at Normal Latency.

Several automatic or semi-automatic two shoot solutions for mechanical shutters are available from third parties. Please ask your dealer for information on these solutions.

### Usage of a classic cable release

should you use a classic cable release e.g. pneumatic or other connected to release button, you need to change latency settings to Zero Latency.



The optional Phase One FlexAdaptor is available for most large format cameras and comes with a “Phase One Wake Up Cable”. This cable has a small button that is used to wake up the camera before release of the shutter.

The Phase One FlexAdaptor also has “Stitch functions” that makes it possible to stitch two or three images together automatically using the Stitch function in Capture One.

Please read the reference manual that comes with the FlexAdaptor.



Phase One  
FlexAdaptor

### **Shutter latency settings when used with FlexAdaptor or other technical camera adaptor**

Using Zero Latency removes the need to wake up the back prior to the actual exposure; hence you just connect the standard flash sync cable to the digital back and the lens, and shoot.

If using the P 65+ back as a manual two shooter, where the first shot will power up the P 65+ back, and the second will make the exposure, you should use “Normal latency”.

Zero Shutter latency will increase your power consumption, as the back will constantly be prepared for exposure.

[To learn how to setup latency please consult the Menu mode section.](#)



## 16.0 Lens Cast calibration

### 16.1 What is Lens Cast?

Lens cast may occur if using the P 65+ with wide-angle lenses or on Technical cameras with the possibility to tilt or shift the lens in front of the CCD.

#### Why does it occur?

Lens cast occurs as a result of the angle at which the CCD is exposed to light. If the CCD is exposed to light coming from a very sharp angle e.g. wide-angle or extreme degrees of tilting or shifting you may experience lens cast.

#### What does it look like?

Depending on the light conditions and photographic setup, lens cast will typically appear as a green cast in one side of the image that changes into a magenta cast in the opposite side of the image. This is mostly visible on neutral grey backgrounds.

### 16.2 How do I get rid of it?

If working with Technical cameras with tilt and shift, you would have to make a new calibration file if you change the tilt or shift position.

Phase One provides a solution in the Capture One 4 PRO that helps you get rid of the lens cast. We call it: Lens Cast Calibration (LCC).

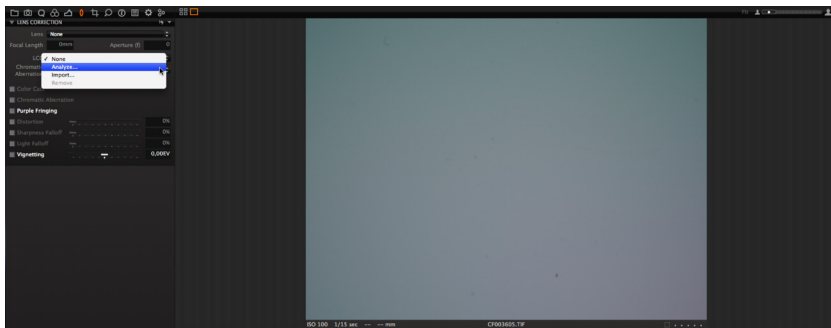
By holding an opal white plate in front of the lens and capturing a calibration image that you then apply to all of your capture files you are able to remove the lens cast.

On medium format cameras with fixed lenses the calibration is very simple: You do one calibration for each lens and then save the calibration files and apply them when needed by clicking “Set as default for new Captures”.

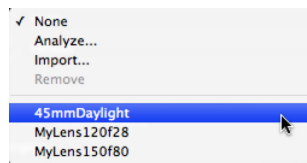
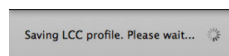
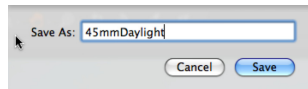


### 16.3 4 Simple steps to calibrate (Mac)

1. Hold the calibration plate in front of the fixed lens (as close as possible), and capture. In order to ensure correct exposure you may have to open up a few f-stops or in a very dark setup, light directly onto the plate.



2. In the Capture One software you select the 'calibration' image and click on the "Save LCC" button (the LCC tool is located under the grey balance tab).

