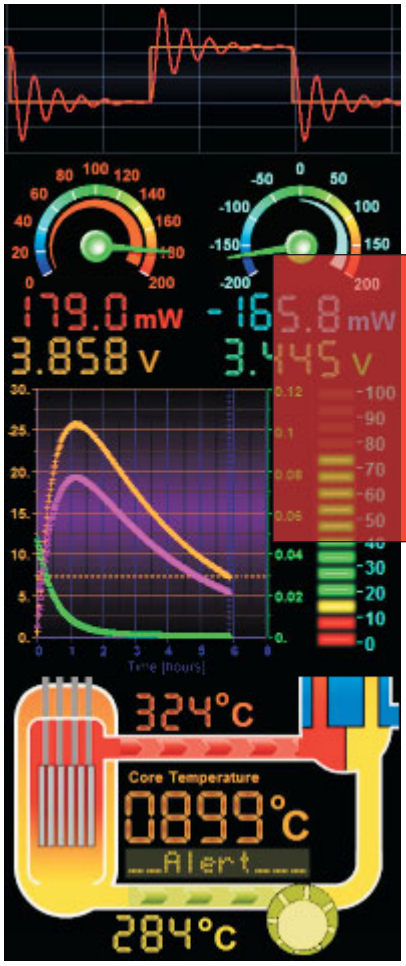
Getting Started with LabRecon for Robotics



This document covers the use of LabRecon for **Robotics/Mechatronics** such as controlling **motors & servos** from a **trackball** or external **joystick.**

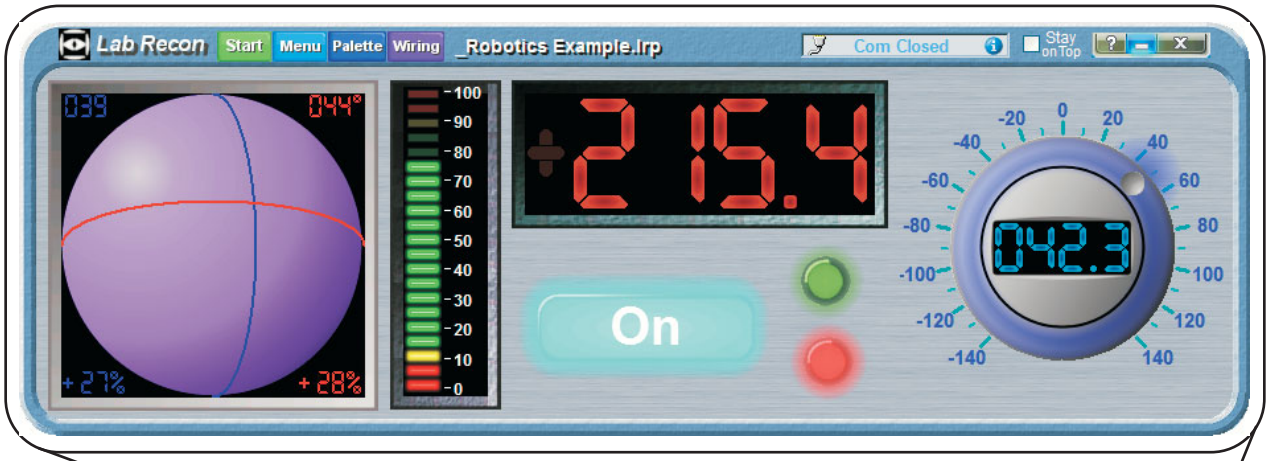
Another document, **"LabRecon - Getting Started with Measurements"**, covers the implementation of **measurements.**

