TI-Nspire CX II
Dash Robot Getting Started

WW Dash Robot

Overview

The Wonder Workshops Dash is a fully programmable robot that will wirelessly connect to your TI-Nspire CX II calculator using the TI Bluetooth Adapter.

The Dash can be programmed using Python to drive, produce outputs, receive inputs, keep track of its drive history, and export it as a data list for graphing and analysis.

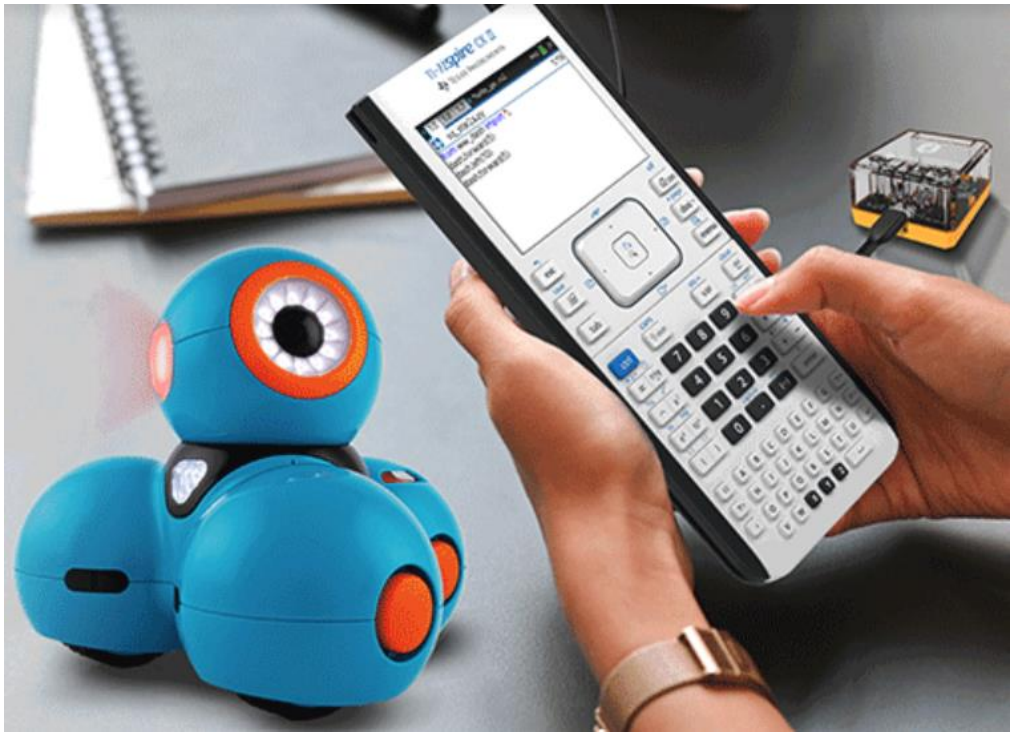
The TI Bluetooth Adapter has been designed to easily facilitate the sharing of one Dash robot among students working in a group, each with their calculator writing their Python program.

When a student in the group is ready to run the program on their calculator, they plug in the TI Bluetooth Adapter and run the program.

When Dash has finished, the TI Bluetooth Adapter can be unplugged and passed to the next student in the group.

The teacher needs to pair the TI Bluetooth Adapter to a particular Dash once.

Once paired, the adapter and Dash are ready to be used by a group of students to do engaging Python programming using their Texas Instruments calculator.



To get started read through the following steps.

