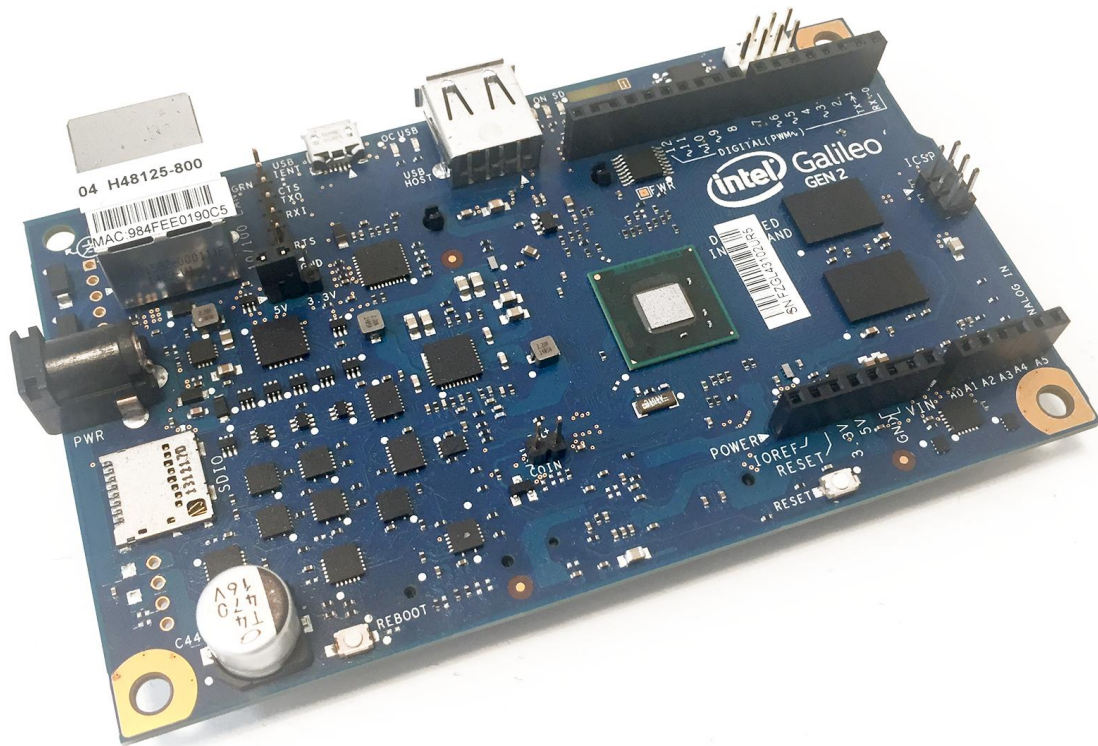


Intel Galileo Networking Cookbook Graphics Bundle

Chapter 1- Installing and Configuring Linux







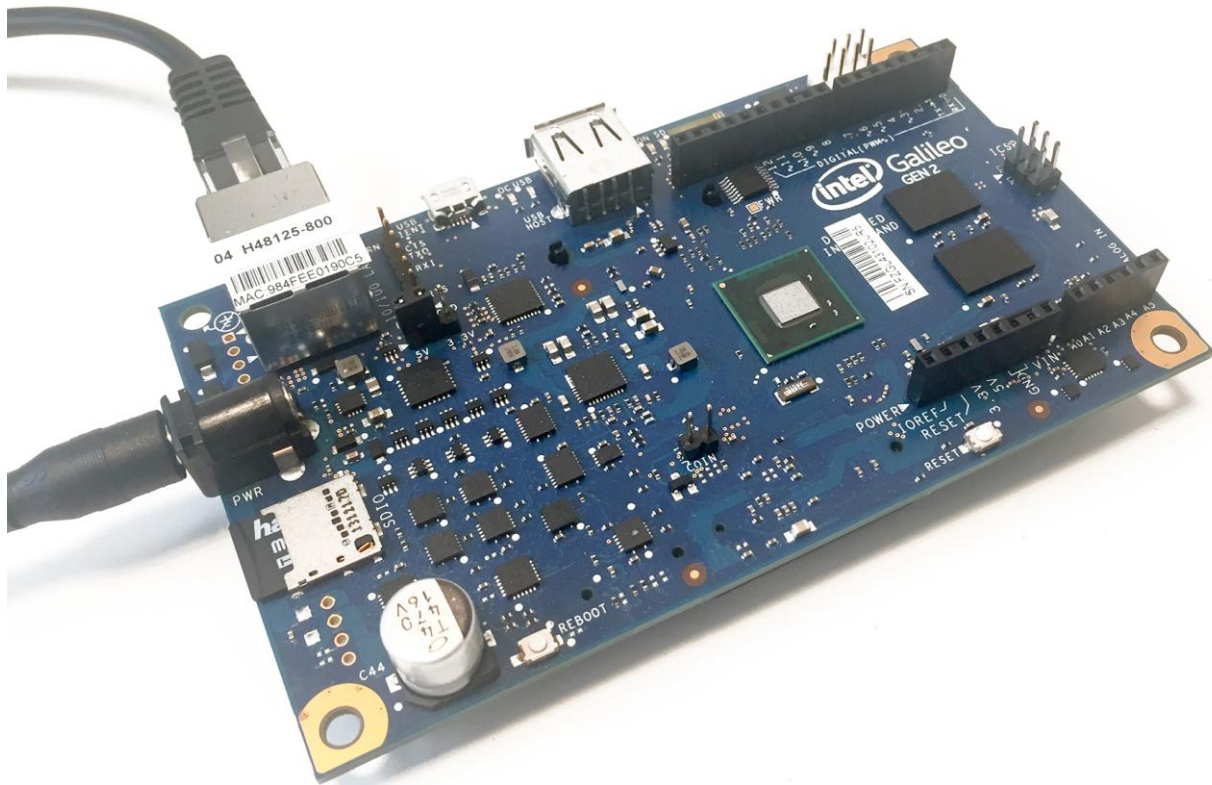
hama® XIX

micro
SD

HC

©

4GB ▶



Intel® Galileo Boards Software Downloads

Question on what software to download? See the [Getting Started Guide](#) for help.

Intel® Galileo Board and Gen 2 Linux Operating System Image
Image enables the Wi-Fi drivers and sketch persistent.

Software	File size	File type
SD-Card Linux Image	48 MB	.bz2

Download Software for the Intel® IoT Developer Kit v1.0

Intel® Edison Updates

The dev kit libraries are already available in the operating system distributed with the Intel® Edison development board. If you already followed the latest [Intel® Edison Getting Started guide](#), you already have the latest versions.

A Windows* 64-bit installation program is now available for the Intel Edison development board.

Download the installation program

[Windows* 64-bit \(21MB\) >](#)



Intel® Galileo Board (Linux Boot Image)

Yocto 1.6 embedded Linux-based OS and our API libraries, useful daemons like LighttPD and Node.js.

Note: Image must be copied to an SD card and is required for using development environments.

Instructions for: [Windows*](#), [Mac OS*](#) and [Linux*](#)

[Download \(210MB\) >](#)



Intel® XDK IoT Edition

Create, Test, and Deliver Internet of Things Solutions

Software tool for JavaScript on-board app and HTML5 companion app development

- Use [JavaScript*](#) to define behavior of IoT device
- Deploy, run, and debug on IoT device
- Design [companion app](#) UI for IoT device or cloud, control IoT device from a phone, tablet, or PC
- Get started with the [Intel® IoT Developer Kit](#) including development Boards, sensors, accessories, and more

Get Intel XDK IoT Edition now.

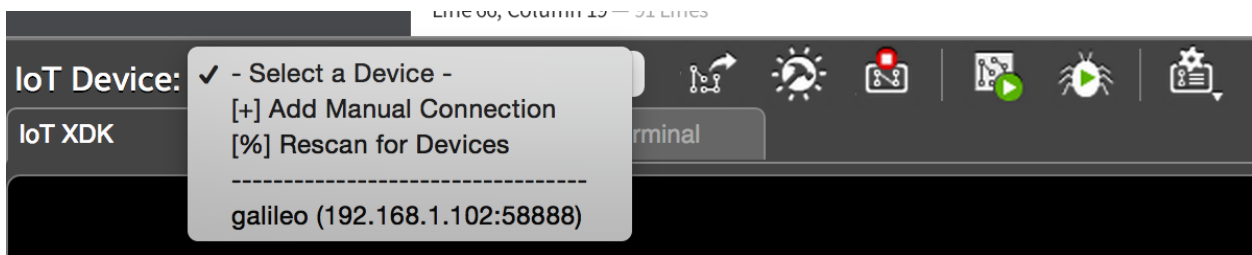
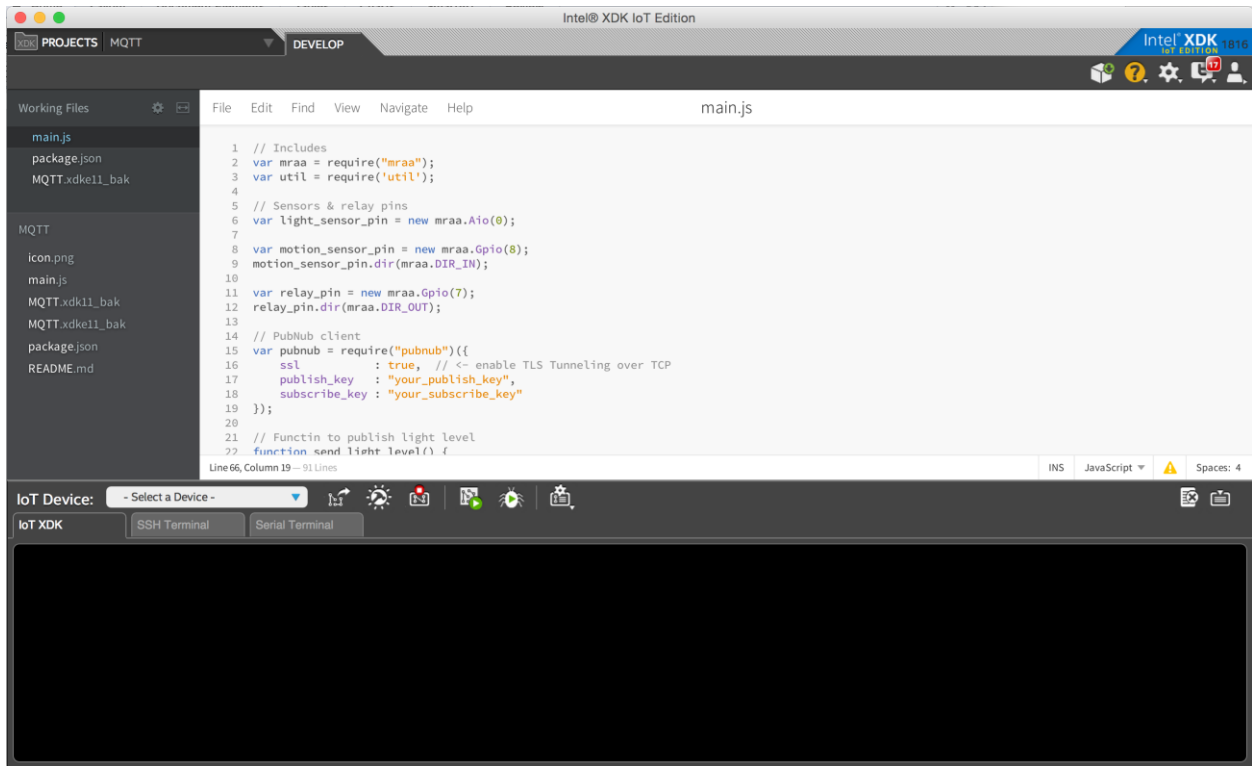
Download **GO!**
for Apple OS X*

