

Bonus EV3 Programming Lessons



MINDSENSORS PSP-Nx Controller for LEGO® MINDSTORMS®



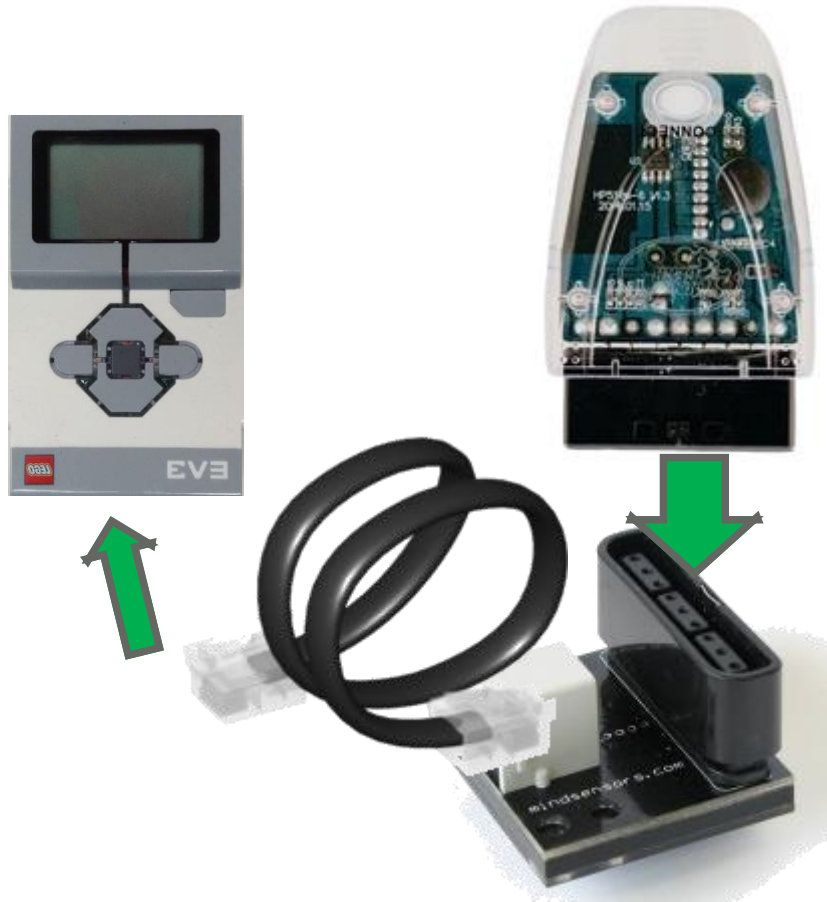
By Seshan Brothers

What is the PSP-Nx Controller?

- The controller is a PS2 controller with a matching receiver
- There is an adapter to connect the receiver to a LEGO sensor port



Step 1: Assembling the Receiver



- Follow the manufacturer's recommendations at all times.
- Attach the receiver into the adapter board
- A standard EV3/NXT cable will work with the adaptor board to the EV3

Step 2: Connect the Remote

- a. Put two AA batteries in the controller's hatch on the back
- b. Turn the controller on by sliding the switch on the back of the controller
- c. Press the connect button on the receiver while pressing the middle button on the remote
- d. Press some keys on the controller. If there is a green light on the adapter board, your controller is paired



Step 3: Download Block

- Download the necessary block online from [http://www.mindsensors.com/ev3-and-nxt/32-
psp-nx-combo-with-wireless-controller](http://www.mindsensors.com/ev3-and-nxt/32-
psp-nx-combo-with-wireless-controller)
- Import it into your software by following our Importing Additional Blocks lesson

Software Libraries and Drivers

EV3 Block EV3 Sample EV3 Tribot Program NXT-G Block NXT-G Sample NXT-G Tribot Program

NXC Library and Sample RobotC (4.28+) Drivers RobotC Demo LeIOS LabVIEW LabVIEW Demo

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Mindsensors-PSPNxev3b

Downloads

New Block: Mindsensors PSPNx

This new block should show up in the Yellow sensor block pallet

Input 1 → i2c: Do not change this input if you do not completely understand i2c (i2c is the data sent out by the EV3 UART ports)

