LUMISSIL Microsystems
A Division of ISSI

IS32IO1028
LIN Transceiver with LDO for Automotive applications

There are dozens of LIN nodes on modern passenger vehicles and many of these needing a system basis chip or SBC to properly communicate on the bus. Lumissil is introducing the IS32IO1028 SBC for the automotive market.

LIN (Local Interconnect Network) is a serial network protocol used for communication between components in vehicles. The need for a cheaper, lower-speed, lower-power data bus led to the development of LIN. The protocol is a sub-bus system of other networking systems, such as CAN (Controller Area Network) bus, and it's primarily intended for the communication of sensors and actuators within a car.

Figure 1 below shows one potential automotive data bus architecture. From left to right the communication buses go from very high speed to much slower at the right due to the amount of data they must transmit. The Ethernet bus is capable of up to 10 Gbps, CAN bus is up to 8 Mbps and LIN bus up to 20 kbps. Lumissil's new IS32IO1028 can be used wherever there is a green arrow. On a side note Lumissil's IS32IO1163 CAN SBC can be used wherever there is an orange arrow.
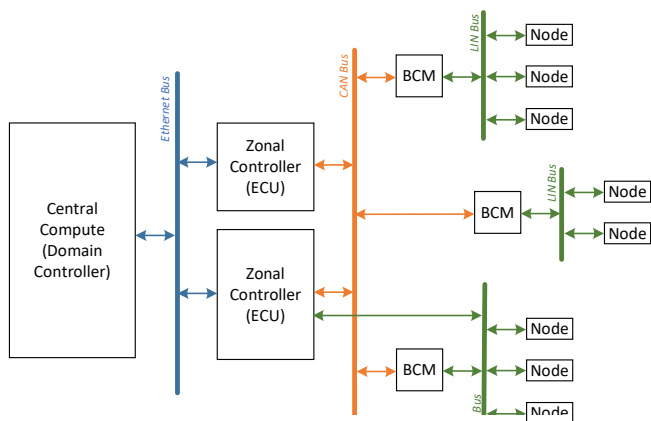
Here are some key features of the LIN bus:

• **Cost-effective:** The LIN bus is a less expensive networking solution compared to other automotive networks like CAN or FlexRay. It's often used for non-critical sub-systems, such as door-lock mechanisms, mirrors, seats, and air conditioning systems.

• **Single-master and multiple-slave configuration:** The LIN network operates with one master and up to 15 slaves. The master controls the clock and instructs each slave when to transmit data.

• **Speed and Distance:** LIN operates at a lower speed (up to 20 kbps) compared to other protocols and is suitable for short-distance communication (up to 40 meters).

• **Power and Data:** LIN carries both power and data over the same wire, simplifying the wiring harness and reducing vehicle weight.

• **Low Power:** LIN networks are designed to operate even during the vehicle's sleep mode, supporting features like remote keyless entry.

• **Standardization:** LIN is an open standard, which means any vendor can implement a LIN interface in their device.

