



Essential Principles of Image Sensors

By Takao Kuroda

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Providing a succinct introduction to the systemization, noise sources, and signal processes of image sensor technology, **Essential Principles of Image Sensors** discusses image information and its four factors: space, light intensity, wavelength, and time. Featuring clarifying and insightful illustrations, this must-have text:

- Explains how image sensors convert optical image information into image signals
- Treats space, wavelength, and time as digitized built-in coordinate points in image sensors and systems
- Details the operational principles, pixel technology, and evolution of CCD, MOS, and CMOS sensors with updated technology
- Describes sampling theory, presenting unique figures demonstrating the importance of phase
- Explores causes for the decline of image information quality

In a straightforward manner suitable for beginners and experts alike, **Essential Principles of Image Sensors** covers key topics related to digital imaging including semiconductor physics, component elements necessary for image sensors, silicon as a sensitive material, noises in sensors, and more.

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Editorial Review

Review

"... covers the basic principles of image sensors from semiconductor devices to sensor physics to image processing fundamentals. Each new concept is presented in a clear manner and the text is elegant, with the author giving essential details and generous insights without adding excessive details. I highly recommend this publication to engineers and applied physicists. Although the subject matter is very technical, it would also be of interest to graduate students."

?Professor Christian Brosseau, Université de Bretagne Occidentale, Brest, France, from *Optics & Photonics News*, February 2015

"The main strength of this book is the breadth of the covered material? from basic semiconductor device and sensor physics to specifics of various types of image sensors, image processing fundamentals, and imaging systems performance. Thus, this book is useful to anyone who wishes to learn the basics of various aspects of image sensors."

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"... a good general resource for digital imaging technologists. ... The author is clearly an expert in the field and has assembled a practical review of this technology."

?Ray Fontaine, Chipworks, Inc., Ottawa, Ontario, Canada

About the Author

Takao Kuroda earned his bachelor, masters, and doctorate degrees from Osaka University, Japan. Throughout his illustrious career, he has held positions in the Panasonic Corporation's Electronics Laboratory, Kyoto Research Laboratory, Elemental Technology Development Group, and Image Sensor Business Unit. He initially retired from Panasonic in December 2005, but at the company's request, he accepted an advisory role to establish a technology strategy. In 2011, he retired completely to write the Japanese version of *Essential Principles of Image Sensors*. An ITE fellow, Dr. Kuroda holds 70 Japanese and 15 US patents. His research has contributed to numerous technological advancements around the world.

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The knowledge that you get from *Essential Principles of Image Sensors* is the more deep you searching the information that hide in the words the more you get considering reading it. It doesn't mean that this book is hard to know but *Essential Principles of Image Sensors* giving you thrill feeling of reading. The writer conveys their point in certain way that can be understood simply by anyone who read it because the author of

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