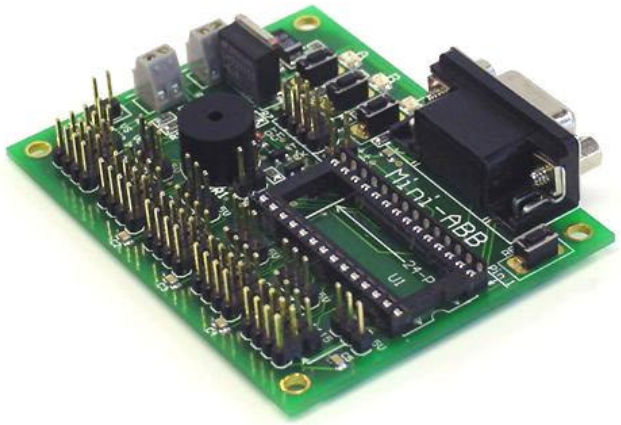
Mini-ABB

Atom Bot Board

for BASIC Atom, BASIC Atom-Pro,
BS2, BS2-E, OOPic-C, BASICX-24

Quick Start Guide

See the website for more information



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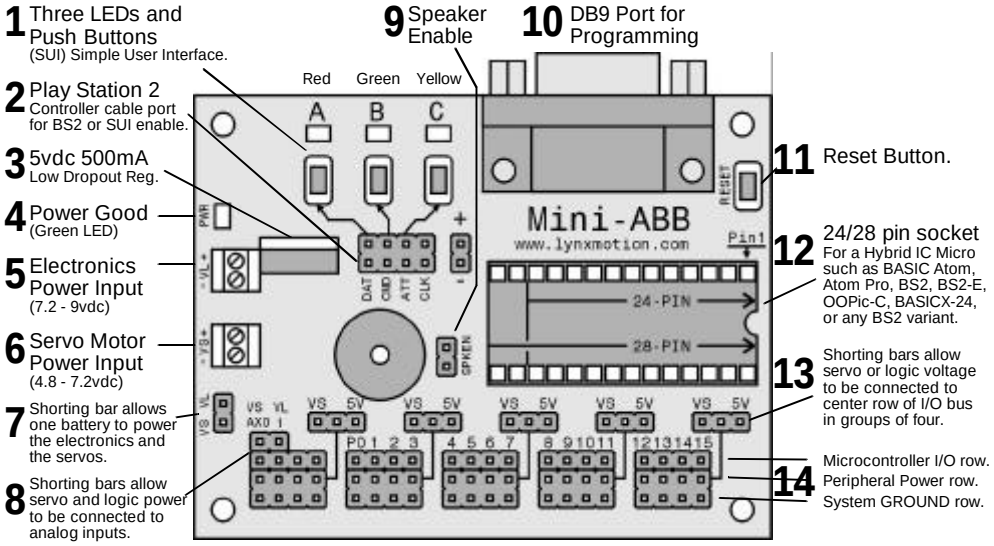
Users Manual ABB-01 Ver 2.0

Things that go Boom!

Caution! Read this quick start guide completely before wiring and applying power to the board! Errors in wiring can damage the Bot-Board, Hybrid microcontroller, and any attached peripherals.

Caution! Never reverse the power coming in to the board. Make sure the black wire goes to (-) ground, and the red wire goes to (+) Vlogic, or Vservo. Never connect peripherals when the board is powered on.

Caution! The onboard regulator can provide 250mA total. This includes the Hybrid microcontroller chip, the onboard LEDs, and any attached peripherals. Drawing too much current can cause the regulator to overheat.



1 The 3 LEDs and Pushbuttons use only 3 I/O lines to make a simple user interface for your program. By making the I/O line a low output the LED can be turned on. By briefly making the I/O line an input the I/O line can be read to see if a button is being pressed. However, do not make the I/O line a high output and press a button, as damage to the I/O pin can occur. The shorting bars will need to be installed for these LEDs and Pushbuttons to be used.