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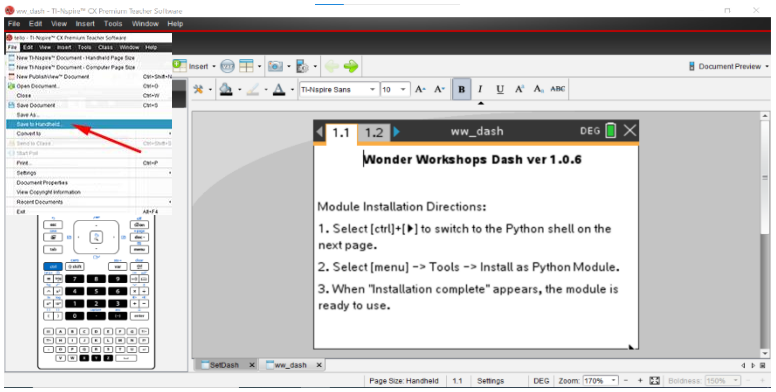
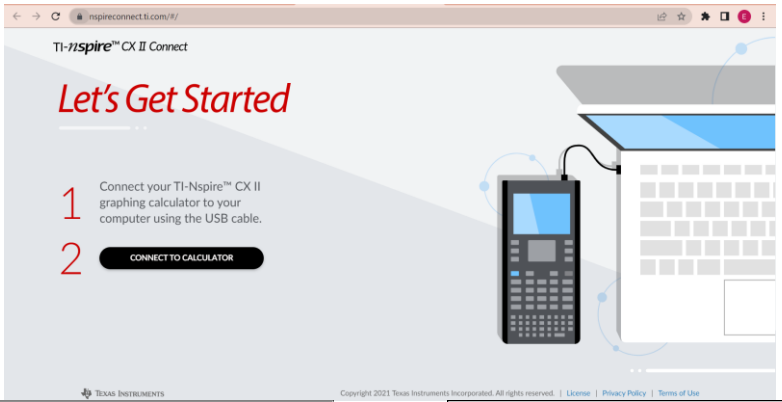
1 - Loading the Software

A. Transfer the SetDash.tns file to your calculator. You will use this file in Part 2 – Pairing the TI Bluetooth Adapter with Dash.

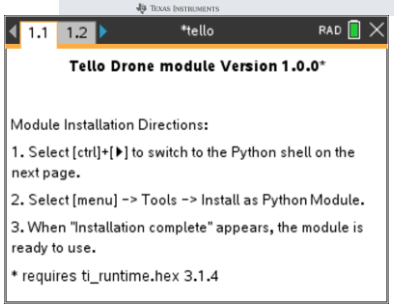
B. Transfer and install the ww_dash module on to the calculator:

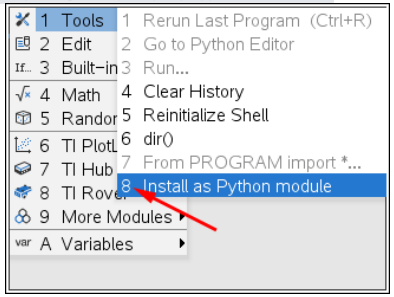
- Plug the calculator into your computer using the mini-USB to computer USB cable.
- Use TI-Nspire CX II desktop software or TI-Nspire CX Connect web-based tool - https://nspireconnect.ti.com - to transfer the ww_dash.tns file to the calculator.
- While you have TI-Nspire CX II desktop software or TI-Nspire CX Connect web-based tool open, update your calculator to the latest TI-Nspire CX II operating system. Dash support requires OS 6.0 or later.





- Open the ww_dash.tns file on your TI-Nspire CX II calculator and follow the directions on the first page to install the module.
- Once the module is installed, the tello.tns will be closed and deleted from the calculator. Module installation is a one-time process and will not need to be repeated.





2. Pairing the TI-Bluetooth Adapter with Dash

1. Using the micro → mini USB cable supplied, connect the micro (B) end into the TI-Bluetooth Adapter to the mini end (A) into the calculator's USB port, as shown in the picture on the right.

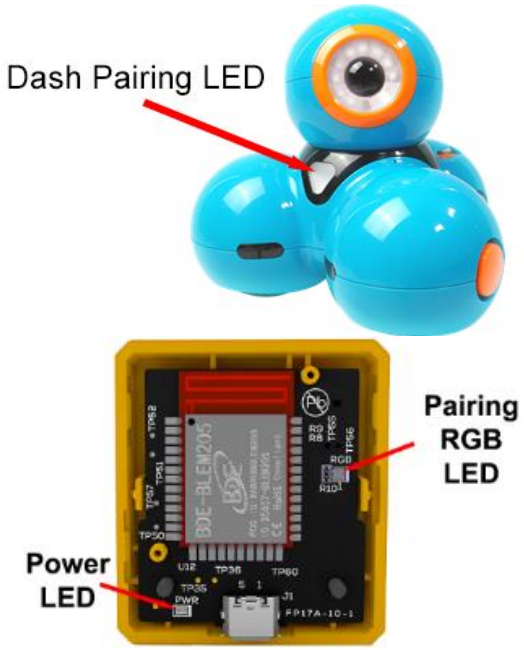
2. For simplicity in the classroom setup, turn on one Dash robot at a time to set up one TI-Bluetooth Adapter at time.

