

Orangutan Robot Controller

Quick-Start Sheet

Overview

The Pololu Orangutan robot controller is a complete control solution for small robots. The small module includes a powerful Atmel MEGA168 microcontroller, two channels of bidirectional motor control, an 8-character x 2-line liquid crystal display, a buzzer, and three pushbutton switches. Twelve general-purpose I/O lines with up to eight analog input channels allow for adding sensors or expanding the system.

Contacting Pololu

You can check the Pololu web site at http://www.pololu.com/ for additional documentation of the Orangutan robot controller, including datasheets, color pictures, application examples, and troubleshooting tips.

We would be delighted to hear from you about your project and about your experience with our product. You can contact us through our online feedback form or by email at support@pololu.com. Tell us what we did well, what we could improve, what you would like to see in the future, or anything else you would like to say!

Programming the Microcontroller

Orangutan has a 6-pin programming connector on the upper right side; the robot controller is designed for an AVR ISP in-system programmer from Atmel or a compatible programmer. Pin 1 is toward the top end of the board.

Schematic Diagram

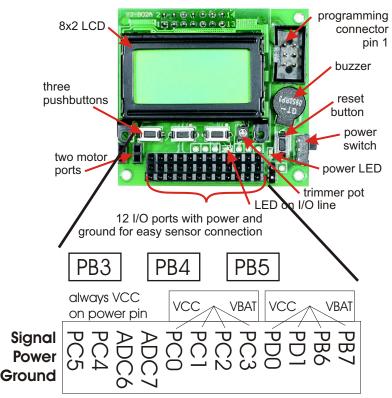
The complete schematic for the system is shown on the back of this sheet, including all optional components. The PCB includes a footprint for a resonator, which can be used to increase the clock speed or improve the accuracy of the clock. However, using the resonator makes I/O pins PB6 and PB7 unavailable; two zero-ohm resistors are installed to connect the microcontroller pins to the user connector strip. These resistors can be removed to disconnect the oscillator circuit from any external influence. Resistor R5 can be installed to adjust the contrast of the LCD.

Important Notes

The power to the board $(5-10\,\mathrm{V})$ can be connected through the 2-pin male connector at the bottom right of the board. The power connected there is routed through a diode that provides reverse-battery protection but which introduces additional losses between the battery voltage and the motor voltage. The diode can be bypassed by connecting the positive supply to the unpopulated hole next to the power connector.

Eight of the twelve I/O ports have selectable power sources of either the regulated voltage (5V) or the direct battery input (which is not disconnected by the power switch). The ports are grouped in two sets of four, and a jumper (small piece of wire) must be installed to make the selection. The remaining 4 connectors (for PC4, PC5, ADC6, and ADC7) are always connected to VCC.

The LCD, pushbuttons, and programming connector share I/O lines. The LCD should be configured so that the data bus lines are in high-impedance mode to make the buttons readable. The MEGA168's internal pull-up resistors on the pushbutton pins should be disabled prior to using the pushbuttons.



Voltage Select JP1 3 2 1 Header 3 JP15 VBAT Header 3 JP7 Orangutan Robot Controller Schematic Diagram ADC7 PC5 Voltage Select JP2 D2 Green 3 2 1 R18 10k TRIMPOT PD0 VBAT ∳ 83 \$ Red Red PB7 PB6 =C6 C0603 0.1 uF 85 Ş 85 PC1 PC2 PC3 PC4 ADC6 ADC7 10_uH PC6 200 PD1 AVCC 18 AREF 20 Motor1 JP18 1 2 Motor2 PC6 (RESET) 29 ~ ~ -C5 C0603 0.1 uF PC0 (ADC0) A PC1 (ADC1) A PC2 (ADC2) A PC4 (ADC4/SDA) A PC5 (ADC5/SC1) A ADC7 A PD1 (TXD) PD0 (RXD) ATmega168 VBAT =C4 C0603 2.2 uF 00T3 12 00T4 10 00T1 GND VS1 VS2 VCC PD2 (INT0) PD3 (INT1) PD4 (XCK/T0) PD6 (OC0B/T1) PD6 (OC0A/AIN0) PD7 (AIN1) PB0 (ICP) PB1 (OC1A) PB2 (SS/OC1B) PB3 (MOSI/OC2) PB4 (MISO) PB5 (SCK) C0603 0.1 uF PB6 (XTAL1/TOSC1) PB7 (XTAL2/TOSC2) GND GND CBND Vcont ΣZ C2 C0603 0.1 uF up to 20 MHz Not Populated -\$∞\$ R14R18R14 U1 LP2950CDT-5.0 PB6 PD2 PD3 PD5 PD5 PD6 IN OUT -||-╢ PB1 PD5 PB2 PD6 C0603 0.1 uF BUZZER → VBAT oSW5 7. K R17 R9 PB3 R16 10k 88 3 SW1 Ş| 7R15 710k >10k Not Populated SP header PD4 PD2 PD3 049 PB3 PB5 PD7 PB4 Ø₽ E a a 200 DB5 412 DB3 410 DB6 4 3 R18 < 4.7k < DB4 411 9 Д Ш R/W 45 DB2 49 DB0 DB1 RS 4 VDD Vss LCD2X8 % **~**← LCD1

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