Chip I/O	PB/LED
Pin 4	A RED
Pin 5	B GREEN
Pin 6	C YELLOW

2 This port is for connecting a Sony Playstation controller to use as a robot controller. This port is specific to the Basic Stamp 2, as it has an inverter built into the Clock signal. When using this port connect the PS2 cable as shown to the right. The Sony and Madcatz units we tested only required a 1K pullup on Pin 4, which is built into the board. Other brands may require a pullup on Pin 7, not included. When using the Atom or Atom-Pro you use the I/O bus, Pins 4 thru 7, as it does not use the inverter on the Clock line. Note, some wireless units will require the green wire be connected to 7.5vdc.

Chip I/O	PS2 cable
Pin 4	DAT Brown
Pin 5	CMD Orange
Pin 6	ATT Blue
Pin 7	CLK Black
*SrvPwr	+7.2 Green
5vdc	+ Yellow
GND	− Black

*Required to enable vibrating motors inside the controller, or for some wireless units.

3 The Low Dropout regulator will provide 5vdc out with as little as 5.5vdc coming in. This is important when operating your robot from a battery. It can accept a maximum of 9vdc in. The regulator is rated for 500mA, but we are de-rating it to 250mA to prevent the regulator from getting too hot.

4 This is a Power Good LED. When you have successfully applied power to the onboard regulator the green LED will turn on.

5 This is the Electronics Power Input. It is also referred to as the Logic Voltage, or VL. This input is normally used with a 9vdc battery connector to provide power to the Hybrid IC and anything connected to the 5vdc lines on the board. This input is used to isolate the logic from the Servo Power Input.

Board	Input
VL+	RED
VL-	BLACK

6 This is the Servo Motor Power Input. It is also referred to as VS. It can be 4.8vdc to 7.2vdc. However, some micro servos will not tolerate more than 6vdc. This input is used to provide power for the servos only, or to provide power to both logic and servos (see 7).

Board	Input
VS+	RED
VS-	BLACK

7 This allows you to power the Servos and Logic from the same battery. It simply connects the VS input to the VL input. Caution, when using this option do not use the VL input.

8 This allows the VL and/or VS inputs to be connected to two of the Atom-28's analog inputs through a 4:1 voltage divider. For example, if the battery voltage were 9vdc the analog input would see 2.25vdc.

Chip I/O	V-Input
AX0	V-Servo
AX1	V-Logic

9 This shorting bar enables the onboard speaker. To use the speaker, send the appropriate sound generating command to Pin 9. Note, the I/O pin does not drive the speaker directly, it just turns on a buffer transistor.

10 Simply plug a straight-through M/F DB9 cable from this plug to a free 9 pin serial port on your PC for downloading programs and receiving debug info.

11 This Pushbutton will reset the micro when pressed. This can be useful for starting a different program depending on which Pushbutton is pressed.

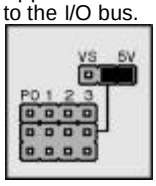
12 This is where you plug in the Hybrid microcontroller. This can be an Atom, Atom-Pro, any Basic Stamp 2, the OOPic-C, BASICX-24, etc.

13 This is where you configure the I/O bus center row to use VL (+5vdc from the onboard regulator) or VS (direct from the Servo Power Input). This is done in banks of four I/O pins. Caution, applying the servo voltage to this row with a 5vdc peripheral installed will cause damage to the peripheral.

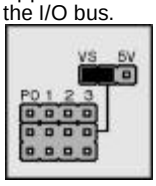
14 This is where you connect servos, motor controllers, sensors, etc. to the microcontroller. Use caution when connecting anything to the I/O bus. Never connect anything while the power is on.

Shorting Bar Jumpers and Connectors at a glance

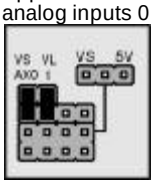
Applies +5vdc to the I/O bus.



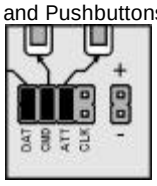
Applies VS to the I/O bus.



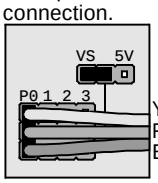
Applies VS and VL to analog inputs 0 and 1.



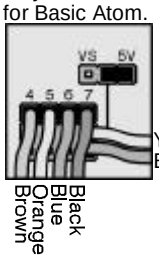
Enables the LEDs and Pushbuttons.



