

A black Phase One camera with a lens attached, positioned over a document. The camera has the 'PHASEONE' logo on its top. The document below is partially visible, showing some text and a red mark.

# Cultural Heritage Solution Guide

PHASE**ONE**

“We are not  
makers of history.  
We are made  
by history.”

Martin Luther King Jr.

# Content

|                                                     |           |
|-----------------------------------------------------|-----------|
| <b>The World of Cultural Heritage</b>               | <b>4</b>  |
| Cultural Heritage Collection Types and Applications | 5         |
| Archives and Manuscripts                            | 6         |
| Rare Books Archiving                                | 7         |
| Transparent Film and Glass Plate Negatives          | 8         |
| Fine Art Reproduction                               | 9         |
| Multi-Spectral Imaging                              | 10        |
| Special Digitization Projects                       | 11        |
| <b>Instant Capture vs. Scanning</b>                 | <b>12</b> |
| <b>Phase One Flat Copy Scanning Solutions</b>       | <b>16</b> |
| Phase One Film Capture Stage                        | 18        |
| <b>Phase One Film Scanning Solutions</b>            | <b>18</b> |
| Phase One Film Capture Stage                        | 21        |
| Phase One Film Carriers and Glass Plate Holders     | 21        |
| <b>Phase One Book Scanning Solutions</b>            | <b>22</b> |
| DT Atom                                             | 22        |
| DT Versa                                            | 24        |
| DT BC100                                            | 26        |
| <b>Capture One for Cultural Heritage</b>            | <b>26</b> |
| <b>Multi-Spectral Imaging</b>                       | <b>30</b> |
| <b>Phase One iXH &amp; iXG Camera Systems</b>       | <b>36</b> |
| <b>Phase One XF Camera System</b>                   | <b>40</b> |
| <b>IQ Digital Back Range</b>                        | <b>44</b> |
| <b>Phase One Lenses</b>                             | <b>46</b> |
| Schneider Kreuznach Blue Ring lenses                | 46        |
| <b>Phase One AutoColumn Copy Stands</b>             | <b>48</b> |
| Phase One RPS 2300XL – Floor stand                  | 48        |
| Phase One RPS 1600 – Table top                      | 48        |
| Phase One 2-Motion Copy Stand                       | 50        |
| <b>Cultural Heritage Solution Partners</b>          | <b>52</b> |
| Phase One                                           | 52        |
| Digital Transitions, USA                            | 52        |
| Cambo, The Netherlands                              | 52        |
| Kaiser Fototechnik, Germany                         | 52        |
| <b>Phase One Scanning Solutions</b>                 | <b>52</b> |
| <b>References</b>                                   | <b>56</b> |
| <b>Magnification - Object Size Reference Table</b>  | <b>58</b> |





# The World of Cultural Heritage

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

The need for digitization is rapidly growing, with increasing focus on public access, research and preservation of information for the future. Many museums and libraries with valuable collections are expanding their digitization efforts, with exciting possibilities, made available by the rapid growth of internet-access for everyone.

The history of Cultural Heritage photography is as long-standing as photography itself. Historic collections in museums and libraries have often had a dedicated photographic studio for creating photographs of sensitive material, or for producing paper copies for researchers and scholars, protecting the original objects from wear or even damage.

Changing from analog based film processing to digitally based media has introduced a completely new range of applications, and the possibility to share the material with





Melk Abbey Library, Melk, Austria  
© Will Pryce

a much broader audience, while significantly increasing the reproduction quality. Preserving the past for the future is often a race against time, as much of the material has a limited lifespan before it is gone forever, thus solutions that enable rapid capture are not only necessary but often crucial.

## Cultural Heritage Collection Types and Applications

All Cultural Heritage collections are unique and diverse, but due to the nature of collections, they often fall into distinct categories. In order to address the diverse nature of collections,

Phase One invests in developing, implementing and delivering specialized and tailored solutions, designed to produce the best output quality, while ensuring material safety and efficient workflow.

The main collection categories are:

- Archives and Manuscripts
- Rare Books Archiving
- Transparent Material and Film Scanning
- Fine Art Reproduction



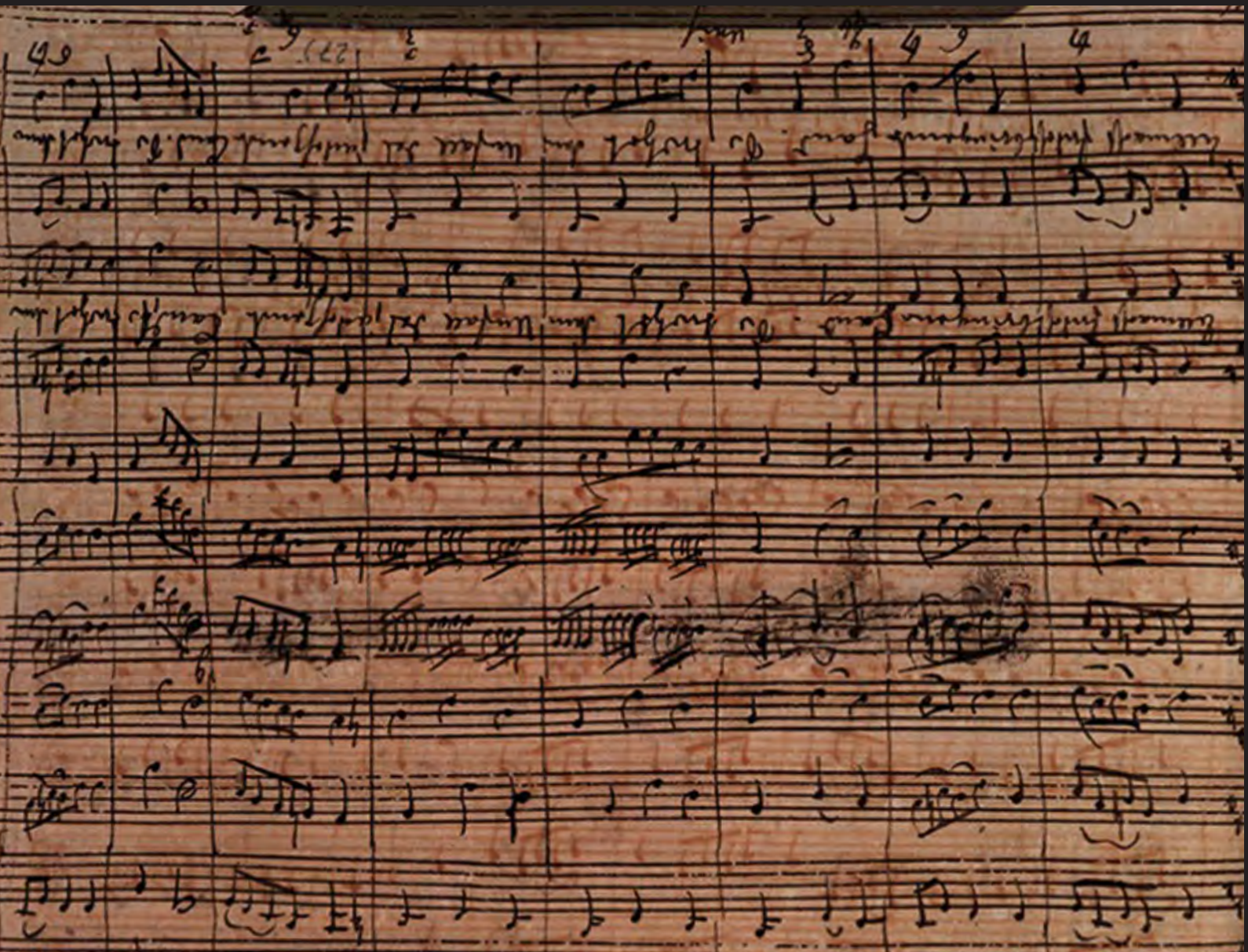


Image courtesy of the Royal Danish Library.  
Multi-spectral capture of note sheet by Danish composer Niels W. Gade.

## Archives and Manuscripts

Documents, drawings, maps, manuscripts, photos, newspapers, musical scores, letters, post cards, and other flat objects in all sizes and shapes.

This type of work often requires a “set and forget” workflow where the camera and software are set up so that large numbers of flat objects can be recorded quickly while maintaining high resolution and accurate consistent color and luminosity.

The high resolution of the Phase One Digital Backs allows capturing several smaller objects at the same time, thus increasing speed and efficiency.

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, as a reference for recreating the correct and exact same colors in the future.
2. Directional light may be used to enhance texture and three-dimensionality of the object. This type of work often leaves artistic freedom to the photographer, as the choices of light will enhance certain features, while diminishing others, thus giving the image an interpreted look or style.





'John Rylands Library Hebrew Manuscript 6, Haggadah f.20 recto'  
Image reproduced courtesy of the Centre for Heritage Imaging and Collection Care  
© University of Manchester

## Rare Books Archiving

A large part of the Cultural Heritage community works on digitization of rare and delicate bound materials, such as books. Digitization of books often requires special attention to the binding, that can be fragile, and will determine how the material can be treated in the process. This fact can sometimes be the limiting factor when looking for fast capture turnaround.

Uniform lighting will typically be the choice of operation here, and will often be the same throughout when working with reflective material.

Using a leveled glass plate with the camera set for fixed focus on a copy stand will accelerate the capture process, and photographing both pages at the same time with one or two cameras will also increase productivity.





## Transparent Film and Glass Plate Negatives

*Vintage glass plate negatives, medium and large format negatives, transparencies, including 35mm mounted slides, microfilm and all other transparent material.*

Uniform illumination of the materials with good color reproduction is mandatory so that all color information may be retrieved during processing, sometimes involving inverting the image from negative to positive.

The conversion process can be open to interpretation, as the base material for the original transparency varies. This is true especially for the earlier glass plates where the specific type of chemicals and processing used is unknown.

Two 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. Phase One camera based solutions work with all sizes of originals.

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

## Fine Art Reproduction

3D and large flat objects such as sculptures, pottery, decorative arts and paintings, are often captured from a tripod in the photo studio or in the gallery and exhibition halls, ideally with uniform lighting to suit the object's character and the curator's requirement.

A whole range of different lighting can be used, from flash-based to continuous light to mixed light or even natural daylight. Best results are always obtained by using medium format camera solutions; either based on an SLR-type, or view cameras with tilt & shift movements.

The fastest workflow solutions comprise of a camera system such as the Phase One XF, available with the highest resolution sensors on the market.

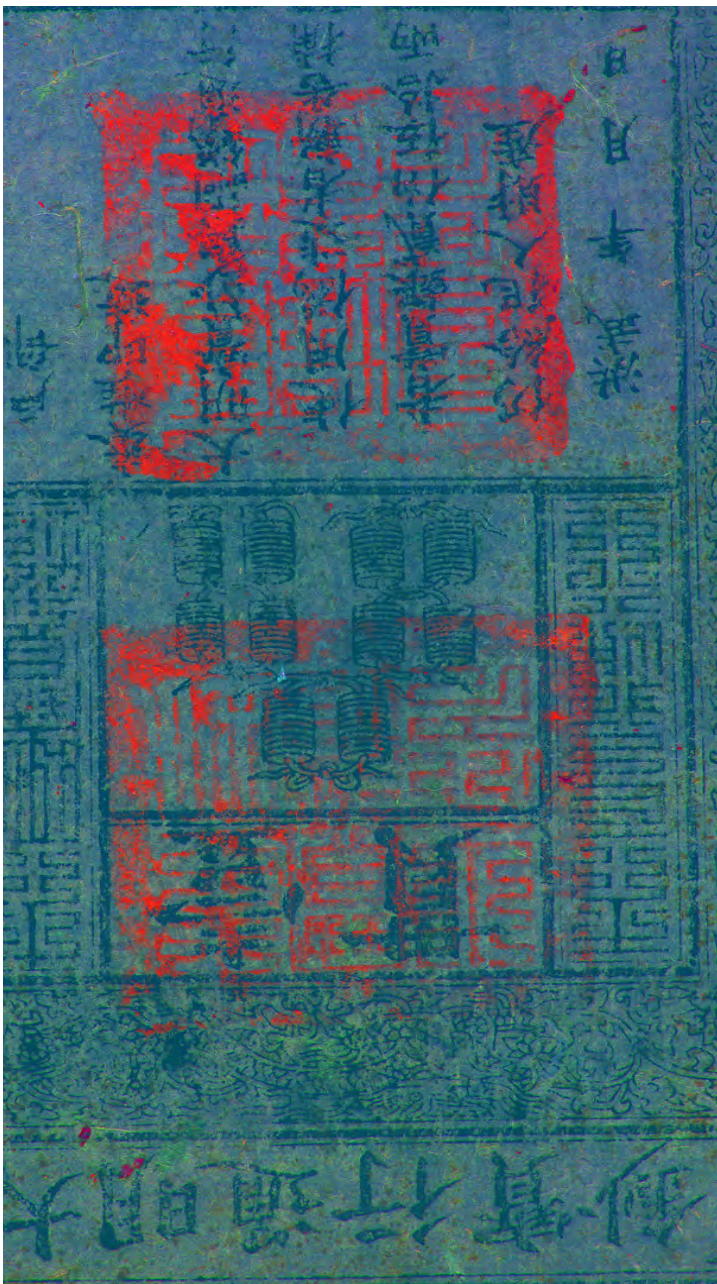




# Multispectral Imaging (MSI)

Multispectral imaging (MSI) captures light from a range of wavelengths - visible and invisible to the human eye - across the electromagnetic spectrum using special camera technology, light sources, and filters. The resulting "stacks" of images are used to analyze substances and surfaces to determine readability, authenticity, age, and material-characterization and distribution. Application areas include analysis of documents, polychrome surfaces, fabrics for purposes of conservation and research

