

VEX Cortex and Electronics Description

Introduction to Robotics and Engineering

Description:

The VEX Robot base is a test platform where we will develop linear and event driven software to explore movement, rotational mechanics, and tele-operation. For the first 4 weeks of this course, we will use a standard base for the following reasons:

1. Standardize software development so we can collaborate on the Computer Science Concepts that Drive Robotics.
2. Streamline Instruction within one robot configuration.
3. Develop working knowledge of motor wiring and two motor drive systems.
4. Gain facility with RobotC programming system.

VEX Cortex Micro Controller

Description of Micro Controller:



Kit Contents	(1) VEX Cortex Microcontroller
Downloads & Docs	Documentation VEX Cortex Microcontroller/VEXnet Joystick User Guide VEX Robot Troubleshooting Flow Charts Cortex Microcontroller Pinout Guide Bootlader & Firmware Change Log CAD File (STEP)
Battery In	<ul style="list-style-type: none"> • Voltage:7.2 volts nominal, 5 to 12 volts min/max. • Type:Six AA batteries or 7.2V Robot Battery • Current:150mA for Controller & Receiver plus Motors, Servos & VEXnet
I/O Ports	<p>(8) 3-wire Motor Outputs</p> <ul style="list-style-type: none"> • Usage:For 3-wire VEX motors, Motor Controller 29s or servos • Type:Hobby standard PWM • Refresh:Every 18.5 mSec <p>(2) 2-wire Motor Outputs</p> <ul style="list-style-type: none"> • Usage:For 2-wire VEX motors • Type:H-Bridge • Refresh:Every 1 mSec <p>(1) I2C "Smart Sensor" Port</p>

	<ul style="list-style-type: none"> • Usage:Future I2C Products (2) UART Serial Ports • Usage:VEX LCD Module (8) 12-bit Analog Inputs • Analog In:12-bit resolution. 10 μSec access time. (12) Fast Digital I/O (can be used as interrupts) • Digital In:150 kHz input frequency. (1) DAC Speaker Output • Usage:Output sound, voice, music to an external speaker (2) Rx1 & Rx2 • Usage:Connects to (2) 75MHz receivers.
Microcontroller	STMicroelectronics ARM Cortex-M3 <ul style="list-style-type: none"> • Speed:90 MIPS (Million Instructions Per Second) • RAM:64KB • Flash:384KB program space
Programming	easyC V4 for Cortex ROBOTC for Cortex & PIC
Size	4.5in W x 3.9in L x 1in H
Weight	<ul style="list-style-type: none"> • .302 lbs (137 grams) Actual weight one item (no packaging)

Pasted from <<http://www.vexrobotics.com/276-2194.html>>

Ports for Standard Robot Base:

Motor Ports:

1: Right Motor
10: Left Motor

8: Hand or Claw
9: Arm

Digital Sensor Ports:

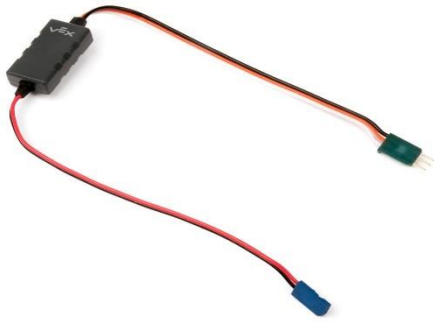
1: Touch Stop Sensor
2: Touch Stop Sensor
3: UltraSonic In
4: UltraSonic Out

Motor Description:

VEX 292 Motor: Slightly Smaller
VEX 393 Motor: Larger

Both motors feature a two wire connection. The Red Wire is the positive lead, the black wire is ground. Ports 1 and 10 are two wire ports and can connect directly to the motor wire. Ports 2 through 9 require the use of an M29 Motor controller between the motor and the VEX Brick.

M29 Controller:



Wiring Instructions

- Note: Black Wires face out away from center



Sensors:

touch: Digital Port 1	L
touchStart: DigitalPort 2	CM

Motors:

Right Wheel: Motor Port 1	L
Left Wheel: Motor Port 10	
Arm: Motor Port 9 (Use three wire motor adapter M29)	
Hand or Claw: Motor Port 8 (Use three wire motor adapter M29)	