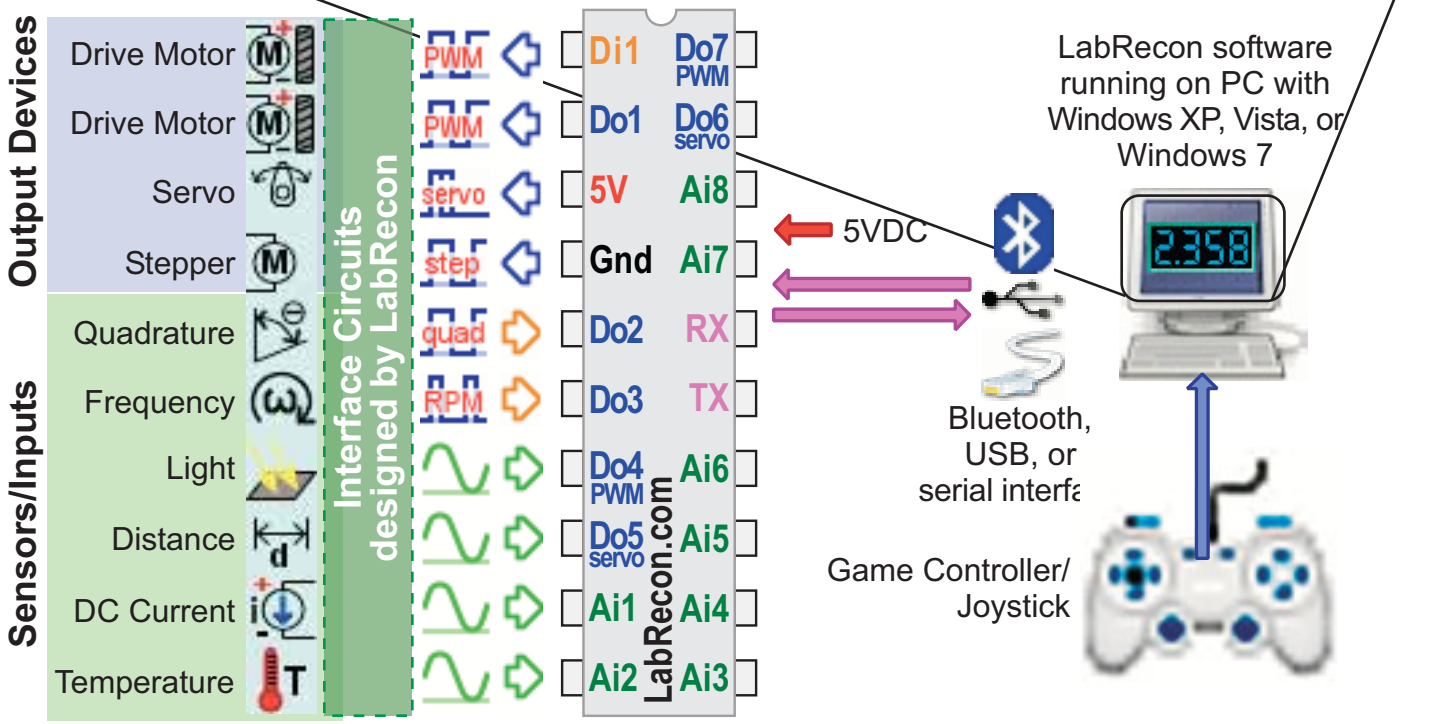
LabRecon

Software and Hardware for Measurement, Control and Simulation

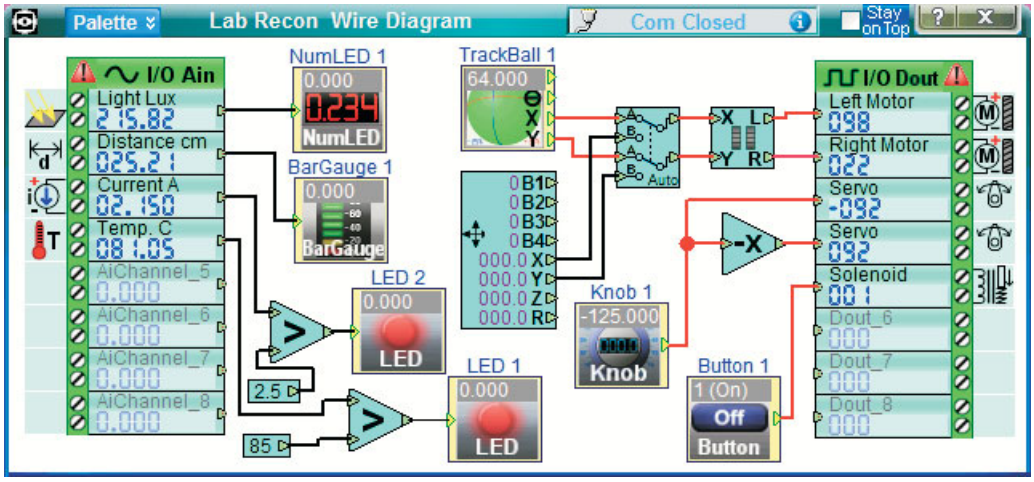
Output Devices, such as DC **motors**, **servos, and stepper motors** can be controlled by objects on the Panel or by a **game controller/joystick**.