3. Turn on the Dash robot, and all of the robot's LEDs will illuminate.

4. Turn on the calculator, the TI-Bluetooth Adapter will boot, and the Power LED will turn green.

5. If Dash is not paired with the TI-Bluetooth Adapter, the Pairing LED will be white.

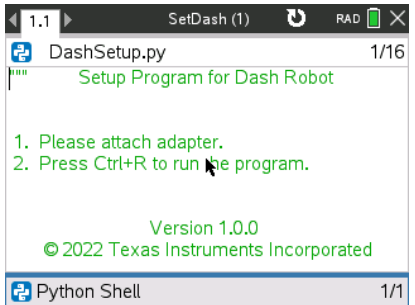
   Note - If the TI-Bluetooth Adapter has already been paired, its Pairing LED will match the color of its paired Dash.

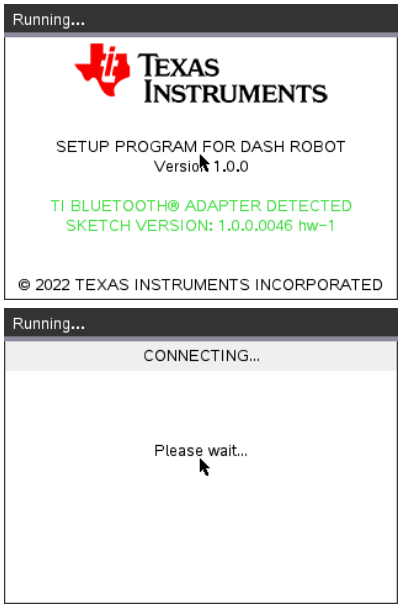


6. Open the SetDash.tns file

   The SetDash.tns file will display the TI-Bluetooth Adapter firmware version.

   If no TI-Bluetooth Adapter is connected to your calculator, you will be prompted to attach the TI-Bluetooth Adapter





7. From the SetDash app menu, select Search For Robots.

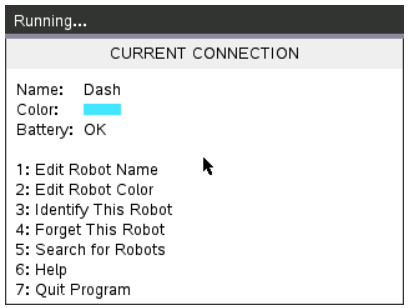
   When a Dash is discovered, it will be displayed.

8. If more than one Dash is turned on and within the range of the TI-Bluetooth Adapter, up to five Dash will be displayed in the app window.

9. Select the Dash you want to pair from the app menu and press the [enter] key to pair the TI Bluetooth Adapter with the Dash.

   After the TI Bluetooth Adapter and Dash are paired, the app will display the CURRENT CONNECTION.

10. To verify the Dash is paired and communicating with the calculator, choose “3: Identify This Robot” and the Dash will respond with a friendly head nod.



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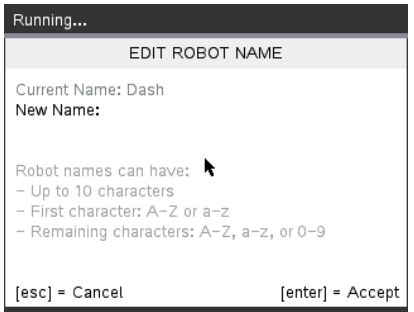
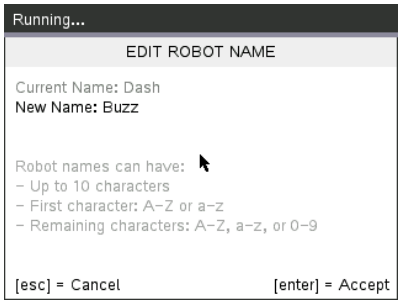
11. From the SetDash menu, select Edit Robot Name to change the name of the Dash, then press the [enter] key to update the Dash and the TI-Bluetooth Adapter.