[Choose another platform ▾](#)



Intel® XDK IoT Edition available with Intel® IoT Developer Kit provides a complete hardware and software solution for IoT application development

- [Product Brief](#) ▶
- [Documentation](#) ▶
- [Demo Video](#) ▶
- [Get Support](#) ▶

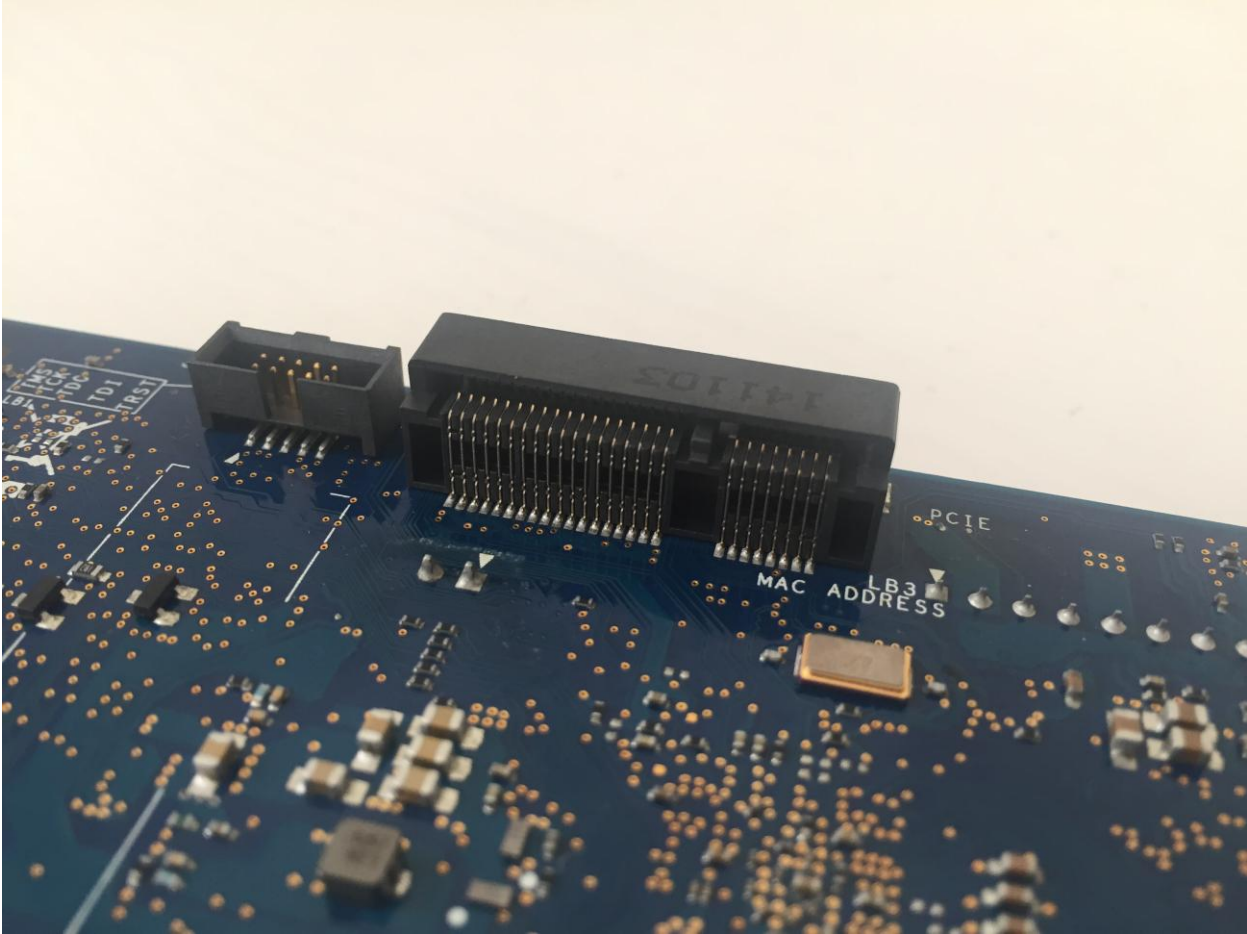


```
macbookpro:~ marco$ ssh root@192.168.1.102
The authenticity of host '192.168.1.102 (192.168.1.102)' can't be established.
RSA key fingerprint is 7a:8b:27:d4:70:55:5d:2a:f8:e7:a8:7b:0a:14:be:4c.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.1.102' (RSA) to the list of known hosts.
root@galileo:~#
```

```
root@galileo:~# opkg update
Downloading http://iotdk.intel.com/repos/1.1/iotdk/all/Packages.
Updated list of available packages in /var/lib/opkg/iotdk-all.
Downloading http://iotdk.intel.com/repos/1.1/iotdk/i586/Packages.
Updated list of available packages in /var/lib/opkg/iotdk-i586.
Downloading http://iotdk.intel.com/repos/1.1/iotdk/quark/Packages.
Updated list of available packages in /var/lib/opkg/iotdk-quark.
Downloading http://iotdk.intel.com/repos/1.1/iotdk/x86/Packages.
Updated list of available packages in /var/lib/opkg/iotdk-x86.
Downloading http://iotdk.intel.com/repos/1.1/intelgalactic/Packages.
Updated list of available packages in /var/lib/opkg/mraa-upm.
root@galileo:~# █
```

```
Interface code. This package contains documentation.
xz - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files Utilities for managing LZMA
compressed files.
xz-dbg - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - Debugging files Utilities
for managing LZMA compressed files. This package contains ELF symbols
and related sources for debugging purposes.
xz-dev - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - Development files
Utilities for managing LZMA compressed files. This package contains
symbolic links, header files, and related items necessary for software
development.
xz-doc - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - Documentation files
Utilities for managing LZMA compressed files. This package contains
documentation.
xz-locale-cs - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - cs translations Utilities
for managing LZMA compressed files. This package contains language
translation files for the cs locale.
xz-locale-de - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - de translations Utilities
for managing LZMA compressed files. This package contains language
translation files for the de locale.
xz-locale-fr - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - fr translations Utilities
for managing LZMA compressed files. This package contains language
translation files for the fr locale.
xz-locale-it - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - it translations Utilities
for managing LZMA compressed files. This package contains language
translation files for the it locale.
xz-locale-pl - 5.1.3alpha-r0 - Utilities for managing LZMA compressed files - pl translations Utilities
for managing LZMA compressed files. This package contains language
translation files for the pl locale.
root@galileo:~# █
```





