

## 一种新型的动态可重构总线时间同步方法

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**摘要:** 动态可重构总线是一种面向嵌入式系统的高速串行总线, 为实现总线系统中各主节点的时间同步, 解决多主仲裁中对时间精度的要求, 设计了一种时间同步方案: 时间主节点通过时间广播包形式向其它节点周期发送自己的时间信息; 时间从节点利用通道检测时的三次握手过程计算出通道传输延迟, 对收到的时间码信息进行修正后, 各节点根据修正后的广播时间来校对自己的时间, 从而达到各节点间的时间同步. 经过通道速率为 100 Mb/s 的实际系统的仿真测量, 节点同步时间误差在 100 ns 左右.

**关键词:** 高速总线; UM-BUS; 时间同步; 故障检测; 嵌入式系统

## A Novel Time Synchronization Method for Dynamic Reconfigurable Bus

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**Abstract:** Dynamically Reconfigurable high-speed serial bus, UM-BUS is a novel high-speed serial bus for embedded systems. Targeting precious time synchronization among master nodes, this paper proposes a novel time synchronization method to meet the requirements of time precision in UM-BUS. In the proposed method, time is first broadcasted through time broadcast packets. Then, the transmission delay and time deviations via three handshakes during link self-checking and channel detection can be worked out referring to the IEEE 1588 protocol. Finally, each node can calibrate its own time according to the broadcasted time. The proposed method has been proved to meet the requirement of real-time time synchronization. The experimental results show that the synchronous precision can achieve a bias less than 100 ns.

**Key words:** high-speed bus; UM-BUS; time synchronization; fault detection; embedded system

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