Sensors, such as for **light and distance** can source values on the Panel and can further be used to control the outputs by creating control logic on the W**iring Diagram.**

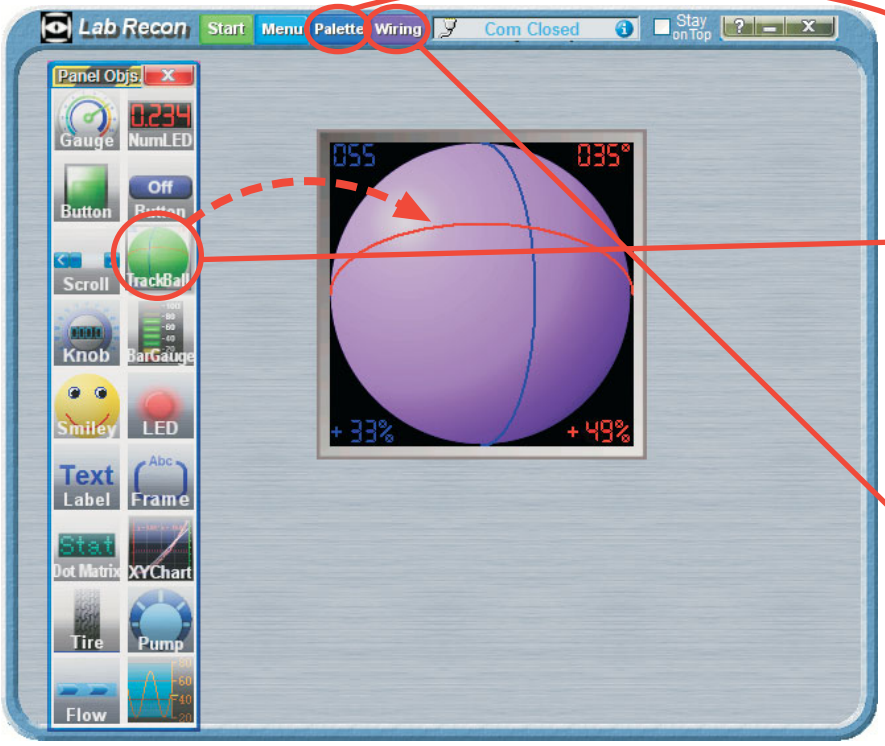




Sensors, such as for **light and distance** can source values on the **Panel** and can further be used to control the outputs by creating control logic on the W**iring Diagram.**