Chapter 2- Connecting External Sensor

Arduino Software 1.6.0 - Intel 1.0.4

Operating system	File size	File type
Linux 32-bit	140 MB	.tgz
Linux 64-bit	147 MB	.tgz
Mac OS X	229 MB	.zip
Windows	304 MB	.7z

```
Blink | Arduino 1.5.3-Intel.1.0.4
Blink
/*
  Blink
  Turns on an LED on for one second, then off for one second, repeatedly.

  This example code is in the public domain.
  */

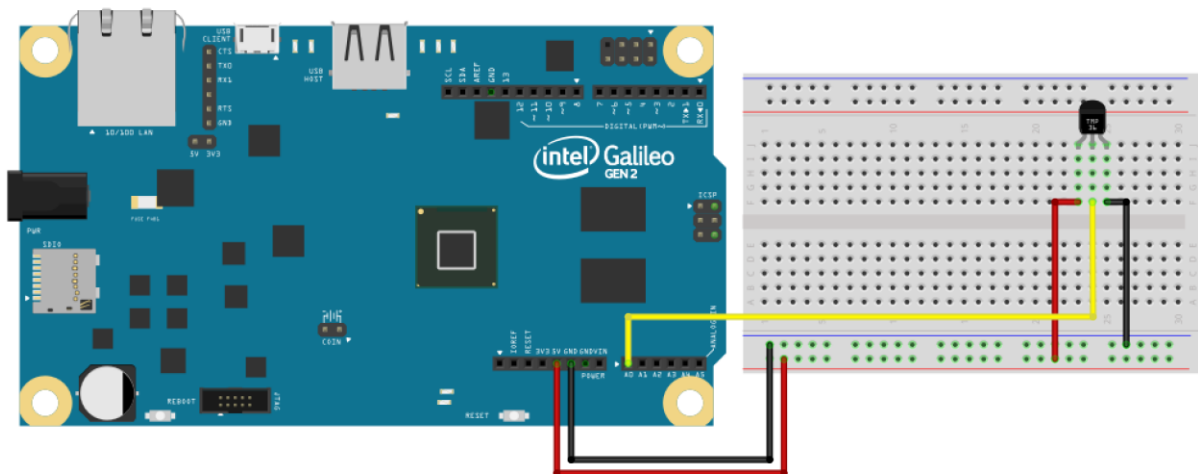
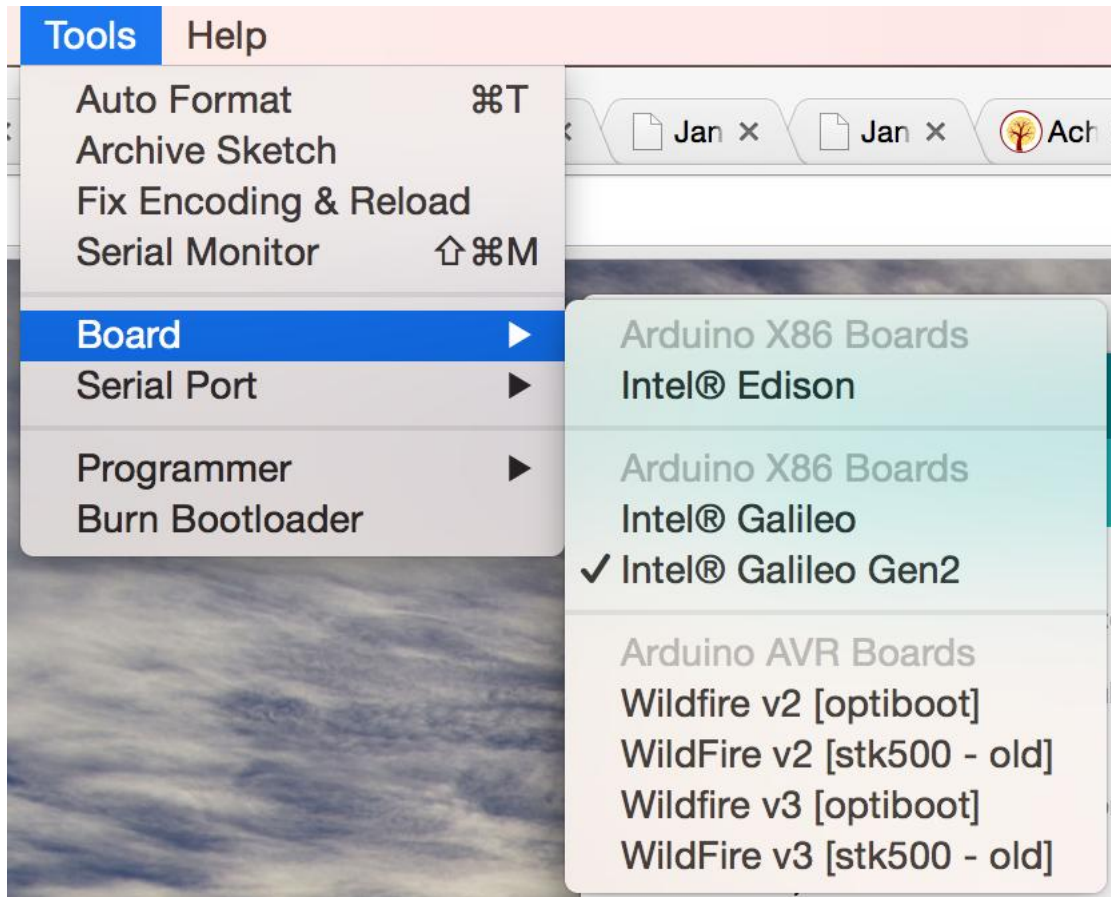
// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;

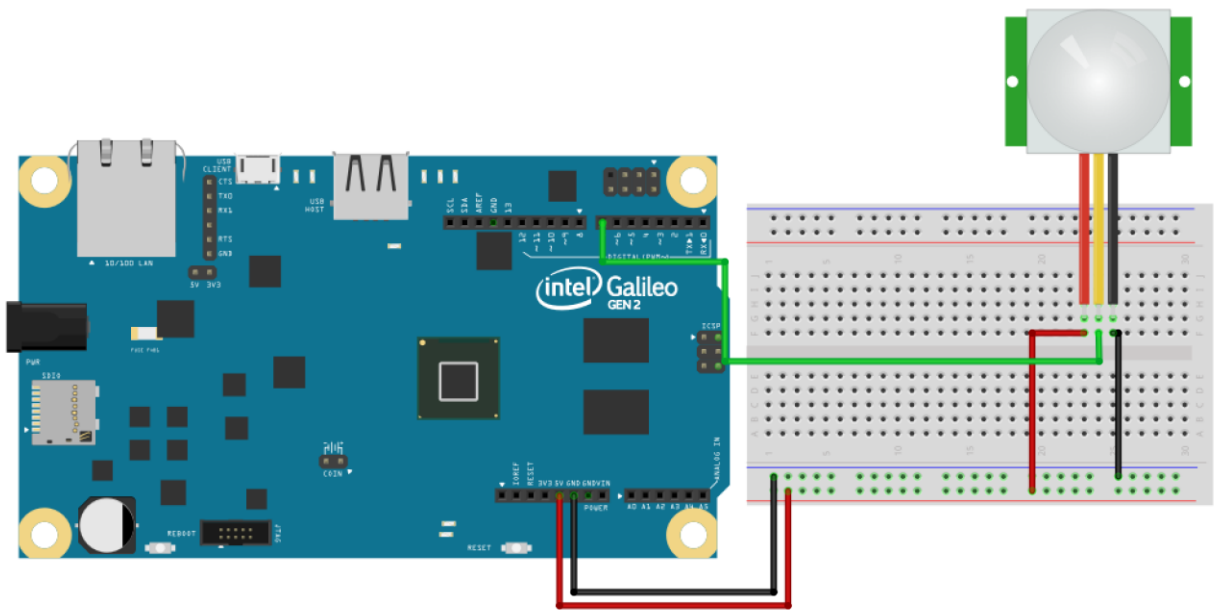
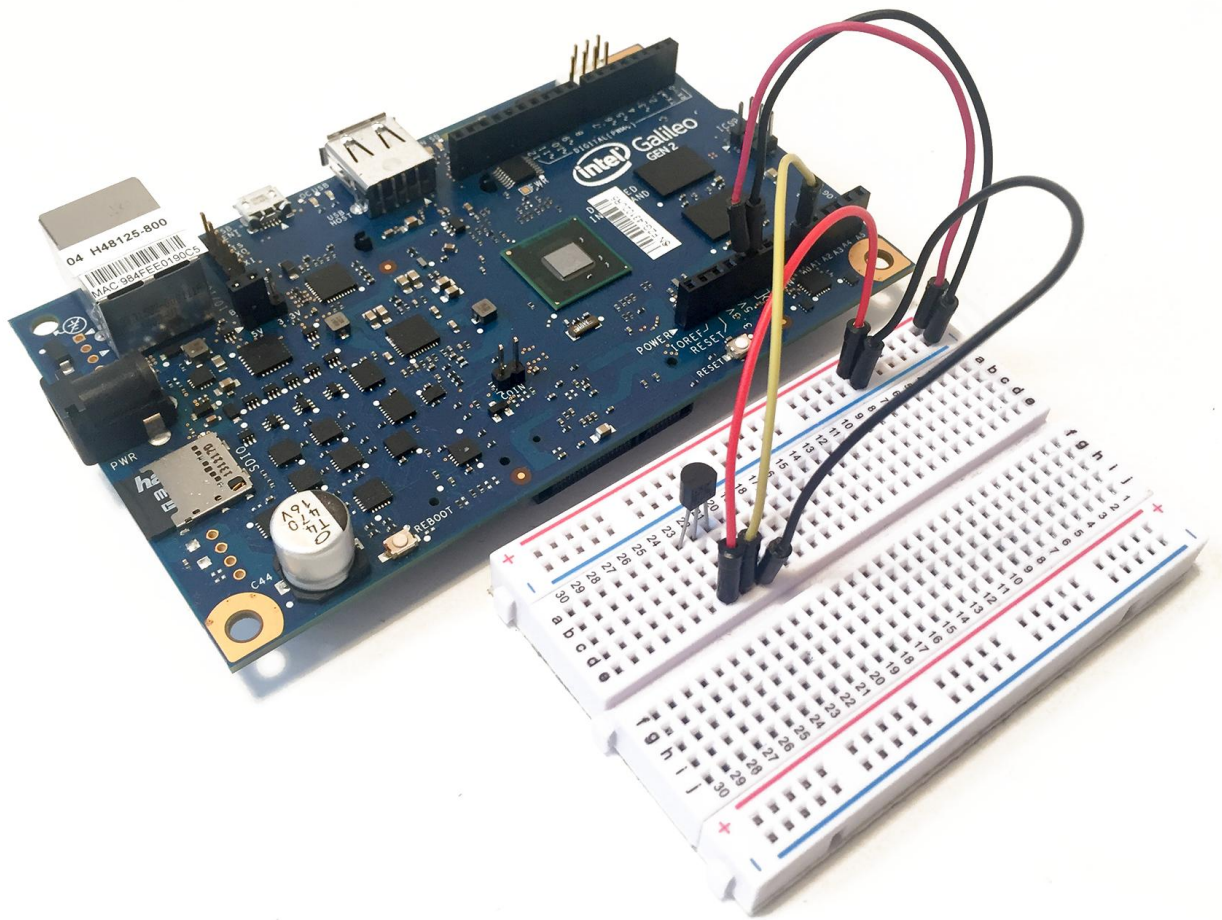
// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