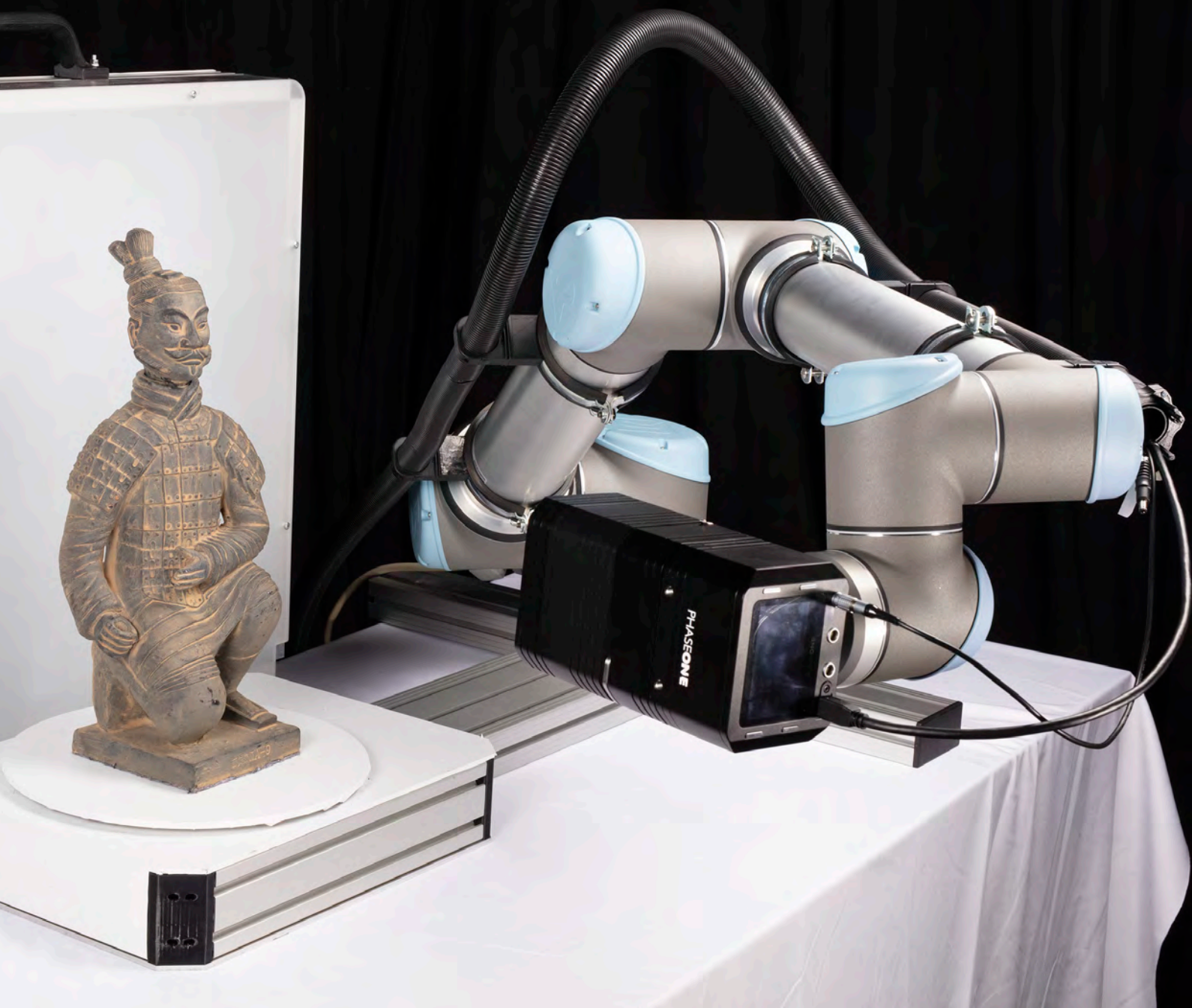
into forensics and materials characterization. Phase One offers "Rainbow": a fully automated 100Mpixel multispectral imaging solution for both Multiband and Narrowband lighting techniques. Please refer to pages: 14-18.



credit "R.B. Toth Associates and Equipoise Imaging



Image credit Fraunhofer IGD



## Special Digitization Projects

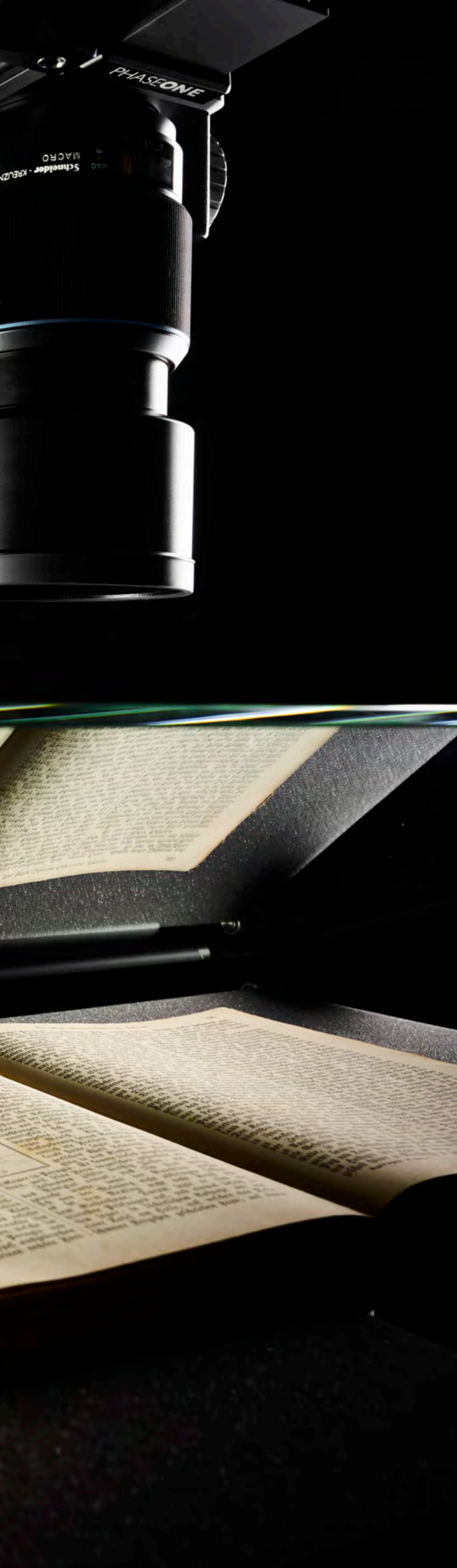
Many cultural heritage objects that are fragile or sensitive due to various types of damage and decay are often very sensitive to human touch and thus require careful handling. Using high resolution, high precision cameras and optics allow researchers and scholars to perform non-invasive investigation and analysis with minimal or no exposure to aggressive light rays or chemicals, and bring out data that cannot be retrieved with traditional imaging techniques.

3D scanning combined with advanced photogrammetry and image analysis and calculation tools are used for measuring and evaluation of damage in historical objects. The same technology is used for creating exact replicas of precious sculptures and art work. The high resolution of Phase One cameras and the high quality and precision of the optics provide the basis for systems that are considerably faster than other scanning solutions.



# Instant Capture vs Scanning

A0 @ 300ppi



## Speed

Traditionally, flat objects such as documents and books have been scanned using flatbed or overhead scanners equipped with a linear CCD sensor. Some of these devices can produce high resolution, high quality output. However, scanning a single page can take up to 20-30 times longer than when using a single-shot, high resolution medium format camera.

## Image Quality

When capturing cultural heritage items, it is important to produce and maintain the highest image quality possible in terms of resolution, sharpness, tonality and color.

Phase One's high resolution sensors, Schneider-Kreuznach high precision optics, stable copy stands, and Capture One's advanced workflow and algorithms, enable the collections' curators, photographers and to ensure that no detail gets missed and that their collections are archived to the highest level of quality for future use and preservation.

## Automation and Ease of Operation

New high precision copy stands paired with the iXH or iXG camera systems and Capture One CH deliver "AutoColumn", automated camera column positioning achieving a wanted capture resolution.

Tools for auto-cropping and for automated conversion of film scans from negative to positive also add to the move towards automation. As does "Slipstream", the new Phase One simplified capturing UI.

## Highest Resolution with ISO Compliance

The Phase One camera systems deliver scanning resolution of up to A0 @300ppi or A1 @400ppi or A2 @600ppi - all in compliance with the industry standards of Metamorfoze, FADGI and ISO 19264.

## RAW Workflow

Unlike scanners, the RAW files coming from the Phase One cameras and digital backs contain the RAW data and all the relevant information necessary for processing and re-processing. This ensures a future-proof workflow and a file that can be used time and again as needed and as software performance develops and improves.



## 115. Hiob's neuer Wohlstand. Hiob 42, 10—14.



### Flexibility

**Future-proof tethering:** With the Infinity platform of IQ4, the tethering options of Ethernet, USB-C, and WiFi provide many possibilities for flexible installation and workflow.

**Advanced storage:** The IQ4 ensures security and speed with both XQD and SD local storage options.

**Multi-purpose use:** Unlike scanners, a camera mounted on a copy stand can be moved up/down and can use different lenses to accommodate different object sizes, and of course can be mounted on a tripod allowing complete portability and flexibility in photographing almost anything.

### Upgradability

With the advancement in technology and improvements in sensor resolution, optics, and software algorithms, each component of the camera system can be changed or upgraded to take advantage of these advances, while keeping the same basic setup and workflow.

### Low Maintenance

Collections often include hundreds, thousands, or even millions of items that need to be digitized and reproduced consistently and accurately.

The Phase One iXH 150MP and iXG 100MP Camera Systems are designed and tested to withstand the toughest working conditions. They are built with minimal number of moving parts and heavy duty leaf shutters, ensuring long life and low maintenance intervals. Modular design allows for quick and easy swapping of components when it is time for service, and the local support provided by a network of trained, value added resellers ensures continuous uptime and fast turnaround.



Einheimischen unter den Kindern Israel;  
\* 2. Mose 22, 20.

23. und sollen auch ihren Teil am Lande haben, ein jeglicher unter dem Stamm, dabei er wohnet, spricht der Herr, Herr.

## Das 48. Kapitel.

Verteilung des Landes. Umfang der heiligen Stadt und Namen ihrer Tore.

1. Dies sind die Namen der Stämme. Von Mitternacht, an dem Wege nach \*Gethlon, gen Hamath und Hazar-Enon und von Damaskus gegen Hamath; das soll Dan für seinen Teil haben, von Morgen bis gen Abend. \*R. 47, 15, 17.

2. Neben Dan soll Affer seinen Teil haben, von Morgen bis gen Abend.

3. Neben Affer soll Naphthali seinen Teil haben, von Morgen bis gen Abend.

4. Neben Naphthali soll Manasse seinen Teil haben, von Morgen bis gen Abend.

5. Neben Manasse soll Ephraim seinen Teil haben, von Morgen bis gen Abend.

6. Neben Ephraim soll Ruben seinen Teil haben, von Morgen bis gen Abend.

7. Neben Ruben soll Juda seinen Teil haben, von Morgen bis gen Abend.

8. Neben Juda aber sollt ihr einen Teil

Breite zehn tausend Ruten haben.

14. Und sollen nichts davon verkaufen, noch verändern, damit des Landes Erstling nicht wegkomme; denn es ist dem Herrn geheiligt.

15. Aber die übrigen fünf tausend Ruten in die Breite gegen die fünf und zwanzig tausend Ruten in die Länge, das soll gemein Land sein zur Stadt, drinnen zu wohnen, und zu Vorstädten; und die Stadt soll mitten drinnen stehen.

16. Und das soll ihr Maß sein: vier tausend und fünf hundert Ruten gegen Mitternacht und gegen Mittag, desgleichen gegen Morgen und gegen Abend auch vier tausend und fünf hundert. Offenb. 21, 16.

17. Die Vorstadt aber soll haben zwei hundert und fünfzig Ruten gegen Mitternacht und gegen Mittag, desgleichen auch gegen Morgen und gegen Abend zwei hundert und fünfzig Ruten.

18. Aber das übrige an der Länge neben dem Abgesonderten und Geheiligten, nämlich zehn tausend Ruten gegen Morgen und zehn tausend gegen Abend, das gehöret zur Unterhaltung derer, die in der Stadt arbeiten.