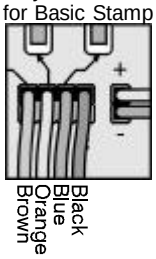
Example servo connection.



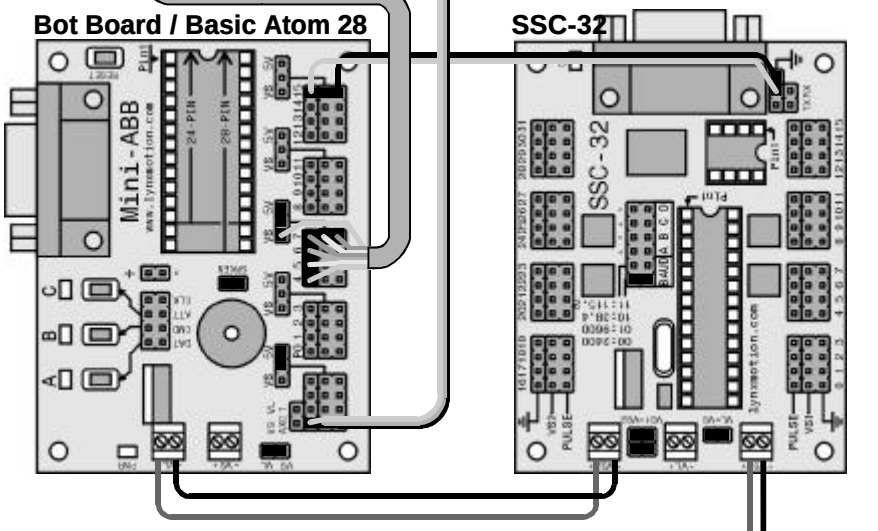
PlayStation 2 cable for Basic Atom.



PlayStation 2 cable for Basic Stamp 2.



Hexapod 2 - (optional L5/6 Arm) RC Wiring Diagram




```
SSC-32 I/O-L5/6 Arm
-------------------
08  Base Rotate
09  Shoulder
24  Elbow
25  Wrist
26  Gripper
27  Wrist Rotate
```

```
SSC-32 I/O-H2 Leg
-------------------
00  Right Rear V
01  Right Rear H
02  Right Center V
03  Right Center H
04  Right Front V
05  Right Front H
16  Left Rear V
17  Left Rear H
18  Left Center V
19  Left Center H
20  Left Front V
21  Left Front H
```

ABB I/O	PS2 cable
Pin 4	DAT Brown
Pin 5	CMD Orange
Pin 6	ATT Blue
Pin 7	CLK Black
*SrvPwr	+7.2 Green
5vdc	+ Yellow
GND	− Black

*Required to enable vibrating motors inside the controller, or for some wireless units.

