



Cultural Heritage

Solution Guide

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About

Phase One

Phase One is the world leader in open-platform medium format digital camera systems and solutions. Phase One medium format digital cameras, digital backs and digital lenses are designed to deliver world-class image quality for professional photography.

All our products are built by hand following the same quality assurance processes as performed by the leading Swiss luxury watch manufacturers.

Our company was born digital and we have always strived to deliver the highest image quality possible through innovative solutions. Our strong commitment to serving the needs for Cultural Heritage photography has been reinforced by our partnership with Digital Transitions, a company with long standing expertise in serving the Cultural Heritage Community. Well known Cultural Heritage institutions worldwide rely on our combined systems to consistently deliver the highest level of quality, performance and safety for demanding collections of objects.

In addition to camera technology, Phase One develops world-class software for optimized capture and postproduction workflow.

Our Capture One raw file converter is known for its quality, flexibility and speed. The total solution of camera system and software enables the Cultural Heritage photographer to achieve preservation grade quality without compromise.

Phase One was founded in 1993 and is based in Copenhagen with offices in New York, London, Tokyo, Cologne, Hong Kong and Shanghai.

Phase One is proud to work together with the world's leading value added resellers. Doing so we ensure that we can always offer our users the best in class service and support.

PHASEONE

what the world's best photography is made of

About

Digital Transitions

The Digital Transitions' Division of Cultural Heritage provides capture hardware and workflow software to support the digitization programs of libraries, museums, archives, collectors, service bureaus and other institutions.

Their experience in designing reprographic systems, executing preservation and commercial imaging programs gives them first-hand knowledge of the requirements and concerns facing cultural institutions when digitizing all collection types.

Their partnership approach is comprehensive: They work closely with every client to design a total solution with an efficient standards-based workflow. This includes selecting ideal hardware, integrating our systems into existing infrastructures, and providing continuing support and training to the staff in order to keep the digitization program running efficiently.

For more information, please see:
<http://www.dtdch.com/>



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Cultural Heritage

& The Market

The market for Cultural Heritage is diverse, with many different needs and challenges. For this reason Phase One delivers modular and configurable solutions, which can be tailored to all specific needs.

We offer solutions to satisfy a wide range of digitization needs, by providing complete installations for new systems, or by optimizing individual components of existing solutions. All our components are modular, so that it is always possible to renew them when technology evolves in a area.

The need for digitization is growing rapidly, with enhanced focus on information to the public, and preservation of information for the future. Many museums and libraries with valuable collections are expanding their digitization efforts, with all the exiting possibilities which are made possible by the rapid growth of internet access for everyone.

The history of Cultural Heritage photography is as long-standing as photography itself. Historic collections at museums or libraries often have had a photographic studio allocated for creating photographs of sensitive material, or to create paper copies for researchers or students, for saving the original object from wear or even damage.

Changing from analog based film processing to digitally based media has enabled for a completely new range of applications, and the possibility to share the material with a much broader audience than previously, and at the same time the reproduction quality has increased significantly.

Preserving and conserving the past for the future is often a race against time, as much material has a limited lifespan before it is gone forever, thus solutions that enable rapid capture are not only necessary but often crucial.

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Cultural Heritage

Collection Types

All Cultural Heritage collection are unique and diverse, but due to the nature of the collections, they often fall into four distinct categories. In order to address the diverse nature of the collections, Phase One and Digital Transitions deliver specialized and tailored solutions, aimed at giving the best output quality, while ensuring material safety and efficient workflow.

I. Flat Art Reproduction



The most common forms of Cultural Heritage collections include documents, manuscripts, photos, newspapers, musical scores, letters, post cards, and other flat objects in all sizes and shapes.

Common to all of these collections is the need to obtain high quality reproductions of consistent quality, on a system with good ergonomics, while at the same time minimizing the risk of errors and accidental damage to the material.

The requirement for lighting may be divided into two categories:

- 1) Uniform light** over the entire surface, with strict requirements to color precision. This is often achieved by photographing the material together with a color chart, for the option of recreating the correct and exact colors in the future.
- 2) Directional light** may be used to enhance texture and three-dimensional look of the object. This type of work often leaves artistic freedom to the photographer; as the choices of light will enhance certain features, while diminish others, thus giving the image an interpreted look or style.

Operators for these types of task will typically be trained photographers for the case of directed light, or curators and photographers for uniform light scenarios.

II. Rare Books



A large part of the Cultural Heritage community deals with the digitization of rare and delicate bound materials, such as books

Digitization of books often requires special attention to the binding, as this often is fragile, and will determine how the material can be treated in the process. This fact will often be the limiting factor for the capture speed of the material.

Uniform lighting will typically be the choice of operation here, and will often be the same throughout when working with non-reflective material. In situations with a mixture of non reflective and reflective materials, the photographer may have to adjust the lighting, which will be possible using rapid capture solutions using external light sources.

On traditional reprographic copy stands, the operator has to check and adjust focus as he progresses through the book, which slows down the procedure. Using a glass plate with fixed focus will accelerate the capture process, and photographing both pages at once will also boost productivity.

This type of work may be performed both by curators or trained photographers.

III. Transparent Film



Most common in this category is work with historic glass negatives, medium and large format negatives, and 24x36mm, but the area covers all different type of transparent film material.

Uniform illumination of the materials, with good color reproduction is mandatory, so that all color information may be retrieved during processing, which often takes place from negative to positive.

The conversion process is often relative and open to interpretation, as the base material for the original transparency material varies. Two different rolls of film may behave very differently, both in the physical characteristics of the original base material and in their subsequent chemical development.

Traditional scanner solutions work with fixed sizes, such as 24x36mm, 6x6 or 6x9, thus limiting the versatility of the equipment substantially. Medium format based solutions work with all sizes, determined only by the light box, which may indeed be very large. If needed, a larger image may be stitched together from several individual high quality captures, to yield extremely high-resolution captures.

There is a tremendous speed advantage in the instant medium format capture over scanning, which may speed up the process by a factor of 200 to 300 or more.

This type of work may be performed both by curators or trained photographers.

IV. Objects and Oversized Materials



This category of Cultural Heritage work covers the area of digitization that typically takes place outside of the photographic studio, when objects are too large or too fragile to move, in exhibition halls, for example.

For very large paintings, it is desirable to work with uniform lighting, but for three-dimensional objects, a more dynamic lighting set-up is necessary, either with natural light or with portable light solutions.

Best results are always obtained by using medium format solutions; either based on an MF DSLR, or technical cameras with tilt & shift functions.

The fastest workflow solutions are obtained by using an automatic MF DSLR system like the Phase One 645DF+, in combination with an IQ digital back.

When tilt & shift movements are required, the best quality is obtained with a technical camera, in combination with an IQ digital back.

Trained photographers are most often to be found performing this type of work, as knowledge of natural and artificial lighting is essential.

Note:
There is no separate chapter in this guide for this collection type, as this type of work is covered by tools already in use for existing photography.



I. Flat art reproduction

High quality general purpose reprographic solutions for books, documents, drawings, musical scores, manuscripts and small objects.

Ideal flat art reproduction is centered around a high quality camera solution with prime optics, which captures every detail and color, mounted on a stable reprographic stand. It is important to have a consistent digitization workflow with uniform quality, while enabling the operator to work in an environment with best possible ergonomic, as many digitization projects are taking place over long periods of time.

Modularity and configurability are key words within this discipline, as collections are highly diverse. Phase One supports the possibility for creating a tailor made solution by providing the best individual parts, or by adjusting already existing solutions.

Solution**Proposal**

	DT RCAM 72
	72mm (reproduction up to A3, 600DPI) 120mm (close up reproduction up to 6000DPI)
	IQ180
	DT RGC180
	2x Profoto Striplight S + light stands 1x Profoto Air transmitter
	Capture One CH 8
	Mac or PC, with i5 or i7 processor 8GB memory or more. Solid State Drive, 256GB or more Calibrated monitor.
	Highest possible resolution with Schneider Kreuznach Apo-Digitar lenses. Rugged camera design with over 1 million captures on the shutter. Built in book capture on glass focus plate on reprographic stand.

1. DT RCam. 2. Profoto Striplight S. 3. IQ180.
4. Schneider Kreuznach 72 mm. 5. Capture One. 6. DT
RGC180.





II. Rare Books

Book reproduction of rare materials should always be done with highest possible care taken to ensure the integrity of the material, during digitization, as this often is fragile, and determines how the material can be treated in the process.

