

The PENTAX K-7 Designers' Story



The Japanese above “K-7” is saying “Premium small”

The Japanese below *Developer* is saying “Design story”



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The goal is a camera body that is the perfect partner for exclusive Limited-series lenses

At first glance, the PENTAX K-7's body may look quite different from that of previous K-series models.

Unlike the delicately contoured, streamlined design employed from the K10D to the K-m, it makes use

of more straight lines and shape-angled edges. However, the K-7 is not a sudden, accidental metamorphosis from previous K-series models: it is the proud successor of a PENTAX legacy that dates back to the peak days of film photography.

At the beginning of the development of the K-7, the camera body designers assigned to the project team were given two formidable goals to achieve. First was to design a camera body that would make it the perfect partner for top-of-the-line Limited-series lenses — invaluable assets for PENTAX. Second, to downsize the camera body to the dimensions of the *ist-D (as the K20D was felt by many to be too cumbersome). In short, these goals were set to make the K-7 the flagship model of PENTAX's digital camera lineup.

The *ist-D certainly was a good standard for size, because it was — and is — one of the smallest digital cameras ever sold. The times have changed since it was released, however. The body designers had to pack many more components — including a large three-inch LCD panel, in-body shake-reduction unit and new aperture-control mechanism — into the same dimensions. If the body designers had made a conventional approach to the design of the K-7 chassis, it was obvious even at the pre-design stage that everything wouldn't fit into the space available.

Collaboration between design and engineering teams

The K-7 design team began a collaboration with the mechanical engineering team, even before the actual design process began. This included the sharing of 3D CAD data, and joint efforts to devise the most space-efficient layout and placement of all the components. Simply packing everything into the available space was not good enough; this might have a negative affect on the camera's appearance or operability. The designers knew that good camera design had to start with a well-conceived chassis, before they could then begin adding on other parts and housings.

One of the fruits of this collaboration was a shortening of the forward protrusion of the built-in flash storage compartment. In previous models, the flash discharge unit was positioned in the very front, meaning that the storage compartment also had to protrude considerably toward the front end. After reviewing and revising the positioning and layout of all internal parts, they were able to reduce this protrusion. Another stroke of luck was that one of the mechanical engineers designing the unit was relatively new to SLR design. So, unlike more experienced engineers, he was freer to use his imagination rather than be bound by conventional ideas.

Making conclusions based solely on design plans often means poor results. Because K-7 designers modeled the camera using three-dimensional CAD technology at every stage from the start of work, mock-ups were available from the initial stages.

Simple is best

The most important design goal for the K-7 was a camera body that would be a perfect partner for Limited-series lenses. In other words, the camera body had to have a design simple enough to make the Limited-series lens mounted on it stand out.

The pentaprism unit — a focal point of the camera body — was traditionally polyhedron-shaped, symbolizing the glass pentaprism it housed and demonstrating the camera's role as a precision instrument. The K-7 shares the same characteristics as the LX, PENTAX's flagship camera in the film photography era: both have been designed to be compact and lightweight, and feature sturdy, water resistant bodies. Out of respect for this renowned masterpiece, the trapezoid motif over the PENTAX logo mark was revived.

This trapezoid was also used in other models in the past, including the MZ-5, MZ-S and *ist-D. The cameras carrying this shape had varied product concepts — some were compact, lightweight models developed by returning to PENTAX's starting point as an SLR pioneer, while others were epoch-making models born out of bold challenges. They were all, however, the first models of new lineups and marked a deviation from the past. Although designed simple and plain, the trapezoid plane featured in the K-7 symbolizes the fact that this new camera belongs to the same category as those predecessors and shares the same PENTAX identity and legacy with them.

Looking at the K-7 from the side, the ridge line of this pentaprism unit is simple and straight, without any obstructing indents or folds. Stair-step indents can in fact make the body appear smaller, but this visual approach was rejected with the K-7 because it could spoil the simplicity of design. The main body was trimmed down to the point where the chassis was nearly exposed in some sections. All these features make the K-7's optical finder, with 100% field of view, appear prominent, and give the body a prestigious and dignified look, despite the compact dimensions.

A touch of analog in digital design

Many cameras in recent years have been designed using only three-dimensional CAD technology. For the K-7, however, there was one section that could not be designed using digital tools only: the grip. Despite today's state-of-the-art computer technology, camera body designers cannot stick their hand into the CAD screen and actually touch the product or feel its weight. And, in fact, when the designers first picked up a mock-up constructed using only three-dimensionally digital data, the feeling was rather uncomfortable. They then added modeling clay to the grip section of the mock-up and redesigned it. When a designer is familiar with the hand-modeling process, it is in fact much faster and easier to reshape by hand, rather than revise the computer data. Once they were satisfied

with what they were feeling, the mock-up was laser-scanned and the 3D measurement data was fed back into the CAD system. Because of this, the K-7's grip was designed to be as comfortable and easy to hold as a K10D grip with a special rubber replacement grip (installed as an after-service by a PENTAX service center). "This is actually a problem for us, because we can no longer expect much profit from the grip replacement service!" joked one of the designers — but the fact is that the K-7's grip is designed to be just that good.



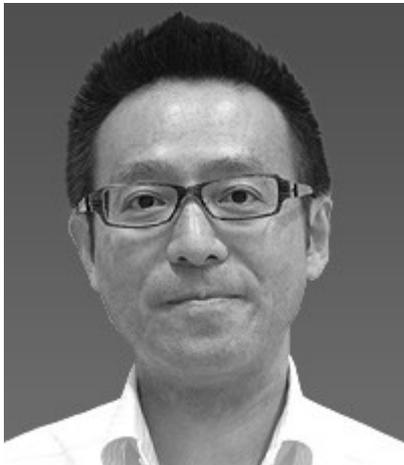
Prototypes using the 3D CAD



Fine-tuning of grip by making many clay mock up,



Clay mock-up measured by the 3D scanner.