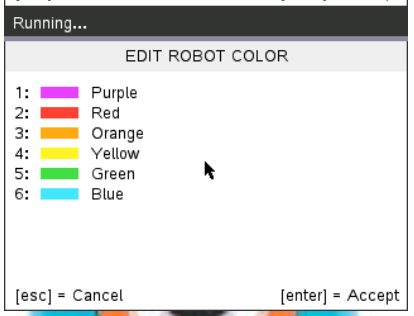
    Type in a name and press [enter].

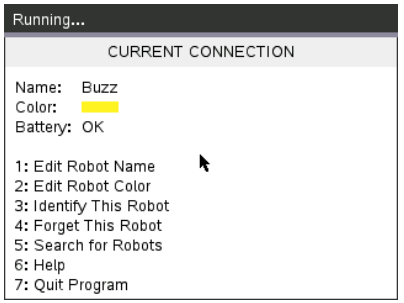




12. From the SetDash menu, select Edit Robot Color to change the color of the Dash. Press the number next to the color you want, then press the [enter] key.

    In this example, yellow was selected.

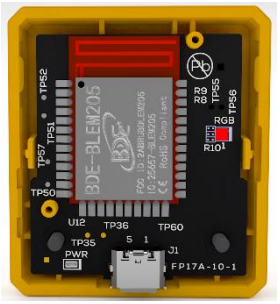




13. When the TI-Bluetooth Adapter and Dash have been paired, named, and colored, the Dash LED color will match the TI-Bluetooth Adapter LED color.

    If more Dashes need pairing, turn off the paired Dash and turn on the unpaired Dash. Unplug the paired TI-Bluetooth Adapter and plug in an unpaired TI-Bluetooth Adapter. Repeat the steps above.

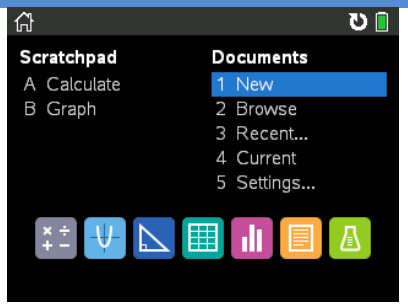
    When all Dashes have been paired, quit the SetDash app; it is not needed for programming.

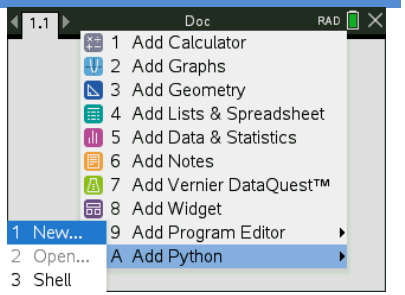


Congratulations! Your Dash is now ready to program wirelessly. The following section guides writing a short Python program to drive the Dash.

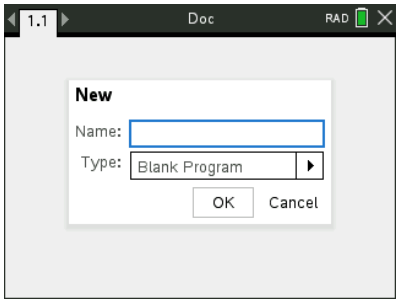
3 – Using the Dash module

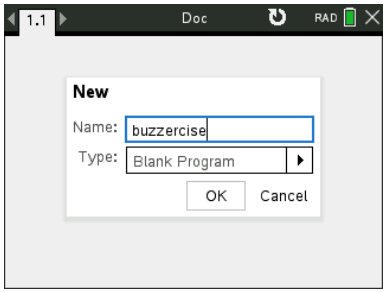
1. Open a new document [on], '1. New'
2. Select 'A Add Python'
3. Select 'New'



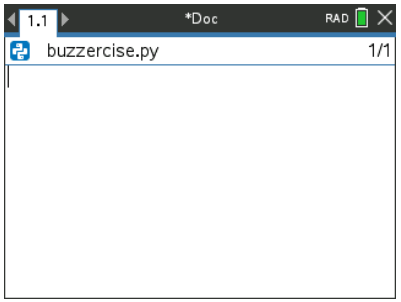


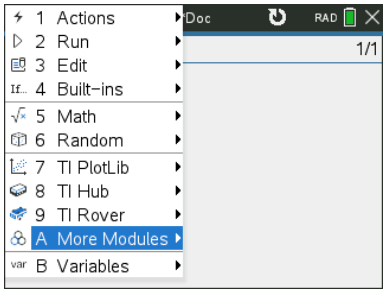
4. Name your program. In the example, "buzzercise" was chosen