19. Und Arbeiter aus allen Stämmen



Phase One iXH 150MP/iXG  
100MP Medium Format  
Camera System



Phase One XF camera



Phase One RS 72mm MkII lens  
Schneider Kreuznach RS 72mm lens  
Schneider Kreuznach RS 120mm lens



Schneider Kreuznach lenses  
from 45 mm to 150 mm



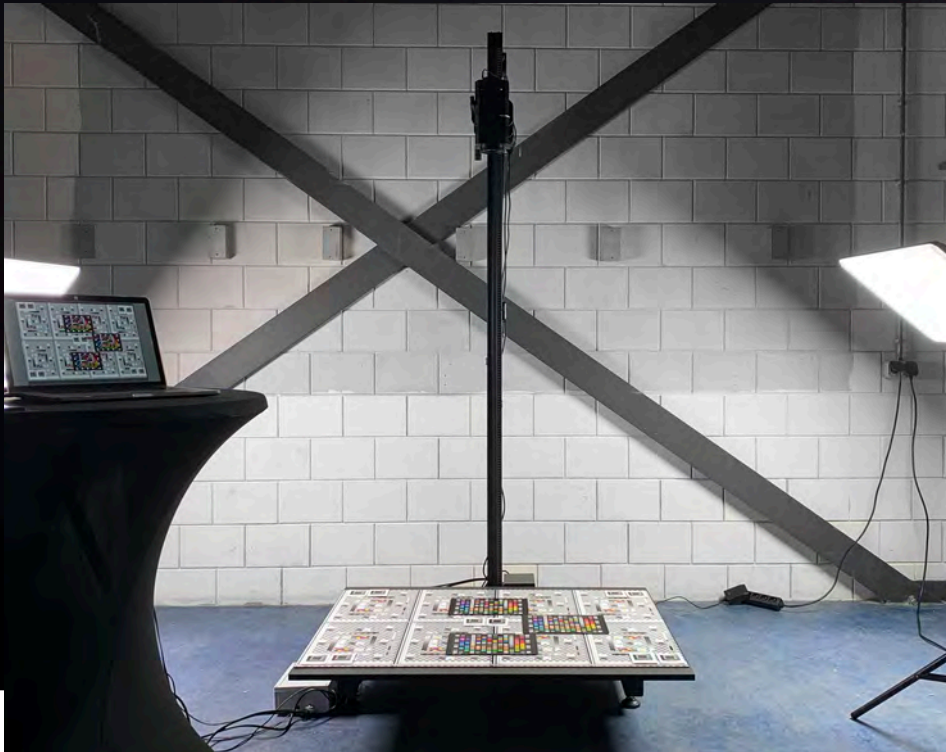
Copy Stand solutions  
from Cambo, Kaiser, Digital  
Transitions and Phase One



CULTURAL HERITAGE



# Phase One Flat Copy Scanning Solutions



## A0@300ppi Scanning with AutoColumn

The Phase iXH 150MP and iXG 100MP systems give the highest levels of resolution and flexibility allowing capture of large objects such as drawings and maps, as well as smaller objects such as books and manuscripts. Sensors with up to 150MP deliver scanning resolutions of up to A0 @300ppi, fit for the most demanding digitization projects.

AutoColumn is available with iXH 150MP and iXG 100MP and the RPS 2300XL copy stand.

The RSP 2-Motion repro stand allows both the camera and the object to be moved and thus capture a wide range of object sizes and resolutions.

With the Schneider Kreuznach lenses, both sharpness and detail are maintained across the field of view.

## Components

### The General Purpose Kit includes

- Phase One iXH 150MP or iXG 100MP
- Phase One AutoColumn RPS 2300XL copy stand or Phase One RSP 2-Motion motorized copy stand
- Capture One CH

### Features and benefits

- Solid, reliable and durable build
- Easy, fool proof operation
- Maximum adjustability
- 2-speed, self-limiting worm gear for accurate positioning
- Max. camera load of up to 15 kg
- Flexible and modular design
- Up to 400 times faster than traditional scanners
- Consistent, reliable Autofocus with excellent manual Live View adjustment



A0 @ 300ppi



Phase One iXH 150MP / iXG 100MP  
Medium Format Camera System



Phase One RS f/2 MK II  
Schneider Kreuznach LS 80 mm f/2.8 lens  
Schneider Kreuznach RS 120mm lens



Phase One RPS 2300XL AutoColumn copy stand/  
Phase One RSP 2-Motion motorized copy stand



# Phase One **Film Scanning** Solutions



## Scanning Transparent Film and Glass Plate Negatives

With a capture rate of one image per second, the Phase One Film Scanning Solutions are up to 400 times faster than flatbed, drum or virtual-drum scanners.

Regardless of the density or size of the original glass or film negative or transparency, it provides a consistent and reliable workflow, ensuring that the highest levels of image quality and accuracy are met.

The newly designed Phase One Film Capture Stage provides an adjustable, geared support mechanism and is compatible

with a range of carriers for glass plate negatives as well as most popular film strip and sheet formats. It can be easily adjusted to position the object directly under the camera. Made of high-grade aluminum, it ensures longevity and reliability for many years.

The film carriers, also made from aluminum, are designed to maintain film flatness with a minimal amount of stress and easy mounting/dismounting.





The glass plate carriers support most common and odd plate formats and are equipped with an optically optimized glass base. These too are made of high-grade aluminum and are built to last. They provide an economical solution for almost all types and sizes of plates.

With sensitive glass and film transparencies and negatives, material handling and its safety are key and the Phase One Film Capture Stage offers the ideal solution for a wide range of applications.

The Phase One iXH 150MP and iXG 100MP Camera Systems come with a Schneider Kreuznach 120mm Macro RS lens

equipped with the Reliance Shutter, rated at 1 million actuations and allowing for reliable and consistent capture of the finest detail with minimum amount of vibration.

The Phase One XF Camera System comes with a Schneider Kreuznach LS 120mm f/4.0 Macro lens designed to produce a flat image and thus ensuring maximum sharpness across the frame.

Check out the full Phase One portfolio of scanning solutions for Cultural Heritage at the end of this guide.





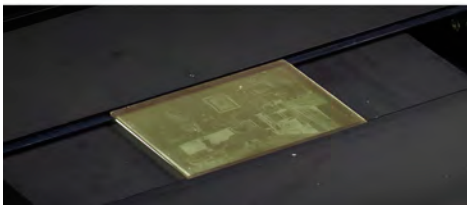
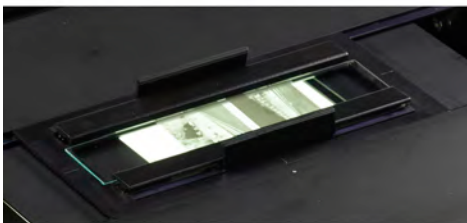


## Phase One Film Capture Stage

The newly designed Film Capture Stage provides an adjustable, geared support mechanism and is compatible with a range of carriers for glass plate negatives as well as most popular film strip and sheet formats. It can be easily adjusted to position the object directly under the camera.

### Specifications

|                    |                                               |
|--------------------|-----------------------------------------------|
| Dimensions (WxHxD) | 730 x 216 x 700 mm<br>(28.7 x 8.5 x 27.5 in.) |
| Weight             | approx. 13.5 kg (29.7 lbs)                    |



## Phase One Film Carriers and Glass Plate Holders

The Phase One Film and Glass Plate Carriers are designed to work with the Film Capture Stage, ensuring smooth handling and efficient workflow.

Made of milled high-grade aluminum and using optically optimized glass base, they maintain parallelism and flatness.

The Film Carriers work with specially designed clamps that carefully stretch and flatten the film strips.

### Supported film formats:

- 35 mm strips
- 120 mm strips
- 9 x 12 cm
- 13 x 18 cm
- 18 x 24 cm
- 4 x 5 in.
- 8 x 10 in.
- Mounted 35 mm slides

The Glass Plate Holders work with specially designed "top stop" which ensures accurate and quick positioning of glass plates of the same size.

### Supported glass plate formats:

- 9 x 12 cm
- 13 x 18 cm
- 18 x 24 cm
- 24 x 30 cm

# Phase One **Book Scanning** Solutions





## Digital Transitions DT Atom Flexible Scanner with Book Digitisation Cradle

The DT Atom is a tabletop digitization platform, featuring AutoColumn, that can be extended and upgraded to accommodate nearly any digitization project. The user can unlock the Standard Hardtop and swap to a variety of accessories to better accommodate different material types. The camera can be removed and used on a tripod or handheld. In this way, it can be used for architectural, portrait, installation art, and other photography.

### DT V Cradle

Compatible with the DT Atom, and DT Versa and all legacy Digital Transitions work stations, the DT V Cradle provides conservation-friendly, preservation-grade, fast and efficient digitization of A3 bound material (up to 17" x 12"). Its unique design incorporates a tilt-inward mount for the camera to provide ergonomic digitization without increasing the footprint of the system.

The optional glass uses a lift-assist mechanism to improve the ergonomics of the user over long periods of use. The glass can be fully removed in less than a minute when even the minimal operator-controlled contact with the glass is not suitable for a given material. To ensure the safety of the binding, the mechanism of the book platform freely slides forward and backward to guarantee the gutter is always properly aligned to the captured frame. This also ensures the glass, if used, cannot produce undue pressure on the binding.

### DT Atom with DT V Cradle, Features & Benefits:

- AutoColumn functionality when used with iXH 150MP and iXH 150MP and iXG 100MP 100MP and Capture One CH.
- Easy to operate and works as mobile solution
- User-swappable tops for wide range of materials
- Operated by foot and/or hand releases
- Includes DT Photon LED lighting (CRI/CQS of 98)
- Allows book opening of 80°, 100°, or 180°
- Allows capture with or without glass
- Glass lift-assist for long-term use ergonomics
- Open platform design allows upgrading resolution, thereby preventing obsolescence.



## Digital Transitions DT Versa All-purpose Digitization Cradle



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

Developed with AutoColumn for the iXH 150MP and iXG 100MP camera systems 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 Versa is the optimum digitization solution for the rapid capture of rare, bound and loose document collections.

The DT Versa 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 63.5 x 89.0 cm with up to 10.2 cm 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 DT Versa 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 Versa 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 76.2 x 101.6 cm 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 Phase One Film Capture Stage), and more can be digitized. The DT Versa Capture Cradle is truly a proficient system that will protect your investment and enable you to expand the scope of your digitization program.



## Digital Transitions DT BC100 Dual Camera Book Cradle Solution

**Built on the success of the DT 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 up to 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 DT 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 DT 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 DT BC100 make it the ideal solution for all of your mass digitization projects.



### 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 up to 17" x 24" or A2 size per side.
- Delivers preservation grade TIFFs, JPEGs, and PDF's 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.

# Capture One

for Cultural Heritage Solutions



CULTURAL HERITAGE





Capture One CH is a professional Rapid Capture Solution dedicated to the Cultural Heritage community. Built on the renowned Capture One software, the Cultural Heritage edition offers a highly specialized feature-set that delivers a significantly faster reprographic workflow during both capture and post-production.

The new Slipstream mode - a simplified user interface - enables less-skilled operators to handle the capturing, and it speeds up the workflow, especially when working on large collections and large volumes of documents that need digitization.

The ever-evolving Capture One CH offers key features designed to increase productivity and efficiency when working with high-volume collections. With extra specialist tools and automation technology, the software expands on the admin and operator toolboxes to facilitate modern production needs and prevent bottlenecks commonly created in large-volume production.

## A Quantum Leap in Productivity

Use Capture One CH to optimize your images. Not only do you get the highest image quality from the advanced image-rendering 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.

## Negative Film Reproduction Tool and Styles

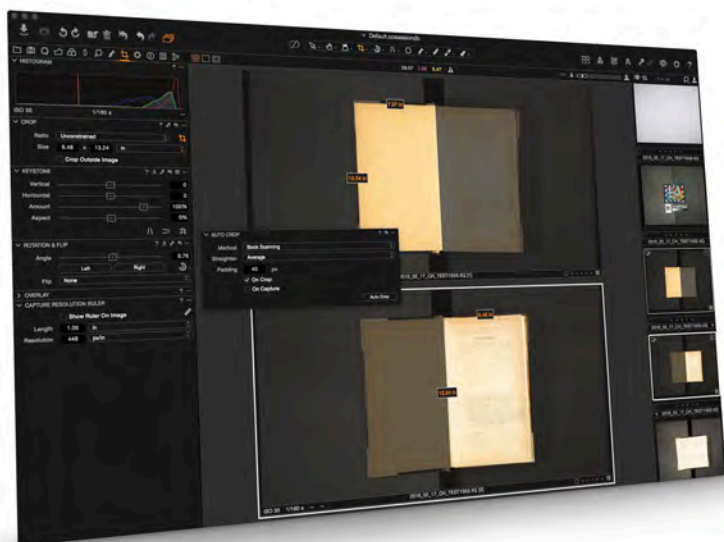
Take advantage of the improved workflow, automating the conversion of negative transparent material in both black & white and colors. Use the intuitive exposure tools to adjust exposure, contrast and colors, and get perfect results for print or further post-processing.

A selection of Cultural Heritage styles allows to quickly choose a set of conversion parameters for different film types.