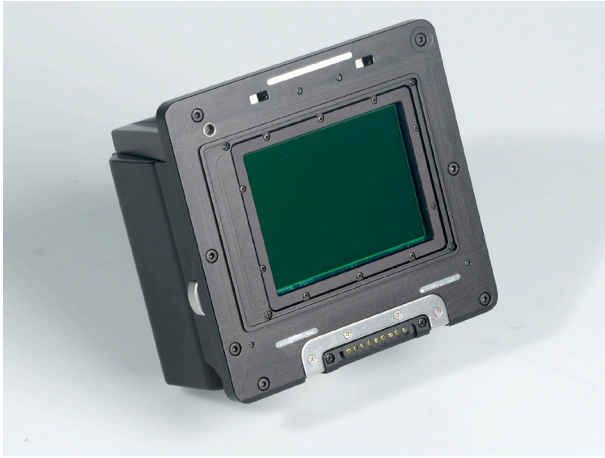


3. Give the calibration file a name that corresponds to the lens in use or the set-up (e.g. 45mmDaylight)

4. Select the calibration file: "45mmDaylight" from the "Lens CC" drop-down list and click "Set as default for new Captures".

#### PLEASE NOTE:

As soon as grey calibration is done and the calibration files are saved and appear in the Lens CC drop-down box the calibration files can be deleted from the thumbnail window.



## 17 Maintenance

### Cleaning the CCD

When the Phase One P 65+ is not attached to a camera, the camera back must be protected with the protection plate.

Over time dust may accumulate on the IR filter. This will degrade the image quality if not removed.

Please follow the directions included in the CCD cleaning kit in the P+ back suitcase.

**IMPORTANT: DO NOT ATTEMPT TO REMOVE THE IR-FILTER IN FRONT OF THE CCD**

## 18. Secure Storage System

### 18.1 Secure Storage system “3S” (How does it work?)

When a card is inserted into the P-back, a complete disk check for a valid file structure is performed.

High GB cards needs slightly longer to load

Large Microdrives is significantly slower than CF -cards, If the load time exceeds 2 seconds the progress will be indicated with series of small dots in the disk icon.

It is not recommended to turn off disk checking, but it is possible by selecting the “Disk Checking” available in the “Menu” under “Storage”

Whenever Disk Checking is turned off the capture counter turns red to indicate that the disk has not been checked.

### 18.2 Disk Check summary

With the 3S technology we have created a new and safe storage system in the P – back that is much more rugged than anything else seen in the industry.

Best performance is obtained by formatting the card in the P+ back (Although other formatting is supported, formatting in the P+ back ensures exact cluster size depending on card size)

Damaged or wrong formatted cards will be detected immediately eliminating the risk of shooting to a damaged CFcard.

Ejecting a card while in a writing session will no longer damage the file structure of the entire CF-card, only the affected buffer of images.

This level of file system security is unique to the Phase One digital backs.

## 19.0 Service and Technical Specifications

All technical specifications and measurements are based on Phase One R&D and Phase One Test Department.

### 19.1 Updating the P 65+

Phase One reserve the right to change or adjust any figure and functionality in future updates, please read any eventual update documentation before installing.

Firmware updates will be available on the download area on [www.phaseone.com](http://www.phaseone.com)

– Or check out the support forum.

## **19.2 Support and recommendations**

Please check [www.phaseone.com](http://www.phaseone.com) for updated support policy  
By purchase of a Phase One product we guarantee you World Class Support and Service!

A Phase One P 65+ is a simple product workflow wise, but the electronic and interior of the back need specialized service, and we only have one place to do interior repair of the back, Copenhagen, Denmark at Phase One production facility.

If you should ever experience problems with your Phase One P 65+, please consult the dealer from whom you have bought the digitalback.

Still some issues might occur as a result of unintended usage or usage of equipment not recommended. Some of the issues are shown as examples here, these issues can be solved by yourself, by following the recommendations by Phase One.

## 19.3 Recommendations

to create the most smooth workflow in your day, it best to follow these recommendations from Phase One support.