Master Power on off

Battery Quick Connect

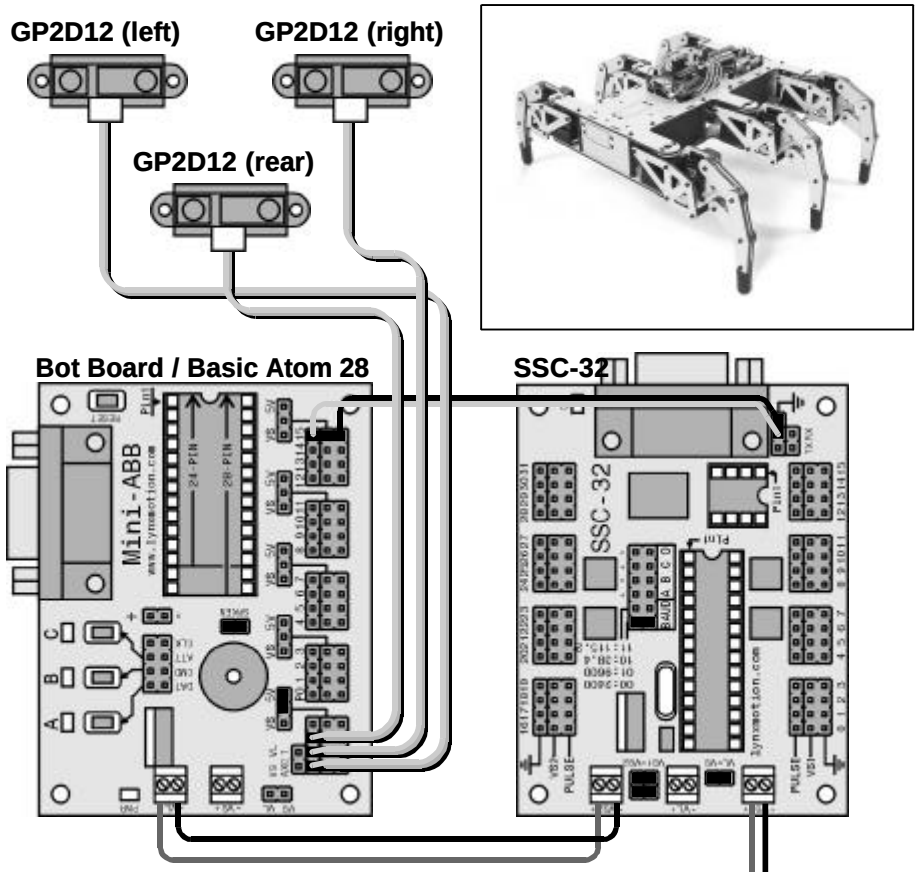
+

7.2vdc 1600mAh NiMH Battery Pack

How does it work?

Refer to the website for the Hexapod 2 - L5/6 Remote Control project for the program and complete instructions. This project offers complete control of all aspects of the hexapod walking gait, and you can even mount an L5 or L6 arm on the hexapod robot. Note, this is verified to work with MadCatz brand wireless controllers only!

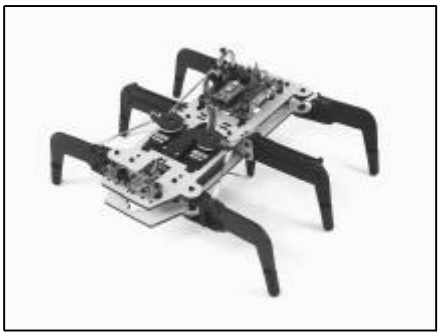
12 Servo Hexapod (Autonomous) Wiring Diagram



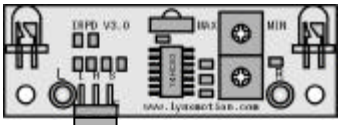
SSC-32 I/O	
15	SSC-32 S-IN
AX0	GP2D12 Left
AX1	GP2D12 Right
AX2	GP2D12 Rear

SSC-32 I/O-H2 Leg	
00	Right Rear V
01	Right Rear H
02	Right Center V
03	Right Center H
04	Right Front V
05	Right Front H
16	Left Rear V
17	Left Rear H
18	Left Center V
19	Left Center H
20	Left Front V
21	Left Front H

