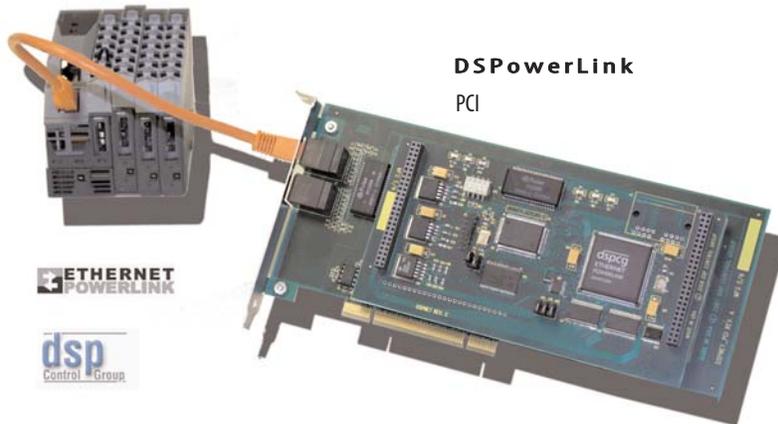


# DSPowerLink



## Ethernet PowerLink Master Motion Controller and Network Manager

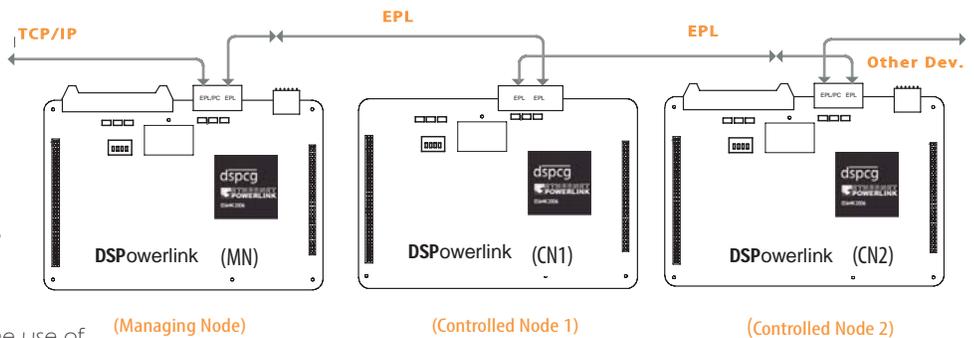


### Features

- Fully compliant with EPL standard
- Fully compliant with IEEE 802.3 standard
- Simultaneous use of EPL and Ethernet
- Maps EPL I/O onto DPRAM
- 100 Mbps of Isochronous speed
- Maps motion commands onto network
- Includes Ethernet gateway
- Offered in PCI and Stand-alone forms

**DSPowerlink**, a single Ethernet cable is sufficient to configure and program all elements of a network. Whether the network is inclusive of a single I/O or multiple I/Os and drive amplifiers, **DSPowerlink** as the managing node is capable of transmitting the asynchronous and isochronous real-time information through the same cable.

The DSPL (motion controller language) provided an instruction set that makes the use of peripheral network components such as remote I/Os simple. For example, variables `EPL_INP1_REG` and `EPL_INP2_REG`, in DSPL each contains 16 inputs connected to the remote I/O unit (e.g. B&R x20 remote I/O units). These variables may be used in conjunction with a PLC or a motion control program residing in a PC (as a soft motion controller) or a DSP based motion controller provided by DSPCG. Similarly, `EPL_OUTP_ON` and `EPL_DRIVE_COMMAND` instructions enable the PC or motion controller to assert its command on the network. While these instructions take advantage of EPL network, they make network information available on an ordinary Ethernet connection which is also available on a DSPowerlink card.





