



DigiBird Develops Cost-Effective 4K60 Lossless Distributed AV Solution Powered by Xilinx Kintex® FPGA

FPGA Platform and Easy-to-Use Vivado™ Tools Help DigiBird Improve the Performance of its AV Solution by 1.5X

AT A GLANCE:

Digibird Technology Co., Ltd. (DigiBird) is a high-tech company focusing on the global specialized audio and visual market, with channels and services covering 56 countries and regions around the world. Its hardware equipment and software platforms, which mainly perform transmission, exchange, processing and control functions, involve multiple product fields such as visualization control, seat management, distribution, KVM optical matrix, splicing processors, edge fusers. As a technologically leading provider of command control and conference industry solutions, DigiBird serves diverse industries including transportation, energy, finance, education, media and other sectors.

Industry: Pro A/V

Headquarters: Beijing, China

Established: 2009

<https://www.digibirdtech.com>

SUMMARY:

In the professional audio and video field, the emergence of audio and video processing products distributed around an AV network has effectively broken the scaling bottleneck where traditional chassis-based matrix products could only support 100 signal channels at most. But, as command centers, control rooms, and other applications demand higher video quality, better latency performance, and higher capacity and reliability, the distributed system solutions, which mostly processes coding or decoding through H.264, H.265, and other lossy algorithms, are growing increasingly incapable of meeting the above industrial requirements. For this reason, DigiBird has developed a cost-effective 4K60 lossless distributed solution powered by Xilinx's Kintex® FPGA.



Figure 1. DigiBird lossless distributed product, UniStream

CHALLENGE:

Command/video control centers and KVM systems are like human brains that command whole-body actions and play an important role in municipal operation centers, industrial command centers, and even large- and medium-sized conference room clusters. Clear picture quality and real-time video streaming are important for these systems to properly collect, organize, and analyze data. Making decisions or taking real-time action based on this information requires a very professional audio and video processing system to provide full frame-rate, lossless, ultra-high-definition audio and video.

Traditional chassis-based matrix solutions only support a maximum of 100 channel signals. This means that for large-scale signal switching, several products must be connected together, which is both complex and impractical. The emergence of distributed products has broken the bottleneck of chassis-based matrix scaling. These products have become widely used in command and control system solutions in both small- and medium-sized command centers in various industries throughout China.

However, distributed products mostly use H.264/H.265 and other lossy video coding compression formats, which offer a great disadvantage compared with chassis-based products in terms of image quality and latency. As a pioneer in distributed products, DigiBird has built a lossless distributed product.

SOLUTION:

DigiBird's lossless distributed product, UniStream, leverages the high performance and block RAM resources of Kintex-7 and Kintex UltraScale+ to solve the scaling problem of chassis-based matrix products while delivering very high image quality at extremely low video latency.

Houpeng Li, CEO of DigiBird, said, "The outstanding performance of the Xilinx FPGA platform and the simple and easy-to-use Vivado development tools provided us critical support for quickly developing specialized audio and video solutions in the industry and rapidly launching them on the market."

Xilinx's portfolio meets DigiBird's development requirements in many areas:

Performance: The outstanding I/O and external memory performance of the Xilinx Kintex-7 and Kintex UltraScale+ series FPGAs are far better than those of competing products, making UniStream a uniquely cost-effective 4K60 lossless distributed solution in the industry.

Resources: Video processing algorithms require a lot of block RAM (BRAM) for caching. The outstanding BRAM performance and extremely high utilization efficiency of the Xilinx platform enables UniStream to enhance algorithm processing performance by 1.5 times over its previous generation of products.

Integration: The combination of rich logic resources, I/Os and memory, excellent BRAM and DSP qualities, and Ethernet capabilities of Xilinx's solution enable DigiBird to integrate numerous functions such as video processing and Ethernet transmission onto a single chip. This makes it possible for UniStream to achieve high power efficiency, with a single-node power consumption of less than 15W.

Reliability: The high reliability of Xilinx's FPGA technology provides a stable platform for UniStream.