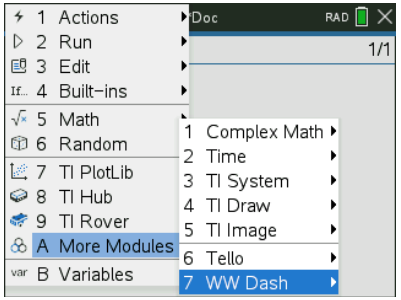


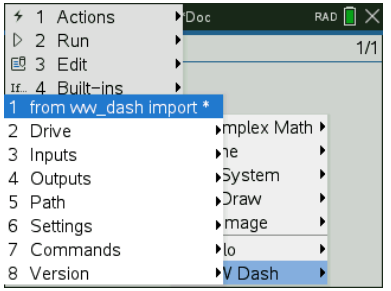
5. A Python editor will appear with the name of your program at the top
6. Press [menu] and select 'A More Modules'





7. Select 'WW_Dash'
   Note - that the module number may change depending on the number of modules installed
8. Select 'from ww_dash import*'
   Note – any Python module will require the first line of your program to be in import statement





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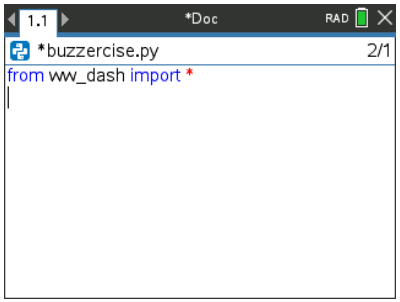
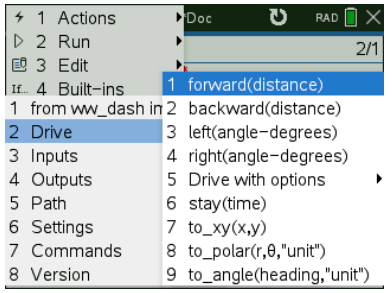
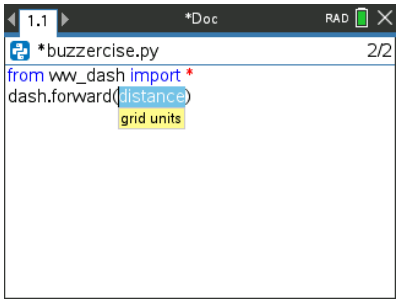
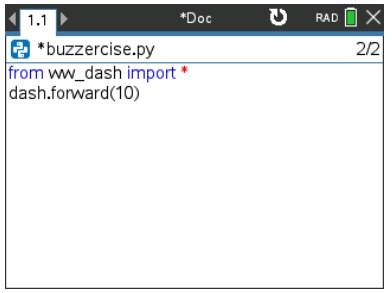
9. You will see the ww_dash import* statement pasted into the editor
10. Next, go to [menu], “More Modules”, “WW Dash”, “2 Drive”, “1 forward(distance)”.



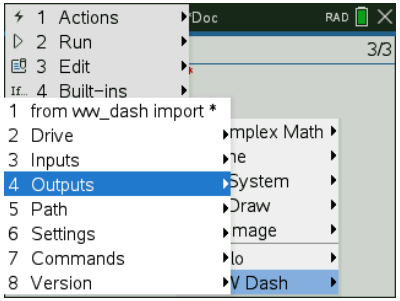


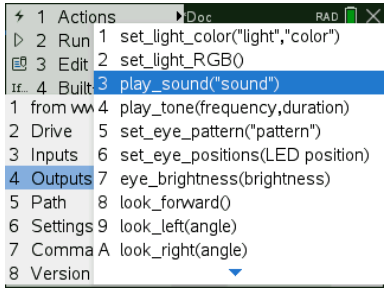
11. The “dash.forward(distance)” method is pasted below the import statement
    Note – any Python statement that has a decimal is known as a “method”
12. Notice the highlighted inline prompt asking for the number of ‘grid units’
13. A grid unit is = 10 cm
14. To drive 100 cm, enter 10 for the number of grid units
    Note – To avoid moving the close paren down to the next line, press [ctrl] + [enter].