Adding Objects to the Panel and Wire Diagram

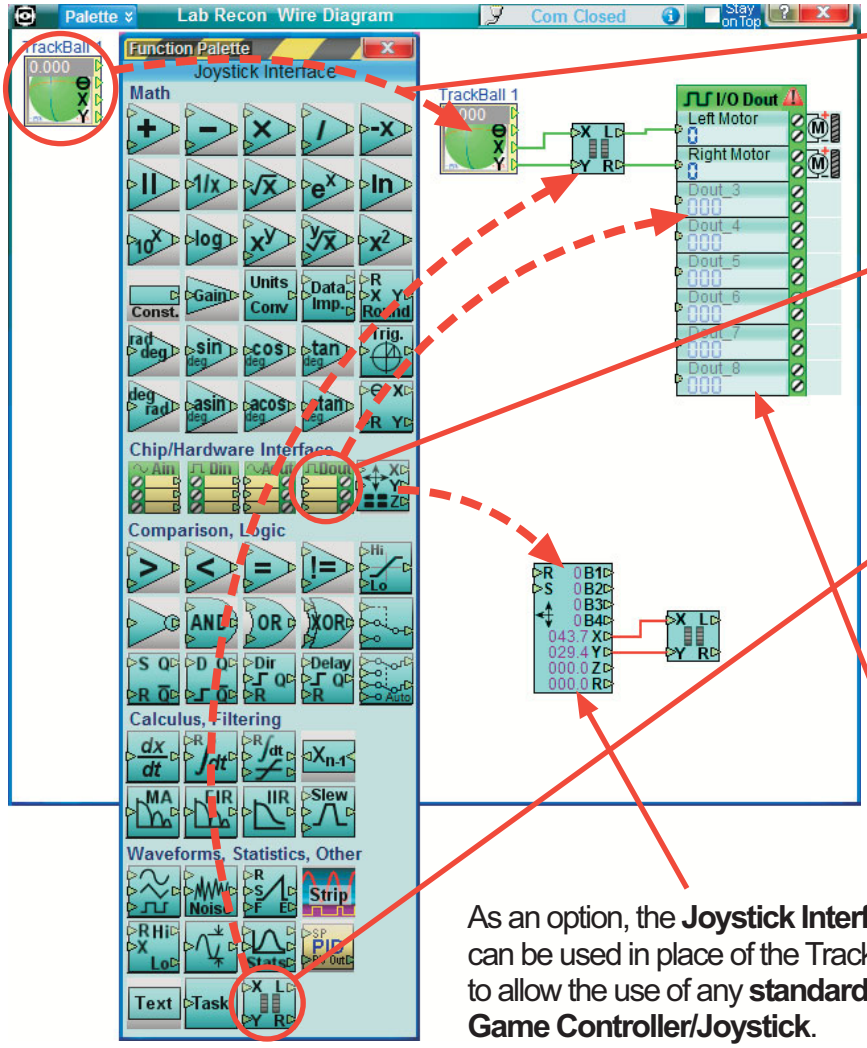


1 Click on **"Palette"**.

2 Click and hold while dragging the **Trackball Panel Object** onto the **Panel**.

As the Trackball is moved with the mouse, the corner values will reflect the ball's position.