## Auto Crop & Auto Rotate

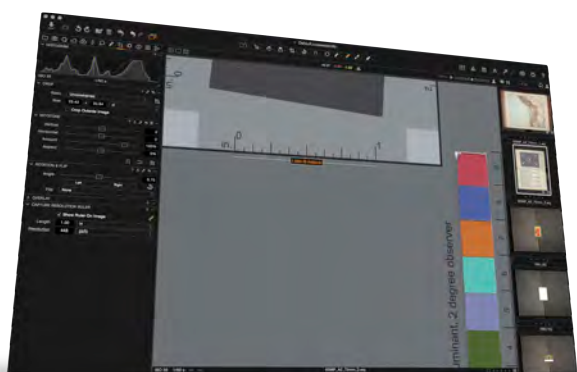
Boost productivity by automating cropping in post-processing. Select cropping options for flat art reproduction or books, including corner or edge alignment with positive or negative padding for all cropping methods.

Save time with On-Capture multi-crop when digitizing books that do not require the full resolution of the camera, where 2 pages can be captured and separated on the fly. Use an advanced auto-cropping setup for film rolls and strips that includes straightening and post-crop auto levels optimization.



## Camera Focus with Auto Column and PPI-Assist

In combination with the iXH 150MP and iXG 100MP camera, the Camera focus tool delivers accurate measuring of distance to object and based on that it calculates the capture resolution, magnification and Field-of-view. The data is calculated for current camera position and delivers precise data for automated or guided re-positioning the camera to capture at target ppi, magnification or Field-of-view. Check out the AutoColumn solutions available at the end of this guide.



## Capture Resolution Ruler

The Resolution Ruler delivers verification of the capture resolution at any given camera position. It allows for marking up a known length in the target subject matter, in inches or centimeters, and calculating the exact capture resolution.

## Slipstream Capturing for non-trained Operators

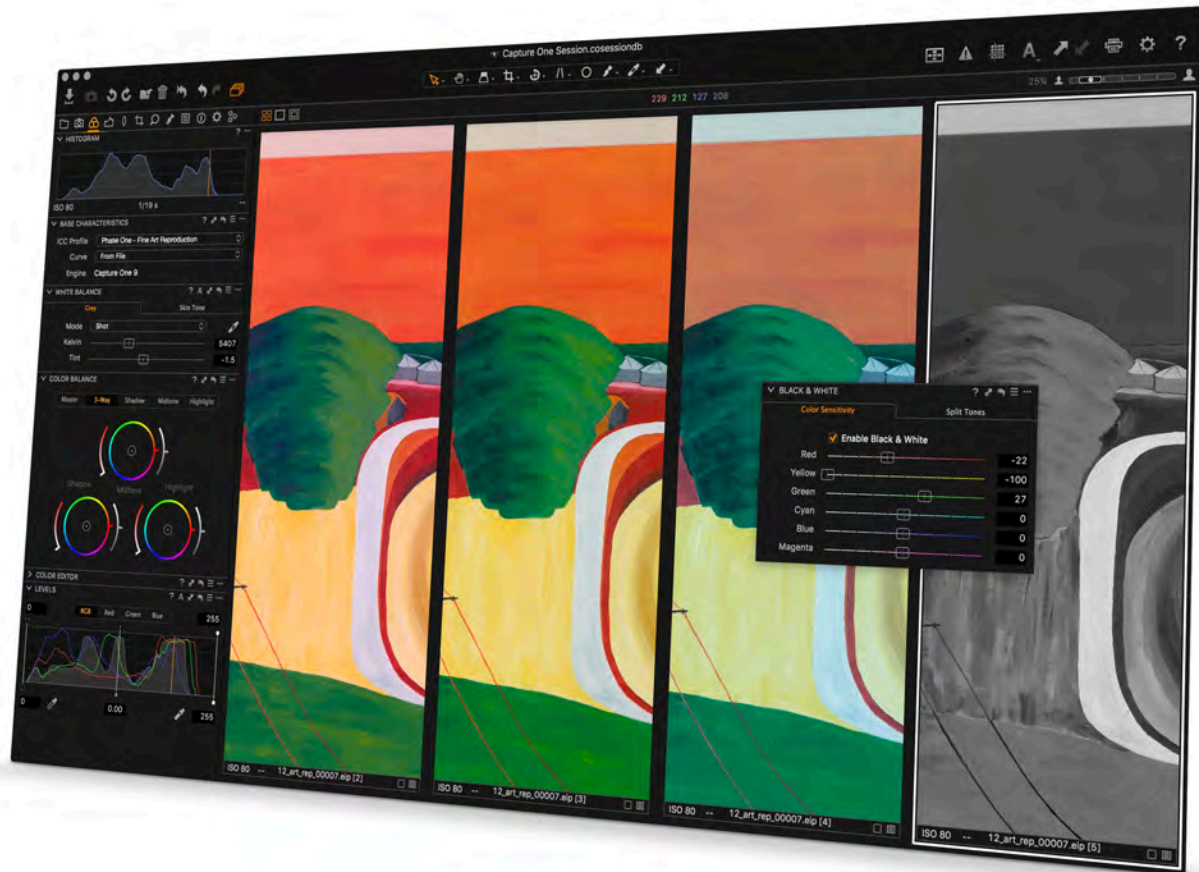
Slipstream delivers a simplified, easy to use capturing interface allowing non-skilled operators to handle the capturing process. Slipstream works on top of the Capture One CH platform. This facilitates interfacing and access to the admin tools for camera setup, for post processing, and for image storage matching the needs of both simple and advanced networking environments.



## Barcode scanner tool

The integrated Barcode Scanner tool ensures that objects are named and identified correctly as they are captured. Use it together with the Next Capture Naming tool.





## CH Workspaces

A Capture One CH workspace is a logical setup with a Collection of tools customized to optimize a given CH workflow. Workspaces may be made for tailoring the user-interface for preparation, for production and for file storage. It can include the required capture and processing tools for specific Reflective or Transmissive materials. Workspaces can be used by both admin and Operator personnel.

## Tools Lock

Admins can lock specific tools (individually or as a set) so that they cannot be accidentally altered by operators during capture. Assign pin codes to specific tools to prevent operators from changing important capture properties or settings.

## ICC Profiles for Cultural Heritage

Obtain high color accuracy with the specialized ICC profiles optimized to be robust under the slight changes happening to lighting over time. The profiles work for both flat art and three dimensional objects. Available for common studio light types such as flash, LED and tungsten as well as for specific types of film.

## Creative Enhancements

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

# Phase One **Rainbow** Solution



Non-invasive & non-  
destructive contactless  
analysis



Quick first step for further  
analysis –  
Do it once, do it right



Nondestructive thanks to low  
energy LED lighting



Modular & mobile  
capturing solutions



## Discovering Multispectral Imaging (MSI)

Multispectral imaging (MSI) captures light from a range of wavelengths - visible and invisible to the human eye - across the electromagnetic spectrum using special camera technology, light sources, and filters.

The resulting “stacks” of images are used to analyze substances and surfaces to determine readability, authenticity, age, and material-characterization and distribution.

### MSI in a wide range of applications

1. Analysis of documents - Readability of text on parchment, scrolls, and paper, often in poor condition is one application.
2. Analysis of polychrome surfaces such as paintings - on canvas, wood, stone, and other materials. Applications include non-invasive analysis for conservation work and authentication.
3. Analysis of Fabrics of all kinds -such as historic research to determine age and material.
4. Police, forensic and crime scene investigation. Analysis for residue of human fluids on fabric, fingerprints, marks from use of weapons, and crime scene evidence.
5. Materials characterization and sorting. Applications include quality assurance, research and development of new materials, and analysis for machine vision.
6. General: MSI is used to differentiate subject matter based upon the differentiated response from materials with different chemical compositions



Images credits R.B. Toth Associates / Equipoise Imaging

# The Rainbow Multispectral Imaging Solution



Credits Loa Ludvigsen (SMK) & Annette T. Keller (Phase One)

## The Rainbow Software

Multispectral cameras have been available in the market for many years but the calibration process, as well as the techniques for changing material sizes whilst maintaining consistent images that can be stacked and analyzed efficiently, has been a challenge and created significant overhead.

Phase One has worked with specialists on MSI projects over years. Based upon this experience and learning, we have devised a flexible and easy to handle, yet robust MSI solution with a workflow based on best practices.

The Rainbow capture process is fully automated: simply position the subject matter and press 'Capture'. The full stack of captures are then made with automated focus, automated "flattening", automated exposure normalization, and automated alignment to deliver the Perfect Stack, again and again - with perfect repeatability and stability.

The Rainbow MSI software controls all the elements - Focusing the camera, moving the filter carousel on the filter wheel, turning the lights on and off in the correct order and timing, aligning the images, and finally creating the Perfect Stack.

## The Rainbow Camera

The iXG camera is presented on pages 34-35

## The Rainbow LED Lights

Rainbow supports two types of LED lights for a wide range of applications:

- Multiband DedoLight, delivering narrowband UV, broadband visible light, broadband and narrowband IR. This light is often used for MSI applications related to Art Conservation and to

Police Forensics. Recipes for the capture of images following the CHARISMA standard manual are included.

- Narrowband EurekaLight, delivers 16 narrowbands of light from UV, through visible to IR. Narrowband MSI is used for a range of research disciplines, including the analysis of inks, paints, residues, and features in manuscripts, objects and artwork.

## The Rainbow Filter Wheel

The filter wheel can hold up to five filters. It is configured to support the filtering needs of accurate visible imaging and luminescence imaging, which fits many applications, including the CHARISMA standard manual.

The carousel, which holds the filters is removable and can be configured with any 2" filters for future scientific applications. The factory capture settings can be adjusted to suit different filter configurations. To support different MSI applications, you can simply work with two or more filter carousels.

## Phase One Expert Team

The Rainbow MSI solution can be tailored for a wide range of applications. The Phase One Expert team is ready with customer guidance to configure the best solution for a given application. Advice is backed up with online demonstrations and sample imaging from the Phase One MSI demo center in Cologne, Germany.

For feasibility studies, smaller projects, and operational support, Phase One offers workshops in which specialists can take the customer through the basics of MSI, and the capturing of relevant samples, directed at the MSI projects in question.



# Multispectral Imaging in Use

## The National Gallery of Denmark

The National Gallery of Denmark owns a painting acquired hundreds of years ago through the Danish Royal Family. The painting has been inspected and analyzed several times to determine its origin and creator, without success. In the fall of 2019, the painting was analyzed again by using wide spectrum photography at a high resolution with a sequence of different lighting, including UV light, visible light in reflectance and photo-induced luminescence, and IR light. The IR image disclosed the painted signature “BRUEGHEL 1562” in the upper right corner. Authentication of a Pieter Bruegel the older masterpiece was well under way.

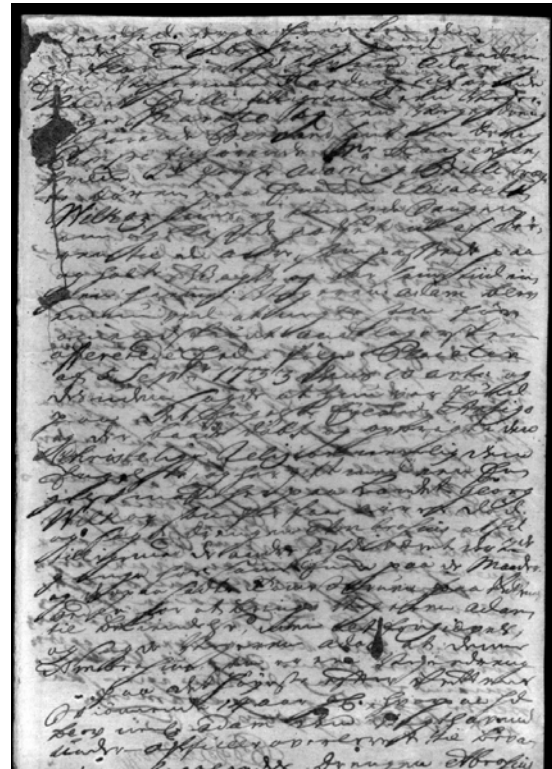
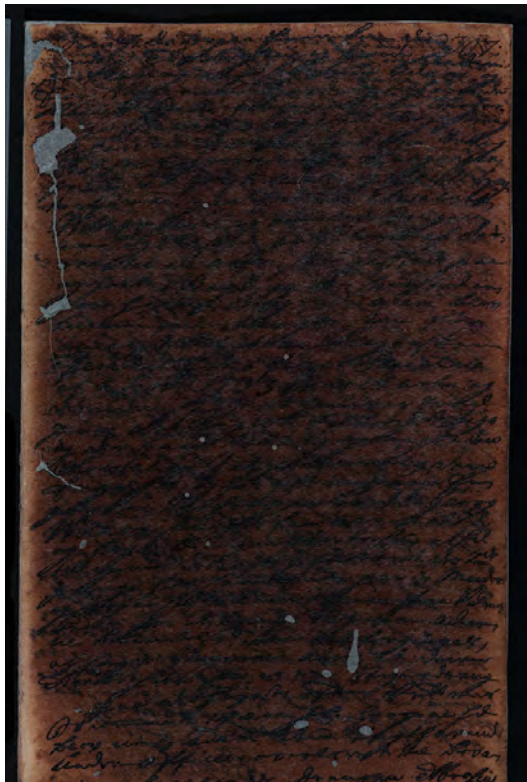
Credits Loa Ludvigsen (SMK) & Annette T. Keller (Phase One)





## 2. The Royal Library of Denmark

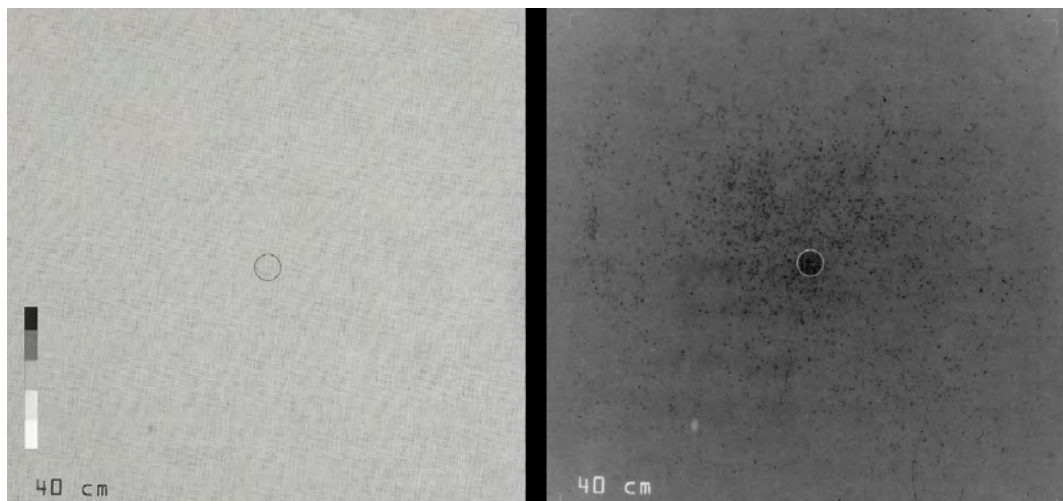
The Royal Library of Denmark holds collections of handwritten letters and records from the former Danish colonies in Tranquebar, India (1620-1845) and St. Croix, the West Indies (1672-1917). Many of these documents are faded and decayed by age, by moisture and from bugs. In 2017 samples from the collections were captured using Multispectral Imaging and the results included the recovery of readability and the appearance of watermarks in the paper.



