Hanwha Techwin

White Paper

Wisenet7 SoC (System on Chip)

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Contents

1. Overview and Background

The heart and brains of a camera are the SoC (System on Chip), which is a collection of semiconductors packaged into an integrated circuit. In the past, computing systems for a specific arithmetic operation or data processing were composed of a box-type form factor, such as the desktop PCs we currently use. After many years of development, new computing system technology has allowed the manufacture of small board type processing systems. Now an SoC which can process millions of operations per second is in wide use. In general, a purpose-built SoC has advantages for miniaturization as well as providing low power consumption.

The demand for purpose-built SoCs started to grow in the video surveillance field as network surveillance cameras became more common. However, this requires sophisticated processor design, Quality Assurance technology, many resources, and long development time. For these reasons, many of the video surveillance manufacturers use a third-party general-purpose SoCs made for image processing.

However, Hanwha Techwin develops its own SoC based on ISP (Image Signal Processor) design know-how and technology. The first SoC Hanwha Techwin released was the WisenetS chipset, which was developed in 2011 for an entry-level network camera.

2. SoC Development History

Hanwha Techwin started the development of chipsets with the W3 ISP in 2004 and continued with the W5, A1, SV5 ISPs in 2009 for analog cameras, which was the mainstream video surveillance market in those days. In 2010, the Wisenet1 and Wisenet2 network camera ISP is developed as the network video surveillance market was growing. The WisenetS is the first full-fledged SoC that Hanwha Techwin developed, in 2011 for the entry lineup. Next was the Wisenet3 SoC, which supported increased resolution, the H.264 codec, intelligent video analytics, and the defog function. Next was Wisenet5 in 2016 which supported additional intelligent analytics, including sound classification, the H.265 codec, and the WiseStream video compression technologies. Hanwha Techwin's latest products are equipped with the Wisenet7 SoC developed in 2020.

The Wisenet7 chip is a technology-intensive SoC, which fully utilizes the company's expertise in developing video surveillance devices accumulated since Hanwha Techwin began in 1991.

The latest SoC provides a range of features that offer greatly enhanced performance compared to previous SoC by supporting ultra-high resolution (4K) and support for multi-sensor interfaces while strengthening cybersecurity and ISP performance.

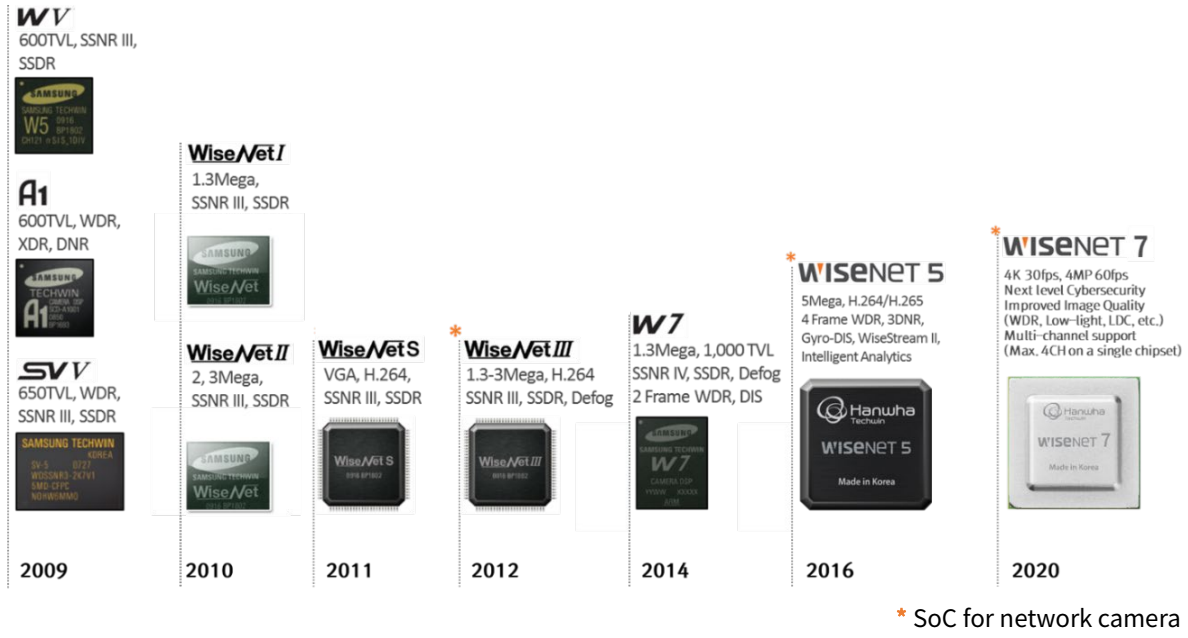

Image 1. Hanwha Techwin's ISP and SoC development history

3. Hanwha Techwin Wisenet7 SoC

As the network video surveillance market has grown, many customers now require advanced features. The Wisenet7 SoC has been developed to meet these requirements to support many different vertical industries and work in any environment and application.

Compared to previous generation Wisenet5, Wisenet7 greatly enhanced its performance from design and manufacturing processes to advanced intelligence features.

