



Control Hardware

At the core of the Caplex System is our control hardware, suitable for beginners and advanced users alike. It provides both plug-and-play usability as well as limitless customizability. Our control hardware includes a specially-configured Host PC, for controller development and Caplex System operation via our GUI, and an I/O Unit with integrated Real-Time Target Machine for processing sensor data from the Wearable Device(s) and controlling Actuator Unit(s).

FEATURE	DESCRIPTION
Analog Inputs	32 single-ended input with optional user selectable differential lines (+/-10V range)
Analog Outputs	8 single-ended outputs (+/-10V range)
Digital I/O	16 DIO connections with with user selectable input output and option of customizing 8 of these to accommodate needed digital protocols (contact Humotech) (5V range)
Quadrature Inputs	8 single ended quadrature inputs (5V range)
Serial Ports	2 x RS232 (for baud rates up to 115.2 kb/s)
Gigabit Ethernet for Real-Time UDP, EtherCAT Master and XCP Master	2 Rj45 connectors are available with Intel I210
MATLAB Versions Supported	2016a or newer
Dimensions of IO	13.75" L x 17.5" W x 15.6" H

Real-Time Controller

At the core of the Control system is the Speedgoat Real-Time Target machine, the Mathworks-preferred platform for real-time control of robotics systems, customized for use with Caplex. Using this very high performance system means developers don't have to worry about optimizing code early in the development process and seamless integration with the Caplex Software suite allows for development free from worries about firmware and can focus on the meaningful work

Additional I/O expansion is available, please contact our team with any special requests.

FEATURE	DESCRIPTION
Power	5VDC, 24VDC, and GND lines accessible to users
Humotech Start/Stop	Safety feature to allow for detection of hard limit on wearable devices and shut down the system in the event of control error. Provides user remote physical access to enabling or cutting power to the actuators
General Analog Inputs	<p>8 dedicated SE analog inputs with isolated BNC connectors</p> <p>16 user selectable SE or differential analog inputs with BNC connectors</p>
Quadrature Inputs	8 dedicated DB9 connectors providing 5V and GND lines for each quadrature input
General Digital I/O	16 dedicated BNC connectors
Humotech End Effectors	8 M12-5 connectors providing access to a single analog input, 24V power and the stop circuit
Humotech I/O Breakout Modules	Humotech customized breakout boxes to allow a single cable to connect to a wearable device and cleanly route signals to the I/O unit, typically contain strain gauge amplifiers to condition load signals for each degree of actuation easily removable for flexibility, scalability, and regular calibration

I/O Unit & Modular Breakouts

Humotech provides a robust I/O Unit that simplifies access to the real-time controller's pins enabling plug-and-play access to all of the Real-Time Controller's pre-configured I/O, adds simple safety and power access to user added equipment and cleanly routes cables to reduce the complexity and chaos of complicate integrated systems

FEATURE	MINIMUM SPECIFICATIONS
CPU	Intel i5
Memory	16GB DDR4 Memory
Storage	C: Drive 256GB SSD D: Drive 1TB HDD
Ethernet Connectivity	1x internet ethernet port 4x ethernet ports with expansion card
Operating System	Windows 10
Power Connection	NEMA 5-15 (Please contact Humotech if your needs vary)

Host PC

To ensure hardware compatibility and ease of setup/use, Humotech-provided Host PCs are strongly encouraged with every Caplex System configuration. The Host PC is based on an industry-standard high-performance workstation, pre-configured with all necessary network connections and software installations to enable plug-and-play functionality.

Special configurations are possible, please contact our team with your requirements.