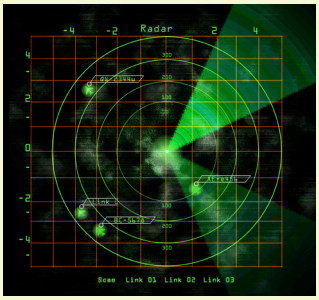
Design Tip: Applications for RapidIO® Gen2



Description

The wireless industry continues to look to the RapidIO® specification to address the needs of mobile users and increase the quality of service. The RapidIO Gen2 specification provides users with more usable bits per milliwatt while remaining backward compatible with the RapidIO Gen1 specification. Let's take a look at the main applications for RapidIO Gen2 products.

Wireless Baseband

Wireless base stations are the key application that drove the adoption of RapidIO. The architecture of wireless baseband processing inherently lends itself to the capabilities of RapidIO in that it uses a cluster of peer-to-peer networked processing elements. This is typically combinations of field programmable gate arrays (FPGAs), digital signal processors (DSPs) and application-specific integrated circuits (ASICs). RapidIO switches are used to pass large quantities of data between processing elements. In wireless baseband, there is the additional constraint of minimizing end-to-end latency and jitter. This makes the traffic management capabilities, latencies and performance of RapidIO Gen2 solutions ideal for wireless.

RapidIO is typically deployed on the baseband cards and the switch cards. The switch card can be used to pass antenna data to processing elements on baseband cards. This might be in a native-streaming interface off the radio frequency (RF) cards, such as Open Base Station Architecture Initiative (OBSAI) or Common Public Radio Interface (CPRI), or it may be converted to RapidIO and packetized, for example, using an IDT CPRI to RapidIO Functional InterConnect (FIC). The switch card can then pass the data to the baseband cards using the multicast function of the RapidIO switch.

Military

RapidIO has received widespread adoption in military and critical embedded systems during the past five years. Today, RapidIO is used extensively in real-world military deployments, leveraging its rich set of features and proven reliability. RapidIO is ideal for the implementation of large peer-to-peer networks of microprocessors and FPGAs typically found in radar, sonar, flight control and navigation systems. RapidIO Gen2 has been actively pushed by vendors developing the latest high-performance systems for military programs because the processing needs grow exponentially as the system requirements increase linearly.

Moving to RapidIO Gen2 with larger port count switches, faster links, better flow control mechanisms, virtual channels and other feature enhancements, the implementation of complex switches will be substantially simplified, improving performance at the system level.

Video

RapidIO saw widespread adoption in the video market during the deployment of RapidIO 1.3. RapidIO was used in high-end video conferencing systems, TelePresence™ and a variety of image processing applications, such as medical imaging systems. All of these applications required large clusters of DSPs or FPGAs for video frame encoding/decoding or for image processing/transform operations.

The less time spent distributing and combining frames means more performance available to keep up with a real-time feed of high-definition video with large frame sizes and high update rates. RapidIO Gen2 offers many feature enhancements that enable this. Improving the performance of multicast over RapidIO 1.3 is the most important feature that enables the high-end video systems. Coupling this with non-blocking switches that support up to 20 Gbps of raw bandwidth full duplex per port means the ability to support larger DSP clusters in real time. With higher-performance RapidIO Gen2-enabled DSP clusters and traffic passing between them using multicast, the ability to manage traffic using end-to-end flow control at both the physical and logical layer will become more important than in RapidIO 1.3.

Discover what IDT know-how can do for you:

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