3 Servo Hexapod Wiring Diagram

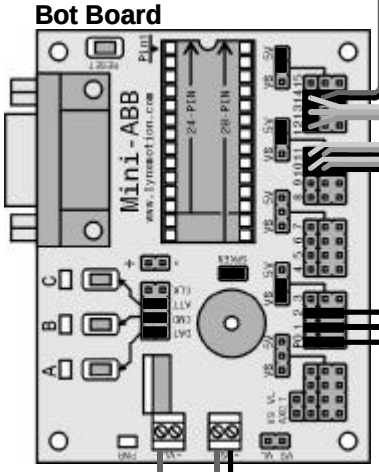


IRPD

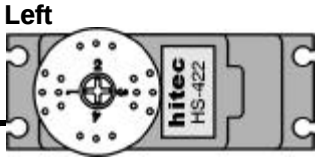


BLUE (L) = I/O 12
VIOLET (R) = I/O 13
YELLOW (S) = I/O 14
RED = +5VDC
BLACK = GROUND

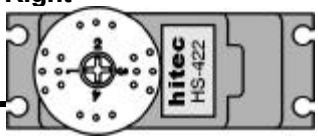
Bot Board



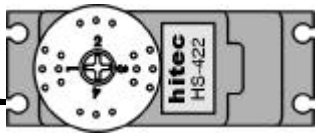
Left



Right



Middle

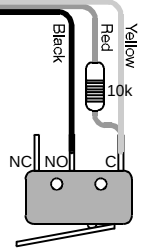


Electronics Power
on
off

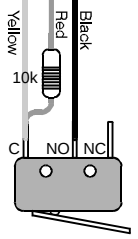
