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Road vehicles — Controller area network (CAN) —

Part 4: Time-triggered communication

Véhicules routiers — Gestionnaire de réseau de communication (CAN) —

Partie 4: Déclenchement temporel des communications

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Foreword

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ISO 11898-4 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 11898 consists of the following parts, under the general title *Road vehicles — Controller area network (CAN)*:

— *Part 1: Data link layer and physical signalling*

— *Part 2: High-speed medium access unit*

— *Part 3: Low-speed fault-tolerant, medium dependent interface*

— *Part 4: Time-triggered communication*

Introduction

In the classic CAN network, communication is event-triggered; peak loads can occur when the transmission of several messages is requested at the same time. The non-destructive arbitration mechanism of CAN guarantees the sequential transmission of all messages according to their identifier priority. For hard real-time systems, a scheduling analysis of the entire system is done to ensure that all transmission deadlines are met even at peak bus loads.

Some real-time operating systems (RTOS) are based on static cyclic scheduling of all tasks in the application system (control unit). They build a schedule of time slots and place each task in at least one slot. Tasks of high priority appear in more than one slot. All activity in one slot, including interrupt handling, must be completed before the beginning of the next slot.

If such an RTOS is considered for a distributed application system consisting of control units linked by a CAN network, system integration and composability are served when the communication on the CAN network also follows a synchronised schedule.

The time-triggered communication option for CAN-based networks (see ISO 11898-1) gives the prerequisites for the synchronisation of all nodes in the CAN network. When the nodes are synchronised, any message may be transmitted at a specific time slot, without competing with other messages for the bus. Thus the loss of arbitration is avoided; the latency time becomes predictable.