

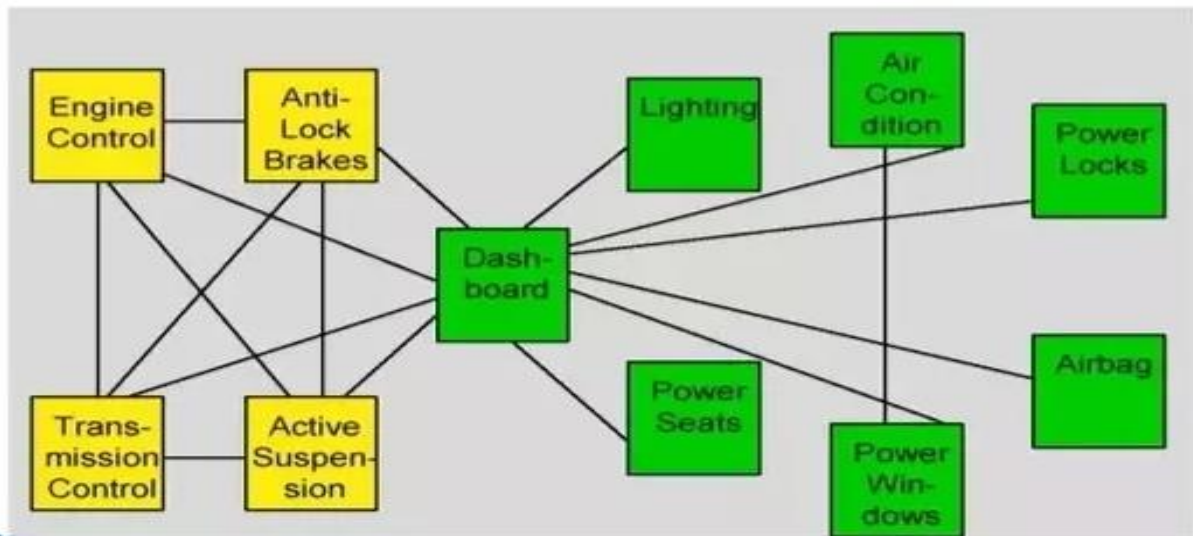
CONTROLLER AREA NETWORK(CAN):

- CAN (Controller Area Network) is a serial bus system invented by Robert Bosch.
- It was originally designed for use in the automotive industry but is used today in many other systems (e.g., home appliances and industrial).
- The CAN bus protocol is a two-wire, half-duplex system that works well for applications that demand a high-speed transfer of short messages.
- CAN found its applications in Air Bag system, Central Locking system, Anti-lock Braking systems in automobile applications etc.
- The maximum baud rate of CAN is 1Mbps.
- It is an Asynchronous and multimaster Bus and supports Error detection.

Bit Rate / Bus Length	
1M bit/sec	40 meters (131 feet)
500K bit/sec	100 meters (328 feet)
250K bit/sec	200 meters (656 feet)
125K bit/sec	500 meters (1640 feet)

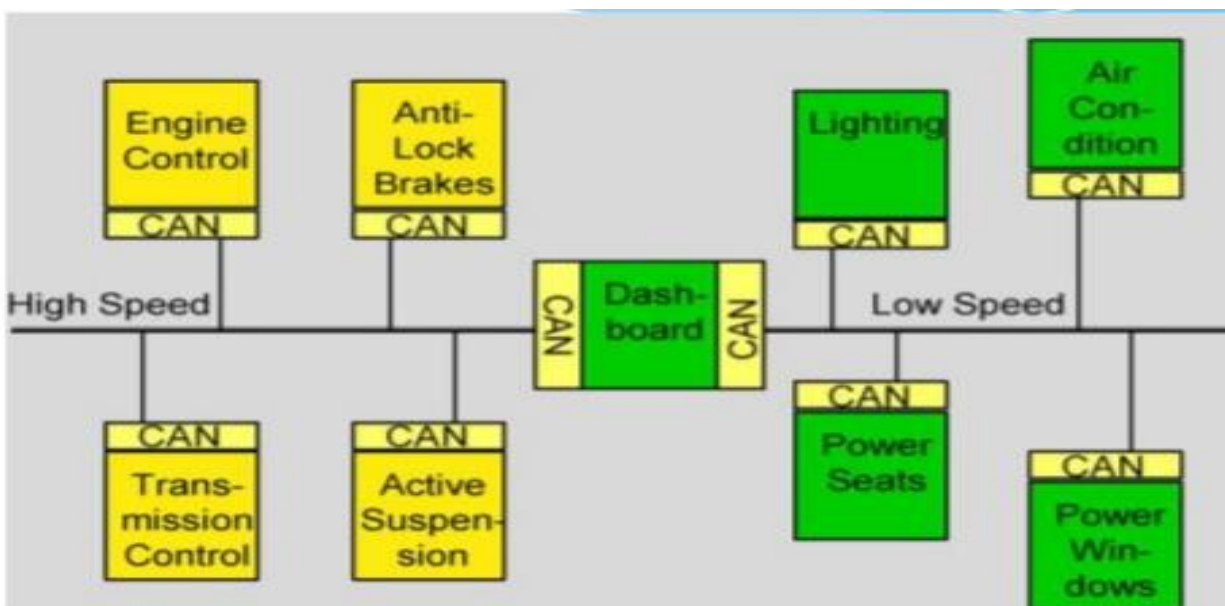
- The car Electronics became a large part and wiring harness became the problem.

