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 lockedantiphase 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.



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Closed Loop Differential Drive Controller



Servos J7 - left servo J9 - right servo

Encoders

- J6 left encoder
- J8 right encoder

Specifications

<u>Value</u>	<u>Min</u>	<u>Max</u>
Digital Vin	6.2	16.0
H bridge PWM	2	64
Servo Control	0.5	2.5
RS232 Baud Ra	ate 1200	57600
12C Trans. Rate	0	400
A/D Inputs	Dedicated: 4	General Pu
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



J4 - digital I/O

J16 - H-bridge direction control

Units

VDC

KH_Z

Baud

KH_Z

msec at 50Hz

- J15 H-bridge current sense
- J13 H-bridge left PWM

J14 - H-bridge right PWM

Purpose: 4

J3 - analog inputs

H-Bridge