### Standard Tethered Setup:

- max 15' (4.5m) double shielded firewire cable.
- Capture folder on internal Hard Drive
- IIQ-L
- Back power forced from battery
- Nothing else on FW bus

### Using CF-cards:

- Use 'UDMA' Ultra Direct Memory Access CF-card's.
- Speed: 40 MB/s (266x), 45 MB/s (300x)
- Sandisk, Lexar and Kingston cards available with this performance

### Optimal Systems for use with Phase One Backs:

#### Studio

- MacPro Tower
- 4 or 8 core Intel Processor
- 4GB Ram
- 2 Internal hard drives (one for backup)

#### Location

- MacBook Pro
- Core2Duo Processor
- 2-4GB RAM



*Possible error if not using the recommended standard tethered set-up.*

## 19.3 Technical specifications

All Technical specifications are based on Phase One test standards, and can be changed without notice.

### Imaging technology

CCD:	Full frame CCD
Lens Factor:	Full frame / 1.0
Resolution:	60.5 mega pixels
Active pixels:	8984 x 6732
CCD size effective:	53.9 mm x 40.4 mm
Pixel size:	6 x 6 micron
Image ratio:	4 : 3
Micro lens on CCD:	No
Dynamic range:	12.5 f-stops

### P 65+ full resolution capture mode:

Resolution:	60.5 mega pixels
Pixel size:	6 x 6 micron
Raw file compression	IIQ Large: 60MB IIQ Small: 40MB
ISO:	50, 100, 200, 400, 800

### Sensor+ capture mode:

Resolution:	15 mega pixels
Pixel size:	12 x 12 micron
Raw file compression	IIQ Large: 15MB IIQ Small: 10MB
ISO:	200, 400, 800, 1600, 3200

### Output files

Color depth:	16 bit per color
Image file formats:	All output formats of Capture One are possible: TIFF-RGB, TIFF-CMYK, JPEG.
Color management:	RGB, Embedded ICC profile, CMYK

### Camera system

Capture time:	1.0 sec./frame - 1.2sec/ frame depending on camera platform
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### Storage security:

Phase One Secure Storage System technology	
Battery type:	7.2 V Lithium Ion 2500mAh
Battery Lifetime:	2000 Captures
Exposure time:	1/10000 sec. - 1 minute
Live preview:	No
IR filter:	Mounted on CCD
Cooling system:	Passive cooling
Power up time:	Less than 2 sec. from OFF, sleeping architecture for instant ON
Power:	8-33 V DC (from FireWire®)

### LCD screen

Size:	2.2"
Resolution:	230,400 pixels
Viewing angle:	160°

### P 65+ mounts

Phase One/Mamiya:	Phase One 645 AF Mamiya 645AFD series, RZ67 Pro IID, Mamiya RB67es
Via adaptor:	Mamiya RZ67 Pro IID
Phase One H101:	Hasselblad H1 and H2
Hasselblad V:	Hasselblad 555ELD, 533ELX, 503CW and 501CM
Contax 645:	Contax 645 AFD
Hasselblad H:	Hasselblad H1 and H2 / Fuji GX645
Contax:	Contax 645AF

### Technical cameras and wide angle

4 x 5" via Flexadaptor: Arca Swiss, Cambo, Linhof, Toyo, Sinar, Plaubel, Horseman

### Operating conditions

Temperature:	0° to 40°C (32° to 122°F)
Humidity:	15 to 80% RH (non-condensing)

### Lighting

Supports all photographic lights: Flash, tungsten, daylight, fluorescent, HMI

### Minimum computer requirements

Mac:	Fast Core 2 Dual or later CPU. 4 GB RAM. Fast HDD: RAID 0 configured systems for max. performance. Nvidia 8800 series graphics card or newer.
PC/Mac:	Pentium III, 2 GB RAM, IEEE 1394 interface, Windows XP/2000

### Software

Capture One 4.5 or later  
Please read the release notes for Capture regarding recommended operating system.

### Certifications

Phase One IIQ file format speeds up the image capture and file transfer. Increases the storage capacity by turning the full 16 bit image data into a compact RAW file format. The default IIQ RAW-large format is completely lossless.