The BC100 capture system provides the best basis for a rapid book capture solution, which takes care of delicate material, while ensuring best possible image quality at a high speed.

Modularity in the construction ensures that cameras and digital backs may be upgraded when technology evolves, ensuring a good long term investment in equipment.

Solution	Proposal
Reprographic Camera:	2 x DT RCAM 90
Lenses:	2 x 90mm (reproduction up to A3, 600DPI)
Digital Back:	2 x IQ180
Reprographic System:	DT BC100
Light:	Built in LED light
Imaging Software:	2 x Capture One CH 8
Computer:	2x Mac or PC, with i5 or i7 processor. 8GB memory or more. Solid State Drive, 256GB or more. Calibrated monitor.
Benefits:	Up to 30x faster than traditional book scanner solutions Best possible material integrity, while maintaining a high capture speed. Ultimate image quality with up to 80 megapixel per page two per shoot. Rugged camera design with >1 million captures on shutter.

Products: 1. DT BC100. 2. DT RCam. 3. Schneider Kreuznach 90 mm. 4. IQ180. 5. Capture One.





III. Transparent Film

The digitization of transparent film on a medium format capture solution is centered around a stable reprographic stand, a camera with a macro lens and a set of precision constructed film holders for the relevant material types.

The DT Film Scanning Kit is an accessory kit for a reprographic system based on an already existing DT RCAM solution, which enables high quality digitization of transparent material, from 24x36 up to a size of 11"x17".

Solution	Proposal
Reprographic Camera:	DT RCam
Lenses:	120mm (close up reproduction up to 6000DPI)
Digital Back:	IQ180
Reprographic Table:	DT RG3040
Light:	Kaiser Lightbox 2493
Imaging Software:	Capture One CH 8
Computer:	2x Mac or PC, with i5 or i7 processor. 8GB memory or more. Solid State Drive, 256GB or more. Calibrated monitor.
Benefits:	Over 200 times faster than existing drum scanners. Highest possible image quality available. Easy to operate. Extremely durable for years of continuous use. Ensures preservation object handling.
Products:	1. DT RCam. 2. Schneider Kreuznach 120 mm. 3. Kaiser Lightbox 2493. 4. IQ180 5. DT Film Scanning Kit. 6. Capture One. 7. DT RGC180 or DT RG3040.



DT RG3040

Reprographic System

The DT RG3040 Reprographic System was developed to meet the high demands of the cultural heritage digital imaging community, while protecting the integrity of the materials.

This system, with its electronically controlled column, fully aligned components, and casters with adjustable and retractable dampeners optimize ease of use, while ensuring the creation of superior digital images every time. The DT RG3040 Reprographic System is also designed for use with virtually any camera, lens, or shutter system in order to prevent obsolescence.

Legacy copy systems were designed to meet the relatively loose precision required for film capture, whereas the DT RG3040 reprographic system was built from the ground up for the era of digital capture. Its design and manufacturing surpass the exacting tolerances required for high-resolution digital preservation imaging. It's ready to use with any digital capture system from low-end dSLRs to the purpose-built DT RCam Reprographic Camera, or the iXR (up to 80MP).

DT RG3040

Features & Benefits:

- A 30" x 40" reprographic table with a heavy duty, moveable electronically controlled column.
- Fully aligned components CNC (Computer Numerical Controlled) machined to 0.005" to ensure even focus across image plane.
- A utility shelf to hold lighting generator and camera accessories.
- Four casters with adjustable and retractable dampeners for mobility, work surface alignment, and elimination of table vibration. This ensures the highest quality reproduction.

Ideal Uses:

- Archiving of books, manuscripts, and serials.
- Bound materials.
- Objects to be restored.
- Maps and blueprints.
- Documents, seals, and coins.
- Transparent objects up to 18.9" x 17.3".
- Glass negatives.
- Historic glass paintings.
- Rare materials such as valuable graphics, pictures and paintings.
- Industrial measuring and testing.
- Material analysis, research and development.
- Reproductions to visualize structures.



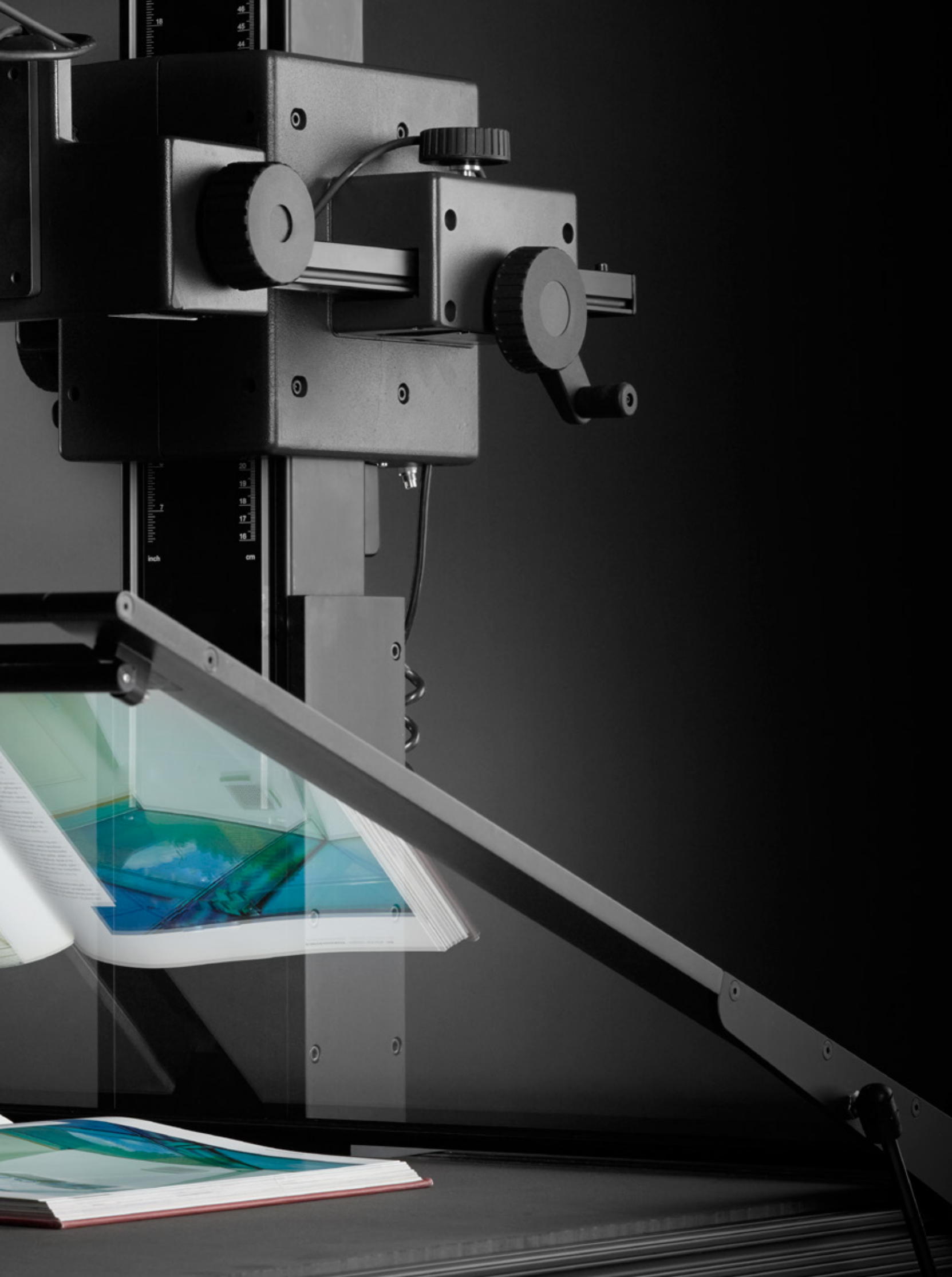


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DT RGC180

Capture Cradle

Originally designed and built for the National Archives Records Administration, the DT RGC180 Reprographic Capture Cradle is the latest integration of book capture and reprographic technology.

Developed to achieve preservation grade reproductions at the fastest rate of capture—while providing reliability, ease of use, and safety of the original materials—the DT RGC180 is the optimum digitization solution for the rapid capture of rare, bound and loose document collections.

The DT RGC180 features a built-in pneumatic 180° dual platen book cradle that adjusts to the thickness of bound collections. The system is designed to bring printed materials to optimal focus and accommodates books up to 25" x 35" with up to 4" bindings.

