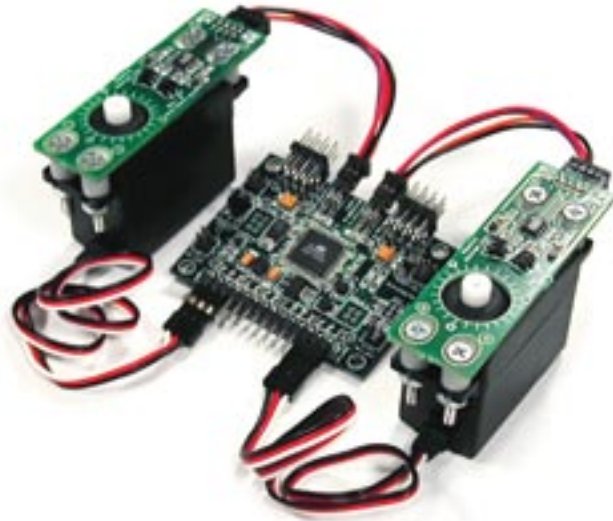# WheelCommander™ – WC-132

Closed Loop Differential Drive Controller

Applications:

- **Dead reckoning**
- **Odometry (how far has it gone)**
- **Closed-loop position, velocity, and acceleration control**

Features:

- **Velocity, rotation rate, position, and angle use real world units; readable any time**
- **Six control loops (each wheel's velocity and position; platform velocity and position) ensure accurate straight-line motion or angle change**
- **Auto-switching RS232 or I2C command interface**
- **Field-upgradable firmware**
- **Four analog inputs, four digital I/O for general purpose use**
- **Drives standard RC servos modified for continuous rotation OR DC gearhead motors with external H-bridge**
- **Compact, low-profile design fits under many existing robot controllers**
- **Easy to interface with external H-bridges in sign-magnitude or locked-antiphase modes**

WheelCommander shown with 2 servos and WheelWatcher™ encoders sold separately.

Unlike others, the Nubotics™ WheelCommander™ controller coordinates the motion of both wheels of a differential drive robot, using odometry provided by Nubotics WheelWatcher™ encoders. It uses real world units of measurement to specify distance, velocity, angle and rate of rotation. It provides battery voltage monitoring, optional motor current monitoring, as well as four analog input lines. It works with simple, low cost RC servos, yet provides accurate dead reckoning and speed control.
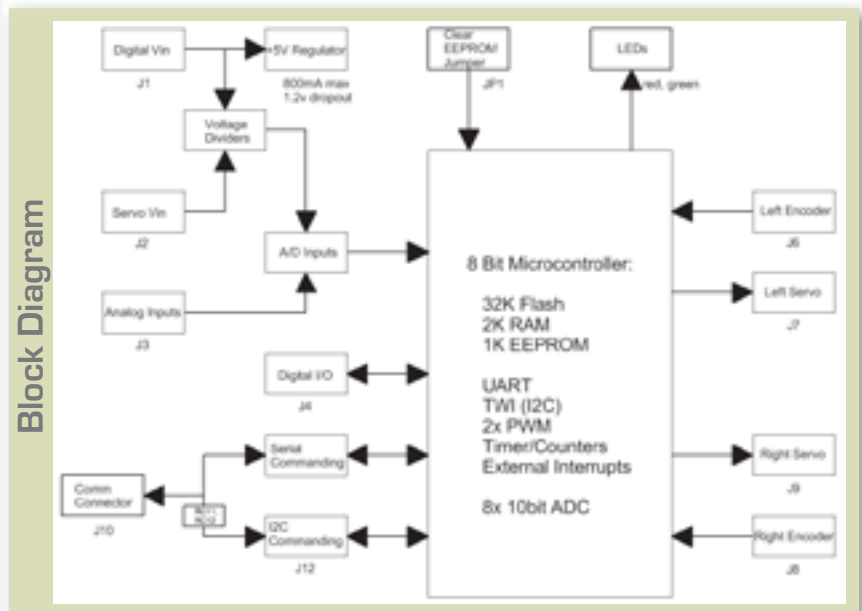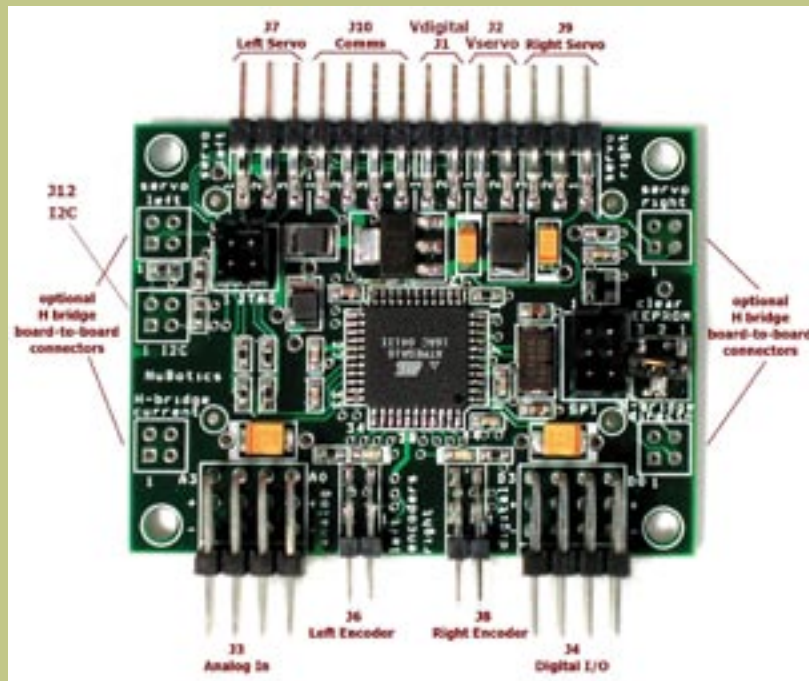

