

ICS 43.020
CCS T36



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 42691.3-2023

**Road vehicles - Local Interconnect Network (LIN) - Part 3:
Protocol specification**

道路车辆 局域互联网络 (LIN) 第3部分：协议规范

Issued on: May 23, 2023

Implemented on: December 1, 2023

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This Document was drafted as per the rules specified in GB/T 1.1-2020 Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents. This Document was Part 3 of GB/T 42691 Road Vehicles - Local Interconnect Network (LIN). GB/T 42691 has already published the following parts:

- Part 1: General Information and Use Case Definition;
- Part 2: Transport Protocol and Network Layer Services;
- Part 3: Protocol Specification;
- Part 4: Electrical Physical Layer (EPL) Specification 12V/24V;

--- Part 5: Application Programmers Interface (API);

--- Part 6: Protocol Conformance Test Specification;

--- Part 7: Electrical Physical Layer (EPL) Conformance Test Specification;

--- Part 8: Electrical Physical Layer (EPL) Specification: LIN over DC Powerline (DC-LIN). This Document equivalently adopts ISO 17987-3:2016 Road Vehicles - Local Interconnect Network (LIN) - Part 3: Protocol Specification. Please note some contents of this Document may involve patents. The issuing agency of this Document shall not assume the responsibility to identify these patents. This Document was proposed by the Ministry of Industry and Information Technology of the People's Republic of China. This Document shall be under the jurisdiction of National Technical Committee of Auto Standardization (SAC/TC 114). Drafting organizations of this Document: Pan-Asia Technical Automotive Center Co., Ltd.; China Automotive Technology and Research Center Co., Ltd.; Geely Automobile Research Institute (Ningbo) Co., Ltd.; Dongfeng Motor Group Co., Ltd.; SAIC Maxus Automotive Co., Ltd.; Great Wall Motor Company Limited; SAIC-GM-Wuling Automobile Co., Ltd.; China FAW Group Corporation; National New Energy Vehicle Technology Innovation Center Co., Ltd.; Huizhou Desay SV Automotive Co., Ltd.; FAW-Volkswagen Automotive Co., Ltd.; and China Automotive Research Institute (Tianjin) Automotive Engineering Research Institute Co., Ltd. Chief drafting staffs of this Document: Wu Shang, Ji Guotian, Ding Juan, Zhu Tong, Zhen Road Vehicles - Local Interconnect Network (LIN) - Part 3: Protocol Specification

1 Scope

GB/T 42691.3-2023 specifies the LIN protocol, the cheap serial bus that connects the many small devices in a vehicle for which CAN would be extravagant. A window motor, a seat adjuster, a mirror, a rain sensor, an interior light - each needs to be commanded and to report, and there are dozens of them. LIN answers with a single wire, no crystal oscillator in the slave nodes, and a strictly master-driven schedule: the master polls, the slaves answer only when addressed, and because the timing is determined by a schedule table rather than by contention, the bus is deterministic and the nodes can be built from the cheapest microcontrollers available. This part specifies the LIN protocol including signal management, frame transfer, schedule table handling, task behaviour and status management, and the behaviour of LIN master and slave nodes, together with the OSI layer 5 properties. It is the protocol core of the GB/T 42691 series. Under CCS T36, it is written for automotive electronics suppliers, for vehicle manufacturers' electrical architecture teams, and for the tool and test equipment vendors serving them.

This Document specifies the LIN protocol including the signal management, frame transfer, schedule table handling, task behavior and status management and LIN master and slave node. It also contains OSI layer 5 properties according to ISO 14229-7 UDSONLIN-based node configuration and identification services (SID: B016 to B816) belonging to the core

protocol specification. A node (normally a master node) that is connected to more than one LIN network is handled by higher layers (i.e., the application) not within the scope of this document.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 42691.2-2023 Road Vehicles - Local Interconnect Network (LIN) - Part 2: Transport Protocol and Network Layer Services (ISO 17987-2:2016, IDT)

GB/T 42691.4-2023 Road Vehicles - Local Interconnect Network (LIN) - Part 4: Electrical Physical Layer (EPL) Specification 12V/24V (ISO 17987-4:2016, IDT)

GB/T 42691.6-2023 Road Vehicles - Local Interconnect Network (LIN) - Part 6: Protocol Conformance Test Specification (ISO 17987-6:2016, IDT)

3 Terms, Definitions, Symbols and Abbreviated Terms

3.1 Terms and definitions For the purposes of this Document, the following terms and definitions apply.

3.1.1 Big-endian Method of storage of multi-byte numbers with the most significant bytes at the lowest memory Each signal shall have one publisher, i.e., it shall be always sent by the same node in the cluster. Zero, one or multiple nodes may subscribe to the signal. All signals shall have initial values. The initial value for a published signal should be valid until the node writes a new value to this signal. The initial value for a subscribed signal should be valid until a new updated value is received from another node.

5.1.3 Consistency Scalar signal writing or reading shall be atomic operations, i.e. it shall not be possible for an application to receive a signal value that is partly updated. This shall also apply to byte arrays. However, no consistency is guaranteed between any signals.

5.1.4 Packing There is no restriction on packing scalar signals over byte boundaries. Each byte in a byte array shall map to a single frame byte starting with the lowest numbered data byte, see 5.2.2.6. Several signals may be packed into one frame as long as they do not overlap each other. NOTE: Signal packing/unpacking is implemented more efficient in software-based nodes if signals are byte aligned and/or if they do not cross byte boundaries. The same signal may be packed into multiple frames as long as the publisher of the signal is the same. If a node is receiving one signal packed into multiple frames, the latest received signal value is valid. Handling the same signal packed into frames on different LIN clusters is out of the scope.