The book cradle platens are self-adjusting platforms that utilize dual pneumatic pistons for raising and lowering. The platforms gently push the books against the glass plate for image capture and can also leave documents partially open when the binding is too fragile and cannot be completely flattened.

The RGC180 is operated by foot pedals and can be fine-tuned to protect the widest range of materials. For increased safety, the glass top is hinge mounted to the back of the table and includes lift-assist gas pistons and is secured with hand locks.

The DT RGC180 features a modular design that incorporates today's finest digital camera systems and can be upgraded as technologies or needs change.

To increase versatility, a 30" x 40" copyboard is also included that can be placed over the glass so that oversized books, foldouts, maps, rare materials, paintings, film and glass negatives (utilizing the DT Film Scanning Kit), and more can be digitized. The DT RGC180 Capture Cradle is truly a proficient system that will protect your investment and enable you to expand the scope of your digitization program.

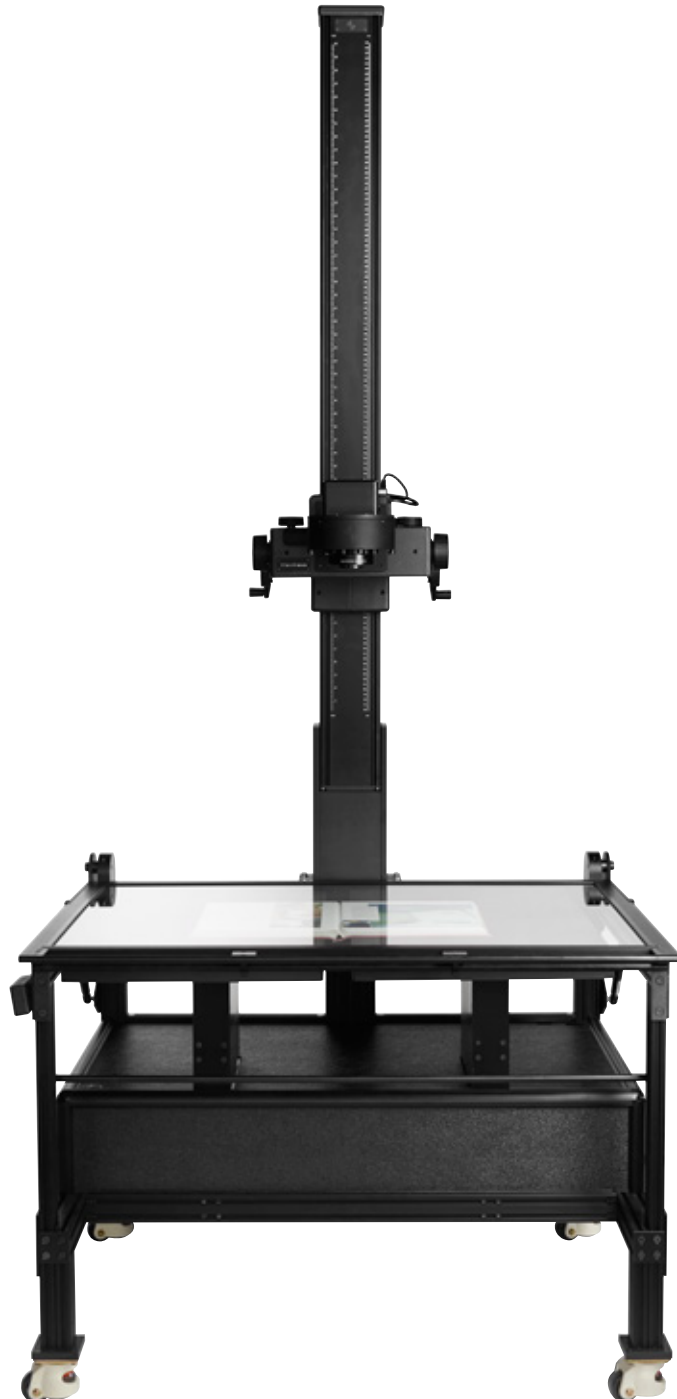
DT RGC180

Features & Benefits:

- 180° anti-reflective glass platen enables the digitization of up to of 25"x 35" books with up to 4" bindings.
- Two pneumatic platforms that automatically adjust to your book for optimal focus.
- System can be fine-tuned for the safety of the widest range of materials.
- Open platform design allows camera and capture device to be upgraded, thereby preventing obsolescence.
- Variable resolution options available.
- Operated by foot pedals.
- Four retractable vibration dampening casters.
- DT Multi-Crop Tool available.
- Easy to operate.
- Durable design for years of continuous use.

Ideal Uses:

- Digitization of books, manuscripts, and book foldouts.
- Newspapers, periodicals, catalogs and magazines.
- Bound and stapled documents including contracts, accounts, and documentation.
- Rare materials.
- Photos.
- Scrap books.
- Maps and blueprints.
- Documents, seals, and coins.
- Glass negatives, photographic plates, photographic films (with DT Film Scanning Kit), transparent objects up to 18.9" x 17.3".
- Historic glass paintings.
- Industrial measuring and testing.
- Material analysis and research.







DT BC100

Book Capture System

Built on the success of the DT RG3040 Reprographic System, this system redefines the way library materials are digitized. The BC100 is the only true 48 bit system on the market that will meet the high demands of cultural institutions by providing the highest image quality, speed, and reliability needed to capture a wide variety of bound and loose materials — all while protecting the original documents.

Designed for the mass digitization of books, the 100° bonded v-shaped anti-reflective glass platen and adjustable book cradle secures and holds the largest variety of bound materials with page sizes larger than 17"x24" or A2 size per side. These combined components keep the focus plane the same while being gentle on the binding of the book. The glass platen of the BC100 is designed with a pneumatic lift system to increase productivity while protecting the books, and is incapable of free falling.

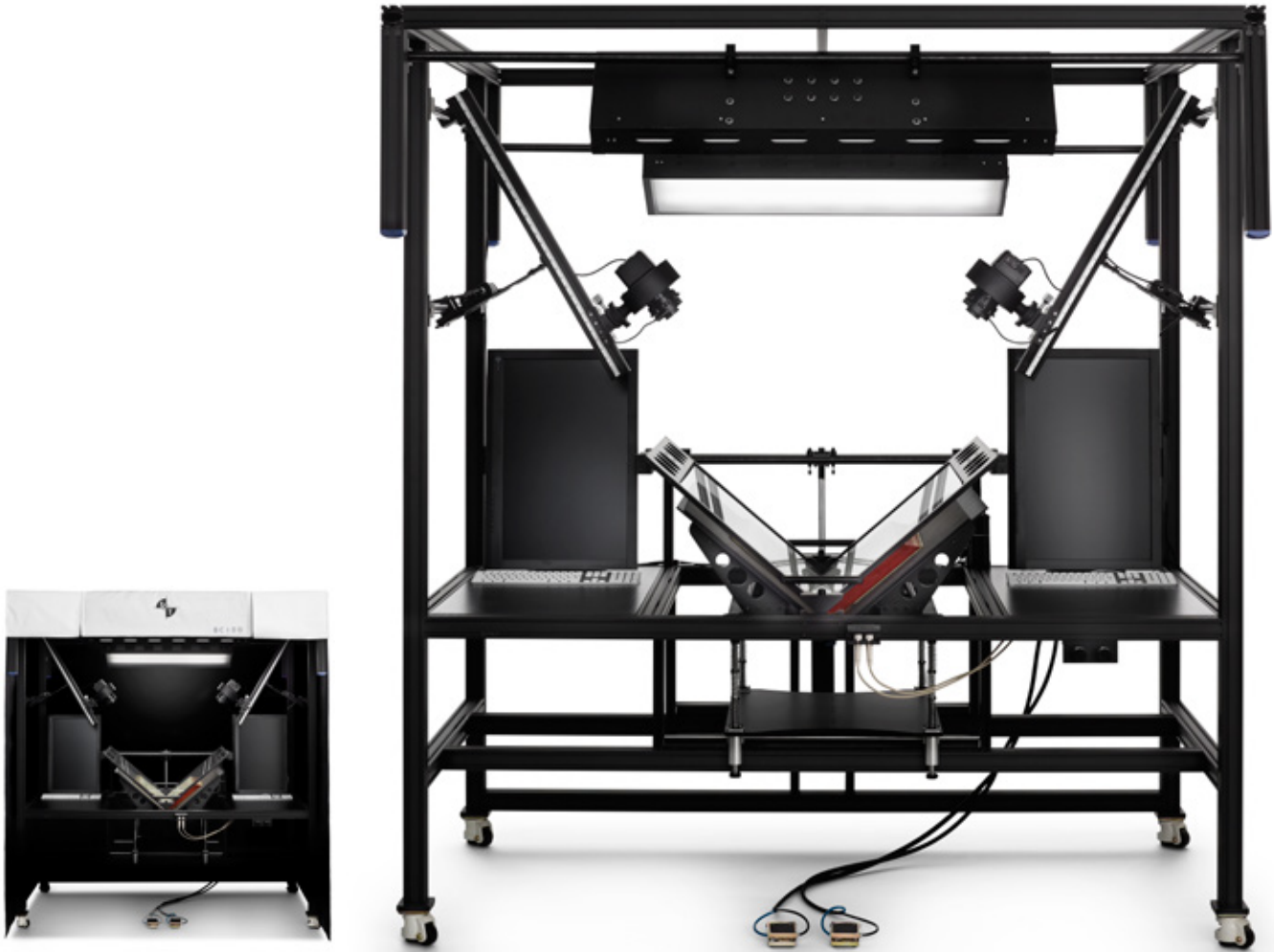
To ensure the safety of the binding, the mechanism of the book platform slides back and forth and then sets to make certain that the glass platen is always in the middle of the book's gutter.