Copyrights Royal Danish Library - August 2015 & Equipoise Imaging/RB Toth Associates

## 3. Police and Forensics

Many disciplines of MSI analysis are applied within Police work. Here is an example of gunshot residue - discovered by photo-induced IR luminescence.



Copyright Annette T. Keller Phase One



# The Rainbow MSI Solution

## iXG 100MP Wide Spectrum

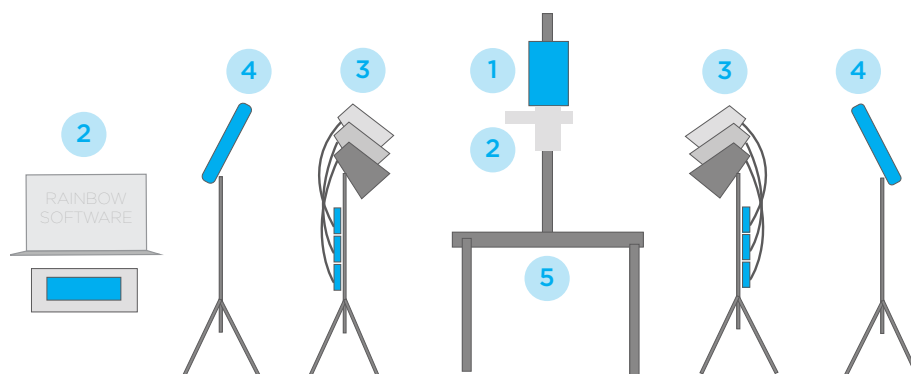
### Camera specification

|                                      |                                                                                                                       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Sensor size</b>                   | 53.4 x 40.0                                                                                                           |
| <b>Resolution</b>                    | 11608 x 8708                                                                                                          |
| <b>Pixel size (µm)</b>               | 4.6µm                                                                                                                 |
| <b>ISO Range</b>                     | 50 - 6400                                                                                                             |
| <b>Data Interface</b>                | USB3                                                                                                                  |
| <b>File Formats</b>                  | Raw 14bit, Raw 16bit                                                                                                  |
| <b>Lenses</b>                        | Schneider Kreuznach RS 72mm and/ or 120mm                                                                             |
| <b>Weight (gr) with 72mm lens</b>    | 2,300 inc. L - Bracket                                                                                                |
| <b>Dimension (mm) with 72mm lens</b> | 150 x 130 x 130 inc. L - Bracket                                                                                      |
| <b>Approvals</b>                     | FCC Class A, CE, RoHS                                                                                                 |
| <b>Operating Temperature (°C )</b>   | -10 to 40                                                                                                             |
| <b>Operating Humidity ( % )</b>      | 15 - 80 (non-condensing)                                                                                              |
| <b>Accessories</b>                   | BG39 filter for normal photography, with magnetic adaptors.<br>Custom lens shade suited for the supplied filter wheel |

### System specification

|                                                   | Multiband Solution                                                                            | Narrowband Solution                                                                                    |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Included LED lights</b>                        | 2 x UV, inc. UG11 filters (365 µm)<br>2 x VIS, inc. BG39 filters<br>2 x IR (860µm & 960µm)    | Wavelengths (µm): 365, 385, 410,<br>420, 450, 480, 510, 530, 550, 600,<br>630, 640, 660, 740, 850, 940 |
| <b>Configuration</b>                              | 2 banks with UV-, VIS-, IR-<br>emission each                                                  | 2 panels with 16 LEDs in each                                                                          |
| <b>Filter Wheel (5- position)</b>                 | Included, controlled via USB                                                                  |                                                                                                        |
| <b>Communication with lights and filter wheel</b> | USB via 7 - port powered hub                                                                  |                                                                                                        |
| <b>Light stands</b>                               | Not included                                                                                  |                                                                                                        |
| <b>Included Capture Computer</b>                  | DELL Mobile Precision 7740 CTO BASE, 17.3", i9 processor, 64GB RAM,<br>1TB SSD, Windows 10 OS |                                                                                                        |
| <b>Workflow Software</b>                          | Phase One Rainbow MSI software                                                                |                                                                                                        |
| <b>Output</b>                                     | 8-image stack, according to<br>Charisma Guidelines                                            | 16-image monochrome stack,<br>ready for statistical analysis                                           |
| <b>Output Luminescence</b>                        | 3 channels                                                                                    | 15 channels                                                                                            |

### Solution at a Glance



1. iXG 100MP Wide Spectrum camera incl. magnetic IR/UV cut filter & hood
2. MSI accessory kit incl. Filter wheel, mounting rail, USB hub, PC and software
3. Multiband/ Charisma Dedolights, including filters, power supplies and USB power switches\*
4. Narrowband Eureka Lights\*
5. Copystand (desktop/ floor/ wall)\*

\*Light stand and copystand not included



# Phase One iXH & iXG Camera Systems

A0 @ 300ppi

Cultural institutions have the staggering task of achieving perfection in the preservation of their collections. Phase One delivers to the need for intelligent capture solutions built to process high volume digitization programs with speed and accuracy. Our specialized research and development team have developed a configurable solution that provides an ergonomic and efficient workflow, resilient hardware, and

Phase One's patented imaging capabilities. The efforts have yielded the **iXH 150MP** and **iXG 100MP** Camera Systems; both designed with quality, durability and ease of use in mind, a wide range of applications, and they come with a complete software integration into **Capture One CH**. These cameras accurately measure distance to object matter and record the resolution (PPI), Field-of-view and magnification, making it





easy to position them on any copy stand for a given scanning purpose. We refer to this functionality as **PPI-Assist**. In combination with the Phase One **AutoColumn** copy stands and Capture One CH, the iXH 150MP and iXG 100MP Cameras are integral for delivering automated camera positioning for a specified PPI. With the Phase One **Film Capture Stage**, all types of film and glass plates can be readily digitized.

The configuration of the iXH 150MP and iXG 100MP solutions go hand-in-hand with the development of Capture One Cultural Heritage software. Our iXH 150MP and iXG 100MP Camera Solutions are designed with quality, material safety and an efficient workflow in mind.

# iXH 150MP & iXG 100MP

## A0 @300ppi

The **iXH 150MP** is Phase One's first camera system purposely built for reproduction and that is capable of capturing a single-shot, A0 size at 300ppi while meeting the stringent imaging standards such as **Metamorfoze**, **FADGI** and **ISO 19264**.

**USB-C** and **10G Ethernet** data interfaces on the iXH 150MP deliver the highest transfer rates and flexibility to suit different needs and workflows.

## Best Flat Field Repro Optics New Phase One RS 72mm MkII lens

Designed from the ground up, the new **Phase One RS 72mm MkII lens** delivers top performance and optimization for the **iXH 150MP**. Its floating element increases precision at all apertures and magnification ranges, from 1:70 to 1:3.

The iXH 150MP Camera is also available with the Schneider Kreuznach 120mm lens. The two lenses allow flat copy work to meet the demands of libraries, archives, and universities. The lenses keep the color uniformity required for the most demanding reproduction applications. The **21mm** and **42mm** extension tube accessories, used with the **120mm** lens, are designed with the same accuracy and quality as the camera body and lenses, allowing close-ups at a higher resolution, resulting in accurate capture of small objects.

The iXG 100MPs utilize integrated flat field optics with the **Schneider Kreuznach 72mm and 120mm lenses**, addressing the needs of flat copy work, being particularly useful for libraries, archives, and universities. In combination with the digital lens profiles of **Capture One CH**, the lenses offer the highest quality in terms of resolution, flatness, sharpness, lack of distortion and color uniformity required for the most demanding reproduction applications. 21mm and 42mm Extension tubes are available for close up capturing of film and small objects at higher resolution and are designed and built with the same accuracy and quality as the camera body and lenses.

## Color accuracy & superior detail

The **iXH 150MP** and **iXG 100MP** Camera Systems use CMOS sensors (the 150MP is also **Back Side Illuminated**) with an outstanding dynamic range of 15 f-stops to ensure the highest resolution, sensitivity and lowest level of noise. They produce the most accurate colors and details thanks to advanced electronics and processors that allow for high accuracy in the reproduction of Cultural Heritage applications such as artworks and precious books.

The **Achromatic** and **WS (Wide Spectrum)** models combine the highest resolution and class-leading spectral sensitivity required for specialized scientific imaging applications, research and conservation of manuscripts, maps and drawings. With its ability to capture in color, UV and IR, the **WS** cameras are the tool of choice for imaging applications such as paintings, medical and forensics. By simply adding an IR block filter, they convert to a regular camera. The **iXG 100MP WS** is also one of the key components of the Phase One Rainbow MSI solutions (see page 30).

## AutoColumn and PPI-Assist

The full integration of hardware with the customized Capture One CH software yields an efficient, professional workflow and precision results. In Addition, the Phase One AutoColumn copy stands, Capture One CH, and iXH 150MP Camera System deliver automated camera positioning for a specified ppi.

## Industrial durability: one million actuations guaranteed

The iXH 150MP and iXG 100MP offer industrial build-quality, made with aerial-grade aluminum and the most durable mechanical and electronic components available today. The camera's mechanical Reliance Shutter is offered with one million actuations guaranteed. In electronic shutter mode, an unlimited number of shutter actuations can be achieved. The newly designed housing with its integrated heat sink and cooling fins, ensures that the temperature remains low even during long days of running Live View continuously, and thus producing noise-free images and consistent results.

## Scientific Tools and SDK for integration

The iXH 150MP and iXG 100MP Camera Systems and the Phase One SDK are designed to provide an open platform for new imaging applications. For example, with the addition of accessory lighting and filtering, the wide spectrum, infrared, and multi-spectral capabilities of the iXH 150MP and iXG 100MP meet the highest standards required. The capabilities and incredible focusing accuracy, open the door to computational and sequential imaging, required for both multi-spectral and 3D applications.



# Camera Systems

## Technical Specifications

### System specification

|                                   |                                                                                                     |                                                                                 |
|-----------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Imaging sensor options</b>     | iXH 150MP, iXH 150MP Achromatic and iXH 150MP Wide Spectrum - all with BSI sensors                  | iXG 100MP, iXG 100MP Wide Spectrum and iXG 100MP Achromatic                     |
| <b>Lens mount</b>                 | Phase One iXH/iXG                                                                                   |                                                                                 |
| <b>Shutter type</b>               | Reliance (RS) leaf shutter, integrated in lens<br>On-Sensor Electronic shutter (ES)                 |                                                                                 |
| <b>Shutter speed</b>              | 1/250s - 1hr                                                                                        |                                                                                 |
| <b>Focus positions</b>            | Close range to near infinity,<br>21 mm max. extension                                               |                                                                                 |
| <b>Focus control</b>              | Motorized & encoded, controlled from Capture One CH software                                        |                                                                                 |
| <b>Mechanical mounts</b>          | VHQ L-Bracket with standard Arca-Swiss dovetail and a 3/8" threaded hole with a dedicated L-Bracket |                                                                                 |
| <b>Data Interfaces</b>            | USB-c/ 10G Ethernet                                                                                 | USB3.0                                                                          |
| <b>Other Interfaces</b>           | Flash Output, LED light control, remote triggering                                                  | Flash Output, remote triggering                                                 |
| <b>Cooling</b>                    | Integrated cooling fins and heat sink                                                               | Integrated heat sink                                                            |
| <b>Dimensions (mm)</b>            | 227 x 130 x 130 inc. L-Bracket with 72 mm MkII lens                                                 | Focused to infinity: 150 x 120 x 100<br>Focused to close range: 180 x 120 x 100 |
| <b>Weight (g)</b>                 | 3,450 inc. L-Bracket with 72 mm MkII lens                                                           | 2300 (Including 72 mm lens and mounting bracket)                                |
| <b>Operational temp range (c)</b> | 10-35 (office environment)                                                                          |                                                                                 |
| <b>Humidity (%)</b>               | 15-80 (office environment)                                                                          |                                                                                 |

### Lens specification

|                                  | Phase One<br>72mm MkII    | Schneider Kreuznach<br>72mm RS-iXG     | Schneider Kreuznach<br>120mm RS-iXG |
|----------------------------------|---------------------------|----------------------------------------|-------------------------------------|
| <b>Magnification range</b>       | 1:70 - 1:3 (optimal 1:11) | Infinity to 1:0.9 with extension tubes | 1:6,9 to 1:1,2 with extension tubes |
| <b>Lens thread diameter (mm)</b> | 77                        | 40.5                                   | 46.0                                |



# Phase One **XF Camera System**

Built on many years of experience in the high end photographic market, the Phase One XF Camera System brings unrivaled quality, accuracy, and reliability, and sets a new standard for a flexible platform equipped with everything that is needed for reproduction at the highest possible level.





