

HD CMOS image sensor with tunable dynamic range for disposable endoscopic applications

The continuous quest for painless diagnostic procedures has resulted in greater interest in endoluminal techniques for several body districts. To reduce the invasiveness of the procedures and improve the diagnostic capability of the devices, it is mandatory to develop new mechanical, electronic and optical parts to be integrated in more and more miniaturized devices. About vision systems, the new trend is chip-on-tip technology. To make this possible, the interest on CMOS imagers is increasing, because of the possibility for deep miniaturization, easy control and reduced costs. However, the offering for CMOS image sensors for the biomedical-endoscopic market is quite limited and the use of non-optimized sensors, designed for other applications, diffused.

In this abstract, EYETECH_1080, a CMOS image sensor designed for disposable biomedical endoscopic applications, is proposed. The sensor presents High Dynamic Range (HDR) capability in a controlled light environment to avoid saturated regions (EYE-TECH IP). The fabricated chip is a color RGB imager compliant with full HD standard. The complete functionality of the chip is through 9 signal pins. Because of the HDR capability in controlled light environments and the good noise performance the image quality is comparable to CCD performance with the advantage of the high system integration.

Monica Vatteroni was born in La Spezia, Italy, in 1975. She received the M.S. degree in electrical engineering from the University of Pisa, Pisa, Italy, in 2001, and the Ph.D. degree in physics from the University of Trento, Trento, Italy, in 2008. She has 15 years of experience both in the industry and the academy in the field of CMOS imager design and endoscopic biomedical applications. She has collaborated with companies like ST Microelectronics and EUROTECH S.p.A. In the research field she still have active collaborations with The BioRobotics Institute of Scuola Superiore Sant'Anna, Pisa, Italy, and the ISA institute of Université Claude Bernard, Lion, France. Presently Dr. Monica Vatteroni is co-founder and research and development manager in EYE-TECH s.r.l. where she is responsible for the research and development of CMOS image sensors mainly for biomedical applications.