The platform rests on a controllable support system that may be adjusted by the operator for different book types. This system has been designed to address the shortcomings of traditional robotic systems, including lack of quality control,

the tendency to skip or damage fragile pages and the need for manual assistance.

The BC100 has also been constructed with the comfort of the operator in mind. The operator sits in the station and controls the system with a variety of foot and/or hand releases, thereby preventing repetitive stress injury. All operations are within arm's length and the lights are at a pleasant level. There are extra shelves allowing the operator to have computer displays and other equipment nearby.

The modular design of the BC100 allows the camera and capture device to be upgraded when necessary, ensuring that it will not become obsolete. It is fabricated with airplane grade extruded aluminum to .005" tolerances, so it will not break down after years of continuous use. The versatile features and reliability of the BC100 make it the ideal solution for all of your mass digitization projects.

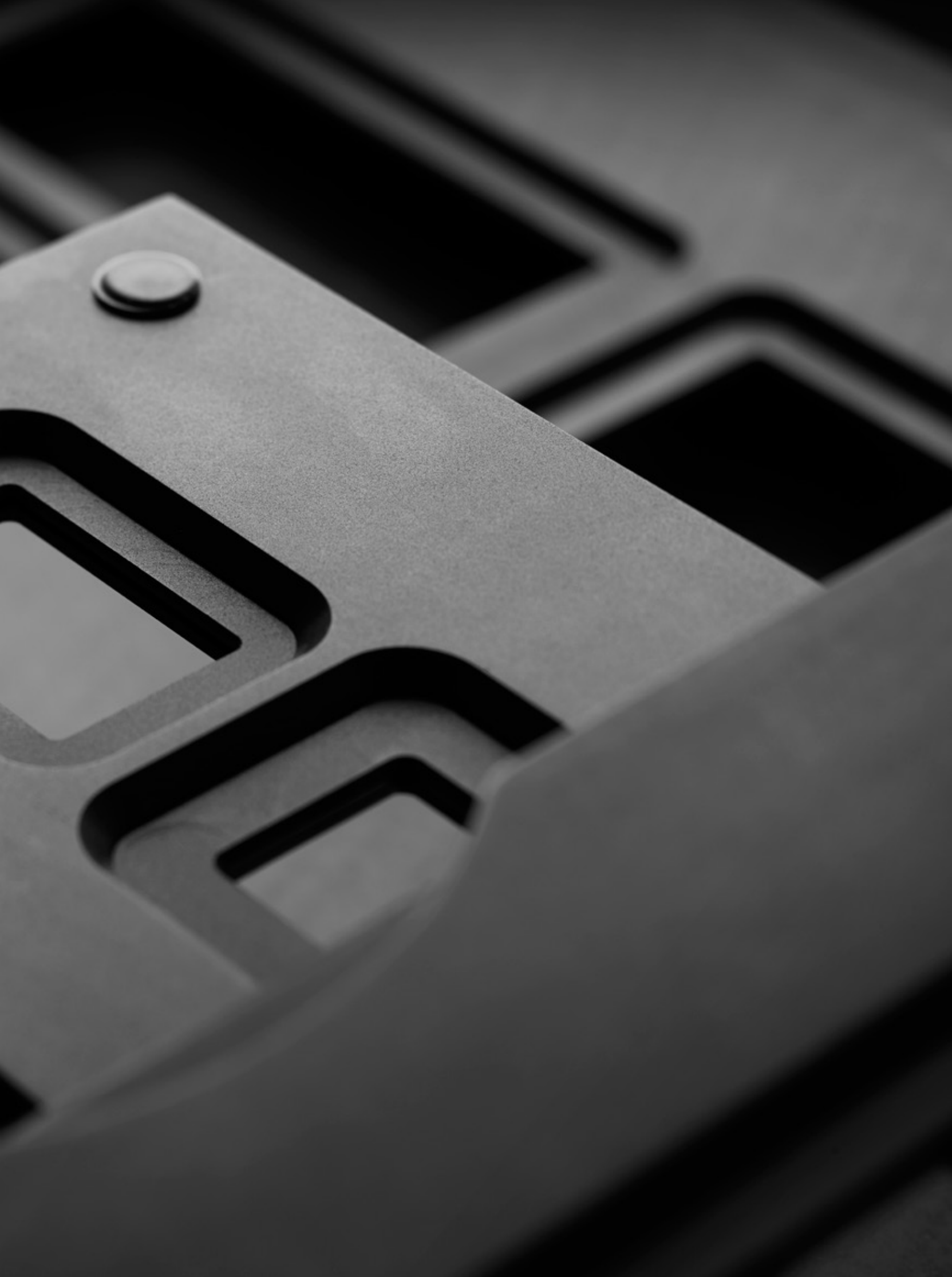


DT BC100

Features & Benefits:

- Dual Camera Book Capture System with an incredible rate of capture.
- Capable of shooting bound and loose materials, including works on paper, serials including newspapers, loose manuscripts, photos, drawings, etc.
- 100° anti-reflective glass platen enables the digitization of up to 6" bindings and page sizes larger than 17" x 24" or A2 size per side.
- Delivers preservation grade TIFFs, JPEGs, and PDFs in RGB, grayscale, and CMYK modes. Open Source Raw and DNG also supported.
- The only true 48 bit system on the market.
- Operated by foot and/or hand releases.
- Four retractable vibration dampening casters.
- Open platform design allows camera and capture devices to be upgraded, thereby preventing obsolescence.
- Variable resolution options available .
- Compatible with our DT Reprographic Systems for increased versatility.
- Easy to operate.
- Durable design for years of continuous use.





DT Film Scanning Kit

The digitization of photographic films, plates and translucent materials has consistently been a cumbersome and time-consuming process. The new DT Film Scanning Kit utilizes the finest capture technology to provide preservation grade image quality both simply and efficiently. Designed to achieve the fastest throughput while complying with the highest quality standards, this proven system will outperform this industry's existing scanning technology.

Boasting an image capture every two seconds, the DT Film Scanning Kit is over 200 times faster than flatbed or drum scanners. This system incorporates a cooled transilluminator and will digitize all types of photographic plates as well as negative and positive film from 35mm up to 11" x 17" and includes all the necessary film pattern holders. Built with versatility and repeatability in mind, this solution will be an asset to your workflow for years to come.

The DT Film Scanning Kit is an add-on fixture for use with the new DT RGC180 Capture Cradle or DT RG3040 Reprographic System. The integration of the DT Film Scanning Kit and these modular reprographic systems utilize the highest resolution digital backs available on the market to ensure the finest quality images.



DT Film Scanning Kit

Features & Benefits:

- Over 200 times faster than existing scanning equipment.
- The highest image quality available.
- Digitizes 35mm up to 11"x 17" film.
- Includes all the necessary film pattern holders.
- Compatible with DT RGC180 Capture Cradle and DT RG3040 Reprographic System.
- Easy to operate.
- Durable design for years of continuous use.

Dt Film Scanning Kit Includes:

- 120mm SK APO-Digitar Macro lens.
- Extension tubes for high magnification.
- Pattern holders for:
 - 35mm film.
 - 120mm film.
 - 4x5" film.
 - 8x10" film.
- Indexed for all standard film sizes.
- Pattern holders are CNC machined aluminum with black anodized finish.