- Robust, solid, aluminum-alloy construction.
- Advanced, expandable operating system.
- Intuitive and easily customizable user interface.
- Choice of fully integrated Waist Level and Prism viewfinders.
- Support for all Schneider Kreuznach LS 645 format lenses, from 28 mm to 240 mm.
- Support for all Phase One and Mamiya Focal Plane lenses and many legacy Mamiya 645 lenses.
- Advanced HAP auto focus system with remote control from Capture One.
- Compatible with all Phase One IQ Digital Backs with a choice of 100-150 Megapixel.

# XF Camera System Highlights



## Honeybee Autofocus Platform

HAP-1 is designed with a custom processor, coupled with a high-resolution CMOS AF sensor. Combining a unique floating-point architecture and a fully programmable interface, HAP-1 allows for continuous tailoring and tuning of the AF system, providing user-accessible software updates for years to come. The new Hyperfocal Point Focusing, creates unique presets for each lens which make HAP-1 automatically return to that specific point on demand.

## Sequence Photography

Focus stacking - Select the desired focus plane and the camera will create a series of images with multiple focusing steps and these can be then stacked in 3rd party software solutions to give a greater depth of field.

Intervalometer - The camera can be programmed to take a series of images at fixed intervals.

Exposure bracketing - When there is a need to record an extremely wide dynamic range, the camera can be programmed to create a series of images with fixed ISO and aperture but with variable exposure times.

## New Modular Viewfinders

The waist-level finder is convenient for many styles of photography, be it in studio or on location. With the ability to attain a more effective working position, the waist-level finder is a great addition to the creative toolbox.

The XF Camera System can measure the light on the newly designed HAP-1 autofocus platform. Using this ability, light metering is now available with our waist-level finder.

With a solid glass prism, the 90° viewfinder is the brightest of its kind and has virtually no loss of light. Together with nearly 100% frame coverage, the prism viewfinder displays a perfect view of the scene and comes standard on all XF Camera Systems.

## OneTouch User Interface

The OneTouch UI on the XF Camera System is a seamless combination of intuitive dials, keys and touch screen interactions. Each operation is used only where it makes sense and where you want it. OneTouch UI is designed with the goal of making controls so simple that photo-graphers will feel at home within moments of getting started. The 1.6" grip screen is designed for clear visibility in any lighting condition using a transfective capacitive.



# XF Camera System

## Technical Specifications

### Imaging Sensor



#### Imaging Sensor

##### Digital Back options

IQ3 50-100MP & IQ4 100-150MP with  
XF mounts  
(See specification for Digital Backs)

##### Backwards compatibility

IQ1 & IQ2 with P mounts

### Size & Weight



#### Dimensions

#### Weight

##### XF Camera System\* w/ 90° prism viewfinder

152 x 135 x 160 mm

1390 g

##### XF Camera System\* w/ waist level finder

152 x 173 x 160 mm

1020 g

##### XF Camera Body w/o battery

152 x 108 x 85 mm

790 g

##### IQ Digital Back

98,5 x 88,5 x 62,3 mm

695 g

##### 90° prism viewfinder

67 x 17 x 57 mm (closed)

500 g

##### Waist level finder

67 x 17 x 57 mm (closed)  
67 x 65 x 57 mm (open)

130 g

\*without lens

### Battery

|                                               |                            |
|-----------------------------------------------|----------------------------|
| <b>Battery</b>                                | BP-911/914/915<br>3400 mAh |
| <b>Powershare</b>                             | IQ4/IQ3 only               |
| <b>Power Input</b>                            | With accessory             |
| <b>Internal battery charging</b>              | XF and IQ4/IQ3             |
| <b>Support for USB 3 charging hub (1.5 A)</b> | IQ3 only                   |
| <b>Power over Ethernet</b>                    | IQ4 only                   |

### Flash

|                                                    |                             |
|----------------------------------------------------|-----------------------------|
| <b>Flash trigger</b>                               | Integrated Profoto wireless |
| <b>Wireless trigger range</b>                      | 20m (outside)               |
| <b>Back flash sync</b>                             | Yes                         |
| <b>Flash sync speed focal plane shutters (max)</b> | XF and IQ4/IQ3              |
| <b>Support for USB 3 charging hub (1.5 A)</b>      | 1/125s                      |
| <b>Flash sync speed leaf shutters (max)</b>        | 1/1600s                     |

# IQ Digital Back Range

## Technical Specifications



### Specifications

|                          | IQ4 150MP         | IQ4 150MP<br>Achromatic |
|--------------------------|-------------------|-------------------------|
| Resolution               | 151 Megapixel     | 151 Megapixel           |
| Long exposure            | 60 minutes        | 60 minutes              |
| 16 bit Opticolor+        | Yes               | Yes                     |
| Sensitivity (ISO)        | 50 - 25600        | 200 - 102400            |
| Sensor type              | CMOS              | CMOS                    |
| Sensor size              | 53.4 x 40         | 53.4 x 40               |
| Active pixels            | 14204 x 10652     | 14204 x 10652           |
| Pixel size (micron)      | 3.76 x 3.76       | 3.76 x 3.76             |
| Output image dim. 300dpi | 120.26 x 90.19 cm | 120.26 x 90.19 cm       |
| Output image dim. 600dpi | 60.13 x 45.09 cm  | 60.13 x 45.09 cm        |
| Mount options*           | XF                | XF                      |
| 3.2" touch display       | Yes               | Yes                     |
| High bandwidth interface | Yes               | Yes                     |
| XF Powershare            | Yes               | Yes                     |
| Wi-Fi 802.11             | Yes               | Yes                     |

### Captures per second

|                          | 14-bit | 16-bit | 14-bit | 16-bit |
|--------------------------|--------|--------|--------|--------|
| Focal plane (full res.)  | 1.4    | 0.7    | 1.4    | 0.7    |
| Leaf shutter (full res.) | 1.2    | 0.7    | 1.2    | 0.7    |





| IQ4 100MP<br>Trichromatic |  |
|---------------------------|--|
| 101 Megapixel             |  |
| 60 minutes                |  |
| Yes                       |  |
| 35 - 12800                |  |
| CMOS                      |  |
| 53.4 x 40                 |  |
| 11608 x 8708              |  |
| 4.6 x 4.6                 |  |
| 98.3 x 73.2 cm            |  |
| 49.1 x 36.9 cm            |  |
| XF                        |  |
| Yes                       |  |
| Yes                       |  |
| Yes                       |  |
| Yes                       |  |

| 14-bit | 16-bit |
|--------|--------|
| 1.4    | 0.7    |
| 1.2    | 0.7    |

| IQ3 100MP      |  | IQ3 100MP<br>Achromatic |  |
|----------------|--|-------------------------|--|
| 101 Megapixel  |  | 101 Megapixel           |  |
| 60 minutes     |  | 60 minutes              |  |
| Yes            |  | Yes                     |  |
| 50 - 12800     |  | 200 - 51200             |  |
| CMOS           |  | CMOS                    |  |
| 53.4 x 40.1    |  | 53.4 x 40.1             |  |
| 11608 x 8708   |  | 11608 x 8708            |  |
| 4.6 x 4.6      |  | 4.6 x 4.6               |  |
| 98.3 x 73.2 cm |  | 98.3 x 73.2 cm          |  |
| 49.1 x 36.9 cm |  | 49.1 x 36.9 cm          |  |
| XF, H          |  | XF                      |  |
| Yes            |  | Yes                     |  |
| Yes            |  | Yes                     |  |
| Yes            |  | Yes                     |  |
| Yes            |  | Yes                     |  |

| 14-bit | 16-bit | 14-bit | 16-bit |
|--------|--------|--------|--------|
| 1.4    | 0.7    | 1.1    | 0.6    |
| 1.2    | 0.7    | 0.9    | 0.5    |

# Phase One Lenses

Schneider Kreuznach Blue Ring Lenses



45mm LS f/3.5

Providing a focal length that is perfect for almost any application, the Blue Ring 45mm f/3.5 offers edge-to-edge sharpness and nearly distortion free results.

- Tack sharp wide-angle lens
- Minimum optical distortion
- Flash synchronization up to 1/1600<sup>th</sup>



55mm LS f/2.8

Minimal distortion semi-wide-angle design provides a normal look, great for editorial portraits and lifestyle photography.

- Fast aperture, shallow depth of field
- Compact size with LS capabilities



80mm LS f/2.8

A preferred choice for location fashion photographers using fill flash and an essential lens for every photographers kit.

- Fast aperture allowing shallow depth of field
- Edge-to-edge sharpness
- Extreme optical performance

For the full range of available lenses please see [www.phaseone.com](http://www.phaseone.com)





110mm LS f/2.8

A longer focal length with just enough optical compression for full-length fashion, beauty and portraiture.

- Fast lens allowing shallow depth of field
- Extreme anti-flare optical design



120mm LS f/2.8

Macro lens ideal for close-up product shots, and equally ideal for close up beauty, action, nature and wildlife photography.

- Edge-to-edge tack sharp images
- Beautiful out-of-focus bokeh
- Auto Focus and Manual focus



150mm LS f/2.8

Our fastest telephoto lens, providing razor thin depth of field at f/2.8. Perfect for studio and location portraiture.

- Fastest telephoto lens
- Auto and manual focus
- Razor thin depth of field

# Phase One AutoColumn Copy Stands

Leveling head



LED insert



Phase One RPS 2300XL - Floorstand  
AutoColumn copy stand with LED option



The new standard of AutoColumn copy stands, the Phase One RPS 2300XL, is designed with motorized AutoColumn technology to accommodate for efficient work with the iXH 150MP and iXH 150MP and iXG 100MP 100MP camera system and Capture One CH. The Phase One RPS 2300XL features high precision camera positioning, and a geared movable camera arm. A camera leveling head secures precise and quick positioning. A LED baseboard insert is available for transparency scanning. Wall mount options are available for the 2300XL column as well as upgrades for existing RPS 2300 products in the field.

