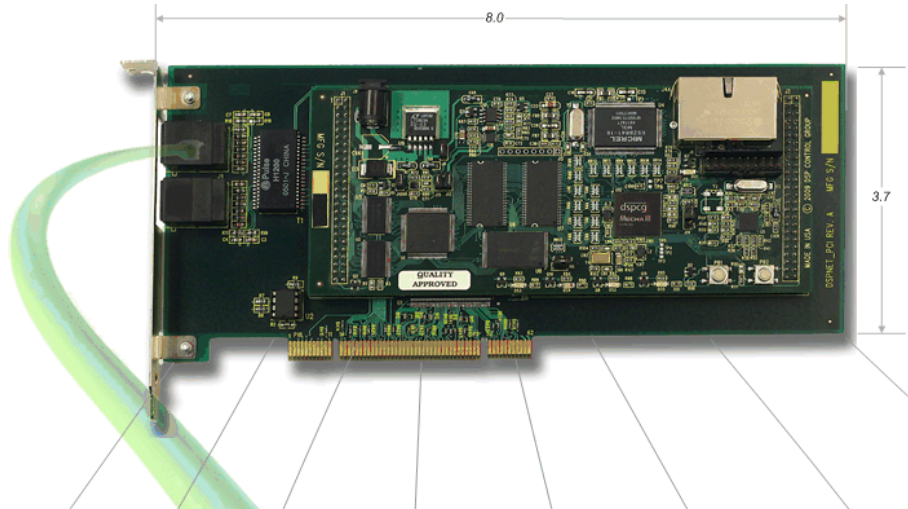


DSPEtherCAT

EtherCAT Master Motion Controller and Network Manager



Features

- Fully compliant with EtherCAT standard
- Fully compliant with IEEE 802.3 standard
- Simultaneous use of EtherCAT and TCP/IP
- Full Motion Controller & PLC on Network
- 100 Mbps of Isochronous speed
- Maps motion commands onto network
- Includes Ethernet Gateway
- Offered in PCI and Stand-Alone forms
- Offered with DSP Motion Control Base Brd. HW or Soft Motion (where PC generates motion commands)

DSPEtherCAT: Master Motion Controller, Linking Servo Amplifiers, I/Os and Managing Network

DSPEtherCAT Motion Master

DSPEtherCAT uses real-time industrial EtherCAT protocol and supports both the line or star topologies. EtherCAT is also very fast - 100 servos can each be updated with 8 bytes of data every 100 microseconds. EtherCAT protocol has a unique feature that distinguishes it from other industrial networking protocols. With EtherCAT there is only one packet per cycle; each slave's data is in a specified part of that packet. Of all the digital networking standards that have been created over the years, one of the oldest, most flexible, and most reliable is industrial Ethernet. **DSPEtherCAT** is offered in three platforms of

- 1) PCI-based DSP motion control hardware,
- 2) Stand-alone DSP motion controller and
- 3) Soft Motion controller (meaning, using a real-time operating system, commands are generated inside the PC by the user program.)

Other protocols can require one packet per slave, with each slave also sending one packet back to the master. Hence when there are many slaves, EtherCAT's approach does not put much of a load on the master's CPU. This can allow for faster cycle times.

Network Delay

The EtherCAT packet leaves the master and then traverses the network. The delay introduced by processing (forwarding) at each slave is bounded by approximately 500 nanoseconds. (The reason that the delay from each slave is so low is because of special hardware that each EtherCAT slave must have. This hardware allows for data to be read or written while the packet passes through the slave.) Taking into account the PHY delay and cable delay, the addition of a slave can add 1 microsecond of delay into the system.





