

DESIGN BRIEF

# Sports Broadcast and IEEE 1588 Synchronization

*GigE Vision® external frame grabbers reduce costs and complexity while providing straightforward approach to precisely synchronize vision system elements in multi-camera applications*

Machine vision systems are being increasingly used in sports video analysis to track and monitor real-time athletic performance and enhance television broadcasts by providing slow-motion replay, panoramic views, and 3D reconstruction.

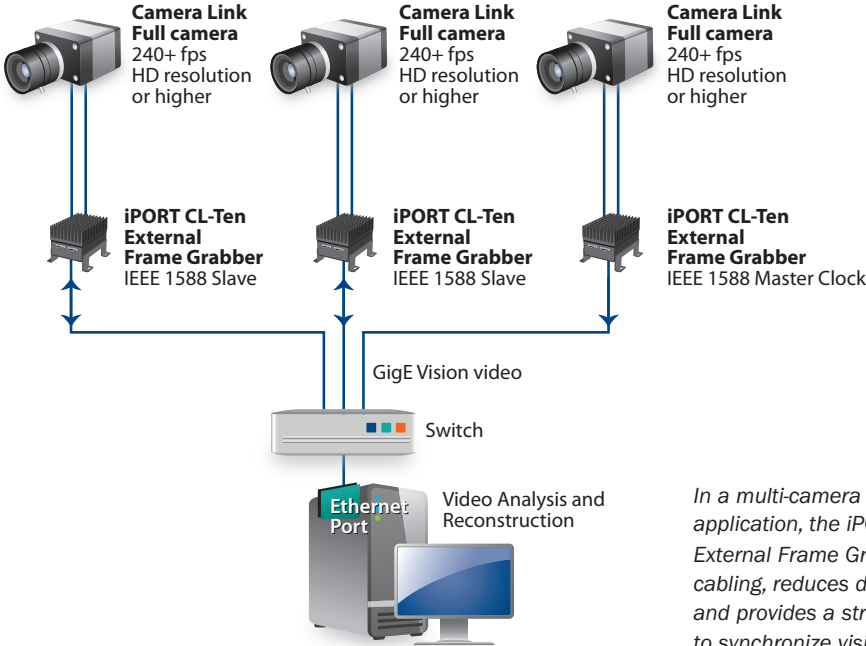
Camera Link cameras are often deployed in these applications due to their high resolution and frame rate, but system designers must compensate for the camera's complex, limited reach cabling and lack of networking support. In addition, Camera Link cameras may require separate connectors for advanced synchronization requirements.

In comparison, the **iPORT™ CL-Ten External Frame Grabber** simplifies cabling, enables more flexible system design, and provides precise synchronization in multi-camera applications. In a sports analysis application, as illustrated below, the CL-Ten converts video data to Ethernet packets and transmits the uncompressed

video at the maximum Camera Link Full rate over industry-standard 10 GigE cable. With the long reach of 10 GigE — 1000s of meters versus less than 10 meters for Camera Link — processing and image analysis equipment can be located in a centralized operations centers.

By transitioning to an Ethernet-based video network, manufacturers can leverage the external frame grabber's integrated support for the IEEE 1588 PTP (Precision Time Protocol) to achieve real-time synchronization between cameras and computing platforms using the same packet network that transports the imaging data.

In a multi-camera application, a CL-Ten serves as the IEEE 1588 master clock, and exchanges synchronization messages with the other devices operating on the network to measure and correct for any offset and delay. Synchronization is achieved with a minimum use of network resources, can be implemented in systems with minimal computing resources, and is easily scalable to add additional devices. Cameras can be synchronized over the Ethernet network with jitter less than 10 microseconds. In comparison, NTP (Network Timing Protocol) and SNTP (Simple Network Time Protocol) don't achieve the synchronization accuracy required for real-time imaging applications.



*In a multi-camera broadcast application, the iPORT CL-Ten External Frame Grabber simplifies cabling, reduces design complexity, and provides a straightforward way to synchronize vision system elements.*