# Chapter 1 INTRODUCTION TO EDISON

In this guide, we will bring you our newly developed robot kit, the Devastator Tank Mobile Platform, controlled by the Intel®Edison microprocessor with its expansion board, the Romeo for Intel Edison. Romeo for Intel Edison expansion board a multi-purpose, all-in-one development platform based on Intel®Edison processing module and Arduino SoC platform. To get you started, in following sessions, we will help you go through a Step-by-step instruction for setting up the microcontroller and take a quick look of the Devastator Tank Mobile Platform.

## Meet Intel<sup>®</sup> Edison

The Intel<sup>®</sup> Edison is a powerful microprocessor with integrated Wi-Fi module. Its size is amazingly as small as a postage stamp. With its powerful computing capability and extremely low energy cost (as low as 1W), it's an excellent tool for portable wireless device studying and developing.

Comparing with the first electronic general-purpose computer, the ENIAC, which was as large as 2.4m x 0.9m x 30m and weighed 27 tons, you will definitely be amazed by the improvement brought by our modern technology.

Just as those big events in the time line below, the invention of Intel<sup>®</sup> Edison may bring us the same amount of excitement.



You are only one step away from your dream!

Before getting started, we would like to present a few applications based on the Intel<sup>®</sup> Edison series microcontrollers. Equipped with Intel<sup>®</sup> Edison microprocessor, even the simplest thing in our daily life can be intelligent. Allthat need is your imagination.

## Bring your cup to life!

Wants to interact with your Facebook friends through a cup? Here it is! With a few electronic components and a simple program, this cup is now able to send notifications through its LED indicator when a massage pops up on your Facebook page.



Facebook messenger cup

It's the time to challenge your imagination with Intel<sup>®</sup> Edison!



Smart bird feeder

### **Interact with birds!**

Birds get angry about their food? No worries. With the image recognition function powered by the Intel<sup>®</sup> Edison microprocessor, this bird feeder is able to recognize their species and feed them with different types of food. Moreover, by adding more modules, we can even make it to be a weather and temperature indicator and exchange data through a cloud sever.

## Romeo for Edison

Arduino platform is an open source platform. Due to its simplicity and functionality, it has been widely used in smart device development. Based on Arduino platform, we developed the Romeo for Edison, a more powerful, functional and user friendly expansion board exclusively designed for robotic uses.

The Romeo for Edison micro Expansion board integrates a 2-path motor driving module and a servo driving module in an ID-card sized mother board, which largely simplifies the circuit connection and saves a significant amount of space. Together with its 14 Digital output pins with optional external power supply and 6 analog input pins, building a robot would never be so easy.





## **Romeo for Edison Extension Board**

### **Digital Pins Power Supply**



## **The Devastator**

The Devastator Tank Mobile Platform is a set of robotic kits controlled by the Intel<sup>®</sup> Edison microcontroller. Its outstanding mobility allows it to travel over various terrains. With an ultrasonic distance sensor and a two-DOF cradle head, the Devastator is able to detect and avoid obstacles. Moreover, Equipped with integrated Wi-Fi module, it can be attached to internet and connected to your own devices so that you can control its motion and view the real-time images captured by its camera wirelessly.

**1. Moving** Two-way deceleration motor gives Devastator perfect maneuverability **2. LED modules** LED modules can be set as light indicators **4. Camera** The camera captures real-time images **5. Two-DOF cradle head** Supports up-down and left-right moving of the camera **6. Buzzer module** Buzzer module can be set as an audial indicator **7. PIR** PIR sensor detects people approaching

- **3. Obstacle avoidance** Ultrasonic distance sensor allows Devastator can avoid obstacles automatically
- **8. Integrated Wi-Fi** Integrated Wi-Fi module supports wireless control and video streaming





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## Installation

Follow the instructions below to set up your Romeo for Edison microcontroller for first time use. *Connect the board to your computer* Plug the smaller end of a micro-USB cable into the OTG port of the Romeo for Edison extension board.

**Note:** OTG port can be used for following purposes

- Powering up the board through USB cable
- Uploading Arduino sketches
- Updating the firmware



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### Plug the other end of the USB cable to your computer.



### After the board is connected to your computer, we need to install its driver software.

## Install the Intel<sup>®</sup> Edison Board Software

### All your Intel<sup>®</sup> Edison Board Downloads in **One Spot!**

Update your development board with firmware and software downloads.

### Installers

There is a new integrated Mac\* OS X\* installer. The installer for Linux\* systems is on our road map and will be coming soon. Stay tuned - we've heard your feedback and are working as hard as we can to improve the out-of-box setup experience.

To access the features in the most current Intel® IoT Developer Kit release, always download the latest version of the integrated installer for your system, as follows:





Open the installation package and enter the installation interface.

Download the Driver software compatible with your operating system from the Intel website in the link below.

https://software.intel.com/en-us/iot/hardware/edison/downloads

0	Intel® Edison – 🗆 🗙
→ Welcome	Welcome to Intel® Edison
License Options Destination Ready Installation Next steps	This installation includes the files you need to install Intel® Edison on your PC. This installation includes the required drivers, an update to your Intel® Edison image, and developer IDEs. Make sure that your Intel® Edison is connected to your computer and powered on before you continue the installation.
(intel)	
Version: 2015.0.1.21	Back Next Cancel



### – 🗆 🗙 Intel® Edison Intel<sup>®</sup> Edison 🍗 Welcome These components will be installed License Action Size omponent Name Options Drivers Installed Destination Intel® Phone Flash Tool Lite Update image Ready 379MB Install 379MB Development Environmen Arduino\* Software Installation Intel® XDK IoT Edition Next steps Eclipse\* (intel) Development Environment Version: 2015.0.1.21 Cancel Back Next

Select "I accept terms of the license" and click **Next**.