Block Diagram

NU-BOTICS™

WheelCommander™ – WC-132
Closed Loop Differential Drive Controller

Connectors

Power
J1 - digital power (> +6.2v DC)
J2 - servo power

Servos
J7 - left servo
J9 - right servo

Encoders
J6 - left encoder
J8 - right encoder

Communications
J10 - RS232 or I2C

I/O
J3 - analog inputs
J4 - digital I/O

H-Bridge
J16 - H-bridge direction control
J15 - H-bridge current sense
J13 - H-bridge left PWM
J14 - H-bridge right PWM

Specifications

| Value	Min	Max	Units
Digital Vin	6.2	16.0	V DC
H bridge PWM	2	64	KHz
Servo Control	0.5	2.5	msec at 50Hz
RS232 Baud Rate	1200	57600	Baud
I2C Trans. Rate	0	400	KHz
A/D Inputs	Dedicated: 4	General Purpose: 4	
A/D Resolution	10 bits		
Digital I/O	4		
PCB Width	2.14"		
PCB Height	1.63"		
PCB Layers	4		

Distributed by:

- TOTALROBOTS, Surrey, UK
- Hobby Engineering, Millbrae, CA
- Zagros Robotics, St. Louis, MO

WC-132 Drive Controller
- Preassembled circuit board
- Two 4" four lead color-coded cables
- One 6" four lead color-coded I2C cable (not pictured)
- WCWizard setup software
- WheelWatcher™ encoders sold seperately
- Servos and wheels not included
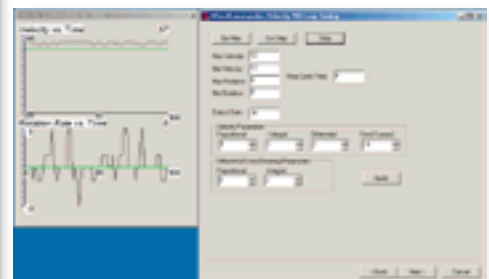
WCWizard Software
Setting up and tuning the WC-132 is easy using a PC's serial port and WCWizard, which runs under Windows 2000 or Windows XP.

The wizard helps you:
- Set up the serial port parameters and/or I2C slave address
- Upload new firmware
- Define the robot chassis geometry (wheel diameter and spacing, forward direction)
- Configure motor connections
- Invoke the built-in motor calibration
- Tune the velocity PID parameters
- Tune the position PID parameters
- Test the robot using an interactive driving dialog

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www.nubotics.com