Specifications

|                       |                                                             |
|-----------------------|-------------------------------------------------------------|
| Base plate            | 100 x 75 cm (39,4 x 29,5 in.)<br>Desk top or Floor position |
| Column height         | 2,30 m (90 in.)                                             |
| LED insert plate      | 42 x 32 cm, 6500K, dimmable                                 |
| Maximum load          | 10 kg (22 lbs)                                              |
| Camera mounting plate | Arca Swiss type quick release                               |

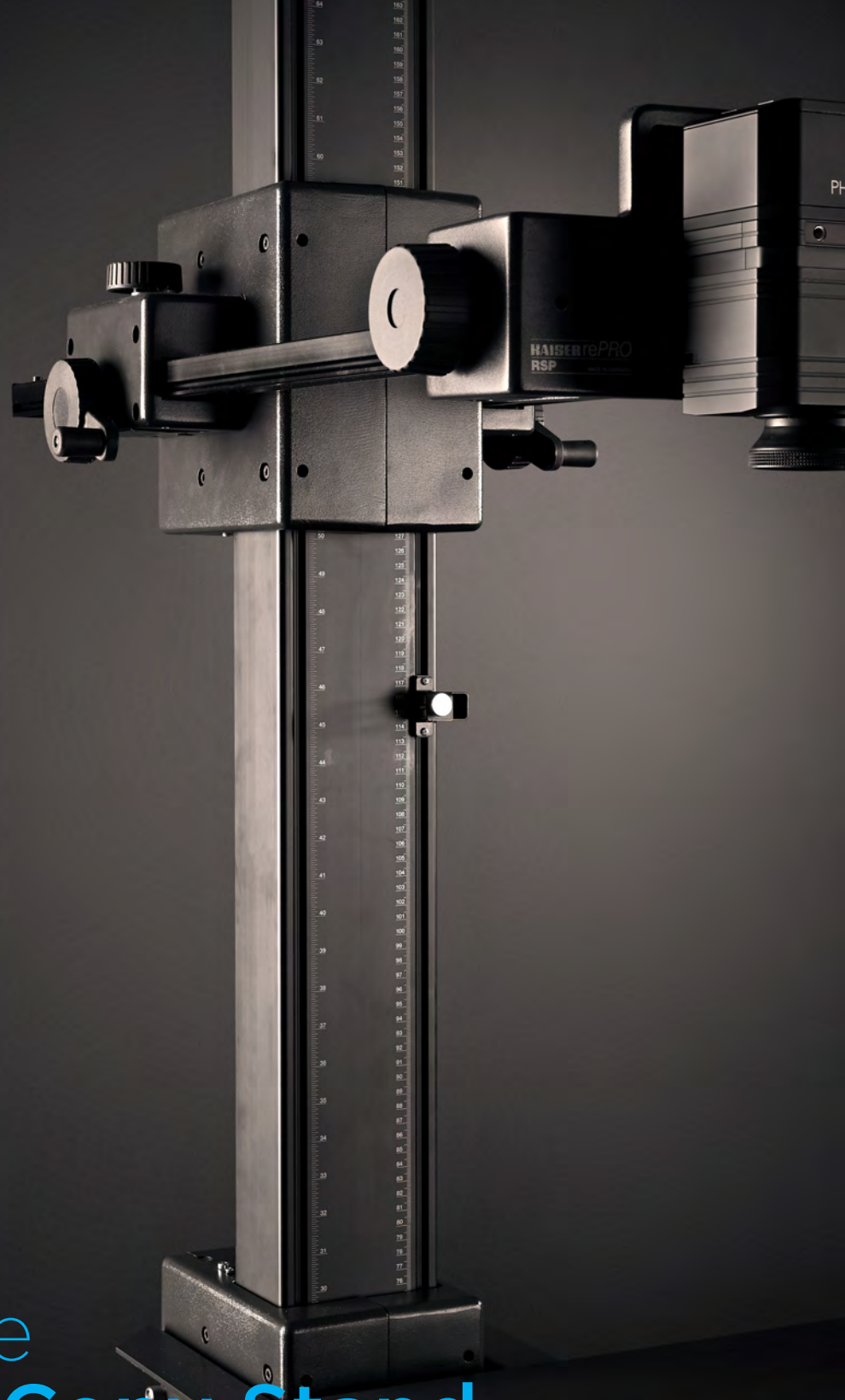
Phase One RPS 1600 - Tabletop  
AutoColumn copy stand with LED option



The new standard of AutoColumn copy stands, the Phase One RPS 1600, is designed with motorized AutoColumn technology to accommodate for efficient work with the iXH 150MP and iXH 150MP and iXG 100MP 100MP camera system and Capture One CH. The Phase One RPS 1600 features high precision camera positioning, and a geared movable camera arm. A camera leveling head secures precise and quick positioning. An LED baseboard insert is available for transparency scanning.

|                               |
|-------------------------------|
| 100 x 70 cm (39.4 x 27,5 in.) |
| 1.60 m (6.2 ft.)              |
| 42 x 32 cm, 6500K, dimmable   |
| 10 kg (22 lbs)                |
| Arca Swiss type quick release |





# Phase One 2-Motion Copy Stand



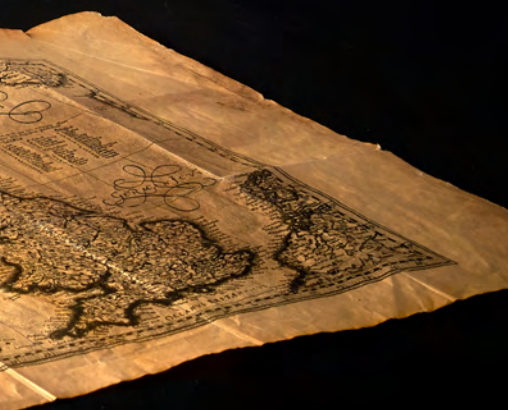


## Phase One 2-Motion Maximum flexibility for larger objects

The RSP 2-Motion adds an adjustable, motorized 100 x 80 cm baseboard allowing for greater flexibility and use of different lenses when scanning larger objects. The baseboard can be fitted with a steel sheet plate up to DINA0 format for magnetic attachment of large drawings, maps etc.

### Specifications

|                                                |                                                                    |
|------------------------------------------------|--------------------------------------------------------------------|
| <b>Total height</b>                            | 227 cm (89.4 in.)                                                  |
| <b>Maximum working span</b>                    | 160 cm (63 in.)                                                    |
| <b>Column cross section</b>                    | 120 x 80 mm (4.7 x 3.1 in.)                                        |
| <b>Maximum load</b>                            | on camera carrier: 10 kg (22 lbs)<br>on base board: 15 kg (33 lbs) |
| <b>Base board</b>                              | 100 x 80 cm (39.4 x 31.5 in.)                                      |
| <b>Camera platform</b>                         | 13 x 13 cm (5.1 x 5.1 in.)                                         |
| <b>Connecting thread<br/>(interchangeable)</b> | 1/4" / 3/8"                                                        |
| <b>Required floor space<br/>(WxD)</b>          | 100 x 126 cm (39.4 x 49.6 in.)                                     |



# Cultural Heritage Solution Partners

## Phase One

Phase One is the world leader in open-platform medium format digital camera systems and solutions designed to deliver the highest image quality for professional photography.

Our products are built by hand using the best materials, highest precision and most advanced quality assurance processes.

Our company was born digital and we have always strived to deliver the highest image quality possible through innovative solutions. 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.

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. In doing so we ensure the highest level of service and support to our customers.

---

## Digital Transitions, USA

The Digital Transitions' Division of Cultural Heritage provides cameras and copy-stand solutions to support the digitization programs of libraries, museums, archives, collectors, service bureaus and other institutions.

Digital Transitions' approach is comprehensive. They work closely with every client to design a complete solution

with an efficient standards-based workflow. This includes careful choice of hardware, integrating our systems into existing infra-structures, and providing ongoing support and training to staff in order to keep the digitization program running efficiently.

For more information, please visit:  
<http://dtculturalheritage.com>

---

## Cambo, The Netherlands

Cambo BV, founded in 1946, is based in the town of Kampen in The Netherlands, and today works from a modern 2,000 sq.m. facility with the latest computer controlled design and machine tools, ensuring production to the highest standards. Cambo produces a range of camera support stands and

other studio accessories, including dedicated Reproduction cameras and Reproduction stands.

For more information, please visit:  
<http://www.cambo.com/en/>

---

## Kaiser Fototechnik, Germany

For more than 40 years, the copy stands from Kaiser Fototechnik have been chosen by photographers, libraries, and archives for professional repro-graphic work. Together with Phase One's camera solutions and software, we have

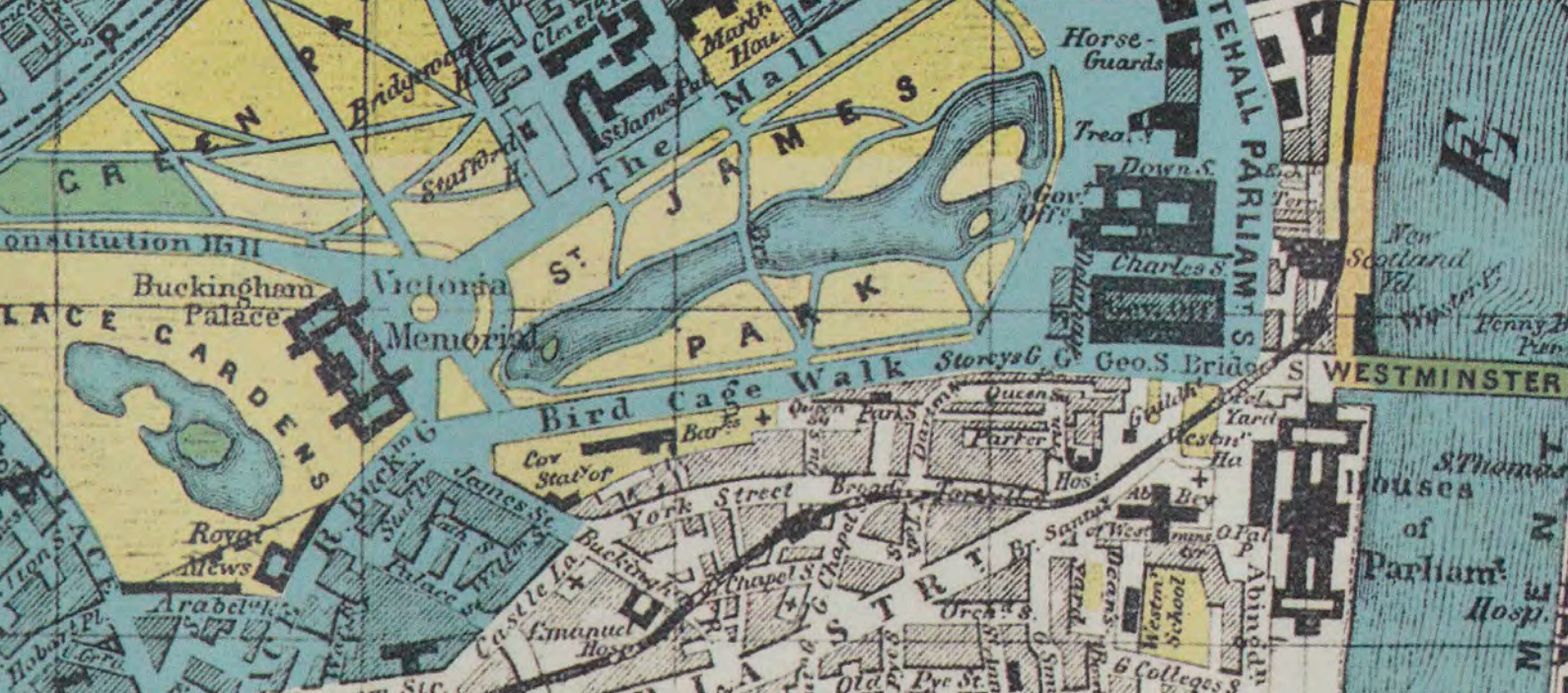
created a line of Instant Capture solutions for efficient and high quality digitization projects.

For more information, please visit:  
<http://www.kaiser-fototechnik.de/en/>









# Phase One Scanning Solutions

## CH Product Portfolio

Suitable Resolution  
(Size@PPI)

Baseboard size

Auto-column

### Film scanning solutions (+/- Autocolumn solution)

|                                                                   |                             |             |     |
|-------------------------------------------------------------------|-----------------------------|-------------|-----|
| - Film scanning solution with Autocolumn, iXH 150MP and iXG 100MP | Down to 6 x 4.5 cm @5500ppi | 100 x 70 cm | Yes |
| - Film scanning solution with Autocolumn, without camera          |                             | 100 x 70 cm |     |
| - Film scanning solution, Kaiser rePro iXH 150MP and iXG 100MP    | Down to 6 x 4.5 cm @5500ppi | 80 x 60 cm  | No  |
| - Film scanning solution, Kaiser rePro, without camera            |                             | 80 x 60 cm  | No  |

### Flat copy scanning solutions (with AutoColumn or 2-motion solution)

|                                                                                             |                   |             |     |
|---------------------------------------------------------------------------------------------|-------------------|-------------|-----|
| - General purpose scanning solution with Autocolumn, iXH 150MP and iXG 100MP                | Up to A1+ @400ppi | 100 x 75 cm | Yes |
| - Optional LED insert for baseboard                                                         |                   | 42 x 32 cm  |     |
| - Wall mounted General purpose scanning solution with Autocolumn, iXH 150MP and iXG 100MP   | Up to A0+ @300ppi | N/A         | Yes |
| - Upgrade scanning solution with Autocolumn for existing Cambo RPS, iXH 150MP and iXG 100MP | Up to A1+ @400ppi | 100 x 75 cm | Yes |
| - Upgrade kit with Autocolumn for existing Cambo RPS, iXH 150MP and iXG 100MP               | Up to A2 @350ppi  | 100 x 75 cm | Yes |
| - General purpose scanning solution with 2-motion, iXH 150MP and iXG 100MP                  | Up to A1+ @400ppi | 100 x 80 cm | No  |