3 Click on **Wiring** to open the **Wire Diagram** shown below.



4 Move the object, which was created automatically to represent the Trackball, to a new position.

5 Click and hold while moving the **"IO Digital Outputs"** object onto the Wire Diagram.

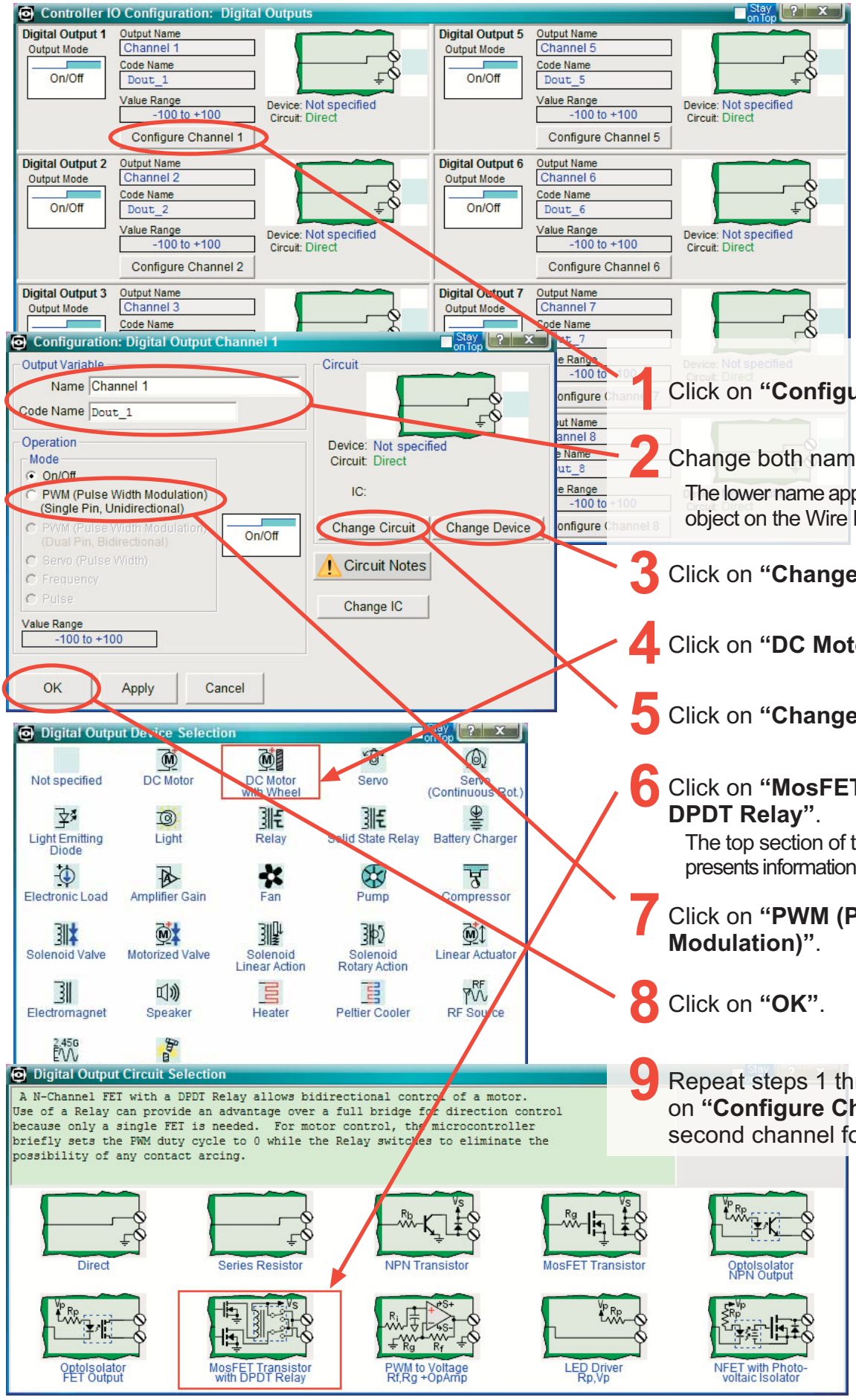
The text and icons will appear at a later step.

6 Add a**"X,Y to Left,Right"** object.

7 Wire the objects just placed, as shown, by clicking on a **triangular connection point** and using additional mouse clicks to complete the wire routing.

8 Right click on the **IO Digital Ouputs** object and select **"Properties"** to open the screen shown on the next page.

As an option, the **Joystick Interface** can be used in place of the Trackball to allow the use of any **standard Game Controller/Joystick**.



1 Click on **"Configure Channel 1"**.

2 Change both names to **"Left Motor"**.

The lower name appears on the object on the Wire Diagram.

3 Click on **"Change Device"**.

4 Click on **"DC Motor with Wheel"**.

5 Click on **"Change Circuit"**.

6 Click on **"MosFET Transistor with DPDT Relay"**.

The top section of this screen presents information about the circuit.