35mm film.



4x5" film.



120mm film.



8x10" film.



20mm extension tube



40mm extension tube



120mm Apo-Digitar with lens-board, electronic USB shutter and focusing ring



DT RCam

Reprographic Camera

Cultural institutions have the Herculean task of achieving perfection when scanning their collections. To ensure these images stand the test of time, it is imperative that they have the best tools. The existing reprographic cameras and reproduction scanners available on the market today were designed around yesterday's digital capture technologies, thus producing a substandard digital product. The DT RCam is the result of extensive research into the needs of cultural institutions in order to develop a state of the art reprographic camera.

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The DT RCam is built from the ground up with the highest quality components for today's modern digital backs. This high quality construction ensures durability, precision and quality – all a must for this industry. The DT RCam is a versatile reprographic camera designed to work with a wide variety of digital backs to ensure that you can utilize the best back for each particular project. Many other reprographic cameras are difficult to align and keep aligned, hard to set up, and are limited by the lenses, shutter systems, software, and digital backs they support. The DT RCam is the only reprographic camera on the market that addresses all of these concerns and is truly a superior product.



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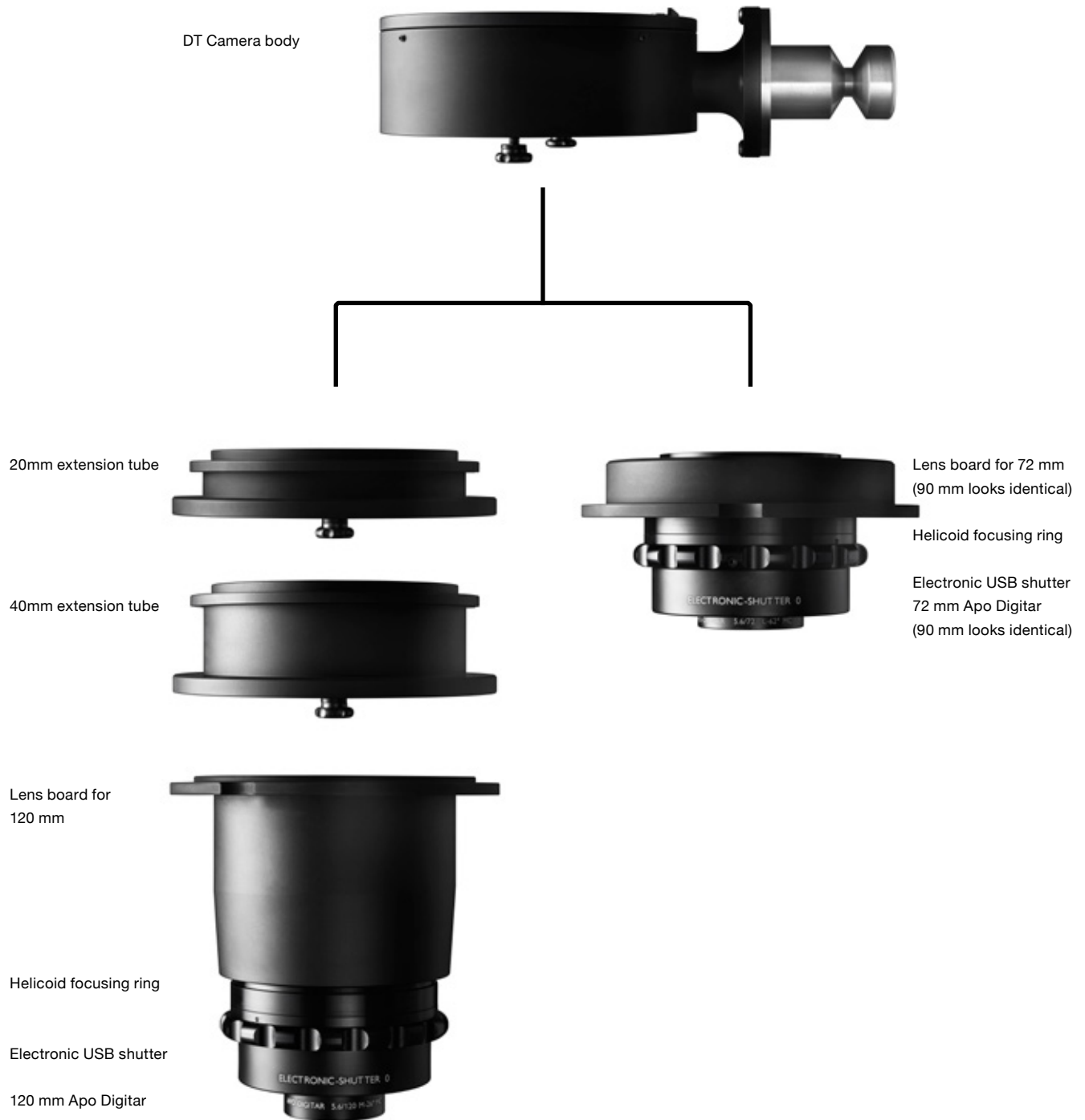
DPT

ELECTRONIC-SHUTTER 0

Schneider - KREUZNACH

DT RCam

Reprographic Camera



Camera

DT RCam

Features & Benefits:

- Built to 0.005" tolerances to ensure image and focal plane are in perfect alignment.
- Extremely accurate purpose-made helical focusing system. Does not slip even when unlocked.
- Optional lock to prevent accidental changes.
- Compatible with a wide variety of digital backs.
- Built with the industry's leading components.
- Accepts mechanical shutters or electronic shutter lenses.
- Ability to stitch images together for maximum resolution.
- Perfect integration with the DT RG3040 Reprographic System.
- Easy 90° rotation for orienting the sensor left-right or fore-aft on the working surface.

Camera Parts

1. Digital back with adapter plate (back sold separately).
2. DT RCam camera body.
3. Lens with lens board, helicoid focusing ring and electronic USB shutter.
4. Power supply for USB shutter.
5. Adapter plate for universal camera mounts.
6. Control box for electronic USB shutter.



iXR

Reprographic Camera

The Phase One iXR is a fully integrated, robust digital camera system enabling a highly productive solution for digitization, fine art reproduction and diverse industrial applications.

Using input from leading reproduction experts, the iXR was built from the ground up to meet the exacting needs of the reproduction photographer and was designed to streamline workflow by enabling you to take full control of the entire process. The iXR's impressive combination of outstanding image quality, high productivity and rugged engineering makes it the perfect camera system for getting your work done on time and on budget.





Camera	iXR
Body of camera:	Medium format camera body for reproduction and industrial applications.
Size of image:	Max. 56 x 41mm (depends on digital back).
Compatibility of lenses:	Phase One digital focal plane lenses. Schneider Kreuznach leaf shutter lenses. Mamiya 645 AFD/PRO lenses.
Fokuscontrol:	Remote or manual, real focus control in Live View mode via Capture One software or SDK.
Automation	Full automation when working with Phase One IQ digital backs.
Shutter:	Leaf shutter: 1/1600s to 60 minutes. Focal plane: 1/4000s to 60 minutes. Constant open aperture option.
Shutter control	1/3 f-stop increments.
Flash synchronization:	Focal plane shutter: Up to 1/125s. Leaf shutter: Up to 1/1600s.
Mirror prerelease	Via mirror up function.
Power input:	24V DC.
Size and Weight:	128 x 147 x 62 mm (W x H x D), 1.6 kg.

645DF+

Tools for professionals

Many professional photographers rely on Phase One digital camera systems. The system is based on the 645 DF+ camera. The camera ideally integrates 35mm handling, speed and individual setting options with the unmatched image quality and precision of a medium format digital system.

Phase One 645DF+ features:

- Fast and accurate autofocus.
- High speed shutter - up to 1/4000s.
- Automatic switching between focal plane and leaf shutter modes.
- Intuitive handling through great ergonomics and easily accessible controls.
- Reliable construction for high volume production use.
- More creative possibilities with leaf shutter lenses.
- A broad range of lenses and accessories for a wide range of photographic applications.





