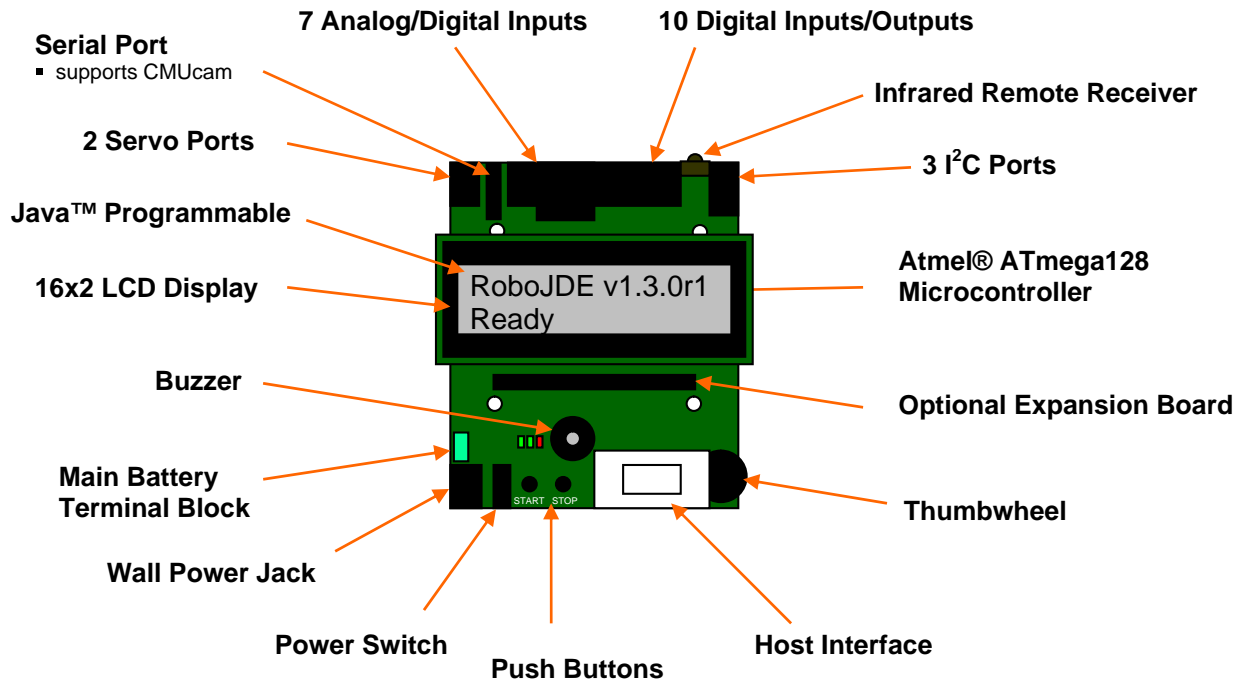




# IntelliBrain™

Robotics Controller



## Overview

The IntelliBrain™ robotics controller is a microcontroller board designed for intelligent robot applications. Use of a modern programming language, Java™, and a powerful microcontroller, the Atmel® ATmega128, make it easier than ever to program sophisticated robot intelligence.

The IntelliBrain controller's design makes it easy to interface to popular sensors and effectors including the CMUcam, Fairchild infrared photoreflectors, Sharp infrared range sensors, Devantech sonar range finders, compass, speech synthesizer and motor controllers, universal infrared remote controls, hobby servo motors, and I<sup>2</sup>C devices.

A 16x2 liquid crystal display, two push buttons, a thumbwheel, a buzzer, LEDs, and an infrared remote control receiver provide a flexible, programmable human interface to the IntelliBrain controller.

## Programming

The RS232 host port provides a high-speed connection (up to 115.2K baud) to the RoboJDE™ Java development environment running on a personal computer.

The RoboJDE Java development environment includes a powerful virtual machine that enables real-time applications, written purely in Java, to execute on the IntelliBrain. Developing robot intelligence in Java is a snap using the rich RoboJDE robotics class library and the easy to use RoboJDE user interface.

## Expansion Board

The optional IntelliBrain expansion board adds the ability to control up to four pulse width modulated DC motors. The expansion board also provides additional servo, analog, and digital ports, a modulated infrared transmitter LED, 64K bytes of EEPROM storage, support for a secondary battery, and flexible motor and servo powering options.

## Mounting

Four mounting holes spaced in a 1 7/8" (48 mm) square make it easy to mount the IntelliBrain controller on a robot chassis constructed using Lego® bricks, the Portland Robotics Society's Mark III mini-sumo chassis, other commercially available robot chassis, or a custom chassis.