3.1. Wisenet7 Key Features

The Wisenet7 SoC supports up to 4K resolution as well as multi-channel (up to 4 channel) video input. This allows multi-sensor cameras to utilize the best chipset while efficiently using only a single processor, keeping costs, power, & size at a minimum. The new SoC also utilizes Hanwha's unique video processing technologies to greatly enhance image quality by improving video processing performances such as extreme WDR, advanced 3DNR, defog, and lens distortion correction (LDC).

The chipset also supports the WisestreamII smart codec which further processes the image to reduces bandwidth and storage for H.265 and H.264 video streams. For enhanced cybersecurity protection, the SoC features secure technologies such as Secure boot, Secure OS, Secure Storage, electronic signatures, Secure JTAG, and OTP (One Time Programmable ROM). Enhanced intelligent video analytics features are included to provide license-free event notification and recording. These analytics include digital image stabilization (DIS), heatmap, people counting, loitering, virtual line crossing, face/body detection, shock & tampering detection, and defocus detection. Audio detection and sound classification analytics are also included, which detects and analyzes sounds including screaming, gunshots, breaking glass, and explosions.

Image 2. Conventional WDR (left) and Wisenet7 extreme WDR (right) comparison

Image 3. Conventional noise reduction (left) and Wisenet7 Wise NR noise reduction (right) comparison

4. Conclusion

Wisenet7 is the Hanwha Techwin SoC designed and optimized for the new Wisenet X and P series of network cameras. These lines of network cameras are the core of the Wisenet models and provide significant improvements in resolution, WDR, low-light image processing technology, intelligent analytics, and next-level cybersecurity.

Since the release of the Wisenet5 SoC, Hanwha Techwin has invested in R&D efforts to develop its next-generation SoC. These new products are designed to be best in class while having a reliable lifespan. These efforts all start with the in-house development of our own, unique System on a Chip. We are pleased to offer these new products to you to protect your people, buildings, and assets safely and securely for years to come.

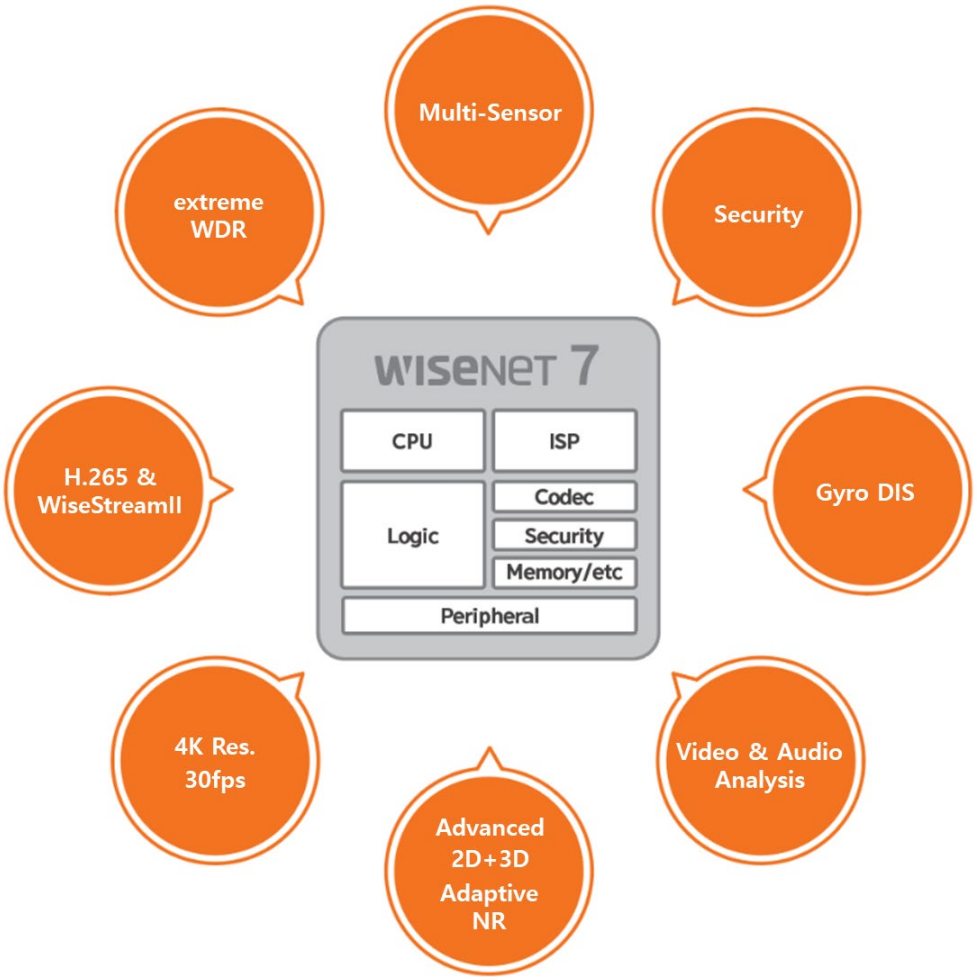

Image 4. Wisenet7 SoC structure and key features

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