On the its welcome page, Click **Next**.

Select "Driver" and item "Arduino\* Software" Under the tag "Development Environment".

Note: if its firmware is needed to be updated, please also select "Intel Phone Flash Tool Lite" and "Update image".

Visit the Intel website in the link below for more information https://software.intel.com/en-us/assembling-and-connecting-your-board



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intel	Destination folder: C:\Intel Selected install folder: C:\Intel Space required: 525MB Space available: 415GB
Version: 2015.0.1.21	Back Next Cancel



0	Intel® Edison – 🗆 🗙
Welcome License Options Destination Ready Installation Next steps	Intel® Edison Installation Downloading 1 of 2 IntelEdisonDriverSetup1.2.1.exe Downloading IntelEdisonDriverSetup1.2.1.exe
intel	Installing component 2 of 6 License file
Version: 2015.0.1.21	Back Next Cancel

Select destination folder for the software and then select **Next**.

Check the installation summary and click Next.

Wait for the program to download and install the interface.





### After all installation are complete, click Finish. The driver to you Intel<sup>®</sup> Edison is now all set!

Once the driver has been successfully installed, after connecting a USB cable to the OTG port, you should be able to find the storage icon named "Edison" appear in "My Computer" and the entry "Intel Edition Virtual COM port" in device manager.





	Boards Manager	
	Arduino AVR Boards	
	Arduino Yún	
	Arduino Uno	
	Arduino Duemilanove	or Diecimila
	Arduino Nano	
	Arduino Mega or Me	ga 2560
	Arduino Mega ADK	
	Arduino Leonardo	
	Arduino Micro	
	Arduino Esplora	
	Arduino Mini	
	Arduino Ethernet	
	Arduino Fio	
	Arduino BT	
	LilyPad Arduino USB	
	LilyPad Arduino	
•	Arduino Pro or Pro M	lini
	Arduino NG or older	
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Boards Manager	<b>x</b>
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Intel i586 Boards by Intel version 1.6.2+1.0 INSTALLED Boards included in this package: Galileo. More info	
<b>Intel i686 Boards</b> by <b>Intel</b> version <b>1.6.2+1.0 INSTALLED</b> Boards included in this package: Edison. More info	

Once the installation is complete, the Intel i686 should be marked as installed in the Boards Manager.

To make your board recognized by your Arduino software, you need to install the driver from **Boards Manager** in your Arduino software.

Go to **Tools** > **Board** and click **Boards Manager** to open the **Boards Manager** window.

In the Boards Manager window, search for Intel i686 boards and click Install.

## **Run the test code - Blink a LED**

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File Edit Sketch Tools Help		
		2
Blink		
/=		~
Blink		
Turns on an LED on for on	e second, then off for one second, repeat	cedly.
This example code is in t	he public domain.	
*/		
// Pin 13 has an LED connec	ted on most Arduino boards.	
// give it a name:		
int led = 13;		
// the setup routine runs of	nce when you press reset:	
void setup() (		
<pre>// initialize the digital</pre>	pin as an output.	
pinMode(led, OUTPUT);		
<i>.</i>		
// the loop routine runs ov	er and over again forever:	
void loop() {		
digitalWrite(led, HIGH);	// turn the LED on (HIGH is the voltage	2 level)
digitalWrite(led, LOW);	// turn the LED off by making the volt	age LON
delay(1000);	// wait for a second	
)		
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1	lot.	el® Edison on COM1

installed.

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Turns on an	Board	•		Arduino X86 Boards	ily.
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*/ // Pin 13 has	Programmer Burn Bootloa	• der		Arduino X86 Boards Intel® Galileo Intel® Galileo Gen2	
<pre>// the setup rout void setup() { // initialize t pinMode(led, 00) } // the loop routi void loop() { digitalWrite(le delay(1000); digitalWrite(le delay(1000); }</pre>	tine runs on the digital TTPUT); ane runs ove ed, HIGH); ed, LOW);	the when you press re pin as an output. ar and over again for // turn the LED on // wait for a secon // turn the LED off // wait for a secon	eve (HI d by	: GH is the voltage : making the voltage	level) e LOW
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Go to **Tools** > **Board** and select the board type ("Intel<sup>®</sup> Edison" in our case).

Follow the instruction below to test if the microcontroller is correctly

In Arduino IDE, go to File > Examples > 1.Basics > Blink and open the LED blink example sketch.



### Go to **Tools** > **Serial Port** and find COM port of your microcontroller then select it.

**Note:** An easy way to find the correct COM port is to reconnect your board to your PC, restart the IDE, and open the menu. The newly appeared entry should be the Intel Edison board.



As COM1 ports and COM2 ports are usually reserved for essential hardware, the COM port to our board is likely to be COM3 or after. Its name will be "Intel Edison Virtual Com Port", same as the name shown in the Device Manager.





## IDE window.



COM port will show up in the bottom right corner of the Arduino

Click **Upload** to upload the code into your board.





<pre>// initialize the digital pin as an output.    pinMode(led, OUTPUT); }</pre>	
<pre>// the loop routine runs over and over again forever: void loop() {</pre>	_
Done uploading.	
Transfer complete	
Transfer complete	

Intel® Edison on COM14

You should see "Done uploading" and "Transfer complete" messages when your sketch has been successfully uploaded.

When upload is complete, the LED indicator on your board should be blinking once for each second.

