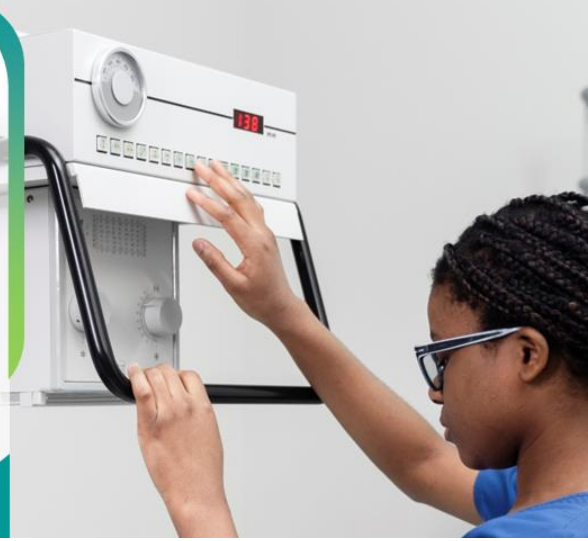


CASE STUDY

iW-RainboW-G27M

i.MX 8QuadMax SoM Digital X-Ray Machines

X-ray based imaging solution



Introduction

Since the advent of digital X-ray machines, the way radiology departments operate has changed. These machines produce digital radiographic images instantly on a computer. These devices consist of flat-panel detectors, also called x-ray sensitive plates, which capture data during the examination of objects and transfer the information directly to the computer without an intermediate cassette.

A leading supplier of medical diagnostic equipment was looking for an off-the-shelf System on Module with universal applicability demonstrated by a diverse peripheral set that allows easy integration with the FPGAs in their design. The hardware design had to overcome multi-disciplinary technological challenges, including designing a flexible and scalable platform that could support multiple sensor configurations and accelerate development time.

Challenges

- Scalable platform with extensive peripheral support
- Ability to support multiple sensor configurations
- Support for multiple high-speed interfaces
- Accurately convert high-speed signals
- Faster boot time
- Improve product development time and effort

Solution Highlights

Considering the above challenges and requirements, iWave proposed the System on Module based on the NXP [i.MX 8QuadMax SMARC](#).

- Multiple core ARM processors
- Gigabit Ethernet, USB3.0, SATA3.0, and multiple GPIO interfaces
- Dual PCIe v3.0 interface support
- Enhanced Vision Capabilities

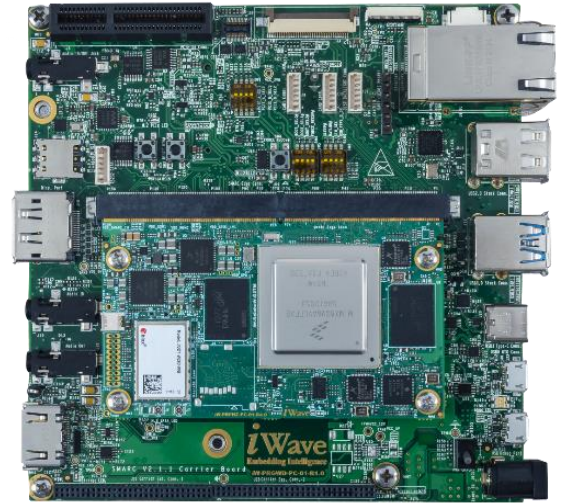


The team decided to use the [i.MX 8QM SMARC System on Module](#) for its scalability and performance and easily integrates with the FPGAs used in their design. The development board and reference design provided by iWave helped the team to jumpstart the project while reducing the design risk.

Flat-panel displays are composed of multiple sensors that work together to create a high-resolution image. Hence, system designers had to integrate extremely sensitive sensors with high-speed digital processing capabilities into a low-profile enclosure. The first step in image acquisition is to capture raw data from sensors. Readout rates up to 10Gbps were required depending on the sensor resolution and desired frame rate.

The development board supports dual PCIe interfaces for transferring raw data from the sensors to the FPGAs. The FPGAs accept the raw data, decode the incoming streams, aggregate them, and perform data serialization. Finally, all of the pixels in the image are reordered, and the FPGAs perform additional image processing operations to improve the image's quality.

The system uses AI tools to automate some of the technologists' manual tasks and assists reading radiologists with new decision support resources. Furthermore, they help prioritize critical cases to detect subtle or complex patterns within X-Ray images, improving efficiency, quality, and clinical accuracy.



System designers can tailor the [i.MX 8QuadMax development board](#) to suit medical device manufacturer requirements and satisfy system integration parameters. The module offers extensive high-speed interfaces, such as Gigabit Ethernet, PCIe Gen3, USB3.0, SATA3.0, and multiple GPIO interfaces, enabling broad system connectivity and simplifying industrial qualification.

The SoM plus carrier card approach provides a complete production-ready computing platform with multiple connectivity options such as display, wired & wireless connectivity, GPIO, and other subsystems on a single platform that optimizes a significant amount of product development time with reduced cost. The client also required a SoM partner committed to product longevity. With an eye for the demand for the supply of System on Modules in years to come, the iWave ensures a strong supply chain for the customers with a minimum of 10 years of product longevity. Hence the product designers can focus on their design without worrying about the product going absolute

More information on i.MX products can be found [here](#).

If you have any queries, drop us an email at mktg@iwavesystems.com.



iWave Systems Technologies is a product engineering organization offering an extensive portfolio of Telematics Solutions, System on Modules and avionic solutions. With over 23 years of embedded industry experience and designing solutions for automotive customers across the globe, iWave is driven with the aim to be a reliable global technology partner. Learn more about iWave at www.iwavesystems.com