Input 2 → Desired Button: Which button do you want to compare

Input 3 → Pressure: Enables or disables Button Pressure (Output 2)

Output 1 → Button Bits: Raw button value. Returns different integers based on the buttons pressed

Output 2 → Button Pressure: How much is the desired button pressed in

Output 3,4 → Left Axis: Returns the X,Y values of the left axis

Output 5,6 → Right Axis: Returns the X,Y values of the right axis

Output 7 → Button pressed: Checks if the desired button is pressed

Output 8 → Success: Checks if data was read successfully



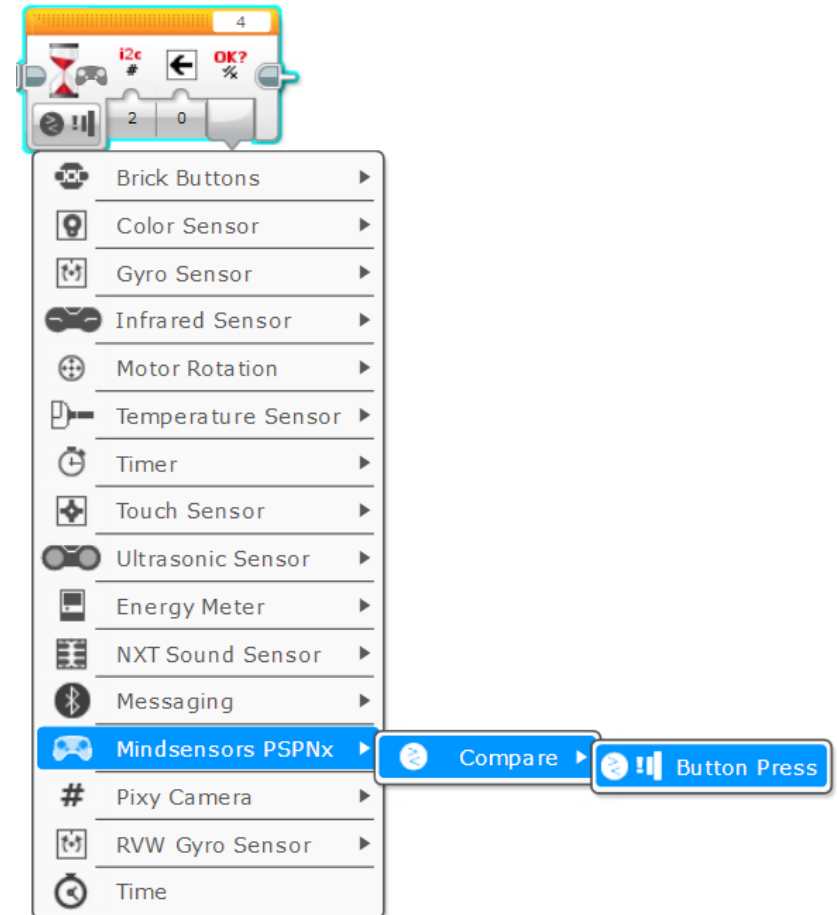
New Block: Wait – Mindsensors PSPNx

To get to the Wait Mindsensors PSPNx mode, click
Mindsensors PSPNx → Compare → Button Press

Input 1 → i2c: Do not change this input if you do not completely understand i2c (i2c is the data sent out by the EV3 UART ports)

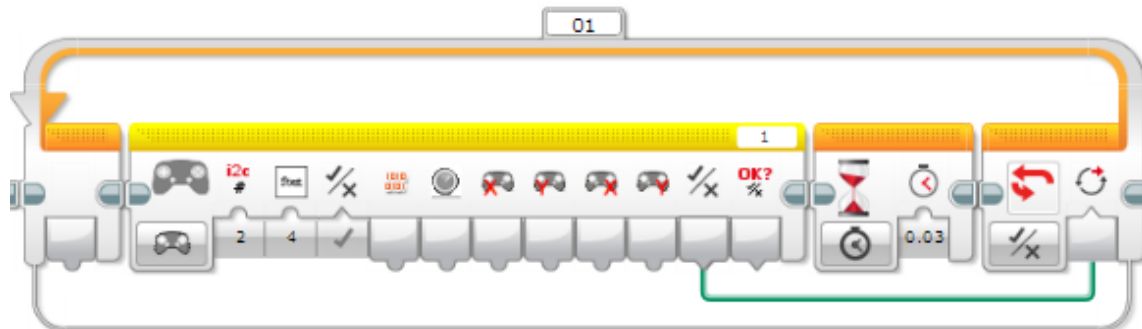
Input 2 → Desired Button: Which button do you want to compare