Camera	645DF+
Body of camera:	Medium format single lens reflex camera with auto focus.
Size of image:	Max. 56 x 41mm (depends on digital back).
Compatibility of lenses:	Phase One digital focal plane lenses. Schneider Kreuznach leaf shutter lenses. Mamiya 645 AF, M645 lenses (manual focus). Compatible with Hasselblad V lenses (via adaptor). Compatible with Pentacon 6 lenses (via adaptor).
Viewfinder:	Fixed prism viewfinder, enlargement 0.71, 95% of image format.
Light Metering:	TTL metering (average, spot and auto). SCA 3952 flash light measuring, three memory cells for individual settings.
Shutter:	Electronic focal plane shutter, 1/4000s to 60 minutes.
Flash synchronization:	Focal plane shutter: Up to 1/125s. Leaf shutter: Up to 1/1600s. 1st and 2nd curtain flash synchronization.
Mirror prerelease	Via mirror up function.
Power requirements:	7,4 volt Li-Ion battery pack or 6 AA standard baterries, external power supply or via V-Grip Air™.
Size and Weight:	153 x 128 x 184mm; 1030g. 6" x 5" x 7.2", 36 oz.

IQ Digital Backs

Available for Phase One / Mamiya 645 DF+, Contax 645, Hasselblad V-Series, Hasselblad H1, H2 and H4X. And with optional adapter for Mamiya RB67 and RZ67 Pro IID and most technical cameras.





IQ260
Achromatic

PHASEONE

IQ280

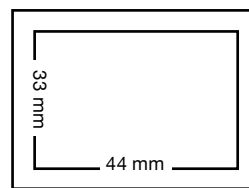
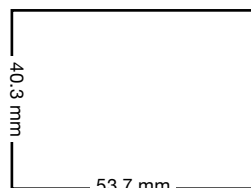
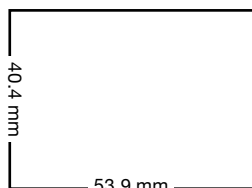
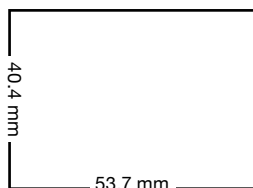
PHASEONE

Digital Backs



Sensor	IQ280	IQ260	IQ260 Achromatic	IQ250
CCD Size (Effective)	53.7 x 40.4	53.7 x 40.4	53.7 x 40.3	44 x 33
Active Pixels	10 328 x 7 760	8984 x 6732	8984 x 6732	8280 x 6208
Lense Factor	1.0	1.0	1.0	1.3
Pixel Size (micron)	5.2 x 5.2	6.0 x 6.0	6.0 x 6.0	6.0 x 6.0
Resolution (megapixels)	80 (20 with Sensor+)	60.5 (15 with Sensor+)	60	50
Light Sensitivity (ISO)	35 - 800 (140 - 3200 in Sensor+)	50 - 800 (200 - 3200 in Sensor+) 140 - 800 in long exp. mode	200 - 3200	100 - 6400
Exposure Time	1/10 000s-2 min	1/10000s - 60 min	1/10 000s-2 min	1/10.000 sec. - 60 min
Image Quality	16 bit-OptiColor 13 f-stops	16 bit-OptiColor 13 f-stops	13 f-stops	14 f-stops
Capture Time (frames per sec.)	0.7 (0.9 in Sensor+)	1.0 (1.4 in Sensor+)	1.0	1.2
Image Buffer	1 GB Highspeed RAM.	1 GB Highspeed RAM.	1 GB Highspeed RAM.	2 GB Adv. high speed RAM.
Display	3.2" QVGA TFT with 1.15 megapixel, 290 ppi(dpi). 16 million colors. 170° viewing angle.	3.2" QVGA TFT with 1.15 megapixel, 290 ppi(dpi) 16 million colors. 170° viewing angle.	3.2" QVGA TFT with 1.15 megapixel, 290 ppi(dpi) 16 million colors. 170° viewing angle.	3.2" QVGA TFT with 1.15 megapixel, 290 ppi(dpi) 16 million colors. 170° viewing angle.

Sensors Size





Features

New features of the IQ2 series

Whether you are interested in 80 megapixel captures, one hour exposures or pure black and white imagery, there is an IQ2 for you.

Up to 14 f-stops dynamic range

The extreme dynamic range of the IQ2 backs enable you to capture, and do justice to, every scene no matter what the lighting conditions.

Remote control

The IQ2 has an integrated state-of-the-art Wi-Fi with antennas. You can connect your iPad or iPhone wirelessly and use Capture Pilot to set exposure, trigger the shutter and instantly check focus.

Review wirelessly

The large screen on the iPad makes it easy to judge composition and focus. With the wireless connectivity in the IQ2 you can review and select images on the fly with an iPad running Capture Pilot. Rating and color tags are applied to the original files.

Focus mask

You can speed up the focus verification process by using the Focus Mask of the IQ2. This feature will display a colored, semi-transparent mask on top of the preview to show which parts of the image are in focus.

Black & White on display

If you want to focus on image composition and the subjects you are photographing, you can set your IQ2 back to render your captures with a black and white preview.

Fast tethered capture

Connect using USB3 or FireWire 800; it's the fastest way to get your images from camera to computer.

IQ180

53.7 x 40.3.

10328 x 7760.

1.0

5.2 x 5.2

80
(20 with Sensor+)

35–800
(140–3200 in Sensor+)

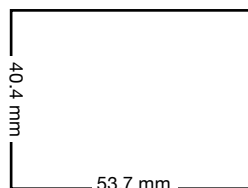
1/10000s–2 min

16 bit-OptiColor
12.5 f-stops

1.0

1 GB Highspeed RAM.

3.2" QVGA TFT with
1.15 megapixel, 290 ppi(dpi)
16 million colors.
170° viewing angle.



IQ160

53.9 x 40.4.

8984 x 6732.

1.0

6.0 x 6.0

60.5
(15 with Sensor+)

50–800
(200–3200 in Sensor+)

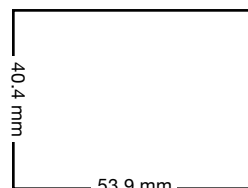
1/10 000s–1 min

16 bit-OptiColor
12.5 f-stops

1.0
(1.4 in Sensor+)

1 GB Highspeed RAM.

3.2" QVGA TFT with
1.15 megapixel, 290 ppi(dpi)
16 million colors.
170° viewing angle.



IQ140

43.9 x 32.9.

7320 x 5484.

1.3

6.0 x 6.0

40
(10 with Sensor+)

50–800
(200–3200 in Sensor+)

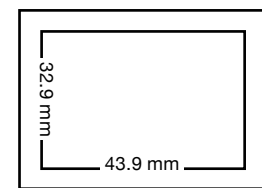
1/10 000s–1 min

16 bit-OptiColor
12.5 f-stops

1.2
(1.8 in Sensor+)

1 GB Highspeed RAM.

3.2" QVGA TFT with
1.15 megapixel, 290
ppi(dpi)
16 million colors.
170° viewing angle.



Schneider Kreuznach

Leaf Shutter and focal plane Lenses

With Phase One you get the best of both worlds - shutter speeds up to 1/4000s with the focal plane shutter and the ability to synchronize with flash as fast as 1/1600s with the leaf shutter.



72 mm

APO-DIGITAR 72mm
Electronic shutter 72mm
F5.6



90 mm

APO-DIGITAR 90mm
Electronic shutter 90mm
F4.5



120 mm

APO-DIGITAR 120mm
Electronic shutter 120mm
F5.6 Aspherical

Fully symmetrical lens constructions, with supreme optical performance.
Apochromatic design, with extremely low distortion in combination with very high resolution.
Virtually free from focus shift, when stepping down aperture – perfect for reproduction.



55 mm



80 mm



110 mm



120 mm TS

Ideal for Cultural Heritage

Leaf shutter AF 55mm
f/2.8 Aspherical

Distortion free lightweight wide-angle lens 1/1600s flash synchronization due to integrated leaf shutter. Shallow depth of field and fast aperture 64° angle of view.

Equivalent to 34mm focal length on 35mm DSLR format

Leaf shutter AF 80mm
f/2.8

Distortion free standard lens with outstanding optical performance 1/1600s flash sync due to integrated leaf shutter. Perfect lens for all-round Cultural Heritage reproduction.

Equivalent to 50mm focal length on 35mm DSLR format

Leaf shutter AF 110mm
f/2.8

Fast lens with a shallow depth of field 1/1600s flash sync due to integrated leaf shutter. Perfect lens for daylight portraits with shallow depth of field.

Equivalent to 68mm focal length on 35mm DSLR format

PC-TS Apo Digitar 120mm
f/5.6 HM Aspherical

Control of perspective with tilt shift technology 12mm shift, 8° tilt. Individually rotatable tilt and shift (360°)

Equivalent to 73mm focal length on 35mm DSLR format.



