

DeviceNet™ - A Quick Overview from Industrial Indexing Systems

What is DeviceNet?

DeviceNet is a low cost communications network that connects to various industrial devices such as limit switches, proximity switches, photoelectric sensors, valve manifolds, motor starters, process sensors, bar code readers, AC and DC drives, servo controllers, panel displays, operator interfaces and others.

What is the origin of DeviceNet?

The DeviceNet communications link is based on the Controller Area Network (CAN) protocol originally developed by Bosch in Europe. This broadcast-oriented protocol was first used to replace expensive wiring harnesses in automobiles. As a result, the CAN network has fast response and high reliability - important consideration in the sometimes harsh automotive and industrial environments.

What are the benefits of DeviceNet?

One of its major benefits is that it can eliminate expensive hardwiring and the cost and time of installing and maintaining it. The ability to directly connect devices to a network also delivers better communications between those devices, and provides device-level diagnostics that are not easily accessible or available through hardwired I/O interfaces.

Another major benefit is interoperability. Simple devices that meet the standard are logically interchangeable from vendor to vendor. Using DeviceNet makes the interconnectivity of more complex devices possible.

DeviceNet is an open network standard – the specification and protocol are available to anyone. Any company can design and manufacture a product that meets the specification merely by purchasing the DeviceNet Specification from the Open DeviceNet Vendor Association (ODVA). Buyers of this specification receive an unlimited, royalty-free license to develop DeviceNet products. Sample code, toolkits, development services and key hardware components are available from a number of sources worldwide.

Is DeviceNet expensive to use?

Increasing automotive, consumer and industrial demand has pushed the cost of CAN chips steadily downward. Tens of millions of CAN chips are shipped every year, compare with (at most) a few hundred thousand of the chips at the heart of other industrial automation networks. This means that the ICs for DeviceNet products are typically 5x to 10x less expensive than chips for other networks.

What is the DeviceNet feature set?

Network Size:	Up to 64 nodes
Network Length:	End to end network length varies with speed 125 kbps 500 m/1640ft 250 kbps 250 m/820ft 500 kbps 100 m/328ft
Data Packets:	0 – 8 bytes
Bus Topology:	Linear (truckline/dropline); power and signal are on the same network cable.
Bus Addressing:	Peer-to-Peer with Multicast (one to many); Multi-Master and Master/Slave special case; polled or change of state (exception based).
System Features:	Removal and replacement of devices from the network under power.

What Industrial Indexing Systems product meets the DeviceNet standard?

IIS manufactures the Emerald EMC-2005™ Multi-Axis Motion Controller.

The Emerald EMC-2005 is a high performance Multi-Axis Motion Controller for demanding applications. It supports coordination of multiple servo axes, I/O and auxiliary equipment. The Emerald Motion Controller embodies a blend of open architecture features with a true realtime operating system to give state of the art performance and superior connectivity to other control systems or network components. The Emerald EMC-2005 also supports DeviceNet as a master scanner or slave device.

What is DeviceNet Profile?

This is a formal model defining the basic characteristics. The General Motion Control Profile in the DeviceNet specification is quite limited and applies mainly to motion controllers that are not “smart”. The Emerald EMC-2005 is a “smart” device, and we’ve created software that allows the user to define a Vendor Specific Profile that meets the needs of a particular application.

The motion control program loaded in the Emerald EMC-2005 builds a Parameter Object containing application specific information. Along with other information, this forms the Vendor Specific Profile, thereby making automatic linkages to the Emerald EMC-2005. Once the Vendor Specific Profile is established, application parameter information is passed seamlessly over the DeviceNet Network. This allows the user to configure high-level "smart" motion control functions in the Emerald EMC-2005 controller, without sacrificing the advantages of DeviceNet. The Emerald EMC-2005 is also available with optional scanner software.

Where can I get more information on the Emerald EMC-2005?

We thought you'd never ask. Just call and ask for one of our Application Engineers. They will be delighted to answer any questions, help you design and specify your application, and send whatever literature you need.

Emerald EMC-2005 Multi-Axis Controller

- ◆ The SERCOS interface (SERIAL Realtime COMMUNICATION System) IEC 61491 and EN 61491 is used to communicate with intelligent motors/drivers, I/O and master follower devices.
- ◆ The DeviceNet port is used to connect to a host of DeviceNet compatible I/O devices, AC & DC Drives, PLC's and other DeviceNet compatible products. The Emerald can operate as a DeviceNet scanner or a DeviceNet slave.
- ◆ The dual PMC ports (PCI Mezzanine Card) are used to add various options including:
 - Master follower resolver
 - Ethernet communications
 - Removable memory
 - Embedded PC
 - Modem



Information on DeviceNet...

The Open DeviceNet Vendor Association (ODVA) publishes the DeviceNet specification and a comprehensive catalog of hardware and software that meets the various device profiles. Contact ODVA at:

4220 Varsity Drive, Suite A
Ann Arbor, Michigan 48108
TEL: (734) 975-8840
FAX: (734) 922-0027
WEB: <http://www.odva.org>
Email: odva@odva.org



Industrial Indexing Systems, Inc
626 Fishers Run
Victor, NY 14564
Phone: (585) 924-9181
Fax: (585) 924-2169
Email: info@iis-servo.com
Web: www.iis-servo.com

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