Output 1 → Success: Checks if data was read successfully



Warning: Read Error and False Readings

- A read error is when the outputs of the PSPNx blocks all read 0 continuously
 - *The read error happens when the program is rapidly reading from the PSP-Nx remote*
 - *There is bug in the EV3 which causes this read error when the reading speed is too high which happens in the Wait block*
 - *Mindsensors' Technical Support suggests that you use a loop instead of a wait until block to prevent using a Wait block*
- Unfortunately the block can occasionally give a false reading.
 - *Mindsensors' Technical Support suggests you add a 30 millisecond delay into the loop. The 30 millisecond delay is added to give time to prevent false readings.*
 - *We found that this delay only reduces the frequency of a false reading. It does not eliminate it. There are situations where the delay can help, but our tests showed that in some conditions a delay is not necessary*



Challenge 1:

- Keep moving until the X button is pressed
- Tips
 - *You will need to use the Wait – Mindsensors PSPNx block described on page 7*
 - *Note: You can use a Wait block in this situation*

Challenge 1 Solution:



Step 1: Turn on the motors

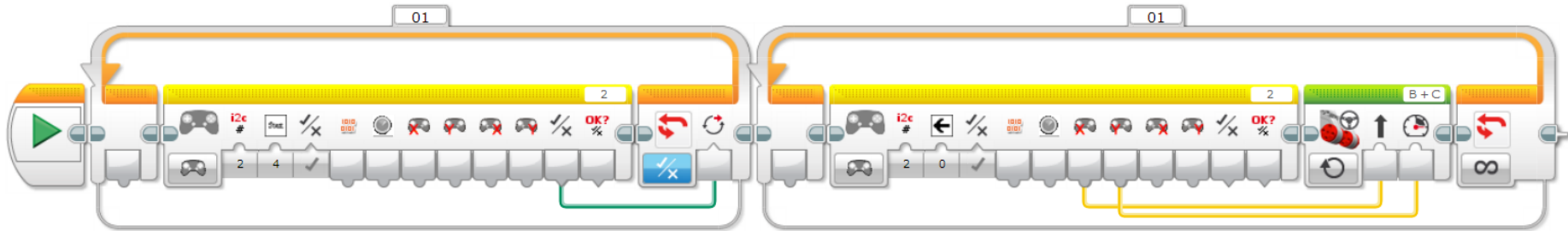
Step 2: Wait for the X button to be pressed

Step 3: Turn off the motors

Challenge 2:

- Create a simple Remote Control program that waits for the Start button to be pressed before controlling the robot
- Tips
 - *You will need the Mindsensors PSPNx Sensor block*
 - *In this situation, you will need to use the alternate code, described on page 8, for waiting until a button is pressed. The Wait for seconds block to reduce false readings will not be needed for this challenge*
 - *The X output for the joystick should be the steering*
 - *The Y output for the joystick should be the power*
 - *You will use the left joystick for both steering and power of the wheels*

Challenge 2 Solution:



Wait until the Start button is pressed using the alternate method without a Wait for seconds block

Read the PSP controller left axis (for X and Y) and wire it up to the steering and the power

Tips for Success

- You can update the program to include a math block that either multiplies or divides the X output for the joystick before going in the steering input
- If you need to invert your controls, just multiply the X,Y values by -1

Next Steps: Project Ideas

- Make a remote control program that uses the left joystick for power and the right joystick for steering
- Make a game using the buttons
- Create a remote controlled LEGO race car like the one in the photo on the left



CREDITS

- This tutorial was created by Sanjay Seshan and Arvind Seshan
- More lessons are available at www.ev3lessons.com



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