Flexibility: The unique flexibility of software and hardware functions enabled by dynamic function exchange enable valuable cost and efficiency advantages, allowing DigiBird customers to easily adapt to future technological evolutions and perform remote maintenance.

RESULT:

With the powerful support of the Xilinx FPGA platform and the technical experts from both Xilinx and its channel partner Avnet, DigiBird delivered its pioneer lossless distributed product, UniStream, to the market six months ahead of schedule. The product has received wide acclaim, and has been deployed in various command, control, and conferencing applications, including the Beijing Municipal Party Committee and Government Project, as shown below.

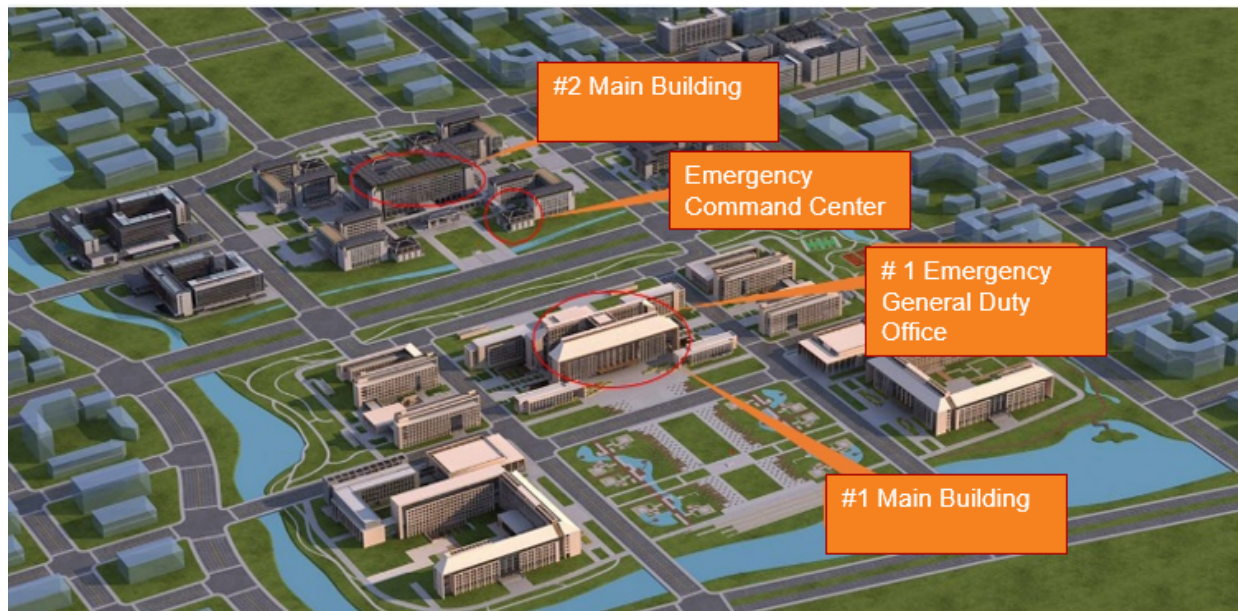


Figure 2: Beijing Municipal Party Committee and Government Office Complex Project at the Beijing Municipal Administrative Center in Tongzhou

After the administrative offices of the Beijing Municipal Administrative Center were relocated to its Tongzhou Office, DigiBird's complete video and audio solution has been adopted throughout the campus. More than 40 conference rooms have implemented a distributed network system, which can realize the inter-floor and complex-wide signal interconnectivity and avoid signal silos. The emergency command center and the armed police command center have both implemented an optical fiber architecture to ensure operational stability and data security, and this has substantially improved the emergency response efficiency of the command centers.



Figure 3: Beijing Municipal Party Committee and Government Office Complex Project at the Beijing Municipal Administrative Center in Tongzhou

ADDITIONAL RESOURCES:

[Learn More about Xilinx's Kintex UltraScale+ Serial Platform](#)

[Learn More About DigiBird](#)

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