Servo Power
on
off

Battery
Quick
Connect
+

7.2vdc 1600mAh NiMH Battery Pack



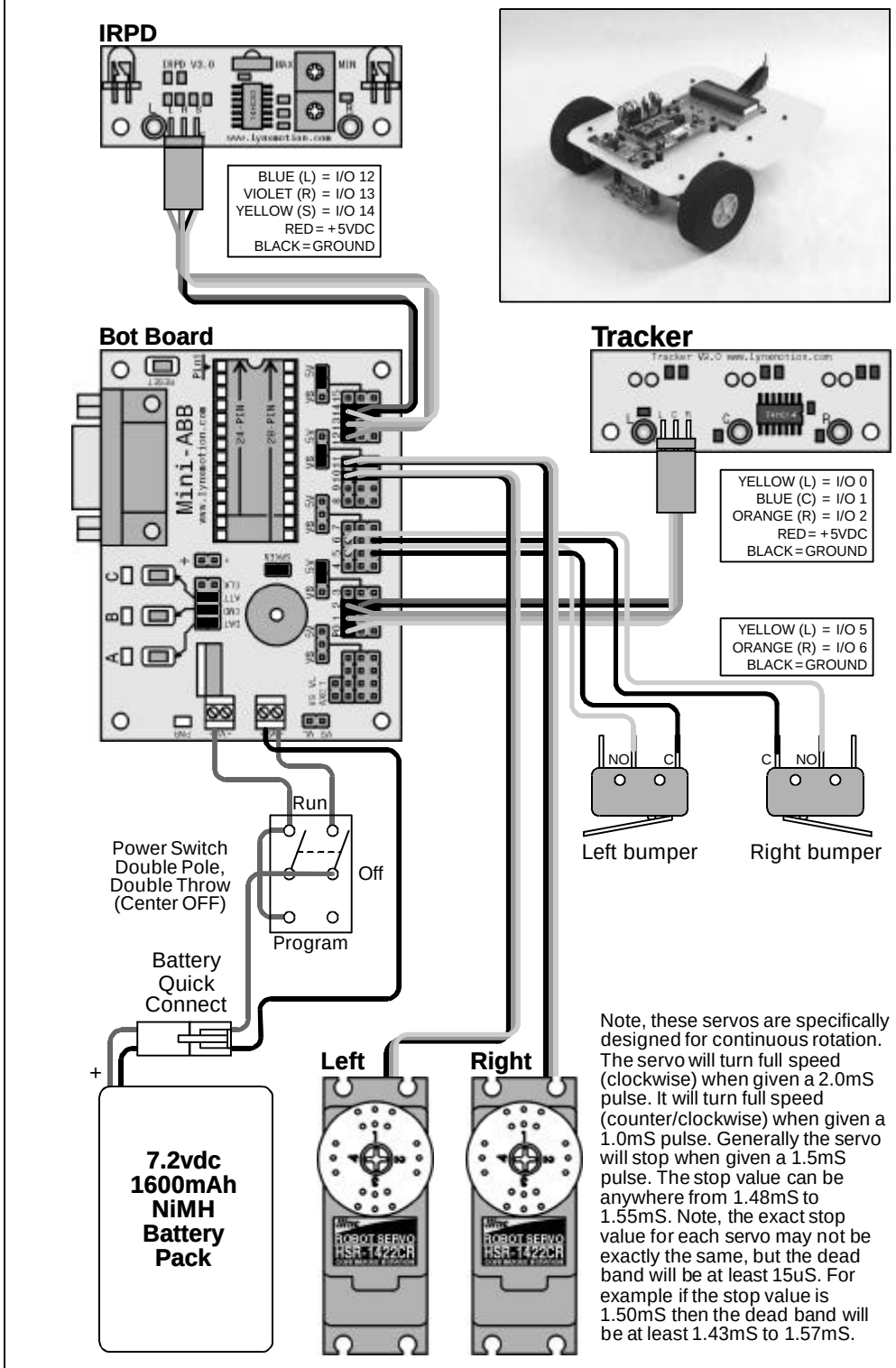
Left bumper



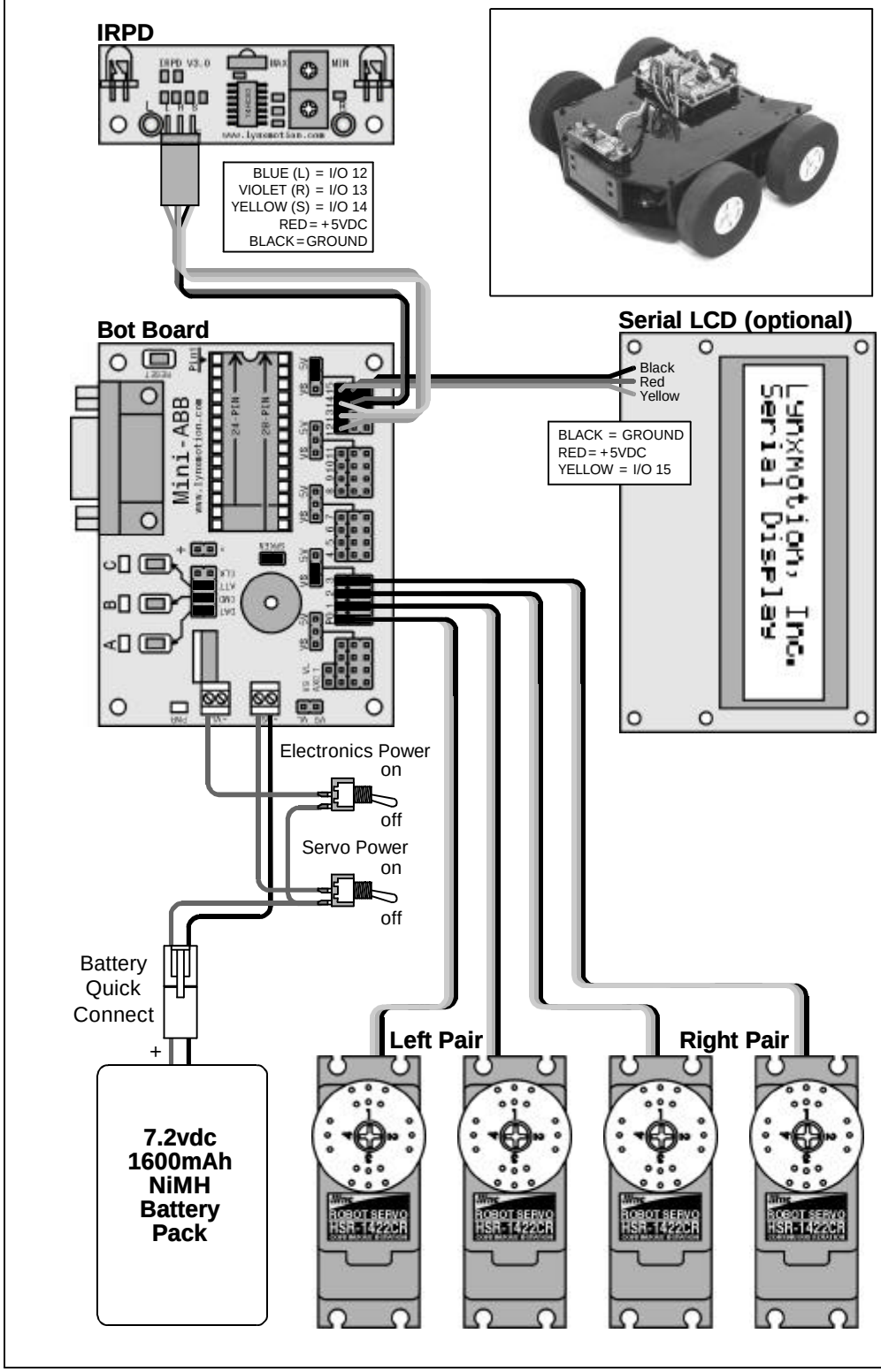
Right bumper

The bumper switches can be added as illustrated. The 10k pullup resistor will ensure the I/O pin will read as a high when the snap switch is not pushed in. The I/O pin will read a low when the bumper switch is pushed in.