### Book scanning solutions (single- or dual camera solution)

|                                                                                                  |                                            |             |     |
|--------------------------------------------------------------------------------------------------|--------------------------------------------|-------------|-----|
| - Book scanning solution, DT Atom flexible book cradle, with Autocolumn, iXH 150MP and iXG 100MP | Bound: A3 @1000ppi<br>Open 180° A2 @600ppi | 59 x 65 cm  | Yes |
| - Book scanning solution, DT Versa 180 degrees cradle, with Autocolumn, iXH 150MP and iXG 100MP  | Bound: A2 @400ppi<br>Open 180° A1 @400ppi  | 102 x 76 cm | Yes |
| - Book scanning solution, BC100 dual camera, 100 degrees cradle, iXH 150MP and iXG 100MP         | Up to A2 @500ppi                           | A2          | No  |





| 2motion:<br>Table and camera | Table-top | Floor-standing | Wall-mount | Column height | Light table for<br>film scanning |
|------------------------------|-----------|----------------|------------|---------------|----------------------------------|
|                              |           |                |            |               | LED insert                       |
|                              | Yes       |                | N/A        | 1.6 m         | LED insert                       |
|                              | Yes       |                | N/A        | 1.6 m         | LED insert                       |
|                              | No        | Yes            | N/A        | 1.5 m         | Kaiser Light Box                 |
|                              | No        | Yes            | N/A        | 1.5 m         | Kaiser Light Box                 |
|                              |           |                |            |               |                                  |
|                              | No        | Yes            | N/A        | 2.3 m         | LED insert                       |
|                              | Yes       |                | N/A        |               | LED insert                       |
|                              | No        |                | Yes        | 2.3 m         |                                  |
|                              | N/A       | Yes            |            | 2.3 m         |                                  |
|                              | N/A       | Yes            |            | 2.3 m         |                                  |
| Yes                          | No        | Yes            | N/A        | 1.6 m         | Kaiser Light Box                 |
|                              |           |                |            |               |                                  |
|                              | Yes       |                | N/A        | 1.4 m         | DT Photon LED                    |
|                              | N/A       | Yes            | N/A        | 1.6 m         | Kaiser Light Box                 |
|                              | N/A       | Yes            | N/A        |               | DT Photon LED                    |





# References

## Partial list

### Austria

Vienna University of Technology  
Vienna

### Denmark

The Royal Danish Library  
Copenhagen

### France

The National Library of France  
Paris

RMN GP  
Paris

### Germany

Berlin State Museums  
Berlin

The Prussian Cultural Heritage Foundation  
Berlin

The Schleswig-Holstein State Library  
Kiel  
Bavarian State Library  
Munich

The House of West Germany  
Bonn

The State Conservation Office  
Mainz

Linden Museum  
Stuttgart

Folkwang Museum  
Essen

The Rhien Picture Library  
Cologne

### Norway

The National Archive of Norway  
Oslo

Munch Museum  
Oslo

Inter-municipal Archive of Møre  
og Romsdal,  
Ålesund

### Qatar

Qatar Foundation  
Doha





The luminous portrait studio of the Alinari Brothers' photographic establishment, in Florence, Italy. On the left is the photographer Gaetano Puccini. 1899, Fratelli Alinari  
© Alinari Archives-Alinari Archive, Florence, Italy

### Switzerland

The National Library of Switzerland  
Bern

The Bodleian Library  
Oxford

Harvard University  
Cambridge, MA

### The Netherlands

The National Maritime Museum  
Amsterdam

The John Rylands Library  
Manchester

Museum of Modern Art  
New York, NY

GMS Digitaliseert  
Alblasserdam

Cambridge University Library  
Cambridge

New York Public Library  
New York, NY

Picturae  
Heiloo

**USA**  
American Museum of Natural History  
New York, NY

Walt Disney Studios Burbank  
Glendale, CA

### UK

The British Museum  
London

Smithsonian Institution  
Washington DC, PA

Stanford University  
Stanford, CAA

The British Library  
London

Library of Congress  
Washington DC, PA

The U.S. National Archives  
Washington, DC

Additional references and customer testimonials can be found on <https://www.phaseone.com/cultural-heritage/resources/videos-in-action>

# iXH & iXG Resolution

## Magnification - Object Size Reference Table

The below table provides useful information for selecting a configuration suitable for the desired capture resolution and the size of the object that needs to be captured. Note that measurements are rounded to the nearest millimeter and that this table may be updated periodically subject to system updates.

| Popular film formats | Dimensions mm | Popular film formats | Dimensions mm |
|----------------------|---------------|----------------------|---------------|
| 35mm                 | 36x24         | 13x18cm              | 180x130       |
| 645                  | 56x44         | 24x30cm              | 300x240       |
| 6x6cm                | 56x56         | 4x5"                 | 127x101.6     |
| 6x7cm                | 70x56         | 5x7"                 | 177.8x127     |
| 6x8cm                | 80x56         | 8x10"                | 254x203.2     |
| 9x12cm               | 120x90        | 11x14"               | 355.6x279.4   |

| Popular U.S. formats | Dimensions mm | Popular U.S. formats | Dimensions mm |
|----------------------|---------------|----------------------|---------------|
| A0                   | 1189x841      |                      |               |
| A1                   | 841x594       | 11x8.5"              | 279x216       |
| A2                   | 594x420       | 14x8.5"              | 356x216       |
| A3                   | 420x297       | 17x11"               | 432x279       |
| A4                   | 297x210       | 40x28"               | 1016x711      |
| A5                   | 210x148       | 36x24"               | 914x610       |

## iXH 150MP

| Lens      | In-camera extension mm | Extension Tube | Total system length mm | Distance sensor-object (approx in mm) | Magnification | PPI (approx.) | Object WxH Size (approx. in mm) | Popular supported formats | Notes              |
|-----------|------------------------|----------------|------------------------|---------------------------------------|---------------|---------------|---------------------------------|---------------------------|--------------------|
| 72mm MkII | 4                      | N/A            | 230                    | 1810                                  | 1:22.5        | 300           | 1204x903                        | A0+, 40x28"               |                    |
| 72mm MkII | 6                      | N/A            | 232                    | 1404                                  | 1:16.9        | 400           | 902x677                         | A1+                       |                    |
| 72mm MkII | 9                      | N/A            | 235                    | 1000                                  | 1:11.3        | 600           | 601x451                         | A2+                       |                    |
| 72mm MkII | 11                     | N/A            | 237                    | 790                                   | 1:8.4         | 800           | 447x340                         | A3+, 17x11"               |                    |
| 72mm MkII | 14                     | N/A            | 240                    | 595                                   | 1:5.7         | 1200          | 301x226                         | A4+, 8x10", 11x8.5"       |                    |
| 72mm MkII | 18                     | N/A            | 246                    | 492                                   | 1:4.2         | 1600          | 224x169                         | A5+                       |                    |
| 72mm MkII | 21                     | N/A            | 250                    | 436                                   | 1:3.4         | 2000          | 180x135                         | A6+, 13x18cm, 5x7"        |                    |
| 120mm     | 0                      | N/A            | 224                    | 112                                   | 1:6.9         | 967           | 373x280                         |                           | Min. practical PPI |
| 120mm     | 5                      | N/A            | 225                    | 964                                   | 1:5.6         | 1200          | 300x225                         | A4, 11x8.5", 8x10"        |                    |
| 120mm     | 7                      | 21mm           | 250                    | 628                                   | 1:2.8         | 2400          | 149x112                         | 9x12cm, 4x5"              |                    |
| 120mm     | 15                     | 42mm           | 282                    | 522                                   | 1:1.7         | 4000          | 89x67                           | 6x8cm, 6x7cm, 6x6cm       |                    |
| 120mm     | 21                     | 21mm+ 42mm     | 370                    | 488                                   | 1:1.2         | 5500          | 64x49                           | 645, 35mm                 |                    |
| SK 72mm   | 4                      | N/A            | 162                    | 1839                                  | 1:22.5        | 300           | 1204x903                        | A0+                       |                    |
| SK 72mm   | 6                      | N/A            | 164                    | 1417                                  | 1:16.9        | 400           | 902x677                         | A1+                       |                    |
| SK 72mm   | 8                      | N/A            | 166                    | 990                                   | 1:11.3        | 600           | 601x451                         | A2+                       |                    |
| SK 72mm   | 10                     | N/A            | 167                    | 783                                   | 1:8.4         | 800           | 447x340                         | A3+, 11x14"               |                    |
| SK 72mm   | 15                     | N/A            | 175                    | 578                                   | 1:5.7         | 1200          | 300x225                         | A4+, 8x10", 8x11.5"       |                    |
| SK 72mm   | 18                     | N/A            | 178                    | 472                                   | 1:4.2         | 1600          | 224x169                         | A5+, 5x7"                 |                    |
| SK 72mm   | 3                      | 21mm           | 182                    | 413                                   | 1:3.4         | 2000          | 180x135                         | A6+, 5x7"                 |                    |
| SK 72mm   | 7                      | 21mm           | 188                    | 375                                   | 1:2.8         | 2400          | 148x111                         | 9x12cm, 4x5"              |                    |
| SK 72mm   | 5                      | 42mm           | 205                    | 309                                   | 1:1.7         | 4000          | 89x67                           | 6x8cm, 6x7cm, 6x6cm       |                    |
| SK 72mm   | 21                     | 42mm           | 220                    | 289                                   | 1:1.2         | 5500          | 64x49                           | 645                       |                    |
| SK 72mm   | 15                     | 21mm+ 42mm     | 237                    | 288                                   | 1:1           | 6756          | 53x41                           | 35mm                      | 1:1 magnification  |
| SK 72mm   | 21                     | 21mm+ 42mm     | 243                    | 287                                   | 1:0.9         | 7400          | 48x36                           | 35mm                      | Max. practical PPI |



# iXG 100MP

| Lens      | In-camera extension mm | Extension Tube | Total system length mm | Distance sensor-object (approx in mm) | Magnification | PPI (approx.) | Object WxH Size (approx. in mm) | Popular supported formats  | Notes                      |
|-----------|------------------------|----------------|------------------------|---------------------------------------|---------------|---------------|---------------------------------|----------------------------|----------------------------|
| 72mm MkII | 6                      | N/A            | 228                    | 1520                                  | 1:18.4        | 300           | 982x737                         | A1+                        |                            |
| 72mm MkII | 8                      | N/A            | 230                    | 1182                                  | 1:13.8        | 400           | 737x553                         | A2+                        |                            |
| 72mm MkII | 10                     | N/A            | 232                    | 853                                   | 1:9.2         | 600           | 491x368                         | A3+, 11x14"                |                            |
| 72mm MkII | 13                     | N/A            | 236                    | 690                                   | 1:8.4         | 800           | 369x276                         | A4+, 8x10", 8x11"          |                            |
| 72mm MkII | 14                     | N/A            | 235                    | 595                                   | 1:5.7         | 1200          | 246x184                         | A5+,                       |                            |
| 72mm MkII | 18                     | N/A            | 241                    | 492                                   | 1:4.2         | 1600          | 184x138                         | A6+, 13x18cm               |                            |
| 72mm MkII | 21                     | N/A            | 245                    | 436                                   | 1:3.4         | 2000          | 147x110                         | 4x5"                       |                            |
| 120mm     | 0                      | N/A            | 219                    | 112                                   | 1:7           | 791           | 373x280                         | 11x14", 8x10", 24x30cm, A4 | Min. practical PPI         |
| 120mm     | 12                     | N/A            | 224                    | 842                                   | 1:4.6         | 1200          | 246x184                         | 4x5", 5x7", 18x24cm, A5    |                            |
| 120mm     | 17                     | 21mm           | 245                    | 585                                   | 1:2.3         | 2400          | 123x92                          | 9x12cm                     |                            |
| 120mm     | 12                     | 21mm+42mm      | 290                    | 506                                   | 1:1.4         | 4000          | 74x55                           | 645, 6x6cm, 6x7cm*         | No margin on the 55mm side |
| 120mm     | 23                     | 21mm+42mm      | 310                    | 498                                   | 1:1.2         | 4500          | 65x49                           | 35mm, 645                  |                            |
| SK 72mm   | 7                      | N/A            | 158                    | 1530                                  | 1:18.4        | 300           | 982x737                         | A1+                        |                            |
| SK 72mm   | 9                      | N/A            | 160                    | 1189                                  | 1:13.8        | 400           | 737x553                         | A2+                        |                            |
| SK 72mm   | 11                     | N/A            | 162                    | 846                                   | 1:9.2         | 600           | 491x368                         | A3+, 11x14"                |                            |
| SK 72mm   | 12                     | N/A            | 162                    | 677                                   | 1:6.9         | 800           | 369x276                         | A4+, 11x8.5", 8x10"        |                            |
| SK 72mm   | 19                     | N/A            | 170                    | 501                                   | 1:4.6         | 1200          | 246x184                         | A5+, 5x7"                  |                            |
| SK 72mm   | 3                      | 21mm           | 176                    | 429                                   | 1:3.4         | 1600          | 184x138                         | A6+, 13x18cm               |                            |
| SK 72mm   | 8                      | 21mm           | 182                    | 383                                   | 1:2.8         | 2000          | 147x110                         | 4x5"                       |                            |
| SK 72mm   | 10                     | 21mm           | 188                    | 354                                   | 1:2.3         | 2400          | 123x92                          | 9x12cm                     |                            |
| SK 72mm   | 10                     | 42mm           | 208                    | 306                                   | 1:1.4         | 4000          | 74x55                           | 6x7cm, 6x6cm*              | No margin on the 55mm side |
| SK 72mm   | 10                     | 21mm+42mm      | 228                    | 298                                   | 1:1           | 5500          | 54x40                           | 35mm                       | 1:1 magnification          |
| SK 72mm   | 15                     | 21mm+42mm      | 232                    | 288                                   | 1:0.9         | 6119          | 48x36                           | 35mm                       | Max. practical PPI         |



For more information, please visit  
[www.phaseone.com/cultural-heritage](http://www.phaseone.com/cultural-heritage)

Follow us on:  
[Facebook](#) @PhaseOneCH  
[LinkedIn](#) company/phase-one-ch  
[YouTube](#) youtube.com/c/PhaseOneIndustrial

PHASE**ONE**