

A Real-Time Visible Light Communication System on Chip (SoC) Design for High Speed Wireless Communication

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The increasing demand of wireless communication bandwidth due to advancement of IoT and smartphone technology, requires the new wireless communication technology that can provide high speed wireless communication. The Visible Light Communication (VLC) has been proven can provide multi gigabit wireless communication throughput using unlicensed visible light spectrum. Therefore, VLC is a promising technology to solve bandwidth limitation problem. In order to achieve high speed throughput, VLC signal processing has to be implemented using Application Specific Integrated Circuits (ASICs) technology. In this research, we develop a baseband processor architecture for VLC application. We use System on Chip (SoC) design approach to reduce design time and easy system integration to various applications. In order to increase spectrum efficiency, we utilize OFDM modulation scheme. Several OFDM processing blocks, such as synchronizer, FFT/IFFT, modulator, demodulator, are designed in the system. The real-time system performance is verified in FPGA based system prototyping. The design includes optical wireless front end module, baseband processing and network layer. The developed prototype shows a real-time performance for high speed internet access.

Biography



Dr. Trio Adiono is a Professor at the School of Electrical Engineering and Informatics of Institut Teknologi Bandung (ITB). He obtained his Ph.D. degree in VLSI Design from Tokyo Institute of Technology (Titech), Japan. From 2002 to 2004 he was a research fellow of the Japan Society for the Promotion of Science (JSPS) in Titech. In 2005, he was a visiting scholar at MESA+, Twente University, Netherlands. He currently also a Visiting Professor at NTUST, Taiwan. He has published more than 240 papers and journals. He has developed several microchips, such as "Binary Template Matching Processor", Near Field Communication, 4G Baseband and IoT chip. Currently he is The Head of Electronics Research Group and IC Design Laboratory-ITB. His research interest are Chip Design, Broadband Wireless Communication, Near Field Communication, Visible Light Communication, Artificial Intelligence and IoT