

# Connecting the LEGO NXT to the computer for control by Logicator

Before the NXT can be used in Logicator it must be bluetooth 'paired' with the computer. This is carried out by using the Windows bluetooth device wizard, as follows:



1. Ensure you are using Windows XP service pack 2 or later.  
*Earlier Windows versions (e.g. XP SP1) do not support Bluetooth*
2. Plug the bluetooth dongle into a spare USB port on the computer.
3. Switch the NXT on. Then, using the NXT switches,
  - Scroll to 'Bluetooth' and press the orange button
  - Scroll to 'Visibility' and press the orange button
  - Select 'Visible' by pressing the orange button
  - Scroll back to 'Turn Off' and press the orange button
  - Turn the NXT on again by pressing the orange button

This ensures the NXT bluetooth feature is enabled and visible.

4. Double click the blue colour 'bluetooth devices' icon on the Windows task bar.

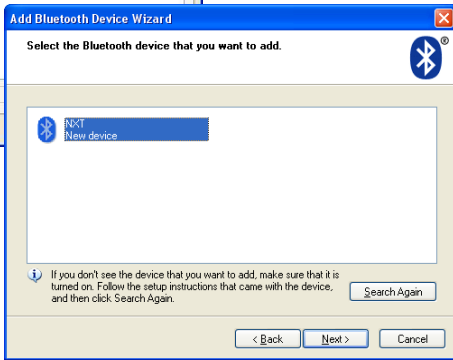


5. On the Devices tab of the Bluetooth Devices window click 'Add'.

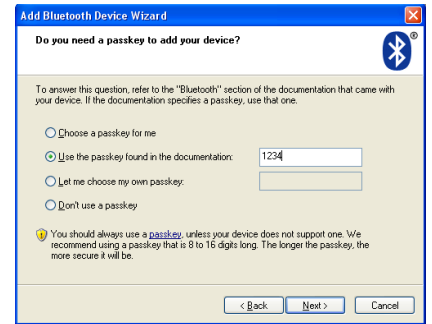
6. On the 'Add device' wizard, check 'My device is set up and ready to be found' and then click 'Next'



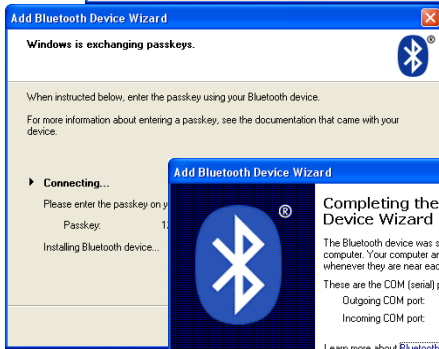
7. After a few seconds the NXT should be listed. Click on NXT in the list and then Next>



8. Select 'Use the passkey found in the documentation' and type in the NXT default passkey, which is 1234. Click Next>



9. The NXT should then beep to inform you that a bluetooth connection is being initialised. Press the orange button on NXT to accept the default passkey (1234).



10. The NXT and computer are now successfully paired.

11. Write down the bluetooth 'virtual' COM port numbers reported by the wizard. Click 'Finish'.

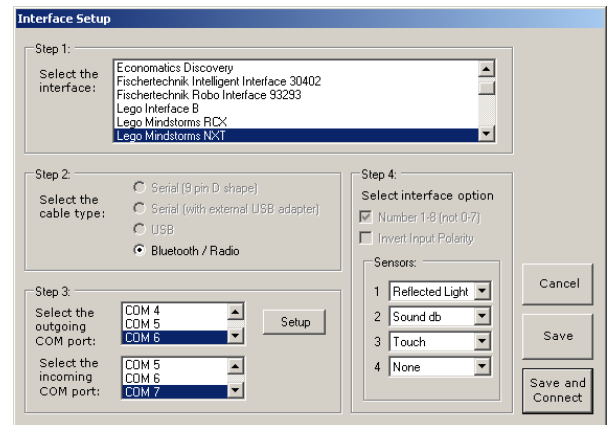


12. Start Logicator. Choose 'System' > Set up Interface'

13. Choose 'Lego Mindstorms NXT', 'Bluetooth radio' and enter the two COM port numbers.

14. Set the sensors and their connections in 'Sensors'.

15. Choose 'Save and Connect'.



## Notes:

It is recommended to switch off the NXT 'sleep after x mins' feature when using bluetooth communications (NXT menu: Settings>Sleep>Never). This is to prevent the NXT switching off (and closing the bluetooth connection) whilst you are working on your Logicator flowsheet. For use in the classroom the NXT optional rechargeable battery pack (Lego part 9798) is recommended (rather than AA cells.)

