



Title: MultiFlex ETH 1000 Series High-Speed Data Broadcasts
Products(s): All MultiFlex ETH 1000 Series Ethernet motion controllers
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Summary

PMC's Multiflex ETH 1000 Series Ethernet motion controllers can provide network broadcasts of motor data at very high update rates to support ultra-fast communication of controller and axis data to a user's host application running on a PC. This allows the MultiFlex Ethernet controller to support speed-critical applications where the user has chosen to coordinate and control all motion and I/O events entirely from the host PC.

More Information

The Multiflex ETH 1000 Series motion controllers communicate with the host computer using standard TCP/IP sockets, allowing the use of common applications such as Telnet, HTTP and FTP. The Motion Control API communicates with the controller over binary and ASCII Telnet sockets, providing a high degree of data integrity through the use of a connection-oriented protocol.

Low-latency access to real time motor data such as position, following error and motor status is crucial to some speed-critical custom applications. For these situations, the controller provides a connectionless protocol which is far more efficient at providing the application with real-time data.

The mechanism for providing the high speed data updates is through the use of an IP broadcast frame that contains a datagram consisting of motor table data for any number of axes that have had the broadcasts enabled. The benefits of using a broadcast frame are

- sparse data frame with no higher protocol encapsulation, reducing network bandwidth
- connectionless protocol, eliminating network acknowledges
- reduction of host computer processing time by elimination of protocol stack processing

The broadcasts are sent from the controller at a rate determined by the selected motor service interrupt rate. This rate can be set by using the following MCCL command function calls

YL	4 kHz (default)
YM	8 kHz
YH	16 kHz

The table below illustrates the contents of a standard IP broadcast frame including the offsets of the motor data segments contained in the datagram. Note that the IP frame is sent as a unicast Ethernet frame to the default host route. Any number of axes can have broadcasts enabled by the use of the MCCL command

aBIn a = axis number
 n = 0 (disable broadcasts)
 1 (enable broadcasts)

byte offset	bit field			
	0-7	8-15	16-23	24-31
0	version/header	diff service	length	
4	id		flags	fragment offset
8	TTL	protocol(0xff)	checksum	
12	source address (192.168.1.100)			
16	destination address (255.255.255.255)			
20	Axis Motor Data packet 0			
52	Axis Motor Data packet 1			
20 + 32n	Axis Motor Data packet n			

The next table shows the specific contents of each motor data packet, beginning with a Start-of-Frame-Delimiter (0xaa) and axis identifier. Currently there are three user-defined data words that can be customized to an individual application as the need arises. If interested, please contact PMC Technical Support for more details.

byte offset	bit field			
	0-7	8-15	16-23	24-31
0	SFD(0xaa)	Axis number	DAC command value	
4	Position Count			
8	Position Error			
12	Motor Status Word			
16	Motor Auxilliary Status Word			
20	User Defined Data 1			
24	User Defined Data 2			
28	User Defined Data 3			