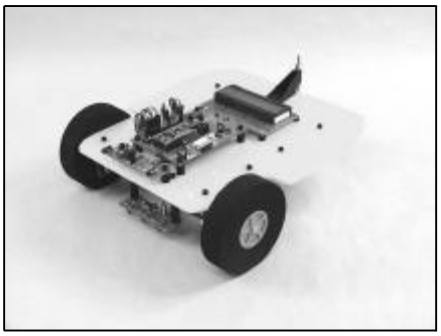
2 Wheel Rover Wiring Diagram



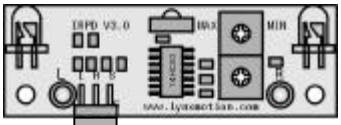
4 Wheel Rover Wiring Diagram



Dual H-Bridge Rover Wiring Diagram

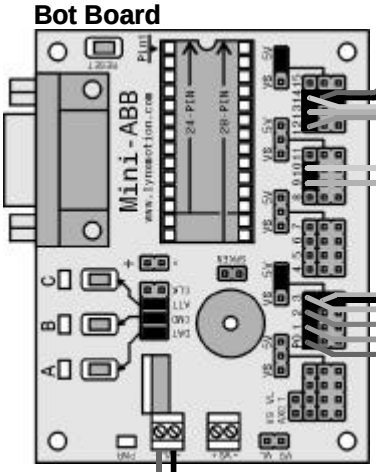


IRPD



BLUE (L) = I/O 12
VIOLET (R) = I/O 13
YELLOW (S) = I/O 14
RED = +5VDC
BLACK = GROUND

Bot Board

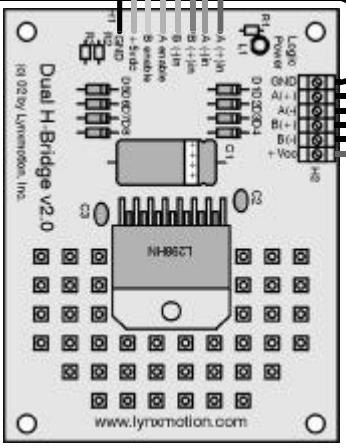


Electronics Power
on
off

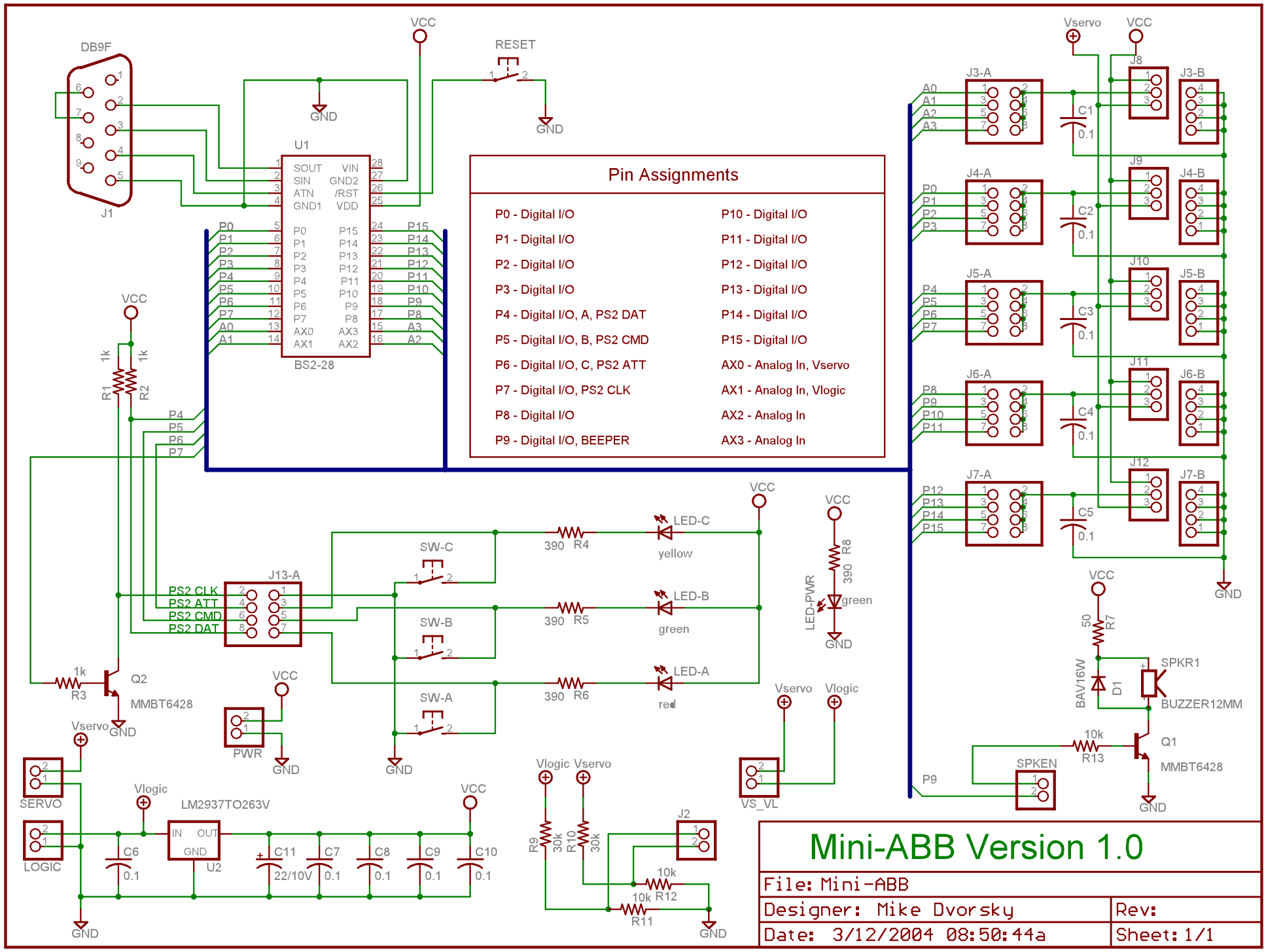
Motor Power
on
off

Battery
Quick
Connect
+

7.2vdc 1600mAh NiMH Battery Pack



Motor A
Motor B


DB9F
J1
VCC
GND
RESET
U1
SOUT
SIN
ATN
GND1
VIN
GND2
/RST
VDD
P0
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
AX0
AX1
AX2
AX3
A0
A1
A2
A3
BS2-28
Pin Assignments
P0 - Digital I/O
P1 - Digital I/O
P2 - Digital I/O
P3 - Digital I/O
P4 - Digital I/O, A, PS2 DAT
P5 - Digital I/O, B, PS2 CMD