## **NXT Sensor Information**

*Please ensure you are using Universal Logicator v7.2 or later.*

### **1) Digital Inputs**

- Use 'Decision' Command
- Appear on Digital Panel

### **NXT Touch Sensor (9843)**

#### **RCX Touch Sensor via 8528 Converter Cable**

### **2) Analogue sensors**

- Use 'Compare' Command with sensors A1 to A4
- Appear on Analogue Panel

### **NXT Sound Sensor (9845)**

This reports sounds level in either dB or dBa.

### **NXT Ultrasound (9846)**

This reports a distance in cm to the nearest object.

### **NXT Temperature Sensor (9749)**

#### **RCX Temperature Sensor via 8528 Converter Cable**

These both measure temperature in degrees celsius (0-125)

### **RCX Angle Sensor via 8528 Converter Cable**

This measures the number of 1/16th turns from the centre position.

### **NXT Light Sensor (9844)**

This has two modes - reflective and ambient.

In reflective mode the internal red LED is switched on and the reflected light is measured.

It can therefore distinguish between dark and light surfaces as light surfaces reflect more red light.

In ambient mode the LED is switched off and so the ambient light level is measured.

### **RCX Light Sensor via 8528 Converter Cable**

This has a reflective mode only as the red LED is permanently illuminated.

### **NXT RGB Colour Sensor**

*Note this sensor requires NXT firmware 1.28 or later.*

The RGB colour sensor has a number of modes.

In full mode all 3 LEDs are cycled and then a number 1-6 is calculated for the nearest colour.

The colours are 'tuned' to Lego brick colours.

- 1 = Black
- 2 = Blue
- 3 = Green
- 4 = Yellow
- 5 = Red
- 6 = White

In red, green or blue modes the sensor only switches on that coloured LED and then measures the reflected light.

Therefore using 'red' mode is effectively the same as using 'reflective' mode on the original light sensor.

In ambient mode all the LEDs are switched off and so the ambient light level is measured.

The sensor should always be used at right angles to the sample.

### **HiTechnic Colour Sensor (MS1038) v1 or v2**

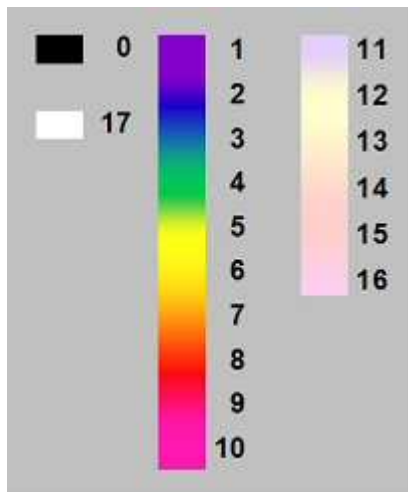
*Do not confuse with the NXT Light or RGB sensor!*

This uses a single white LED and calculates a number 0-17 for the nearest colour.

The colours are 'tuned' to Lego brick colours.

Note that the colours returned are NOT the same as the Lego RGB Colour sensor values.

The table below shows the HiTechnic colour table.



The sensor should always be used at right angles to the sample.  
Note that in Europe the sensor should be tuned to the 50Hz electricity supply.  
For more details see: <http://www.hitechnic.com/colorsensor>

#### **HiTechnic Compass Sensor (MS1034)**

This reports a compass degree heading divided by 2 (as 360 is > the maximum 255 available).

0 = North  
45 = West  
90 = South  
135 = East

Follow the sensor instructions to hold level and at least 20cm away from motors or the NXT.

#### **HiTechnic Tilt/Accelerometer (MS1040)**

This reports a tilt in the X axis.

### **Frequently Asked Questions**

#### ***How do I know which type of NXT light sensor I have?***

- An NXT colour RGB sensor is easily identified as 'RGB' is engraved next to the 3 LEDs.
- The NXT light sensor has 2 LEDs and shines a red light.
- A HiTechnic color sensor has 2 LEDs and shines a white light.
- The RCX light sensor is shaped like a 4x2 blue lego brick.

#### ***Can I use the new RGB color sensor with my older NXT?***

Yes, but you must upgrade your NXT firmware to version 1.28 or later.

See Settings>NXT Version on the NXT screen.

Firmware is available as a free download from the Lego mindstorms website.

#### ***How do I connect older RCX/Interface B sensors to the NXT?***

The older style touch, temperature, angle and light RCX 'brick' shaped sensors can all be used with the NXT by purchasing the converter cables (Lego part 8528)