28 mm

Leaf shutter 28mm
f/4.5 Aspherical

Up to 1/1600s giving unique control in mixed lighting 102° viewing angle 35cm minimum focusing distance. Ideal for interior, landscape, architecture and creative editorial photography.

Equivalent to 17mm focal length on 35mm DSLR format



150 mm

Leaf shutter AF 150m
f/3.5

Long focal length, tack-sharp with very little vibration due to leaf shutter 1/1600s flash sync due to integrated leaf shutter. Perfect lens for fashion and product photography.

Equivalent to 93mm focal length on 35mm DSLR format



75-150 mm

Leaf shutter 75-150mm
Zoom f/4 – f/5.6

Preferred lens for on location fashion at all focal lengths Flash synchronization up to 1/1000s f4 / f5.6 – f22

Equivalent to 47 - 93mm focal length on 35mm DSLR format



240 mm

Leaf shutter 240mm LS
f/4.5 IF

Up to 1/1000s giving unique control in mixed lighting Internal focusing, no external component movement when lens focuses. Exceptional performance whether you're shooting beauty, landscape, sports or wildlife.

Equivalent to 149 mm focal length on 35mm DSLR format

Phase One

Focal Plane Lenses





45 mm



80 mm



120 mm



120 mm

Ideal for Cultural Heritage

Digital AF 45mm
f/2.8

Using low dispersion glass, this wide angle lens offers minimal chromatic aberration. Ideal for travel because of its light weight and small size 74° Angle of view

Equivalent to 29mm focal length on 35mm DSLR format

Digital AF 80mm
f/2.8

Outstanding optical performance
Shallow depth of field
Lightweight and compact

Equivalent to 50mm focal length on 35mm DSLR format

Digital AF 120mm
f/4.0 Macro

Staggeringly sharp lens for macro and beauty work
Focus Limiter ensures fast auto focus in the relevant focus range. Amazing results both in close-up shots and on long distances

Equivalent to 73mm focal length on 35mm DSLR format

Digital MF 120mm
f/4 Macro

Perfect for beauty, portrait and product photography
Highest image quality for close up, 1:1 macro. Minimum focus of 40cm
Also available as AF version 120mm f/4

Equivalent to 73mm focal length on 35mm DSLR format



28 mm



35 mm



150 mm



75-150 mm

Digital AF 28mm
f/4.5 Aspherical

Extreme wide angle, ideal lens for landscape, architecture and creative ideas
102° Angle of view
35cm minimum focusing distance

Equivalent to 17mm focal length on 35mm DSLR format

Digital AF 35mm
f/3.5

Compact and light weight wide angle.
Ideal for street, landscape, interior or architecture photography.
90° Angle of view

Equivalent to 22mm focal length on 35mm DSLR format

Digital AF 150mm
f/2.8 IF

Ideal for portraits of the highest quality at fast aperture
Internal focus allows fast workflow
100cm minimum focusing distance

Equivalent to 93mm focal length on 35mm DSLR format

Digital AF 75-150mm
f/4.5 IF

Multifunctional zoom lens for on location, fashion and portrait shoots
Compact zoom for travel and reportage
100cm minimum focusing distance

Equivalent to 47- 93mm focal length on 35mm DSLR format

Lenses

A camera system, which is as fast and versatile as the Phase One 645 DF+, needs high quality lenses with the highest image performance. All Phase One lenses were designed to achieve optimal image quality for digital photography without compromise.



Optical peak performance

Featuring completely new designs optimized for the high optical performance of the Phase One digital backs and the Phase One 645DF+, this lens collection delivers superior image quality for a wide range of shooting requirements.

Schneider Kreuznach leaf shutter lenses

The range of leaf shutter lenses has been developed with Schneider Kreuznach, based on decades of experience in optical design and manufacturing. Each lens design embodies the highest image quality and unequalled resolution. With an integrated leaf shutter, Schneider Kreuznach lenses for the Phase One 645 DF+ offer extremely fast flash synchronization up to 1/1600th of a second. Now the photographer can achieve the critical balance between daylight and strobe.

High intensity of light

All Schneider Kreuznach leaf shutter lenses have fast aperture ranges. Especially on location, the photographer has many possibilities due to a shallow depth of field and the highest image quality.

Prepared for the future

All Phase One lenses are built for the demanding optical requirements of digital photography. The latest manufacturing techniques and world-class components provide extreme resolution, optimized for the 645 format, surpassing the resolving power of both current and future sensors.

The world class optical performance of the Schneider Kreuznach and Phase One digital lenses, combined with Phase One digital backs and additional enhancement features in Capture One, guarantee perfect captures. The Capture One software uses specific lens data to achieve world class image quality with a unique reproduction of color and detail.

The highest image quality

Whether extreme wide-angle or telephoto, all Phase One Digital AF lenses offer both automatic or manual focus. From zoom to macro, to specialty lenses, Phase One is constantly expanding its line of high performance imaging tools.

Focal Length Overview



Photography by Gerald Freyer

| 28 mm | 35 mm | 55 mm | 80 mm | 110 mm | 150 mm | 240 mm

Film Scanning



120 mm macro lens: 6000 DPI, 24 x 36 mm

Flat Repro



80 mm / 72 mm lens: 600 DPI, A3 size

Courtesy of Museum für Entartete Kunst, Wien

Capture One CH 8



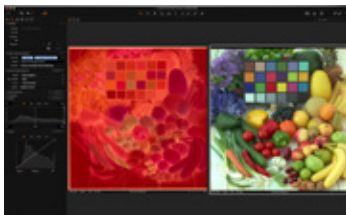
Capture One CH 8 is a professional Rapid Capture Solution dedicated to the Cultural Heritage community.

Built on the renowned Capture One Pro 8 software, this new Cultural Heritage edition offers a highly specialized feature set that delivers a significantly faster reprographic workflow during both capture and post-production.



AUTO CROP

Boosting productivity by automating cropping in post-processing. Select cropping options for flat art reproduction or books, including alignment of material to specific corners or proof margins. Possible to add or crop pixels on detail level.



NEGATIVE FILM REPRODUCTION TOOL

New and improved workflow that automates the conversion of negative transparent material in both black & white and colors. Use the exposure tools in an intuitive way to adjust exposure, contrast and colors, and get perfect results, ready for print or post processing.

L*	49.25	38.62	28.86	16.19
a*	-0.16	-0.18	0.54	-0.05
b*	0.01	-0.04	0.60	0.73
Density	0.75	0.96	1.24	1.67

22	23	24	25	26	27
1.41	72.46	72.95	29.37	54.91	43.96
0.96	-24.45	16.83	13.06	-38.91	52.00
0.43	55.93	68.80	-49.49	30.77	30.01

LAB COLOR READOUT

Enables precise verification of colors, in LAB (1976 CIE L*a*b*). Full compliance with FADGI IV and Metamorfoze Strict guidelines. Export methodologies compatible with major CH solutions on the market, such as Golden Thread (TM) and Adobe Photoshop (TM).

APPLESCRIPT SUPPORT

Quick and efficient workflow with feature automation; generating multiple crops, stitching images into higher resolution, and more.

ICC PROFILES FOR CH

Obtain high color accuracy with specialized ICC profiles optimized for both color precision and three dimensional gradients at the same time. Available for several common studio light types.

CH WORKSPACES

Logical setup of tools customized to optimize CH workflows during preparation, production and file storage.



A quantum leap in productivity

Use the Capture One software to optimize your images. Not only do you get unparalleled high image quality from the advanced image render engine, you also have access to powerful adjustment tools to fine-tune your images for final presentation, digital asset management for archival and retrieval, and much more.

Creative enhancement

Advanced Color Editor can help to achieve monochrome images or to enhance selected colors. In order to achieve the perfect image, Capture One Pro offers an Enhanced Color Editor and also a black and White Tool. Capture One Pro offers a vastly improved noise reduction, especially for higher ISO images.



Phase One Warranties

If you want to be on the safe side, Phase One offers you a Value Added Warranty for five years on all IQ series digital backs, as well as a three year warranty on P+ series digital backs and Phase One focal plane lenses.

For the 645DF+ Camera body and Schneider Kreuznach Leaf shutter lenses, both Classic and Value Added Warranty offers 1 year or 100.000 captures (whichever comes first). This means that we will fix all manufacturing defects within these periods from the date of purchase.



Loan unit during repair

In addition, we offer a digital back as a free loan unit to all value added customers during the repair period. This means that you do not lose a job. The loan unit will be delivered within 24 hours depending on availability.