}

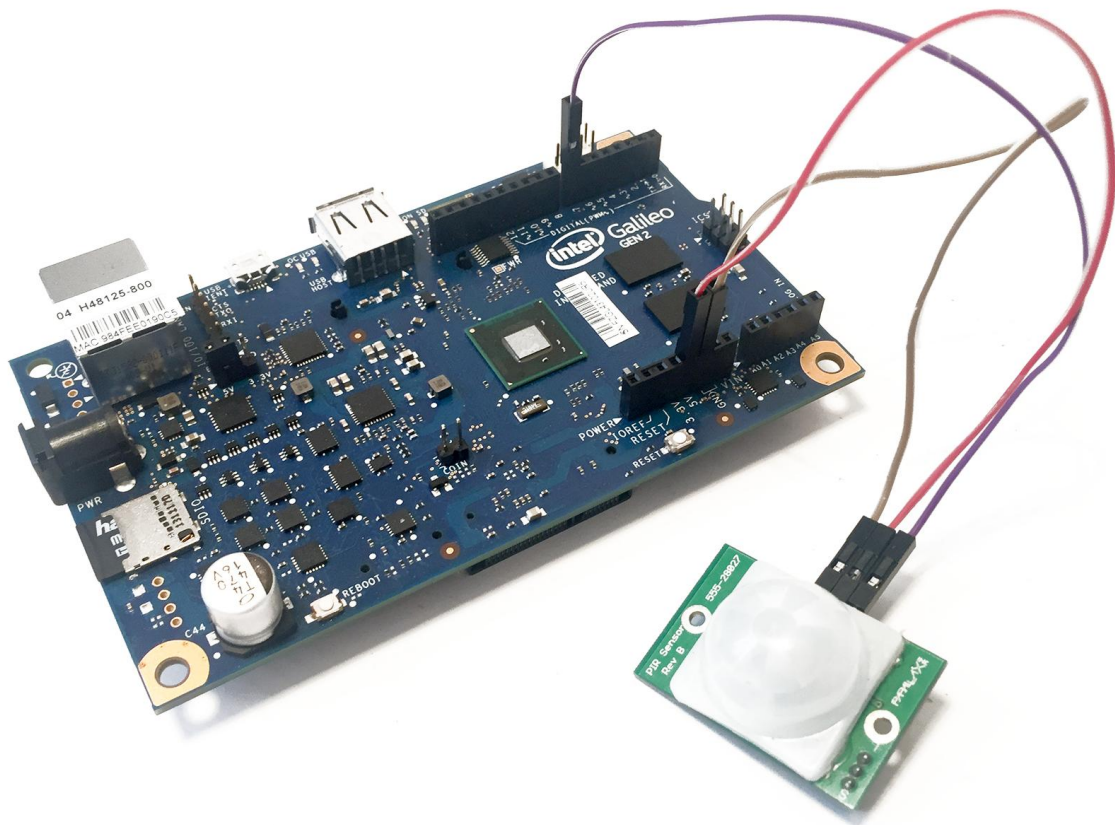
// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000);             // wait for a second
  digitalWrite(led, LOW);  // turn the LED off by making the voltage LOW
  delay(1000);             // wait for a second
}

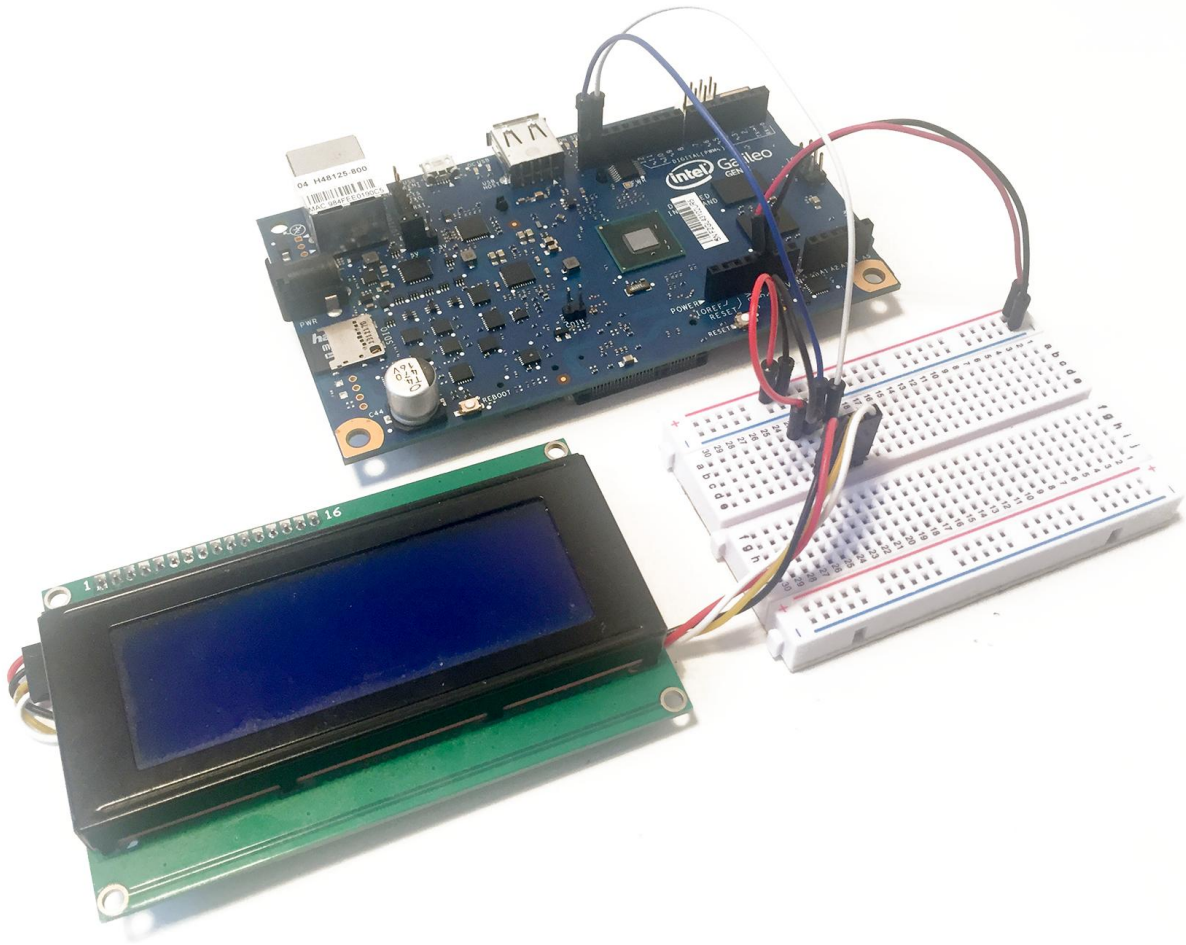
Invalid library found in /Users/marco/Dropbox/Arduino/libraries/Ethernet: Missing 'core-dependencies' from library
Invalid library found in /Users/marco/Dropbox/Arduino/libraries/Temboo: Missing 'dependencies' from library

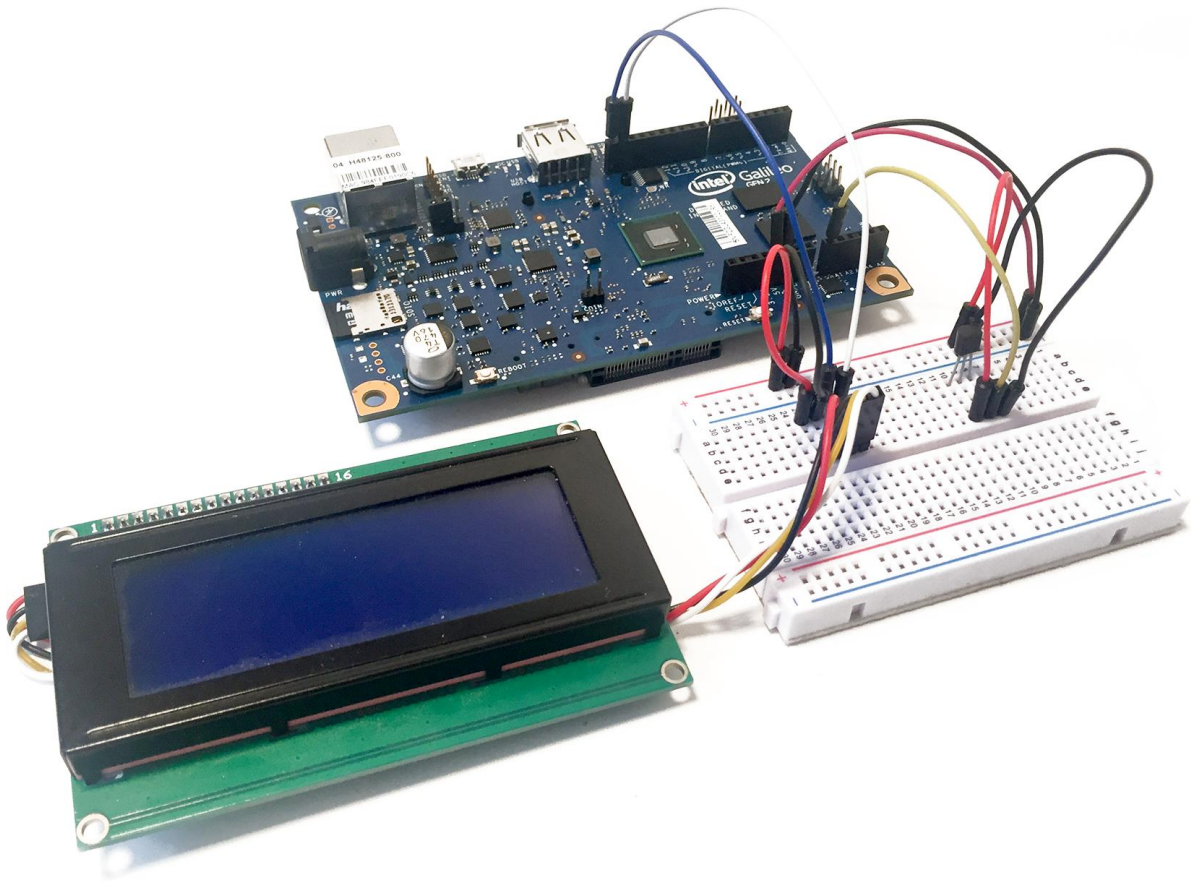
1 Intel® Galileo Gen2 on /dev/tty.usbmodem1411
```