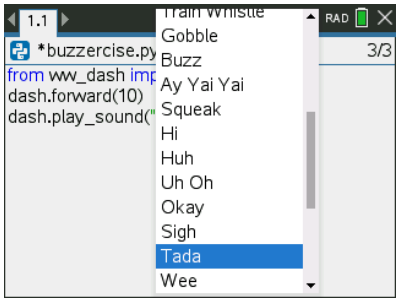


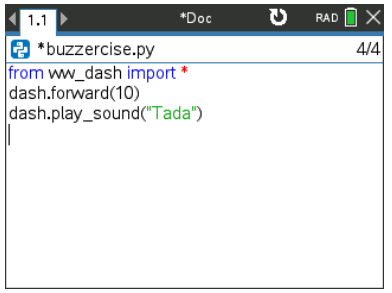
15. Next, add a sound that Dash will make after driving 100 cm
16. Select [menu], “More Modules”, “WW Dash”, “4 Outputs”, “3 play_sound(“sound”)
    Note – any information between ( ) is known as an argument
17. Notice the method, “dash.play_sound(“Tada”) is pasted into the editor.





18. Notice the argument, “Tada”, is pasted into the method





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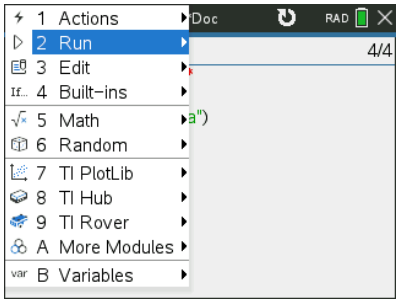
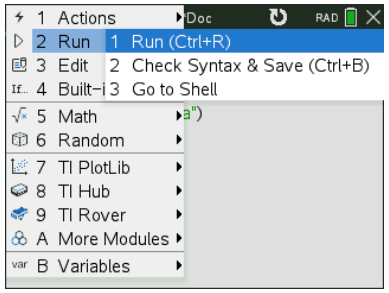
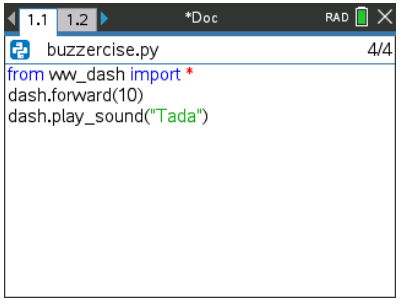
19. To run the program, Press [menu], “2 Run”, “1 Run (Ctrl + R)”.
20. A new page will be added. This is the Python Shell, where Python programs are executed.
21. The TI Bluetooth Adapter will connect to the Dash and execute the Python program. The Python shell will report the connection status and the Dash’s battery charge level.
22. This program should cause Dash to drive forward 1 meter and, when completed, say “Tada.”





23. To edit the program, go back to the editor (Press [ctrl] + [left click])
24. Congratulations! You have written and run a Dash Python program. For more STEM and coding activities, check out TI’s STEM Projects program at www.TIstemProjects.com.



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Trouble Shooting Guide	
Problem	**Solution**
I can't find the Dash module menus in the Python menu.	Make sure you have downloaded the ww_Dash.tns file and installed the module in the Python editor.
I don't see the "from ww_dash import *" statement under the Add-On menu.	The modules have not been installed on the calculator. Transfer the Dash modules to the calculator. See Part 1 – Loading the Software.
When I run my program, I get the message "TI Bluetooth Adapter not set up with a Dash robot."	See Part 2 - Pairing the TI-Bluetooth Adapter with Dash
When I run my program, I get the message "Program stopped."	The Dash will stop and display this message when jostled or picked up while driving; this can happen when the robot drives over a rough surface or carpet.
My Dash drives erratically and does not follow a straight path.	The robot must be on a smooth surface, and driving on the carpet will cause erratic behavior.
Where can I find Dash activities for the classroom?	Go to TI STEM Projects at www.TIstemProjects.com for more Dash activities.
How do I keep my TI-Bluetooth Adapter up to date with the latest firmware?	*Occasionally it may be necessary to update the TI-Bluetooth Adapter. To do so, please go to the TI Bluetooth Adapter Update Software and the TI-Bluetooth-Adapter-Sketch to download the necessary software.*