## Features

Feature	Main Board	Expansion Board (additions)
CPU	<ul style="list-style-type: none"> <li>Atmel ATmega128</li> </ul>	
Clock	<ul style="list-style-type: none"> <li>14.7 MHz</li> </ul>	
RAM	<ul style="list-style-type: none"> <li>132K</li> </ul>	
Flash	<ul style="list-style-type: none"> <li>128K</li> </ul>	
EEPROM	<ul style="list-style-type: none"> <li>4K bytes</li> </ul>	<ul style="list-style-type: none"> <li>64K bytes</li> </ul>
Display	<ul style="list-style-type: none"> <li>16x2 LCD</li> </ul>	
Program Buttons	<ul style="list-style-type: none"> <li>START/STOP</li> </ul>	
Thumbwheel	<ul style="list-style-type: none"> <li>1</li> </ul>	
Buzzer	<ul style="list-style-type: none"> <li>1</li> </ul>	
LEDs	<ul style="list-style-type: none"> <li>1 power</li> <li>2 programmable</li> </ul>	<ul style="list-style-type: none"> <li>8 motor status / programmable</li> <li>1 modulated IR</li> </ul>
Host Port	<ul style="list-style-type: none"> <li>RS232</li> <li>up to 115.2K</li> </ul>	
Secondary Serial Port	<ul style="list-style-type: none"> <li>RS232</li> <li>up to 115.2K</li> <li>CMUCam power</li> </ul>	
General Purpose I/O Pins	<ul style="list-style-type: none"> <li>7 analog / digital inputs</li> <li>10 digital I/O</li> </ul>	<ul style="list-style-type: none"> <li>7 analog / digital inputs</li> <li>8 digital I/O</li> </ul>
I <sup>2</sup> C Ports	<ul style="list-style-type: none"> <li>1 I<sup>2</sup>C bus</li> <li>3 headers with +5V and ground</li> </ul>	
Servo Ports	<ul style="list-style-type: none"> <li>2</li> </ul>	<ul style="list-style-type: none"> <li>6</li> </ul>
Motor Ports		<ul style="list-style-type: none"> <li>4 (up to 15V, 1A each)</li> </ul>
Modulated Infrared (38 kHz)	<ul style="list-style-type: none"> <li>1 receiver</li> </ul>	<ul style="list-style-type: none"> <li>1 transmitter LED</li> </ul>
Powering	<ul style="list-style-type: none"> <li>4.5V to 9V main battery (battery not included)</li> <li>4 cell AA battery holder included</li> <li>Support for 5V or 6V AC to DC regulated wall adapter via 2.1mm center positive coax jack (adapter not included)</li> </ul>	<ul style="list-style-type: none"> <li>Optional secondary battery to power motors and/or servos (up to 15V, battery not included)</li> <li>Individually selectable motor and servo power from main or secondary battery</li> <li>Optional servo power regulation</li> </ul>
Dimensions	<ul style="list-style-type: none"> <li>3.2" x 2.8"</li> <li>LCD module: 1.4" x 3.1"<sup>1</sup></li> <li>Mini-sumo compatible</li> </ul>	<ul style="list-style-type: none"> <li>2.2" x 2.8"</li> </ul>
Mounting	<ul style="list-style-type: none"> <li>4 1/8" mounting holes in 1 7/8" (48 mm) square</li> <li>Lego® grid compatible</li> <li>Mark III mini-sumo compatible</li> </ul>	<ul style="list-style-type: none"> <li>mounts on connectors on main board</li> </ul>
Software	<ul style="list-style-type: none"> <li>Full RoboJDE license included</li> </ul>	

<sup>1</sup> May vary depending on module vendor

## Sensor & Effector Interfacing

All IntelliBrain I/O ports are designed to make it easy to electrically interface to sensors and effectors. All ports provide power and ground in addition to the port's signals using standard 3 or 4 pin 0.1 inch male headers. Sensors and effectors are easily connected using Molex connectors. Motor and battery connections are via screw terminal headers.

The IntelliBrain controller supports a large variety of sensors and effectors, including:

- CMUcam
- DC motors (up to 15V – 1A each)<sup>2</sup>
- Devantech CMPS03 magnetic compass
- Devantech MD03 & MD22 motor drivers
- Devantech SP03 speech synthesizer
- Devantech SRF04 & SRF08 sonar range finders
- Futuba compatible servo motors
- infrared photoreflectors, including Fairchild QRB1134
- LEDs (including 38kHz modulated IR LEDs<sup>2</sup>)
- Lego DC motors<sup>2</sup>
- Nubotics WheelWatcher™ shaft encoders
- photoresistors
- potentiometers and switches
- Sharp infrared range sensors
- Sony infrared remote controls
- Universal infrared remote controls

## Host PC Requirements

- Windows 98/Me/2000/XP
- 50 Mbytes available disk space
- 128 Mbytes RAM
- RS232 serial port

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<sup>2</sup> Requires IntelliBrain expansion board