

design FlexRay

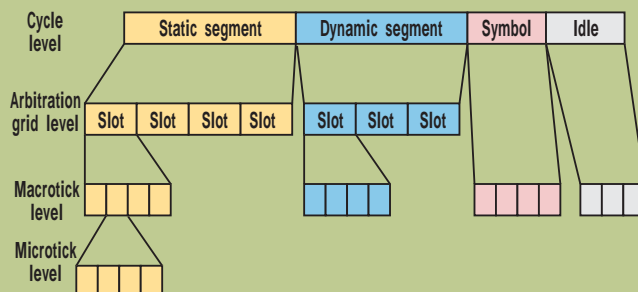
FAQs

William Wong
Embedded/Systems/Software Editor

FREQUENTLY ASKED QUESTIONS

What is FlexRay?

FlexRay is a high-performance network designed for determinism, safety, and reliability. It supports single or dual-channel operation to provide fault tolerance, and it can be configured as a star or in a passive bus configuration. Mixed configurations are possible.



1. FlexRay divides a cycle up into fixed-time-length microticks that allow applications to use very strict timing.

What kind of synchronization methods does FlexRay support?

FlexRay supports master and distributed synchronization (Fig. 2). The latter handles pure static and mixed configurations. Master synchronization triggers cycles by the master.

What is FlexRay used for?

FlexRay is a high-performance network technology designed for automotive applications such as x-by-wire and engine control.

What are the physical characteristics of FlexRay?

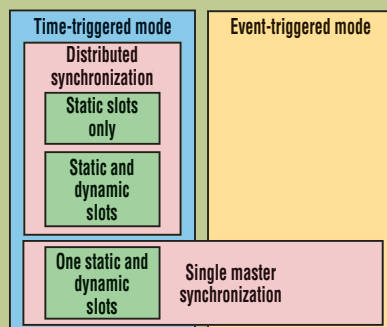
FlexRay is targeted to support data rates of up to 10 Mbits/s. It can support a cascaded star architecture with up to three hops between nodes. It supports a low-power sleep mode as well as normal mode. The node connection is a terminated, unshielded twisted pair (UTP). Improved EMC performance is possible using a shielded twisted pair (STP). FlexRay is 14- and 42-V battery-voltage compliant.

How does FlexRay provide fault tolerance?

FlexRay can utilize dual networks. It also uses a “never give up” strategy. Nodes must be configured to survive several cycles without receiving a frame of data. End-to-end data consistency is a requirement. Applications have control over the communication system. FlexRay supports static and dynamic bandwidth allocation.

What is static and dynamic transmission?

Data is transferred in a cyclic fashion with a fixed static portion and an optional, variable dynamic portion to handle event-driven data (Fig. 1). Each slot consists of an integral number of macro-ticks and micro-ticks. Bandwidth allocation handles frames up to 246 bytes. FlexRay supports multiple sending slots per node per cycle. Dynamic bandwidth allocation can occur at run time. Static and dynamic portions do not interfere with each other. Systems can run in a full static or dynamic mode as well as in a mixed configuration.



2. The event-triggered mode enables the system to synchronize to an event instead of to time-periodical timing.

What is a time-triggered protocol?

The time-triggered protocol is based on time as its underlying driving force, i.e., all activities of a system are carried out in response to the passage of certain points in time. It is therefore necessary that all nodes in a system have a common notion of time.

What is time-triggered clock synchronization?

A FlexRay system adjusts the local time of an electrical control unit with the help of special control algorithms. This ensures that all of the local clocks of the individual nodes are running synchronous to a global clock.

What is the architecture of a FlexRay node?

A node consists of a bus guardian, controller, host, and bus driver. The controller handles sending and receiving data for the host processor using the FlexRay protocol.

Where can I find out more about FlexRay?

Go to the FlexRay Consortium Web site, at www.flexray.com.

ED ONLINE 11820