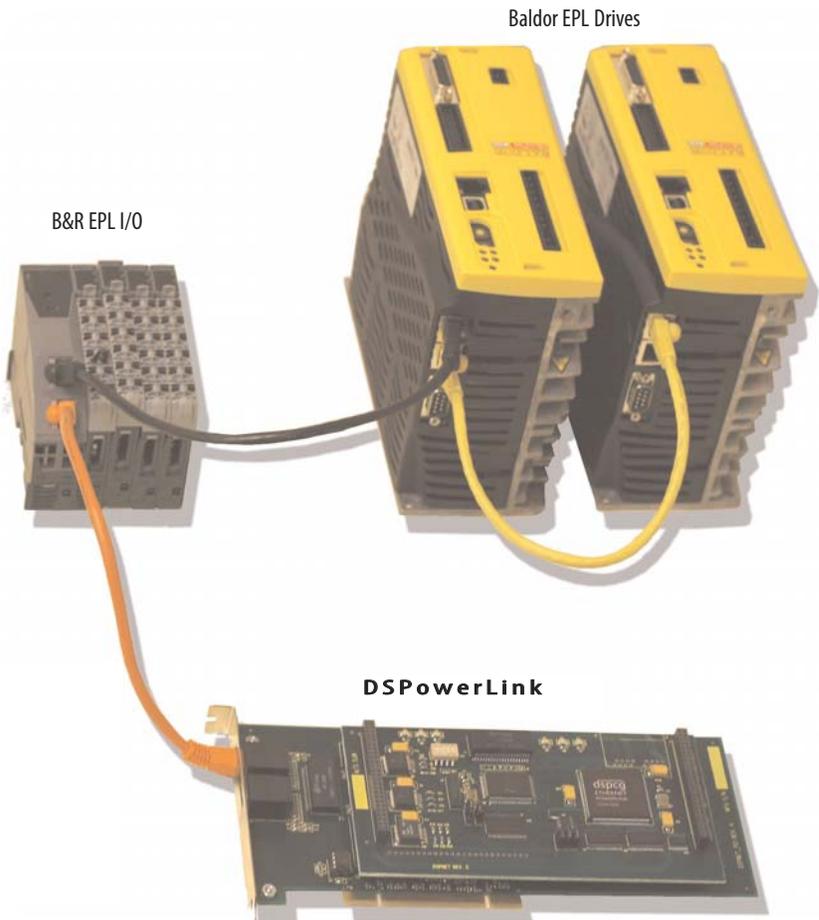
# DSPowerLink



## Ethernet PowerLink Master Motion Controller and Network Manager

### Industrial ethernet for automation of Motion, PLC and other Powerlink Network Devices

ETHERNET Powerlink (EPL) is a deterministic real-time protocol for standard Ethernet. EPL expands Ethernet with a mixed polling and time-slicing mechanism. That brings:



- (a) Guaranteed transfer of time-critical data in very short isochronous cycles with configurable response time
- (b) Time-synchronization of all nodes in the network with a very high precision of sub-microseconds
- (c) Transmission of less time-critical data in a reserved asynchronous channel

DSPCG implementation, DSPowerlink reaches cycle-times of 200µs and a time-precision (jitter) of less than 1µs.

This communication profile meets timing demands typical for high-performance automation and motion applications without changing basic principles of the Fast Ethernet Standard IEEE 802.3; it also extends it towards Real Time Ethernet (RTE). EPL is a cyclic communications network.

The diagram next page represents one EPL cycle.





# DSPowerLink

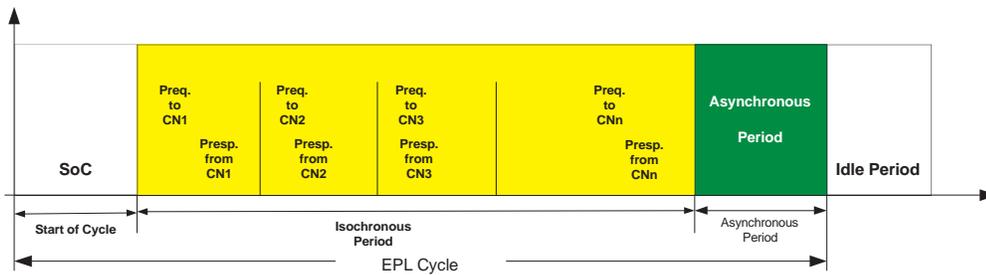


## Ethernet PowerLink Cyclic Communication

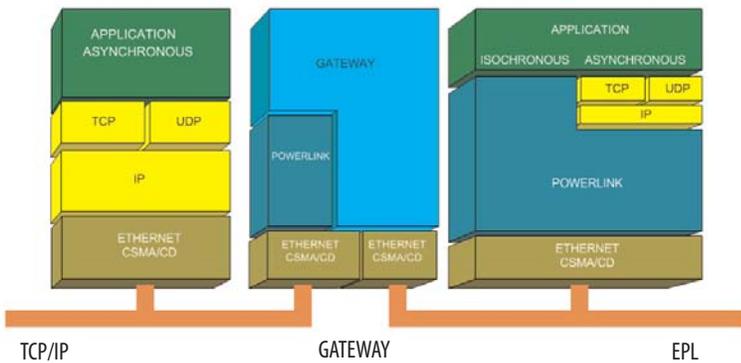
To avoid collisions and to make maximum use of the bandwidth, data exchange between the devices is time slot-based. One device on the EPL network takes on the function of the Managing Node, which controls the communication, defines the clock pulse for synchronization of all nodes, and assigns the right of transmission to the individual devices. The Controlled Nodes only transmit when requested to by the manager. An EPL cycle is divided into three periods:

a) Start of Cycle (SoC): Here the manager transmits a "Start of Cycle" frame (SoC) as a broadcast message to all controllers. All devices in the EPL network synchronize on the SoC. b) Isochronous Period: Cyclic data exchange takes place in this time period. According to a preset (configurable) schedule, the manager transmits a Poll Request frame (PReq) sequentially to each controller. The addressed controller responds with a Poll Response frame (PRes). All nodes

involved with these data can receive them, whereby a real producer (or consumer) communication between the nodes is achieved similar to CAN. c) Asynchronous Period: This time interval is available



for asynchronous, non-time-critical data exchange. The Master Node grants access to one of the Controlled Nodes based on a priority which the request contains.



Internal Data Communication Flow of DSPowerlink

**DSPowerlink** superior implementation allows for simple communication between an ordinary Ethernet and the EPL network. That is, information on the EPL network is made available to a generic Ethernet card that may be part of any PC computer. The figure above illustrates the hardware and communication protocol provided by **DSPowerlink**.