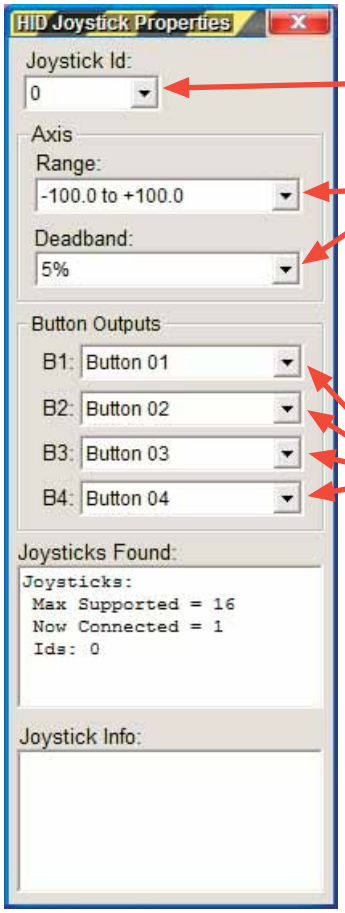
7 Click on **"PWM (Pulse Width Modulation)"**.

8 Click on **"OK"**.

9 Repeat steps 1 through 8, but click on **"Configure Channel 2"** to set a second channel for **"Right Motor"**.

Joystick/Game Controller Properties

When the **Joystick Interface** object is placed on the Wiring Diagram it should be **ready to use as is** for **4 axes (-100 to 100)** and **buttons 1 to 4**. Properties can be setto use different buttons as shown below.



This Properties screen is opened by **right clicking** on the Joystick object on the **Wiring Diagram** and selecting **"Properties"**. The joystick should be **connected to the computer before opening this screen**.

The Joystick Id selects the joystick to use if multiple joystick devices are connected to the computer. The lower **"Joysticks Found"** box shows joysticks presently available.

The **Range and Deadband** settings apply to all 4 Axes (X, Y, Z, R).

The Axis **Range** by default is -100 to 100, but can be set to other options as listed.

-1.000 to +1.000
-10.00 to +10.00
-100.0 to +100.0
-255.0 to +255.0
-1000 to +1000
-32767 to +32767

The Axis **Deadband** determines the amount the joystick must be moved from its center position to produce a value. The default is 5%, but can be set to other values as listed.

None
1%
2%
5%
10%
15%
20%
25%

The **Button Outputs** determine the assignments of the **B1, B2, B3, B4** ouputs of the Joystick object.

By default, the outputs follow the state of the corresponding buttons, **1, 2, 3, 4**, on the game controller. Each "B" mapping an be set tto any of the options on the right.

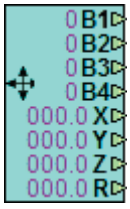
The **"Point-Of-View"** option allows an output to follow the **POV control** on a game controller, which will output **0 or direction values from 45 to 360** with a resolution of 45 degrees.

The **"All Buttons"** option allows an output to produce a value in which each bit follows a button.

Button 01	Button 10
Button 02	Button 11
Button 03	Button 12
Button 04	Button 13
Button 05	Button 14
Button 06	Button 15
Button 07	Button 16
Button 08	All Buttons (bits)
Button 09	Point-Of-View

This front and top view of a Logitech USB Game Controller shows the axis and button ids.

The **B1, B2, B3**, and **B4** outputs initially follow the corresponding buttons and can be remapped as shown above.



The **X, Y, Z**, and **R** outputs follow the corresponding axes with default ranges of -100 to +100, which can be changed as shown above.

Connecting to the LabRecon Chip or Hardware

1 Insure the LabRecon Chip or Hardware is **powered** and **connected** to the PC.

If using USB, the cable should be attached.

(If using wireless Bluetooth see notes below.)