P6 - Digital I/O, C, PS2 ATT
P7 - Digital I/O, PS2 CLK
P8 - Digital I/O
P9 - Digital I/O, BEEPER
P10 - Digital I/O
P11 - Digital I/O
P12 - Digital I/O
P13 - Digital I/O
P14 - Digital I/O
P15 - Digital I/O
AX0 - Analog In, Vservo
AX1 - Analog In, Vlogic
AX2 - Analog In
AX3 - Analog In
R1
R2
1k
PS2 CLK
PS2 ATT
PS2 CMD
PS2 DAT
J13-A
SW-C
SW-B
SW-A
LED-C
LED-B
LED-A
LED-PWR
yellow
green
red
390 R4
390 R5
390 R6
390 R8
R3
Q2
MMBT6428
PWR
SERVO
LOGIC
LM2937TO263V
IN
OUT
GND
U2
C6
C7
C8
C9
C10
C11
0.1
22/10V
Vservo
Vlogic
VS_VL
R9
R10
R11
R12
30k
10k
J2
J3-A
J3-B
J4-A
J4-B
J5-A
J5-B
J6-A
J6-B
J7-A
J7-B
J8
J9
J10
J11
J12
C1
C2
C3
C4
C5
R7
50
BAV16W
D1
SPKR1
BUZZER12MM
Q1
R13
SPKEN
P9
Mini-ABB Version 1.0
File: Mini-ABB
Designer: Mike Dvorsky
Date: 3/12/2004 08:50:44a
Rev:
Sheet: 1/1

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