AEROTECH AUTOMATION**1**

CONNECT

DEVELOP CONTROL DRIVE

Perform at Light Speed.

The fiber-optic, light-based HyperWire® motion control bus from Aerotech is the fastest, highest-throughput communication bus in motion control. It enables 20 times the throughput that was possible with a 100BASE-T Ethernet.

Superior Reliability. Total Flexibility.

With HyperWire, you can count on reliable communication that is immune to electromagnetic interference (EMI) and nearly free of jitter. Plus, the HyperWire protocol operates at 100 kHz — five times the speed of competing solutions — enabling efficient, multi-input, multi-output (MIMO) control algorithms you won't find anywhere else.

Because Hyperwire is flexible, servo motor, galvo scan head and piezo nanopositioning drives can be added to a HyperWire network simultaneously.

- *Premier solution for distributed multi-axis motion control*
- *Controls motion at the speed of light*
- *20x the throughput of 100BASE-T Ethernet*
- *Zero-jitter technology (patent pending)*
- *100 kHz cycle time for low-latency, drive-to-drive distributive control*
- *Controls up to 32 axes with no performance loss*
- *Uses standard glass optical fiber cables with small form-factor pluggable (SFP) connectors*
- *Immune to EMI noise*

High Speed

Low Latency

Low Jitter

EMIT GREAT MOTION.

When you choose to build your solution around HyperWire, you're making the choice to outperform your competitors. Fiber optics are the clear winner in high-performance systems, and HyperWire is the clear winner in motion technology.

HyperWire enables high-speed, highly coordinated motion control by providing two Gbps communication — 20 times that of conventional solutions. This enables high-resolution, 64-bit, double-precision floating point trajectory values to be sent to Automation1 drives at astonishingly high frequencies:

- *20 kHz 64-bit trajectories for servo drives*
- *100 kHz 64-bit trajectories for galvo drives*
- *40 kHz 64-bit trajectories for piezo drives*

A glass optical fiber with small form-factor pluggable (SFP) connectors ensures your reliable communication is immune to electromagnetic interference (EMI).

The HyperWire protocol provides direct drive-to-drive communication at 100 kHz, allowing multiple drives to share information within a single servo-cycle. The result is efficient, multi-input, multi-output (MIMO) control algorithms that cannot be achieved using other communication buses.

HyperWire also features Aerotech's patent-pending jitter reduction technology, which reduces communication jitter by a factor of 80. This enables nanometer-level multi-axes synchronization.
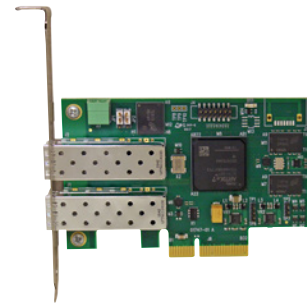
GAIN DESIGN AND APPLICATION FLEXIBILITY.

HyperWire allows for flexible solutions. Fiber-optic cables connect a wide selection of Automation1 drives to the Automation1 software-based machine controller (iSMC) via a HyperWire peripheral component interconnect express (PCIe) interface card installed on an industrial PC.

This configuration enables complex, real-time control to be implemented on the Automation1 controller and allows access to that controller directly through the Automation1 .NET API.

