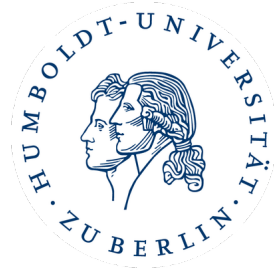

Bosch's CAN bus
Investigation of the standard

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July 19, 2016

Content

Introduction and Basic Concepts

- Controller Area Network
- Serial communications protocol/bus system
- Supports distributed realtime control with a very high level of security [1]

Purpose and Context

- Created by BOSCH
- Used in the automotive industry, automation engineering, medical technology, aerospace engineering
- Connecting automotive electronics, engine control units, sensors, anti-skid-systems
- High speed networks to low cost multiplex wiring

RELATED STANDARDS

- standardized after ISO 11898
- ISO 11898-2 (Highspeed-CAN) - related
- ISISO 11898-3 (Lowspeed-CAN)- related
- Not compitable with each other

HIGHER STANDARDS

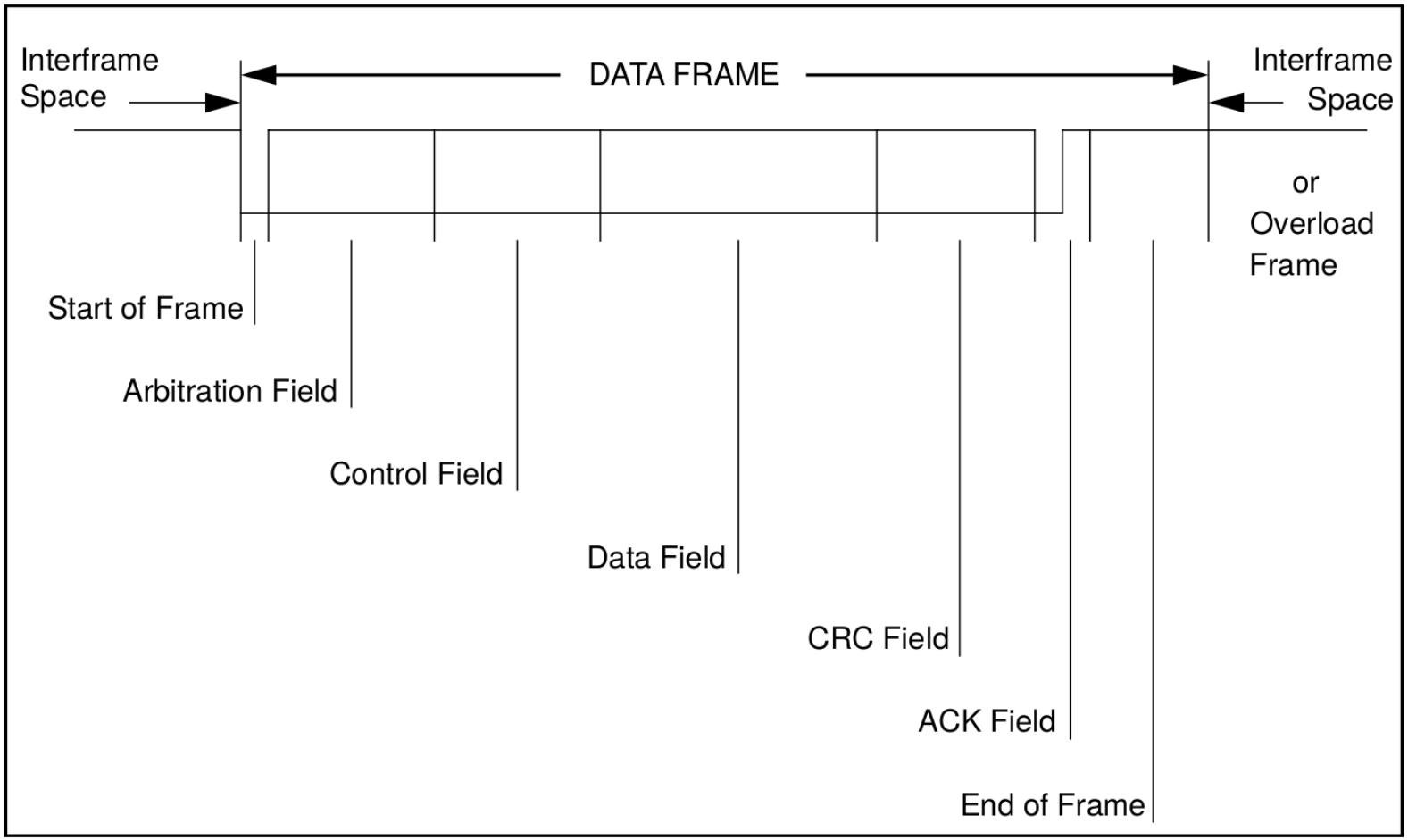
-
-
-
-

Message Transfer and Validation – 1

Overview:

- Information is sent in fixed format messages of different but limited lengths
- When free, any connected unit may send messages over the bus
- The content of the message is named by an identifier

MESSAGE TRANSFER AND VALIDATION – 2



Message Transfer and Validation – 3

- A unit sending a message is the “transmitter” of that message
- It stays transmitter, until the bus is idle or it loses arbitration
- A unit is called “receiver” of a message, if it is not the transmitter and the bus is not idle

Coding and Error Handling – 1

Overview:

- Bit stuffing → control mechanism
- Distortions etc. → error handling to achieve error tolerance
- 5 different error types (Bit, Stuff, CRC, Form, ACK)

Coding and Error Handling – 2

- Message passing mechanism, no additional structure needed
- Errors broadcasted when detected
- Semantics important for correct transmission
- Drivers: reliability, error limitation
- Problem: new error types?

Fault Confinement

- Unit can have 3 states and 2 counters
- Strength: Enables extensibility
- Drivers: Seperation of concern, reliability, error limitation
- Problem: More Unit means more errors?

Bit Timing Requirements

- List of definitions and rules
- Strength: short, but includes everything important
- Weaknesses: almost text only, hard to read (structure), like a glossary
- Improvable by usage of more pictures and examples

CAN Improvements

Conclusion

References

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CAN Specification.
http://www.bosch-semiconductors.de/media/ubk_semiconductors/pdf_1/canliteratur/can2spec.pdf.
Last accessed: July 16, 2016.