2 Click on **"Start" on** the main screen.

3 Click on **"Connect to LabRecon Chip/Hardware".**

4 Click on **"Select Port".**

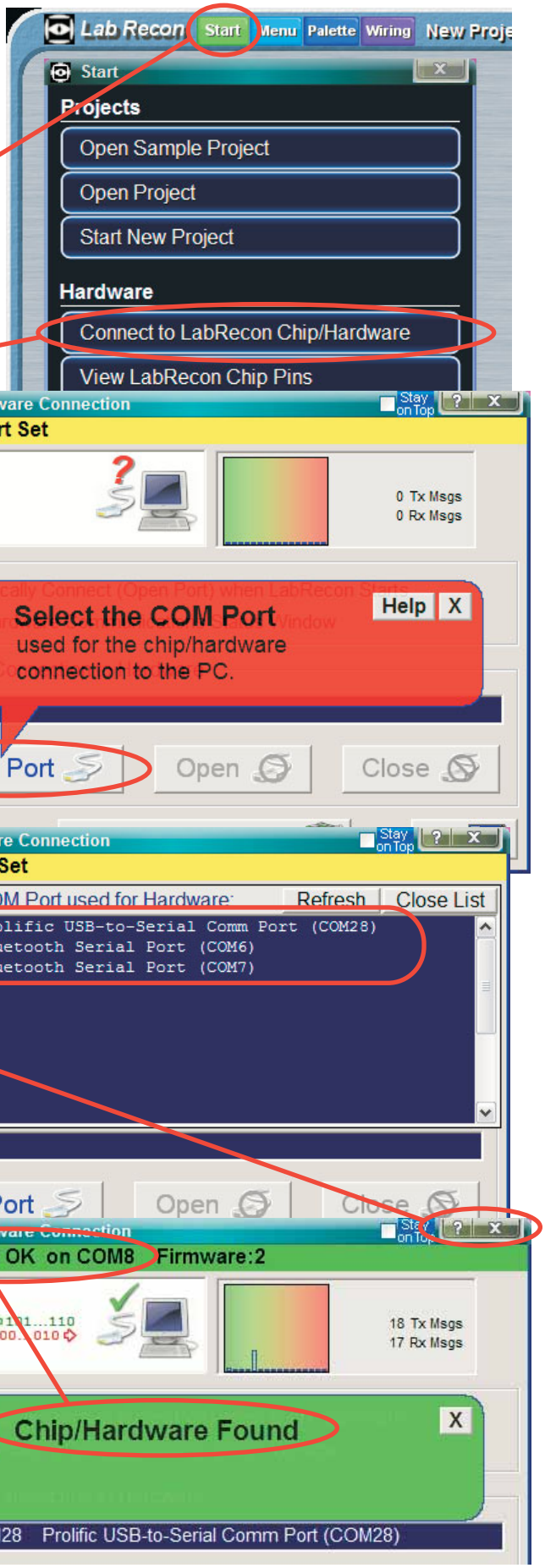
If the COM port has been specifed in the LRConfig.ini file, the attention message may not show.

5 Click on the **COM port** used for the **LabRecon connection**.

(If using Bluetooth see notes below.)

Messages should indicate if the connection was successful with a "Chip/Hardware was Found" message.

