

CASE STUDY

iW-RainboW-G30M

ZU7CG System on Module Medical Imaging

8K Image acquisition system for medical imaging

Introduction

Medical imaging has been a valuable tool in diagnosing diseases in patients. But it can be challenging to find a reliable medical imaging solution that allows real-time, high-resolution image acquisition with ease of integration.

System designers required an image acquisition system that combines high-precision image sensors with high-speed digital processing capabilities. The image acquisition system with two MIPI cameras is designed to capture real-time images of the specimen (up to 8K UHD) and process them on the host PC. Advanced image analysis combined with machine learning & deep learning techniques is employed in the Host PC for accurate diagnosis.

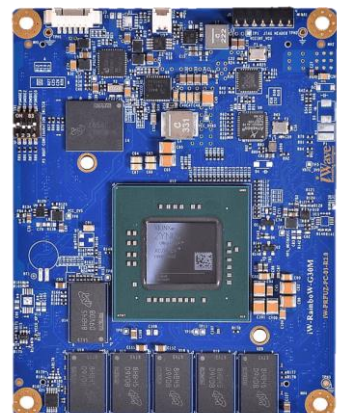
Challenges

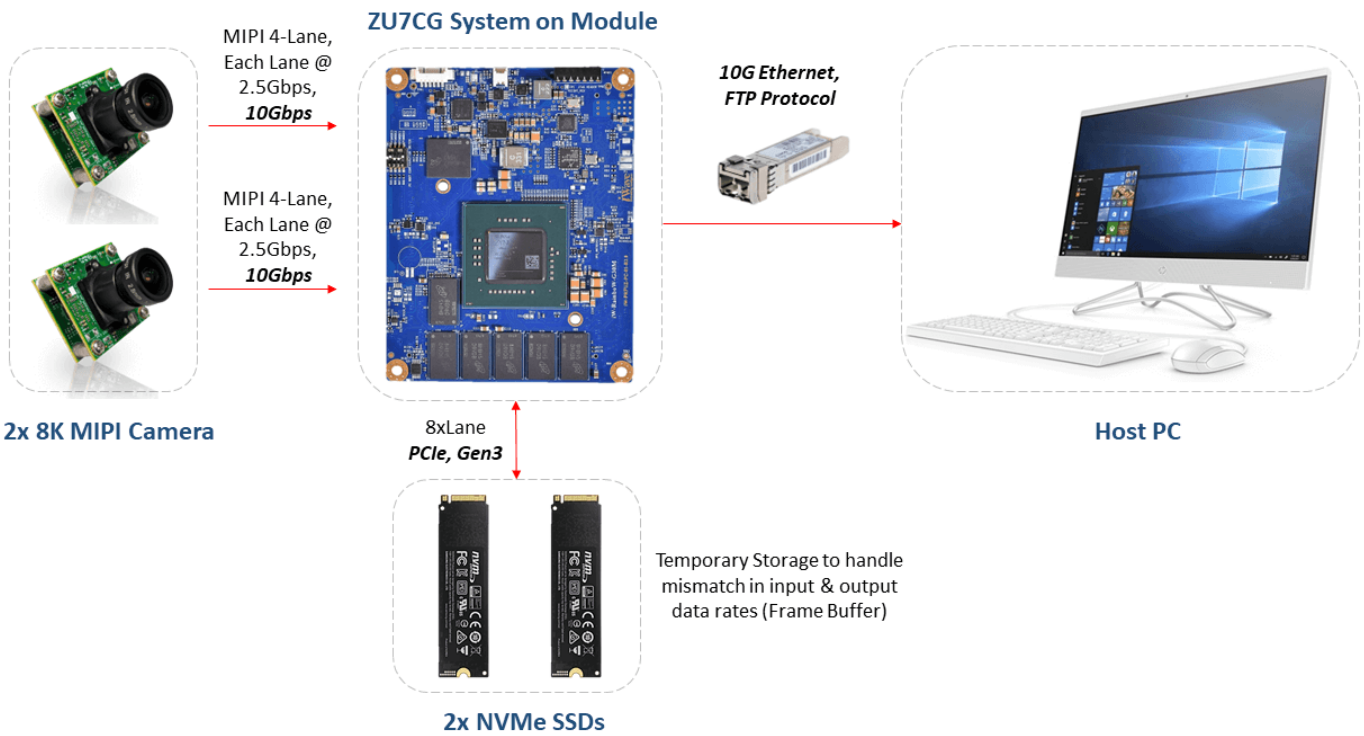
- Simplified design with image acquisition system
- 4-Lane MIPI Sensors to capture very high-resolution (8K) images
- Support for 10G Ethernet port

Solution Highlights

iWave developed a pathology-specific medical imaging platform on a highly adaptable [Zynq UltraScale+ MPSoC evaluation kit](#), which offers real-time, high-resolution image acquisition with increased integration, flexibility, and reliability, which is essential in diagnostic imaging.

- ZU7CG SOM with up to 504K Logic cells
- Simplified, cost-effective architecture
- NVMe SSD (Buffering) through PCIe 3.0
- Designed custom carrier card with reduced design cycle
- Design and development of custom hardware FPGA
- Custom carrier card, RTL & Petalinux development
- Production of 300 units





The first step in the image acquisition process is to capture high-speed raw images from the sensors. The Xilinx [Zynq UltraScale+ MPSoC platform](#) is the heart of the system and is responsible for capturing high-resolution images from the MIPI cameras at 10Gbps link speeds. NVMe SSDs serve as a local frame buffer for data storage and retrieval. These SSDs deal with the difference in data rates between input and output. Finally, the captured data is delivered to the host PC via a 10G Ethernet link through the FTP protocol.

The embedded microcontroller on the board handles all functions, from capturing raw data from the cameras to transmitting it to the host PC for further analysis.

iWave took complete ownership of the design and development of the custom hardware, RTL development, and petalinux development reducing the design cycles. iWave also took on the responsibility of integrating third-party IP on the platform, to provide a complete data acquisition solution to the customer. A comprehensive ecosystem was provided around the hardware, software, and FPGA for the customer to quickly get started with the development of their final product.

For more information on Zynq MPSoC SoM, contact iWave at mktg@iwavesystems.com.