HyperWire PCIe Card

Turn your industrial PC into a high-performance motion engine with the HyperWire PCIe card. Simple to install, the card adds two SFP ports for the glass optical fiber, high-speed HyperWire communication bus and can connect up to 32 axes of precision motor drives — each capable of operating at industry-leading performance levels.
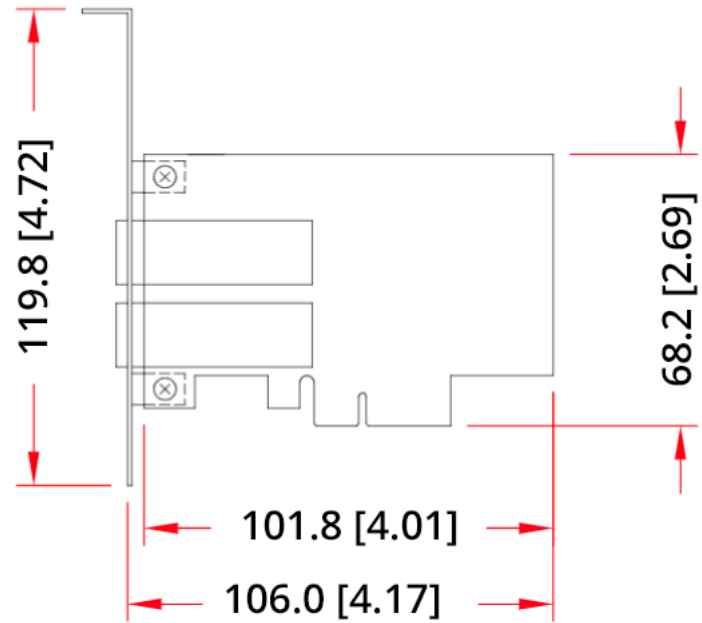
HyperWire Cables

Glass optical fiber HyperWire cables are immune to EMI noise, securely click into Automation1 drive hardware and enable drive-to-drive spacing of more than 400 meters. "Snap-in" SFP connectors offer reliable, simple connections, and a 30 mm bend radius allows for easy installation in electrical cabinets.

SPECIFICATION	DESCRIPTION
Communication Rate	2 Gbps
Jitter	< 1 nsec (after 16 axes)
Master Clock Stability	± 5 ppm
Network Rate (Up to 32 Axes)	100 kHz
Connected Axes of Motion	32
Trajectory Point Data Types	64-bit double-precision floating point values
Servo Motor Drive Trajectory Rate	20 kHz
Galvo Scan Head Drive Trajectory Rate	100 kHz
Piezo Nanopositioner Drive Trajectory Rate	40 kHz (in development)
Physical Connectors	SFP (small form-factor pluggable)
Cable Type	Glass optical fiber
Drive-to-drive MIMO Communication	Within a single 20kHz servo-cycle

HyperWire PCIe Card

119.8 [4.72]

68.2 [2.69]

101.8 [4.01]

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HyperWire Cables
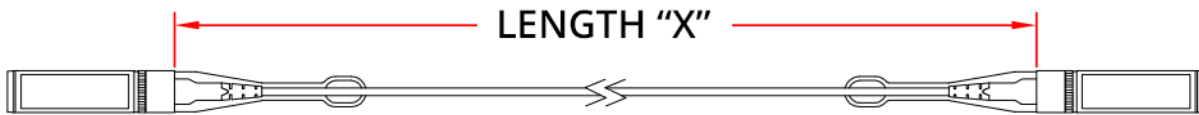
LENGTH "X"

HYPERWIRE CABLE LENGTH "X"	MAXIMUM ALLOWABLE CONNECTOR TO CONNECTOR SPACING
0.5 Meters	0.4 Meters
1 Meter	0.9 Meters
3 Meters	2.9 Meters
5 Meters	4.9 Meters
20 Meters	19.9 Meters

Automation1 ComAcc: HyperWire Communication PCIe Card

ORDERING OPTIONS	EXAMPLE SELECTIONS	HYPERWIRE® SELECTIONS	
Options	HyperWire PCIe	HyperWire PCIe	HyperWire Interface Card, PCIe Bus

Example Configuration: HyperWire PCIe

Cable Communication: Aerotech Communication Cables

ORDERING OPTIONS	EXAMPLE SELECTIONS	HYPERWIRE® SELECTIONS	
Cable*	HyperWire AO10-5	HyperWire AO10-5	HyperWire Active Optical Cable, 0.5 meters
		HyperWire AO10-10	HyperWire Active Optical Cable, 1.0 meters
		HyperWire AO10-30	HyperWire Active Optical Cable, 3.0 meters
		HyperWire AO10-50	HyperWire Active Optical Cable, 5.0 meters
		HyperWire AO10-200	HyperWire Active Optical Cable, 20.0 meters

Example Configuration: HyperWire AO10-5

*Special lengths available