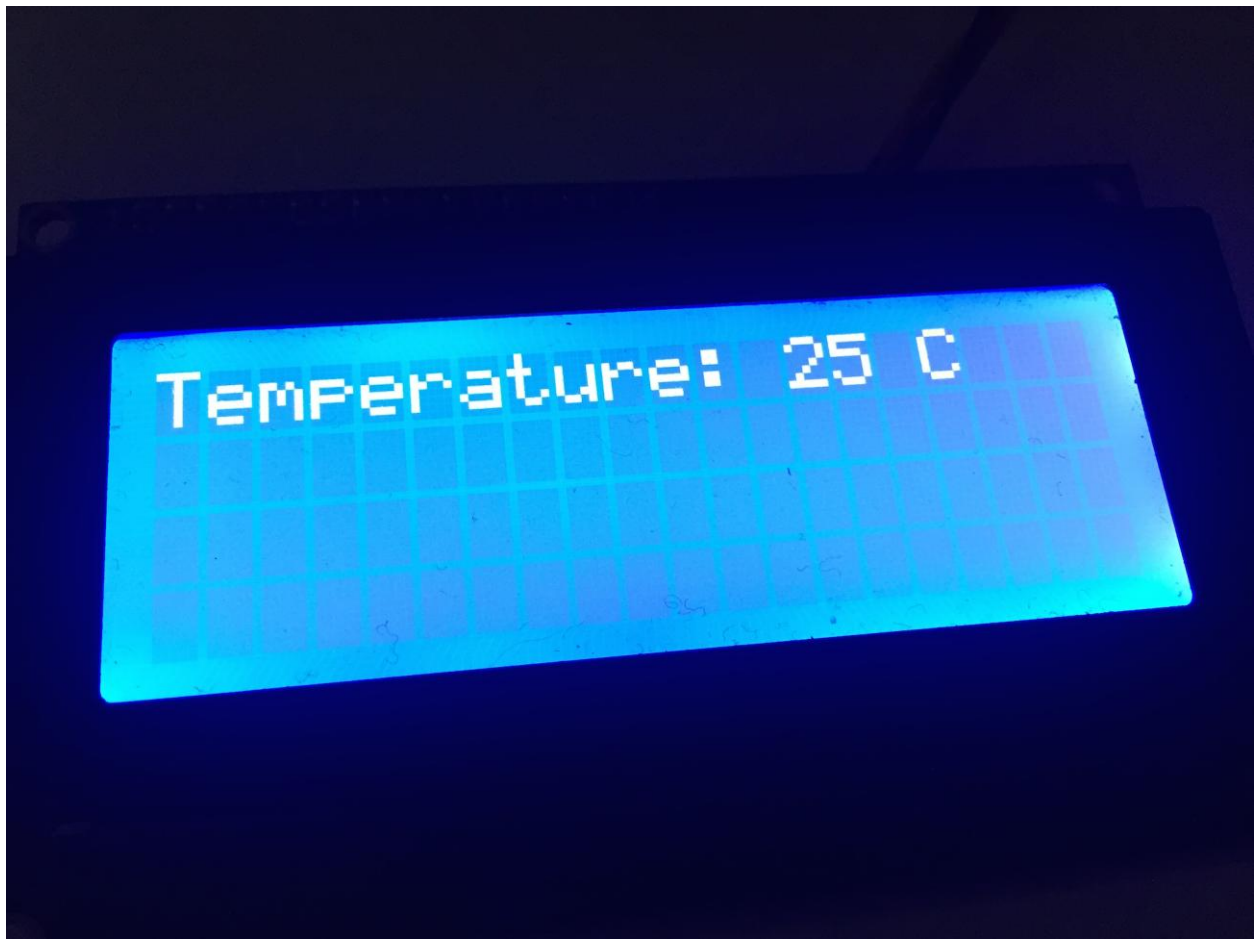






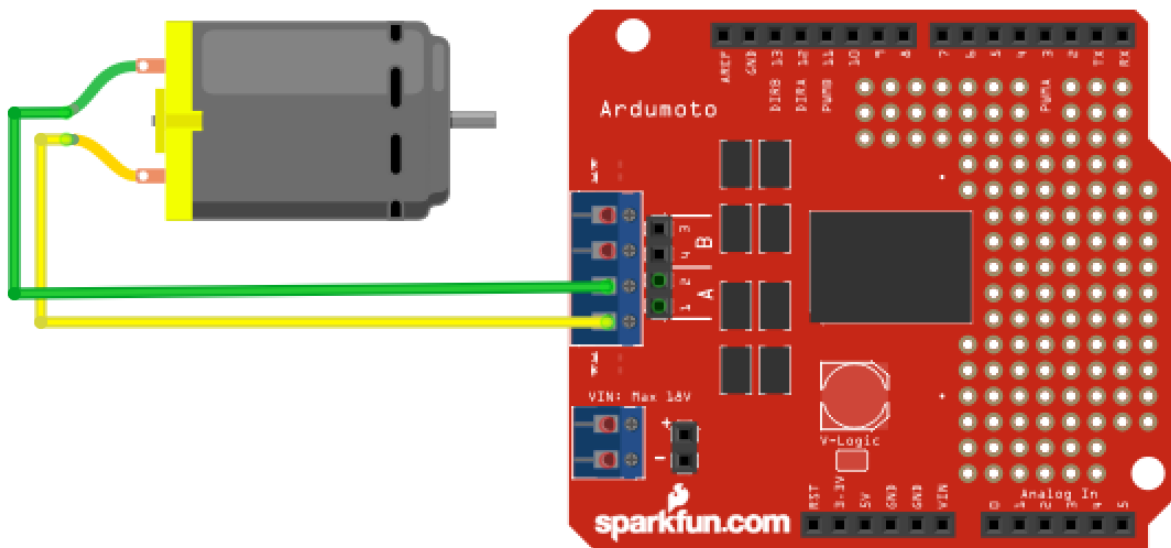
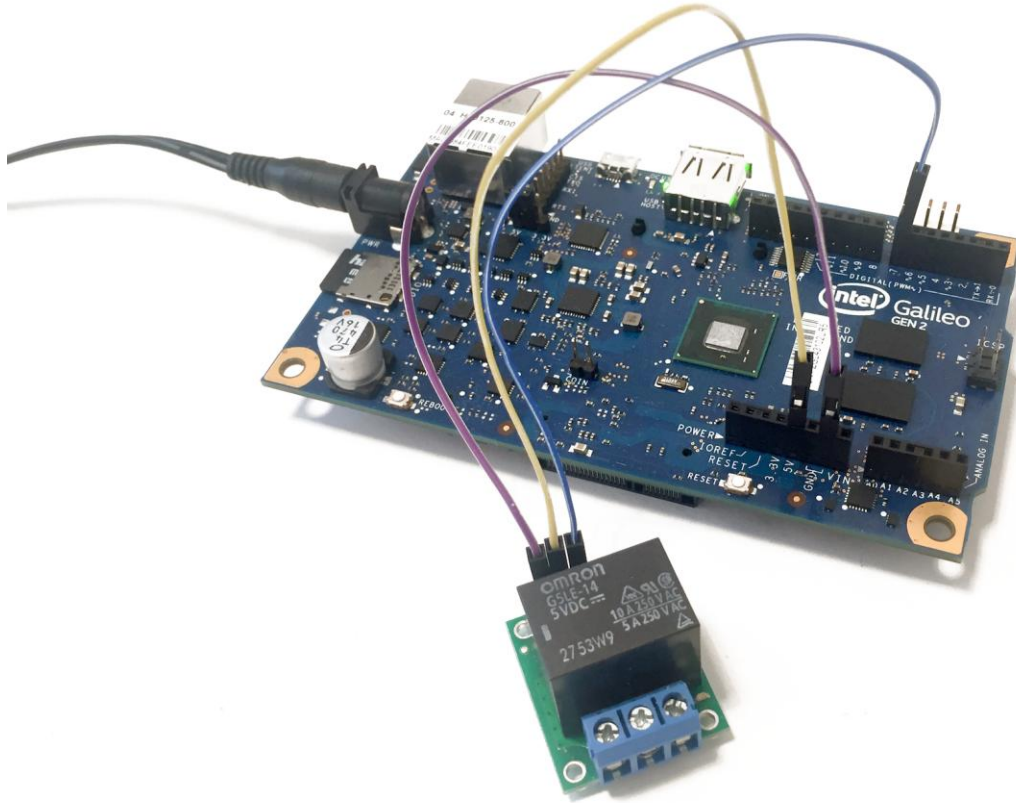


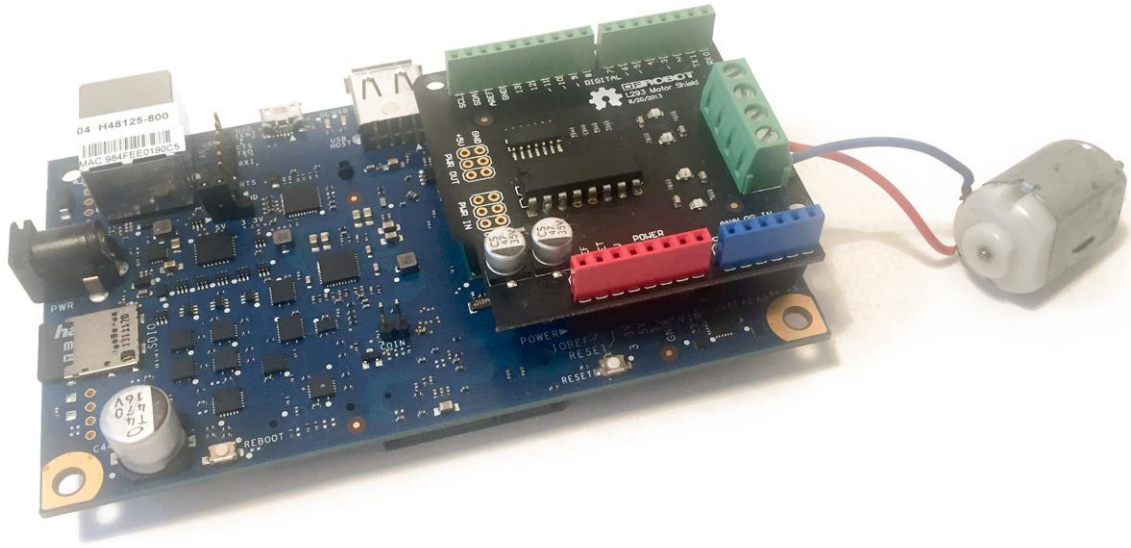


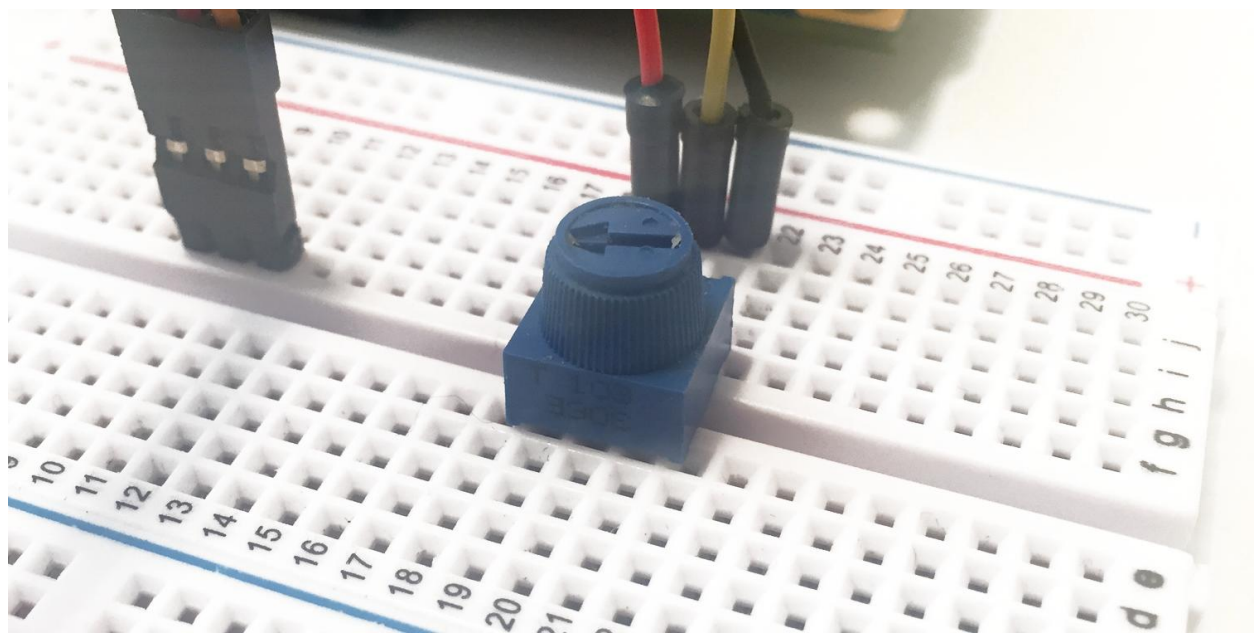
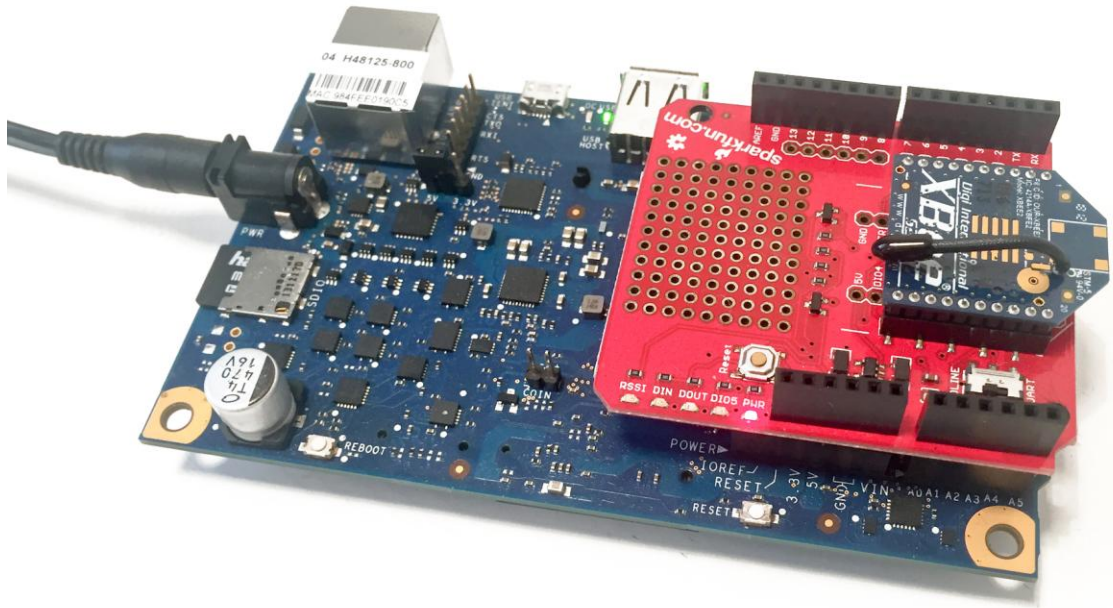