Before CAN

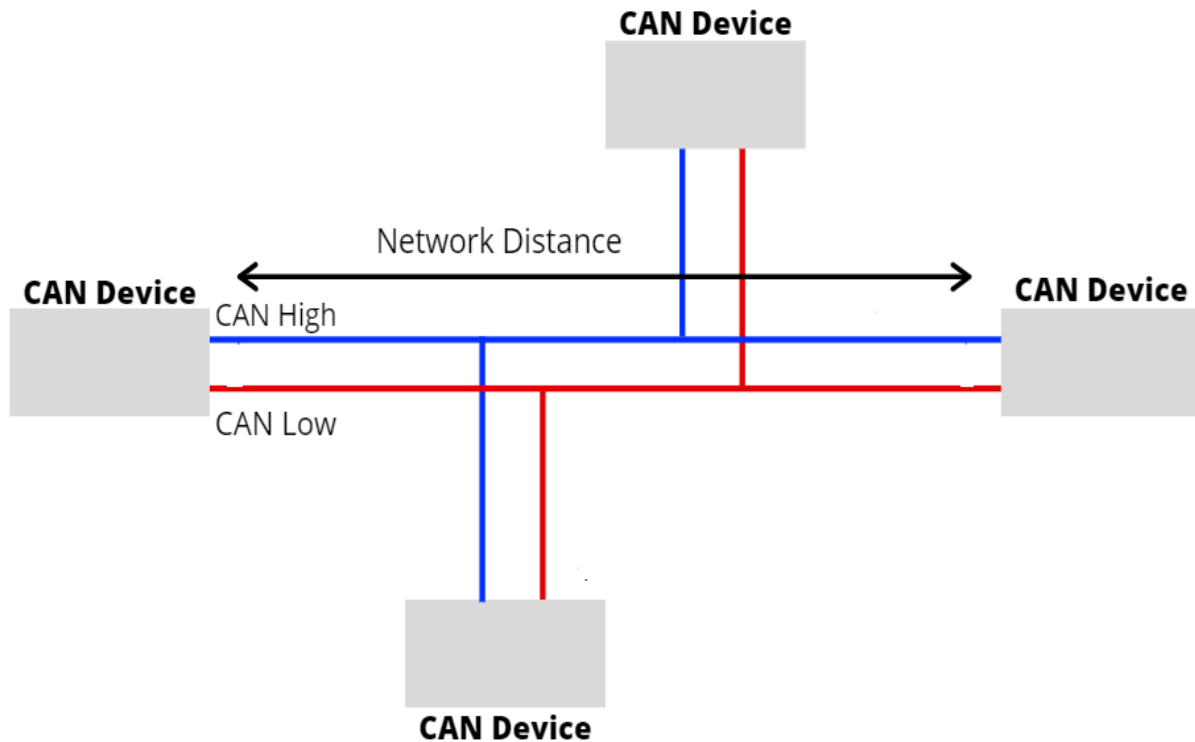


After CAN:

- It has two lines they are:
a) CAN High B) CAN low.



CAN Bus Structure:



Message format of CAN:

Standard CAN

S O F	11-bit Identifier	R T R	I D E	r0	DLC	0...8 Bytes Data	CRC	ACK	E O F	I F S
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- **SOF:** Start of frame bit (dominant). Used for synchronization (marks the beginning of data)
- **Identifier:** The system designer assigns the priority to each message. The CAN identifier as a part of message indicates the priority. The value low indicates the High priority.
- **RTR:** Request to Transmit. Can be used by the application to indicate it wants another device to transmit.

- IDE: Whether or not this is an extended CAN frame. The IDE bit is 0 (dominant) for standard frames and 1 (recessive) for extended frames.
- DLC: Data length code. Which indicates the number of data bytes to be transmitted.
- Data. Data may be between 0 and 8 bytes.
- CRC: Which is followed by data field and is used in detection of transmission errors. It is 16 bits in size
- ACK: When transmitting, the controller leaves the bus in a recessive state during the ACK bit. If any other device on the bus has received the just-transmitted frame and considers it valid, it will assert the bus during this bit, and the transmitter can know that the message was successfully transmitted.
- EOF: End of Frame. It marks the end of CAN Message. It is 7 bits in size
- IFS: Interframe space. It is the time taken by the controller to move correctly received frame to its proper position in message area. It is 7 bits in size.

Advantages:

- Low Cost. When the CAN protocol was first created, its primary goal was to enable faster communication between electronic devices and modules in vehicles while reducing the amount of wiring (and the amount of copper) necessary. ...
- Built-in Error Detection
- Speed.

Disadvantages:

- Limited number of nodes.
- High maintenance time.