Ensuring Reliable Networks TTTech

TTESync for VxWorks 653 2.4

Precise Network-Wide Synchronization of Modules

TTESync for VxWorks 653 2.4 for the TTE-End System A664 is a synchronization component that allows tight synchronization of VxWorks653 partitions to the fault-tolerant system-wide cycle time of the TTEthernet communication network (Figure 1). All partitions executed on different modules can be "pinned down" within the overall system cycle time, thus enabling the lowest latency and minimum jitter in message exchange among distributed functions.

KEY FEATURES/BENEFITS

- **Brings deterministic high bandwidth, low latency, and minimal jitter communication up the application level**
- **Establishes a precise and fault-tolerant network-wide synchronization of modules**
- **Precision: Using the highly precise (sub-microsecond) fault-tolerant time base of TTEthernet for synchronizing modules/partitions, allowing for a precision in the 10 µs range for application synchronization**
- **Flexibility and growth path: Existing software components can be re-used within partitions without changes; new applications can be built that make use of the robust global notion of time**

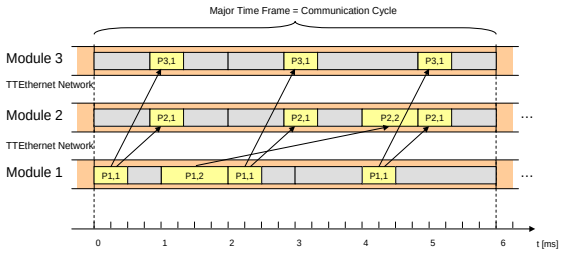

Figure 1: Low-latency and minimum jitter communication between partitions residing in distributed modules simplifies application design and system integration.

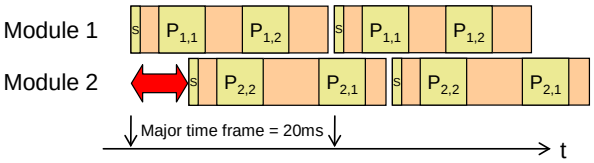

Figure 2: Unsynchronized Modules

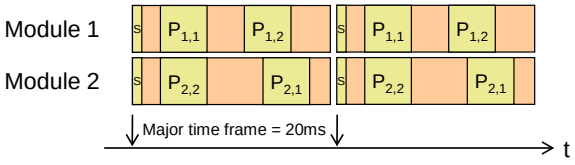

Figure 3: Synchronized Modules

Simplified Design Decision

The local clocks of the individual modules drift apart from each other due to the (slightly) different drift rates of their local clocks (Figure 2). Unsynchronized local clocks on different modules introduce changing temporal behaviour, cause inefficient resource use, complicate design of mission-, time-, and safety-critical functions, as well as system verification and certification.

The high determinism and robustness of a time-triggered TTEthernet communication system supports unambiguous definition of key system interfaces and functional interactions. It also enables deterministic hard real-time behaviour throughout the system, even if the Ethernet medium is overloaded by standard Ethernet LAN messages. The synchronization of partitions (Figure 3) allows application designers to simplify software design and efficiently distribute applications in the network among different modules. System architects can simplify design decision such as federated vs. integrated, or centralized vs. distributed.

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Features

TTEthernet Hardware Support

- TTE End System A664 Lab
- TTE End System A664 Rugged
- TTE End System A664 Pro

TTEthernet Tool Support

- TTE Plan
- TTE Build Device Configuration
- TTE Build Network Configuration
- TTE Load

Hardware Support

- CES SBC RIO6-8093AF
- CES SBC RIO6-8093TF
- Other board support packages will be provided upon request

Software Environment Support

- VxWorks 653 2.4
  (only in combination with TTE-COM A653)

Packaging Contents

- TTE Driver for VxWorks 653: The TTE Driver for VxWorks 653 provides an interface for communicating with the TTEthernet end system hardware including functions to read and write messages, to obtain status information and to perform the
  configuration of the TTEthernet end system. The TTE PCI Driver for configuring the TTEthernet PCI device is also included.
- TTE Sync for VxWorks 653 2.4: Provides the library that enables to synchronizing the local VxWorks 653 clock with the TTEthernet cluster cycle time.
- User Manual

Order Number

- 12573: TTE Sync for VxWorks 653 2.4 for TTE-End System A664

Recommended Products

- 12572: TTE COM A653 for VxWorks 653 2.4 for TTE-End System A664

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