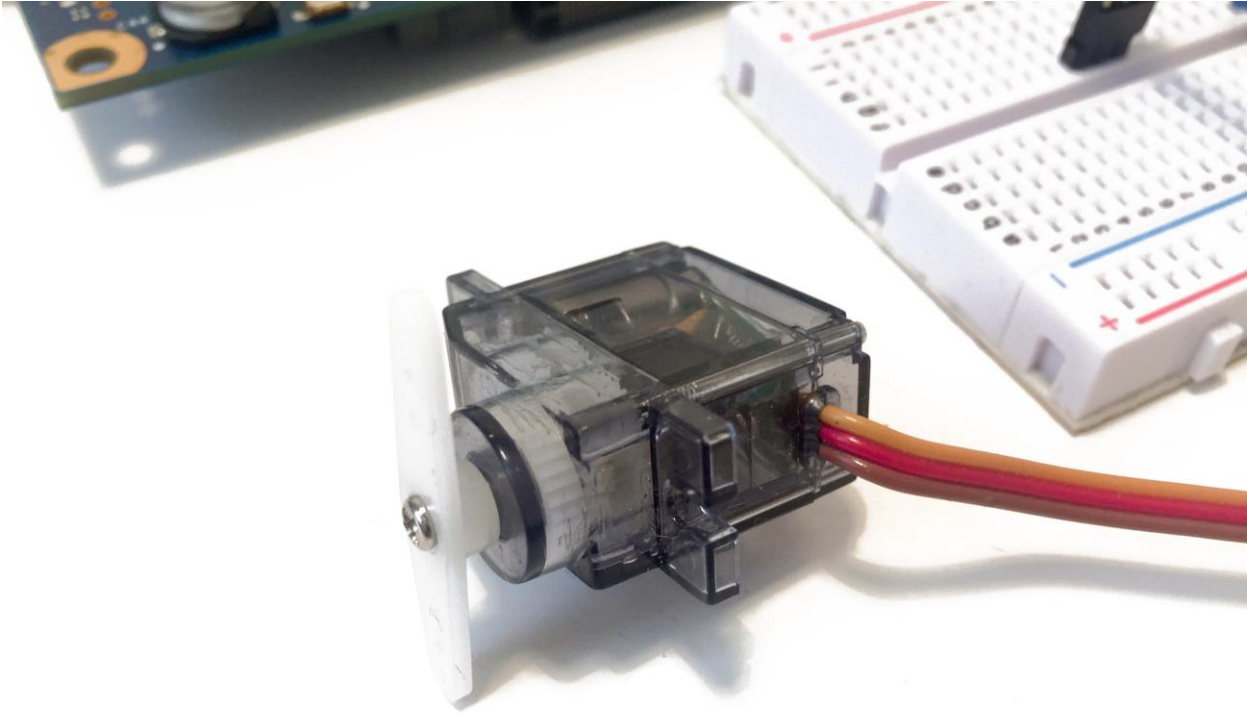
Temperature: 25 C

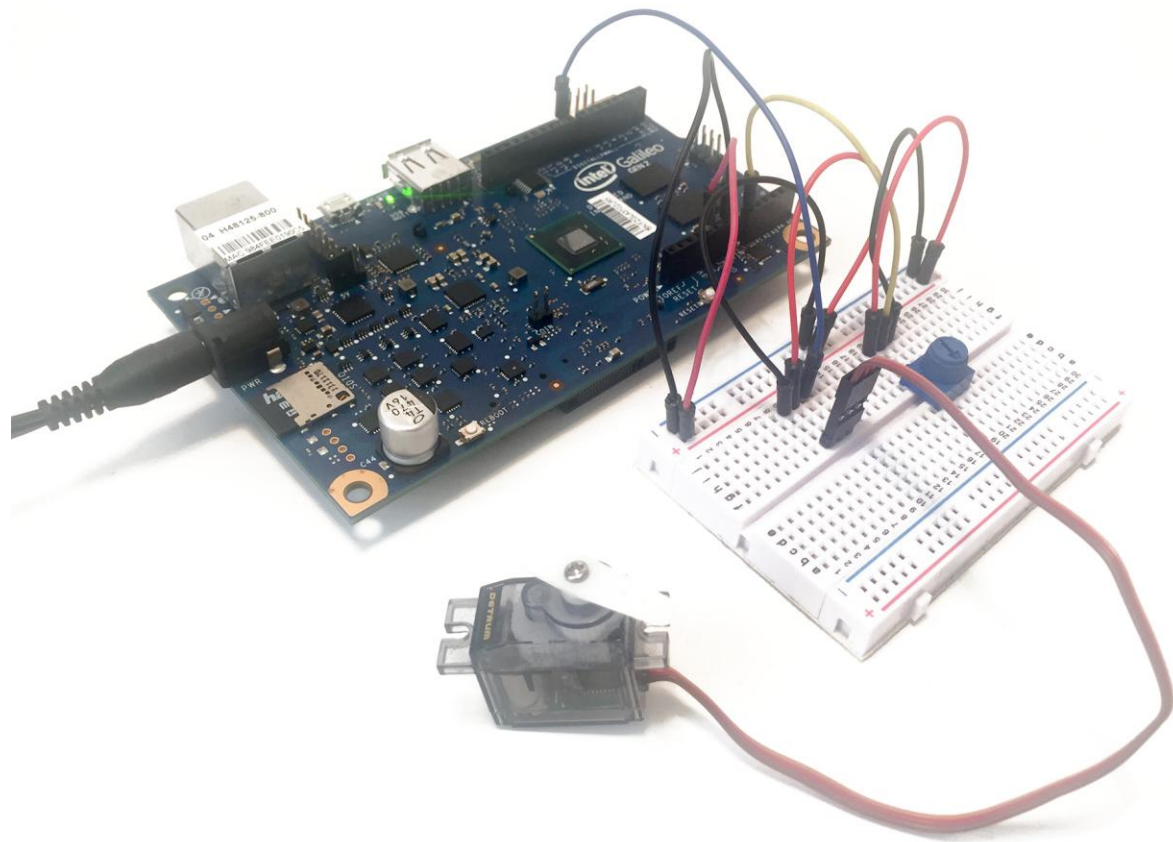
Chapter 3- Controlling Hardware Devices

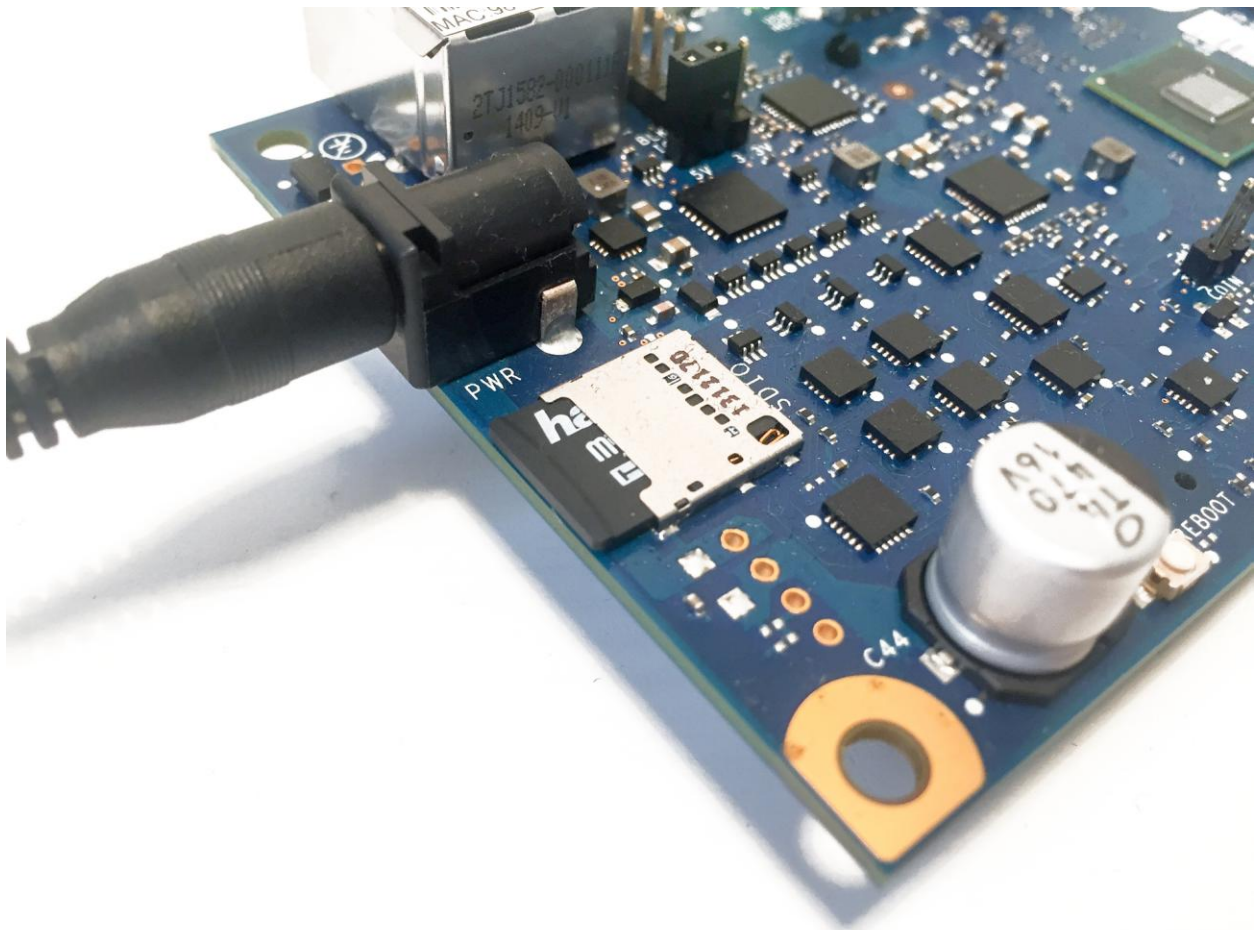


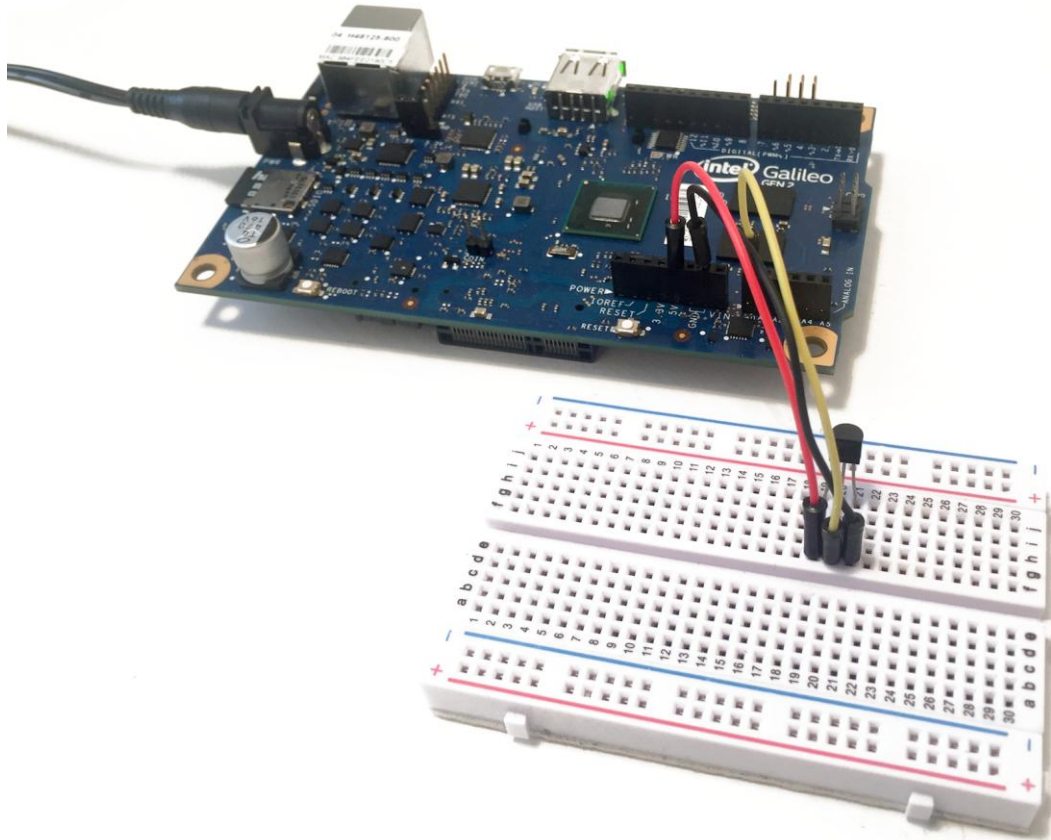


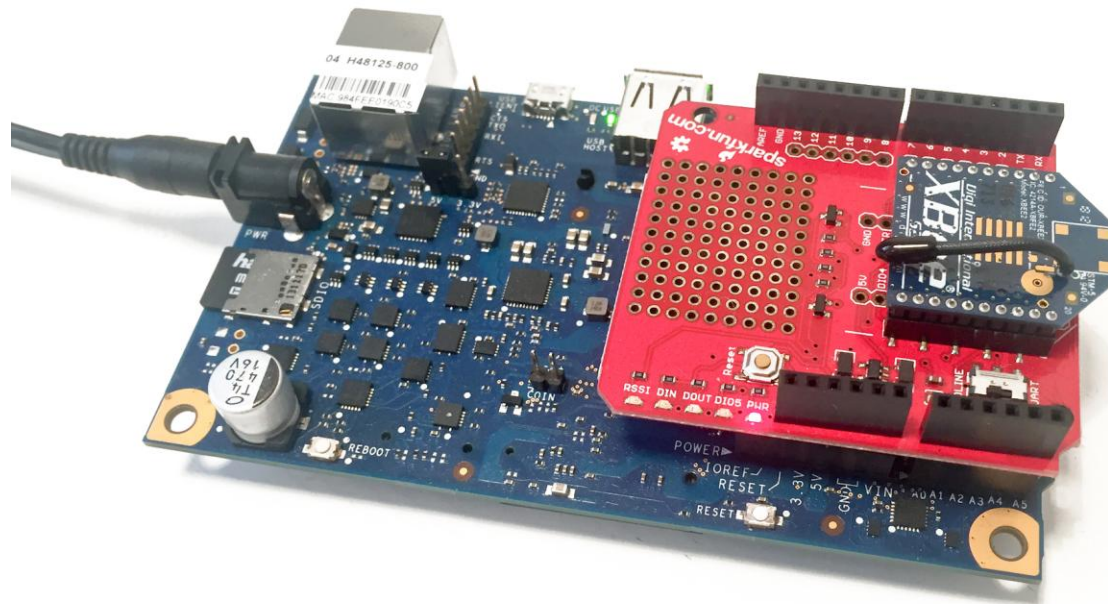




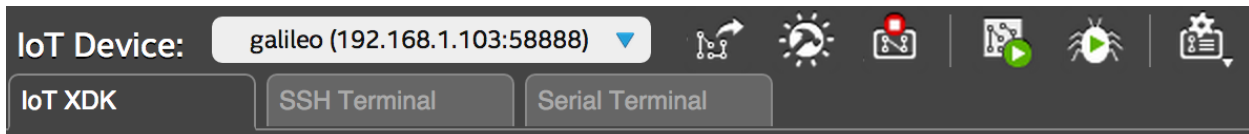
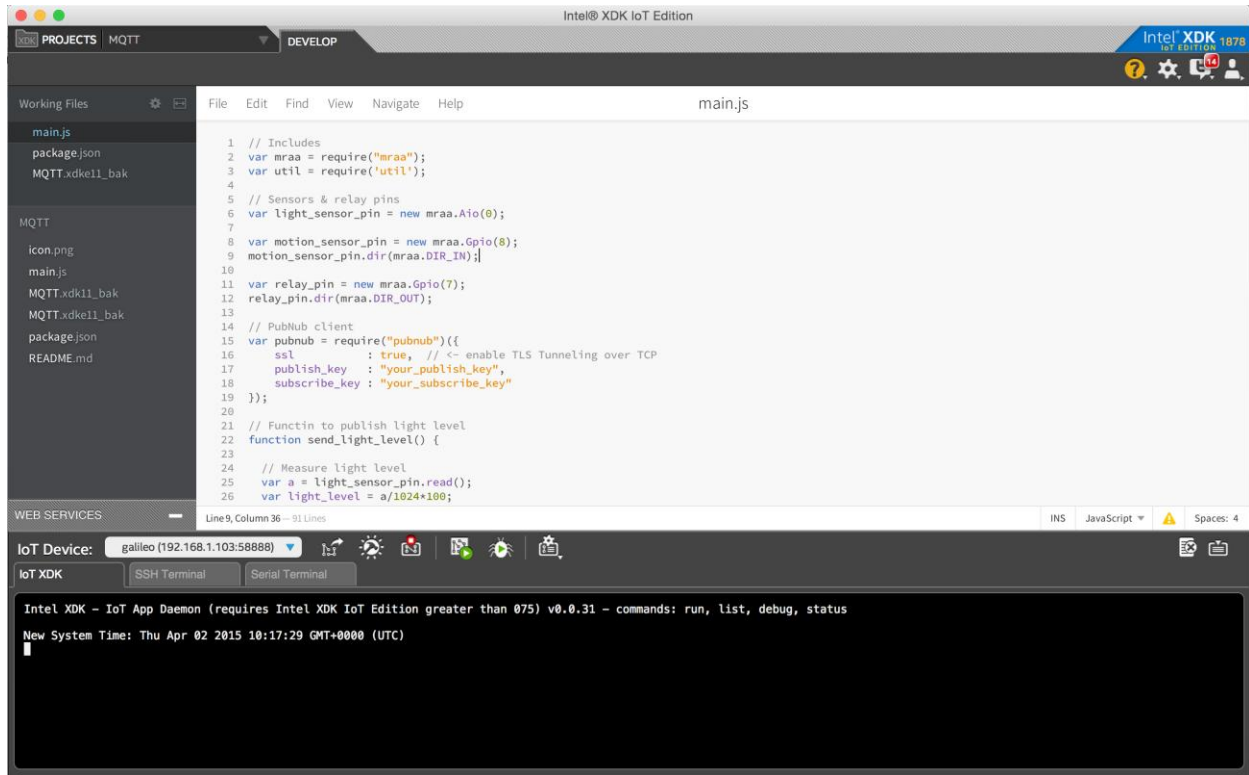








Chapter 4- Creating a Web Server



Connect to IoT Device (must be running the Intel XDK app daemon)

Address: (ex: 192.168.1.104)

Port: (ex: 58888) Default Intel XDK app daemon port is 58888

Use ssh keys

User Name:

Password:

[Why is my device not auto-detected?](#)

Cancel

Connect

IoT XDK

SSH Terminal

Serial Terminal

```
Intel XDK - IoT App Daemon (requires Intel XDK IoT Edition greater than 075) v0.0.31 - commands: run, list, debug, status
New System Time: Thu Apr 02 2015 10:17:29 GMT+0000 (UTC)
```

