lamaPLC Communication: DeviceNet

DeviceNet is a network protocol used in the automation industry to interconnect control devices for data exchange. It utilizes the Common Industrial Protocol over a Controller Area Network media layer and defines an application layer to cover a range of device profiles. Typical applications include information exchange, safety devices, and large I/O control networks.

DeviceNet was originally developed by American company **Allen-Bradley** (now owned by **Rockwell Automation**). It is an application layer protocol on top of the CAN (*Controller Area Network*) technology, developed by **Bosch**. DeviceNet adapts the technology from the Common Industrial Protocol into an open standard.

In order to promote the use of DeviceNet worldwide, Rockwell Automation has adopted the *“open”* concept and decided to share the technology to third-party vendors. Hence it is now managed by ODVA, an independent organization located in North America. ODVA maintains specifications of DeviceNet and oversees advances to DeviceNet. In addition, ODVA ensures compliance to DeviceNet standards by providing conformance testing and vendor conformity.

ODVA later decided to bring DeviceNet back to its predecessor's umbrella and collectively refer to the technology as the *Common Industrial Protocol* or **CIP**, which includes the following technologies:

- EtherNet/IP
- ControlNet
- DeviceNet
- CANopen

ODVA claims high integrity between the three technologies due to the common protocol adaptation, which makes industrial controls much simpler compared to other technologies.

DeviceNet has been standardized as IEC 62026-3.

Architecture

Technical Overview Define the OSI seven-layer architecture model the physical layer, data link layer and application layer:

1. Network in addition to the signal, but also including power, self-powered support network function (generally used in small devices, such as photo detectors, limit switches or proximity switches, etc.)
2. Allows three bit rates: 125 kbit/s, 250 kbit/s and 500 kbit/s, the main trunk under different bit rates (trunk) is inversely proportional to the length and bitrate
3. Flat cable network can be used
4. Single network can have up to 64 nodes, node address (called MAC ID in DeviceNet) by 0–63. Usually the default address for a new out of the box device is 63
5. Duplicate node address detection function
6. Supports master-slave and end-to-end peer-to-peer communication architecture, but most of the equipment is operating in the former network architecture

7. Multiple network allows a single master function
8. Can be used in high-noise environments

Sources

Wikipedia (here)

DeviceNet topics on lamaPLC

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• lamaPLC Communication: DeviceNet	2024/11/16 20:43	bus, communication, devicenet, 62026-3, cip, can, ethernet ip, ethernet, controlnet, mac, peer-to-peer, canopen, allen-bradley, rockwell automation, bosch
• lamaPLC Communication: EtherNet/IP	2026/04/23 21:51	communication, ethernet, bus, ip, cip, ethernet ip, udp, industrial ethernet, ie, tcp, unicast, devicenet, controlnet, ieee 802.3

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