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Single-hand operation system for enhanced operability

Once the basic camera body design was completed, the user-interface designers turned their attention to the K-7's operation system. Again, the downsized body and the incorporation of a large three-inch LCD panel on the back were major challenges, and the designers soon realized that they could not use the controller layout employed in the K20D and other models.

The solution was found rather easily, in the single-hand operation system featured in the K-m, an entry-class model that went through drastic downsizing. After discussing the feasibility with the camera body designers and mechanical engineers, it was confirmed that they were working in the same direction. Soon, the user interface designers started designing for the ideal positions to install two electronic dials, so that they could adopt the two-dial configuration used in PENTAX's medium-class models to accommodate single-hand operation.

In fact, a medium-class model requires more controllers than an entry-class model, so it was physically impossible to place all of them on the grip side. Even if they could be fit them within a

limited space, they would be placed so close together that they would be impractical in use. The decision was made to classify the controllers into two groups: those for shooting, and those for playback. The former group would be placed on the grip side of the camera's back panel, while the latter would be positioned at the left shoulder of the back panel. This layout successfully allowed single-handed control of all shooting modes.

New independent ISO button, added to complete the direct-access exposure control system

One PENTAX concept is to promote the active use of ISO sensitivity as a parameter for deciding exposure in digital photography. To support this, we have created the innovative Sv and TAv exposure modes for the K10D. This concept has been inherited by every PENTAX digital SLR camera marketed since.

However, the conventional operations for setting sensitivity were somewhat troublesome, because they were classified only as one of the settings controllable via the Fn (function) button. That's why we have incorporated more efficient control to it through firmware update: the desired ISO sensitivity can be selected manually by rotating the front electronic dial while depressing the OK button; the auto sensitivity control mode can be set by pushing the green button while depressing the OK button.

To further facilitate sensitivity-setting operations, a new ISO button was added to the K-7, positioned side-by-side with the \pm (exposure compensation) button just behind the shutter release button. This layout gives the user direct access to all essential exposure parameters — aperture, shutter speed, sensitivity and exposure compensation.

To make user customization of the PENTAX-original two-dial control system easier, the K-7's status screen is programmed to display aperture, shutter-speed, sensitivity and exposure-compensation settings as its main data. As a result, the user can check the customization status of the two electronic dials with just a quick glance.

More versatile four-way controller

Following the thorough review of controller layout, several shooting functions are now assigned to the K-7's four-way controller keys, with each of the four keys featuring an icon representing the function assigned to it for easy, at-a-glance recognition. These keys also give direct access to the desired functions to facilitate setting changes, further enhancing the camera's operability.

One setback, however, was that these controller keys are also used to shift the AF sensor point during shooting. To solve this problem, the four-way controller keys can be switched back and forth to

perform two different functions: either to recall shooting functions, or to shift the AF sensor point. The user-selected function can then be easily confirmed on the status screen and in the viewfinder. One benefit of this double-function system is that the user can lock the AF sensor point, after it is shifted to the desired position.

The making of a true multi-function camera that satisfies diversified different user requirements

In addition to the drastic layout change of the controller system, a wide range of user interfaces had to be newly developed for the K-7, including start-up, control and ending steps of different modes and display steps of various information — especially to handle real-time live-view shooting and movie recording. Along with the new design and upgrading of hardware, many of the camera's software programs had to be reviewed and reprogrammed as well to handle the new or upgraded functions. Since the K-7's controllers have a different layout than with previous models, a great deal of time and effort was needed to synchronize them and make them user-friendly.

For instance, the digital filter function — very well received with the K-m — had to be revised, because the user could not review which filters had been used after the image was processed. The K-7's digital filter function was designed to be far more user-friendly and practical, including new features such as the history function of digital filters applied, review function of multiple filter application steps, and a quick search function for an original image before any application of digital filters. This should encourage users to make more aggressive use of the digital filter function and create more dramatic, personalized images. And, thanks to the incorporation of the PENTAX-original SR (Shake Reduction) mechanism, the K-7 features new fine image-composition adjustment and auto level compensation functions. Add to these such sophisticated functions as digital level, HDR (High Dynamic Range) and lens optical characteristics compensation, it's easy to understand just how much the K-7 design and development team had to pack everything into the camera's compact body!

A wide range of user customization is available with the K-7, giving it the flexibility to meet nearly every user requirements. With so much to choose from, the photographer will be able to find the exact combination of settings to meet their specific visual goals and operational preferences.

PENTAX paid very close attention even to the most minute elements of camera design, because we believes that even the smallest feature could affect the K-7's operability and maneuverability. For instance, the front electronic dial is slightly slanted for easier access by the index finder, and both electronic dials are completely coated by a rubber material to prevent slippage. The design of the wing — the hollow finger hook area to accept the photographer's left-hand fingers — was redesigned to provide a firmer, more comfortable hold of the camera.

The meaning of the single digit

The K-7 is the first PENTAX K-series digital SLR camera with a single-digit product name — and there's a good reason for this. The strength of a single number signifies PENTAX's pride and confidence in this new camera, and once you start shooting pictures with the K-7, you'll immediately understand why.



Newly equipped ISO button. All the necessary setting for exposure is now able to be access directly by one push of the button



Print icons of each function on the 4 way controller, making it easy to use and easy to understand



Now you can see the record of digital filter on the screen.