6 Click on the top **"X"** to exit.

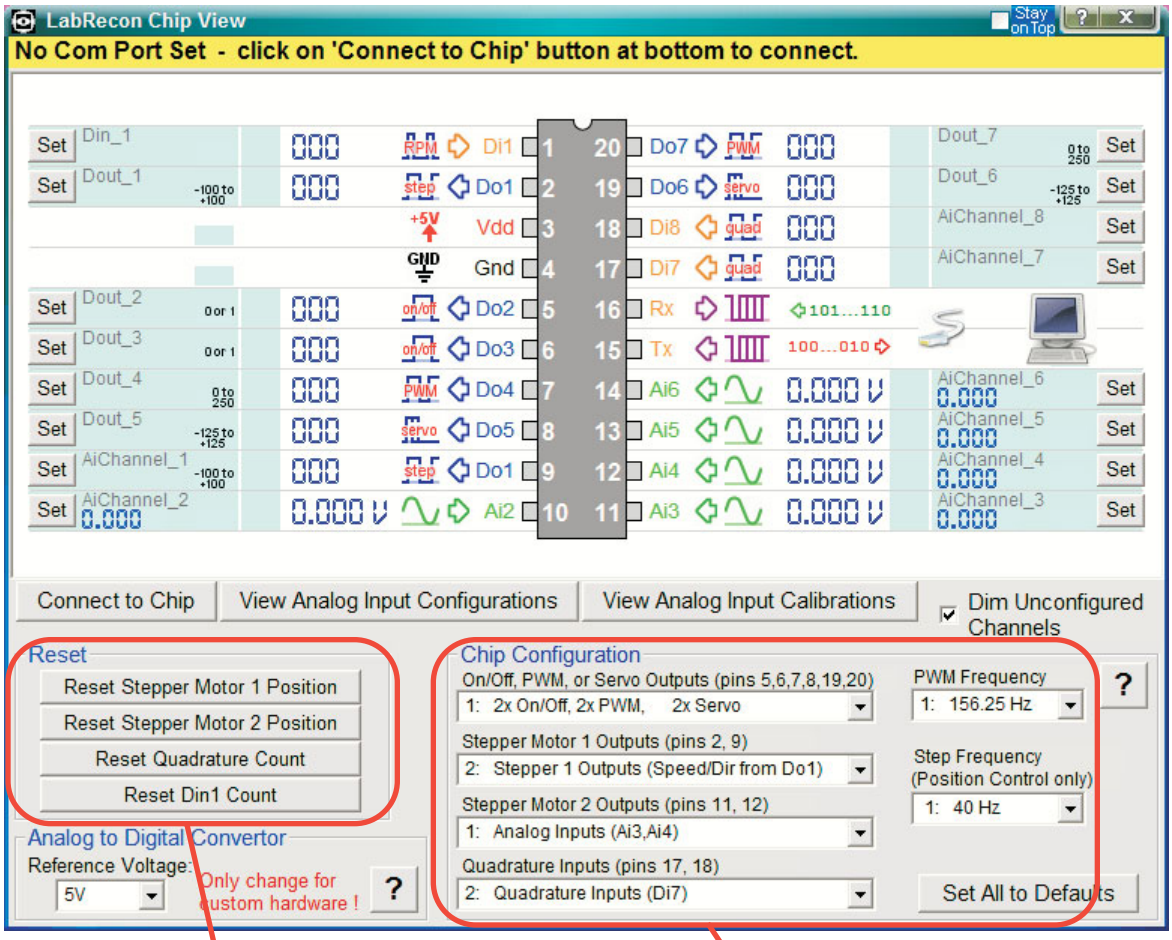


If the connection fails see the **"Connection Troubleshooting"** page or click the top **"?"** or **"Help"** on any message.

Bluetooth Notes:

If using Bluetooth, the hardware must be "paired" with the PC's Bluetooth adapter using the Bluetooth software provided by the manufacturer of the Bluetooth device or the PC. A default password of 0000 may be requested.

There may be multiple COM ports. The Bluetooth software should indicate the COM Port used for the present connection.



These buttons reset the counters associated with the Stepper Motor Outputs, the Di1 Counter, and the Quadrature Counter.

These list boxs allow changing the functionality of some pins for various combinations of analog inputs, digital inputs, and digital outputs.

Digital input options include combined Count/Frequency and Quadrature/Frequency.

Digital output options include On/Off, PWM, Directional PWM, Servo, and Stepper Motor.

See the “LabRecon Chip Datasheet” document for additional information.

Additional Documents (www.LabRecon.com/Documents.html):

LabRecon - Chip Datasheet (rev2.0).pdf
LabRecon - Getting Started with Measurements (rev1).pdf
LabRecon - Measurement Configuration.pdf
LabRecon - Photovoltaics.pdf
LabRecon - Reflow Oven PID Control.pdf

Instructional Videos:

www.LabRecon.com/Videos.html

Revisions to this Document

Rev 0	Initial document
Rev 1	added chip configuration

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