Access to worldwide service

The value added program includes priority access to the Phase One partner network consisting of partners in over 80 countries. Additionally, you get access to the Phase One 24/7 online support service. Our trained team of photo experts guarantees full technical support, no matter when and where you need it.

Up-to-date through updates

All Phase One digital back owners can always work with the latest software. Phase One constantly strives to improve the quality of the Phase One products with new technological developments, all to secure your investment. You can benefit from attractive upgrade offers for your existing system. Learn more about current upgrade options from your Phase One partner.

Classic:

Warranty and services coverage	Backs	Cameras			Lenses	
Products	IQ	645DF+ Body	DT RCAM	iXR	Focal Plane	Leaf Shutter
Warranty period	1 years	1 year	1 year	1 year	3 years	1 year
Free repair of manufacturing defects	Yes	Yes	Yes	Yes	Yes	Yes
Shutter actuations covered	Unlimited	100,000	Unlimited	100,000	Unlimited	100,000
Product defect within first month	New product	New product	New product	New product	New product	New product
Free loan unit during repair	No	No	No	No	No	No
Free camera platform exchange	No	No	No	No	No	No
24/7 online support forum and access to knowledge base articles	Yes	Yes	Yes	Yes	Yes	Yes
Investment Protection program	Yes	Yes	Yes	Yes	Yes	Yes

Value added:

Warranty and services coverage	Backs	Cameras			Lenses	
Products	IQ	645DF+ Body	DT RCAM	iXR	Focal Plane	Leaf Shutter
Warranty period	5 years	1 year	1 year	1 year	3 years	1 year
Free repair of manufacturing defects	Yes	Yes	Yes	Yes	Yes	Yes
Shutter actuations covered	Unlimited	100,000	Unlimited	100,000	Unlimited	100,000
Product defect within first month	New product	New product	New product	New product	New product	New product
Free loan unit during repair	Yes	No	No	No	No	No
Free camera platform exchange	Yes	No	No	No	No	No
24/7 online support forum and access to knowledge base articles	Yes	Yes	Yes	Yes	Yes	Yes
Investment Protection program	Yes	Yes	Yes	Yes	Yes	Yes



Noniam quide intelligere et scire contingit circa omnino scientia: quarum sunt principia causarum et elementa. Et horum cognitione. Tunc enim opinamur cognoscere unumquodque: quum causas primas cognoscimus: et principia prima: et vias ad elementa. Manifestum quidem quod et que sunt circa principia scientie que de natura est primo determinare sciendum.

Noniam dispositio scientie: et certitudo in omnibus vijs habentibus principia: et causas et elementa: non acquirit nisi ex cognitione illorum. Credimus enim in vnaquaque rerum ipsam scire: quum sciuerimus causas eius simpliciter: et prima principia eius: donec perueniamus ad elementa eius. Manifestum est quod in scientia naturali etiam oportet primo querere determinationem principiorum eius.

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hoc non fuit manifestum in hoc loco: indat sermonem in forma dubitationis: et dicitur in principia: aut causas: aut elementa. i. quod idem sequitur sicut ponat quod ille res habeat principia agentia: aut finalia: aut elementaria: aut omnia: et impossibile est ut hoc cõiunctio aut sit sicut copulatio: nam dispositio certe scire inuenit in rebus habentibus causas quasdam per se ipsas illarum causarum: sicut inuenit in omnibus omnium causarum: que posuit hanc dispositionem indat testimonium ad verificandam illam: quod scire indat in posterioribus: analectica: et dicitur credimus enim in vnaquaque rerum et signum eius quod dicitur quod dispositio scire certe de alijs non acquirit nisi ex cognitione causarum: est: quia omnia qui dicunt se scire aliquid: non dicunt hoc nisi qui sciuerint illud per suas omnes causas: per quas et remotas: et hoc inuenit in omnibus qui aliquid scire in veritate: aut finem est stimulationem: et quod in illa dispositione: omnia considerant adeo quod enim possunt ut dicit in posterioribus. d. o. quod scire veritas causas eius simpliciter: et intendit ut videt causas existentes in re primas non dispositas: et sunt prima materia: vltima forma: que enim sunt partes primam materiam et vltimam formam: cuiuslibet rerum naturalium sunt materie dispositas: et forme dispositas. d. o. et prima principia: et intendit huc ut videt per prima principia: primas causas que sunt extra rem. i. primam agentem: et vltimam finem omnium rerum. d. o. donec pueniamus ad elementa eius: et intendit huc per elementa causas existentes in re proportionatas et essentielles: et inuenit per hoc quod dicitur: quod doctrina ordinata est incipit a cognitione causarum primarum rei cognoscende profere. Deinde intendit ad cognitionem aliarum causarum remotaarum finem ordinem: donec pueniat ad causas: per quas: et finem hoc vult hanc notie causa: et elementum alio modo ab eo que visus est illi: seu finem finem motum in habendo modicam sollicitudinem de nominibus: et quum posuit hanc maiorem dispositionem in hoc sermone. scilicet quod scientia certa de rebus habentibus causas et elementa non acquirit nisi ex cognitione causarum et elementorum eorum: dimisit minus dispositionem: et indat conclusionem quam intendit per hunc sermonem: et dicit manifestum est quod in scientia naturali et. i. manifestum est: quia et hoc sequitur quod qui vult largiri scientiam de natura oportet ipsam primo querere determinationem causarum rerum naturalium habentium causas et elementa: et iste sermo compositus sic: omnia naturalia habent causas et elementa: et omnia habentia causas et elementa non sciunt nisi ex cognitione causarum et elementorum: omnia naturalia non sciunt nisi ex cognitione suarum causarum et elementorum.

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Et via ad illa est de rebus notioribus et maius

VE MER ARISTOTELEM PER VVS W PRDVXA ORBI



Courtesy of The Morgan Library & Museum, New York. Photography by Graham S. Haber.

References



More than 100 institutions worldwide are using our equipment for Cultural Heritage digitization - the list below contains some of these institutions:

J. Paul Getty Museum	Los Angeles, CA
American Museum of Natural History	New York, NY
Smithsonian Institution	Washington, DC
Library of Congress	Washington, DC
The Morgan Library & Museum	New York, NY
The U.S. National Archives and Records Administration	Washington, DC
Harvard University	Cambridge, MA
Museum of Modern Art	New York City, NY
New York Public Library	New York, NY
Columbia University	New York, NY
Minneapolis Institute of Arts	Minneapolis, MN
Stanford University	Stanford, CA
The Frick Collection	New York, NY
Yale University	New Haven, CT
New York University	New York, NY
University of Pennsylvania	Philadelphia, PA
University of Virginia	Charlottesville, VA
Walt Disney Studios-Burbank	Glendale, CA
The Franklin Mint	Franklin Center, PA
New York Botanical Gardens	Bronx, NY
The Museum of Fine Arts Houston	Houston, TX
Indianapolis Museum of Art	Indianapolis, IN
Amon Carter Museum	Fort Worth, TX
Princeton University Library	Princeton, NJ
Dallas Museum of Art	Dallas, TX
Creekside Digital	Glen Arm, MD
Pixel Acuity	Maitland, FL
Amon Carter Museum	Fort Worth, TX
Harvard Library	Cambridge, MA
Harvard Graduate School of Design	Cambridge, MA
The Clark Art Institute	Williamstown, MA
Backstage Library Works	Bethlehem, PA
The British Museum	London, UK
The British Library	London, UK
The Bodleian Library	Oxford, UK
The Centre for Heritage Imaging and Collection Care, The John Rylands Library	University of Manchester, UK
Museum Folkwang	Essen, DE
Landesamt für Denkmalpflege Mainz	Mainz, DE
Römisch germanisches Zentralmuseum Mainz	Mainz, DE
Museumsinsel Berlin	Berlin, DE
Staatsbibliothek Berlin	Berlin, DE
Deutsches Historisches Museum Berlin	Berlin, DE
Ethnologisches Museum Berlin	Berlin, DE
Geheimes Staatsarchiv Berlin	Berlin, DE
Stiftung Preussischer Kulturbesitz Potsdam	Potsdam, DE
Haus der Geschichte der Bundesrepublik Deutschland	Bonn, DE
Zwinger	Dresden, DE
Rheinisches Bildarchiv	Cologne, DE
Dombauarchiv	Cologne, DE
Landesmedienzentrum	Düsseldorf, DE
Schleswig Holsteinische Landesbibliothek	Kiel, DE
The National Maritime Museum	Amsterdam, NL

PHASE**ONE**

what the world's best photography is made of