The IS32IO1028 is called a system basis chip because it combines both a transceiver and the physical layer (PHY) for communication on the bus. In addition, the SBC will manage bus traffic, provide fault protection, power management and voltage regulation. By managing these aspects of the LIN communications, it takes a large burden off an MCU that performs tasks such as motor control or monitoring of a sensor.
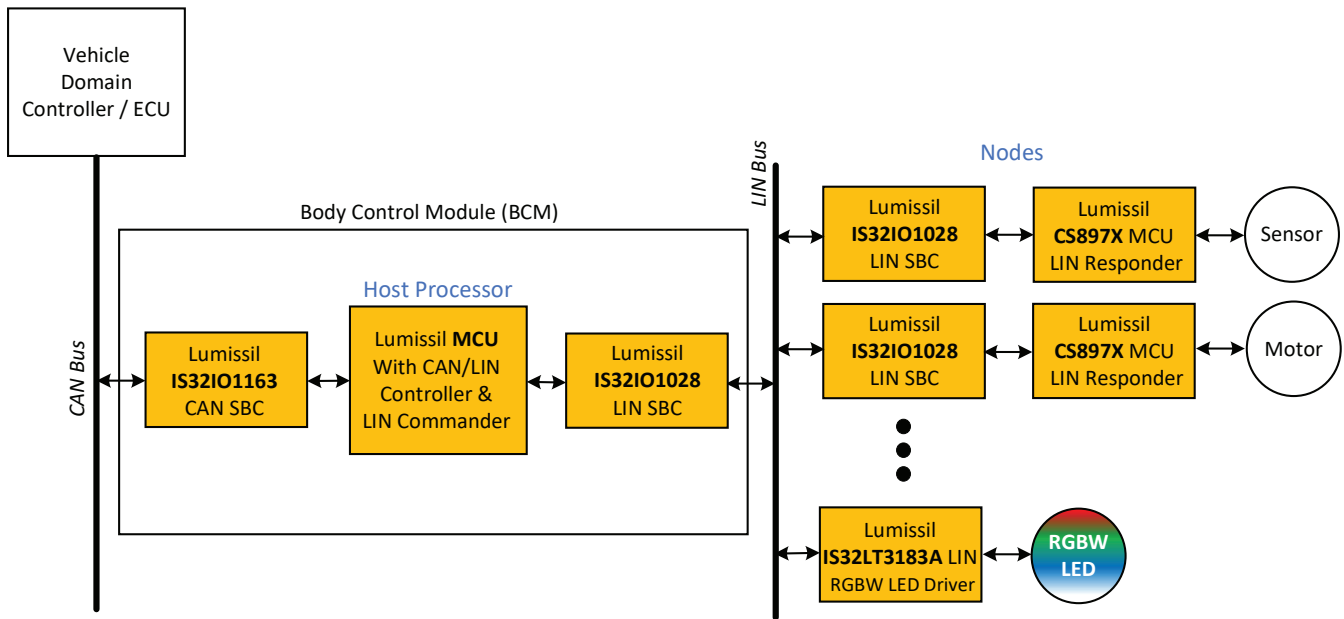

Figure 1: Example of a Vehicle Bus System

Figure 2: Example of a CAN / LIN System

Figure 2 above shows an example of the ECU to body control module to sub system communication. A vehicle ECU or domain controller will talk to the BCM through CAN since it's a higher speed communication. The body control module, say for example in the drivers door can then control the window, door lock, door handle sensor and puddle lamp.

Here is a list of examples in a vehicle that can use a LIN SBC:

Application Segments	Specific LIN/CAN SBC Application Examples
Roof	Interior light control, sun-roof
Steering wheel	Cruise control, wiper, turning light, climate control, radio, wheel lock
Seat	Seat position motors, occupant sensors, control panel
Engine	Sensors, small motors, cooling fan motors
Climate	Fan motors, Vent control, HMI panel
Door	Mirror, central ECU, mirror switch, window lift, seat control switch, door lock
Illumination	Vehicle trim enhancement, sill plates illuminated with RGB LED

Since the LIN bus has become such a cost effective for simple communications it is finding its way into other markets like white goods, agriculture, medical devices, and industrial automation. Given that it started its life as an automotive application other markets can depend on it's functional reliability and supply chain robustness.

The IS32IO1028 has the following features:

Feature	Value
LIN Standard	LIN 2.0, 2.1, 2.2, 2.2A and SAEJ2602-2
Speed	20k Baud, Slew rate control, +40V/-24V
Power	3.3- or 5.0-Volt Options
Package	eSOP-8 or DFN-8
Qualification	AEC-Q100

Lumissil's new LIN SBC simplifies your design and guarantees reliable and robust LIN communications.

The IS32IO1028 is sampling now and will be in mass production late 3rd quarter of 2023. For more information, please visit us at www.Lumissil.com or email us at marketing@lumissil.com.