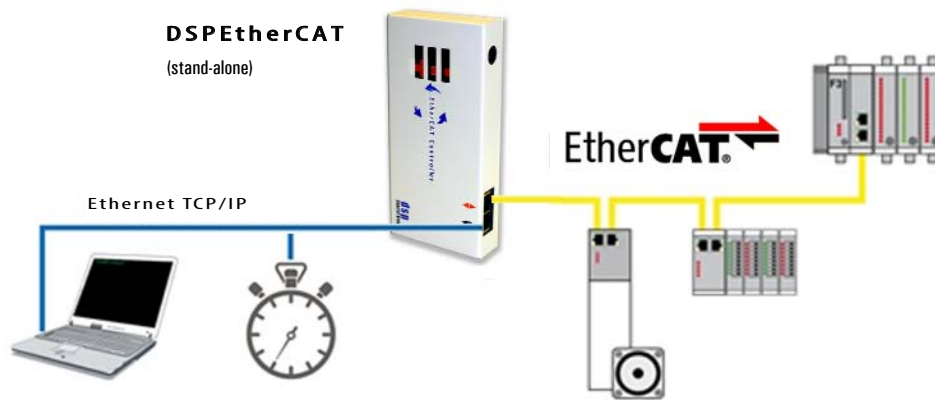
DSPEtherCAT



EtherCAT Master Motion Controller and Network Manager

The EtherCAT solution

The EtherCAT protocol is a real-time industrial Ethernet protocol. As a matter of fact, it was one of the first, and is supported well and widely used. The protocol is completely open. Most people are now familiar with the term "Ethernet". This technology is very prevalent in home and office networks as the mechanism for PCs to be a part of a network, which usually involves access to the Internet and internal networked servers. However, because this technology has been so developed and tested, it now presents itself as a solution for industrial networking as well. The components, such as Ethernet cabling and PHY interfaces, are well-tested and widely available. These components are used in an EtherCAT solution.



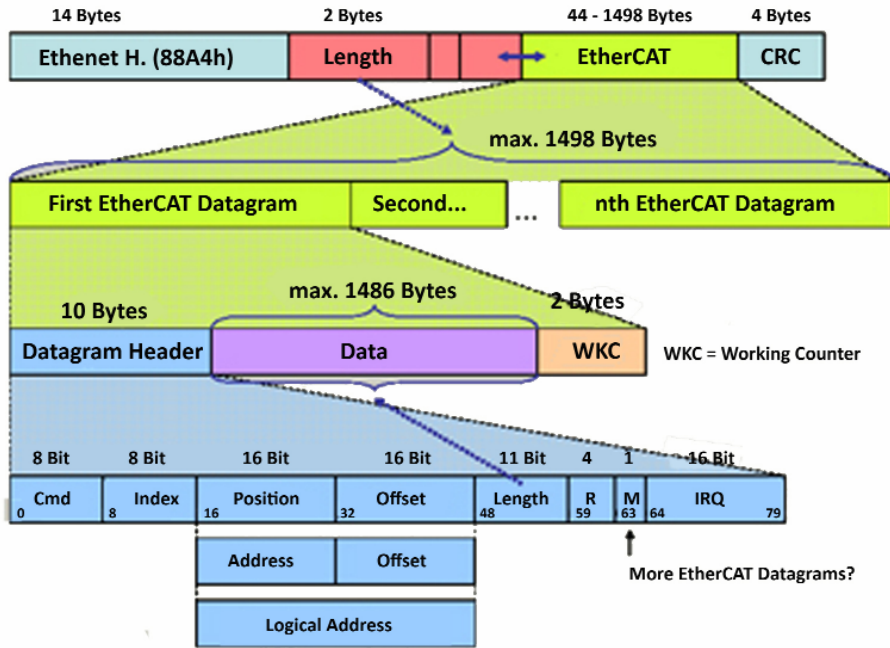
EtherCAT Timing Cycle

With EtherCAT there is only one packet per cycle; each slave's data is in a specified part of that packet. Since Ethernet allows for a maximum packet size of 1518 bytes, subtracting the 18 bytes for Ethernet overhead leaves 1500 bytes for EtherCAT to work with (also there will be 14 bytes of EtherCAT header, leaving 1486 bytes for data). This lends itself to optimal bandwidth utilization. When you incorporate the 32 bytes of overhead per packet, one large packet is certainly more optimal than many small packets.



DSP EtherCAT

EtherCAT Master Motion Controller and Network Manager



Ethernet Frame Structure / EtherCAT Datagrams

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