START A NEW PROJECT

INTERNET OF THINGS EMBEDDED APPLICATION

Templates

Import Your Node.js Project

HTML5 COMPANION HYBRID MOBILE OR WEB APP

+ Templates

+ Samples and Demos

Import Your HTML5 Code Base

Templates



Blank Template



Analog Read



Blank Template



Digital Read



Digital Write



Onboard LED Blink

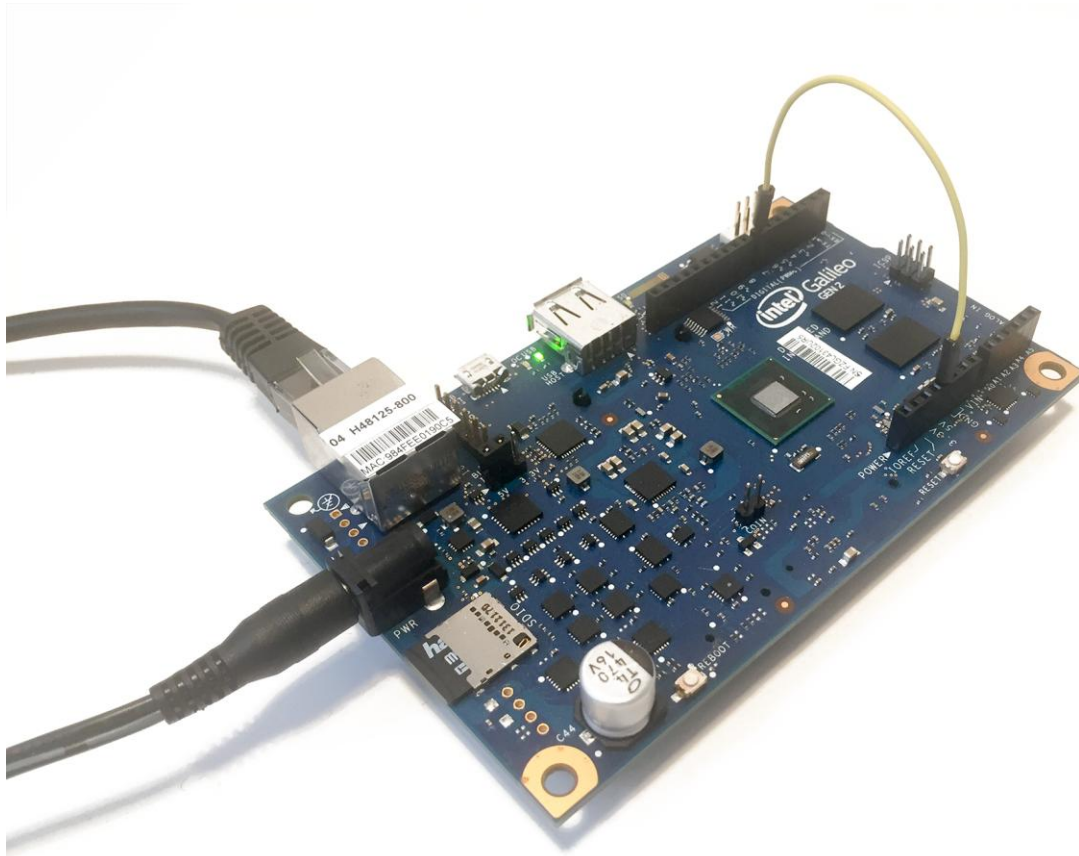
Blank Template

Blank Template

Embed on maker boards

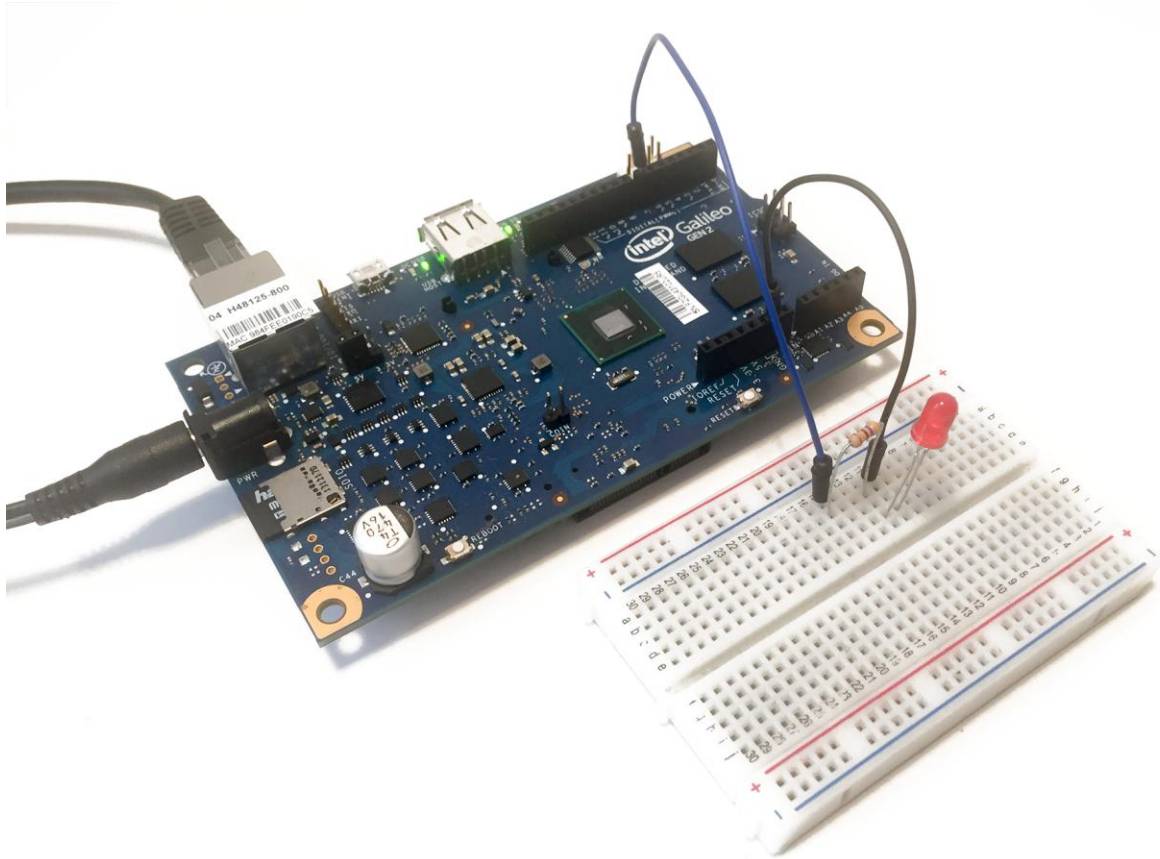


PWM



```
← → ↻ 192.168.1.100:3000/read
```

Digital pin 7 value is: 1




← → ↻ 192.168.1.100:3000/on

Pin 7 is on

← → ↻ 192.168.1.100:3000/api/read?pin=7

```
{"pin": "7", "value": 1}
```

← → ↻  192.168.1.100:3000/api/write?pin=7&value=1

```
{"pin": "7", "value": "1"}
```

Chapter 5- Hosting Applications on the Galileo Board

API Key [Reset API Key](#)

Twitter Apps

Create New App



Application Settings

Keep the "Consumer Secret" a secret. This key should never be human-readable in your application.

Consumer Key (API Key)	[REDACTED]
Consumer Secret (API Secret)	[REDACTED]
Access Level	Read, write, and direct messages (modify app permissions)
Owner	MarcoSchwartz
Owner ID	81862926

Your Access Token

This access token can be used to make API requests on your own account's behalf. Do not share your access token secret with anyone.

Access Token	[REDACTED]
Access Token Secret	[REDACTED]
Access Level	Read, write, and direct messages
Owner	MarcoSchwartz
Owner ID	81862926

Code the Internet of Everything

Your Software Stack for Connected Devices.
Generate production-ready code. Connect hardware instantly. Enhance and extend devices with our cloud.

- ▶ Facebook
- ▶ Factual
- ▶ FedEx
- ▶ FedSpending
- ▶ FilesAnywhere
- ▶ Fitbit
- ▶ Flickr
- ▶ Foursquare
- ▶ Freebase
- ▶ Genability
- ▶ GitHub
- ▶ Google
- ▶ GovTrack
- ▶ Highrise
- ▶ InfluenceExplorer
- ▶ Instagram
- ▶ Instapaper

▼ GLOSSARY

Social Graph

The people in the Facebook platform and the connections between them. Every object in the social graph has a unique ID.

▼ CHOREOS

Accounts

Retrieves a list of the Facebook apps and pages owned by the specified user.

Books

Retrieves a list of books that a given user has liked.

Checkins

Retrieves a list of checkins associated with a specified user.

Comments

Retrieves comments for a specified Graph API object.

Facebook . Reading . **GetLatestMention** ☆

Retrieves the latest status update in a user's feed that mentions the specified user.

INPUT **Get OAuth Tokens**

AccessToken

The access token retrieved from the final step of the OAuth process.

Name

The name of the user who is mentioned.

▶ **OPTIONAL INPUT**

Run 

▼ **OUTPUT**

Response

The response from Facebook.

Dashboard



TestApp ○

This app is in development mode [?]

App ID

428512017304901

App Secret

●●●●●●●●

Show

Website Quick Start ×

Site URL

Mobile Site URL

3 Populate App ID and App Secret


Copy your **App ID** and **App Secret** from your Facebook app, and paste them below.

AppID

The App ID provided by Facebook (AKA the Client ID).

AppSecret

The App Secret provided by Facebook (AKA the Client Secret).

INPUT  **Get OAuth Tokens** Save Profile

AccessToken
The access token retrieved from the final step of the OAuth process.

Name
The name of the user who is mentioned.

▶ **OPTIONAL INPUT**

Run

▼ CODE

Node.js ▼

```
// You'll need a single TembooSession object in your code, eg:  
// var tsession = require("temboo/core/temboosession");  
// var session = new tsession.TembooSession  
  
var Facebook = require("temboo/Library/Facebook/Reading");  
  
var getLatestMentionChoreo = new Facebook.GetLatestMention(session);  
  
// Instantiate and populate the input set for the choreo  
var getLatestMentionInputs = getLatestMentionChoreo.newInputSet();  
  
// Set inputs  
  
// Run the choreo, specifying success and error callback handlers  
getLatestMentionChoreo.execute(  
  getLatestMentionInputs,  
  function(results){console.log(results.get_Response());},
```

COPY

Search Library



☆ **Favorites**

🛡️ **Categories**

- Civic
- Developer
- eCommerce
- Education
- Green
- Health
- Location
- Marketing
- Media
- News
- Nonprofit
- OAuth
- Payments
- Photo
- Productivity
- SaaS
- Search
- Shipping
- Social
- Storage
- Weather

▶ Amazon

▶ eBay

GitHub

GitHub has changed the way code is shared. A web service for development projects, it uses the Git revision source control system (Oh Linus, thank you!), and allows you to share code with friends, co-workers, classmates, and anonymous users.

▼ BUNDLES

[GistsAPI](#)

The Gist API gives developers an easy way to share snippets and pastes with others.

[GitDataAPI](#)

The Git Data API gives you access to read and write Git objects to your Git database on GitHub and to list and update your references such as branch heads and tags.

[IssuesAPI](#)

The Issues API gives developers an easy way to access issues associated with GitHub repositories.

[OAuth](#)

This bundle contains functions to help generate OAuth access tokens for your application's users.

[ReposAPI](#)



The Repos API gives developers an easy way to access GitHub objects such as repos, collaborators, comments, commits, contents, forks, and more.

Dropbox

Dropbox is a free online service that lets you store and share your documents, photos, and videos anywhere there's an Internet connection.

▼ SETUP INSTRUCTIONS

To use these Choreos:

- Create a Dropbox Developer Account [here](#)  if you haven't already.
- Log in to your Dropbox account.
- Go to the [App Console](#)  to register your application. You'll get an App Key and App Secret, which will be included in every call to the Dropbox API.
- With your Dropbox application in place, visit the [Dropbox > OAuth](#) bundle. Starting with the InitializeOAuth Choreo, use these Choreos to grant your application access to a Dropbox account. This [short video](#) demonstrates how to use our OAuth Choreos, and it's a good idea to take a break and watch it now before you dive into this step. You'll need the access token and access token secret returned by this process to use the Dropbox Choreos.

▼ BUNDLES

[Account](#)

This bundle contains functionality for retrieving account details from Dropbox.

[Datastore](#)

This bundle contains functionality for keeping your app's structured data in sync with Dropbox.

[FileOperations](#)

This bundle handles file operations on Dropbox files stored in Dropbox, as well as creating new folders.

[FilesAndMetadata](#)

This bundle handles a variety of file and metadata functionality.

[OAuth](#)



This bundle contains functions to help generate OAuth access tokens for your application's users.


Twilio

Telephony for the cloud era, Twilio's platform lets you easily create scalable voice, VoIP, and SMS text-messaging applications.

▼ SETUP INSTRUCTIONS

To use the Choreos in this bundle:

- If you don't already have a Twilio account, sign up for one [here](#) .
- Twilio will provide you with an AccountSID number and an authorization token which you can find on your Account Dashboard [here](#) .

Please note: If want to test your application using a Twilio Sandbox number, you'll need to send SMS messages to phone numbers that you've verified. You can manage your verified numbers [here](#) .

▼ BUNDLES

Accounts

Twilio allows you to create more than one account. You can create subaccounts which are used for segmenting phone numbers and usage data for your customers and controlling access to data. Choreos within this bundle are used for managing your subaccount resources.

Applications

The Choreos within this bundle allows you to manage applications that you've created with Twilio.

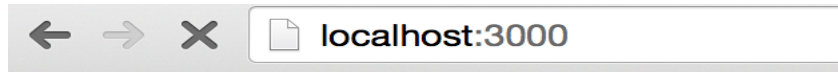
AvailablePhoneNumbers

The Choreos within this bundle allows your application to search for incoming local and toll-free phone numbers that are available for you to purchase.

Calls

The Choreos within this bundle allows your application to initiate calls and retrieve information about calls.

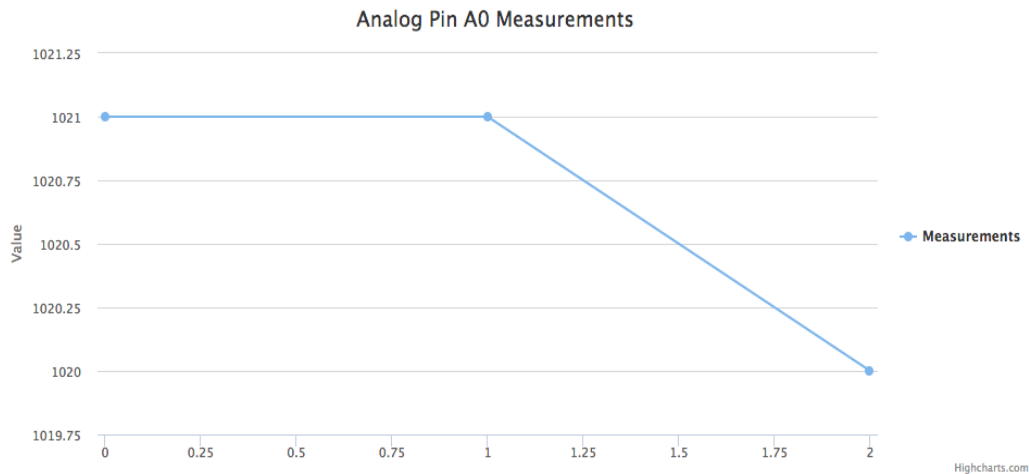
Chapter 6- Local Network Monitoring



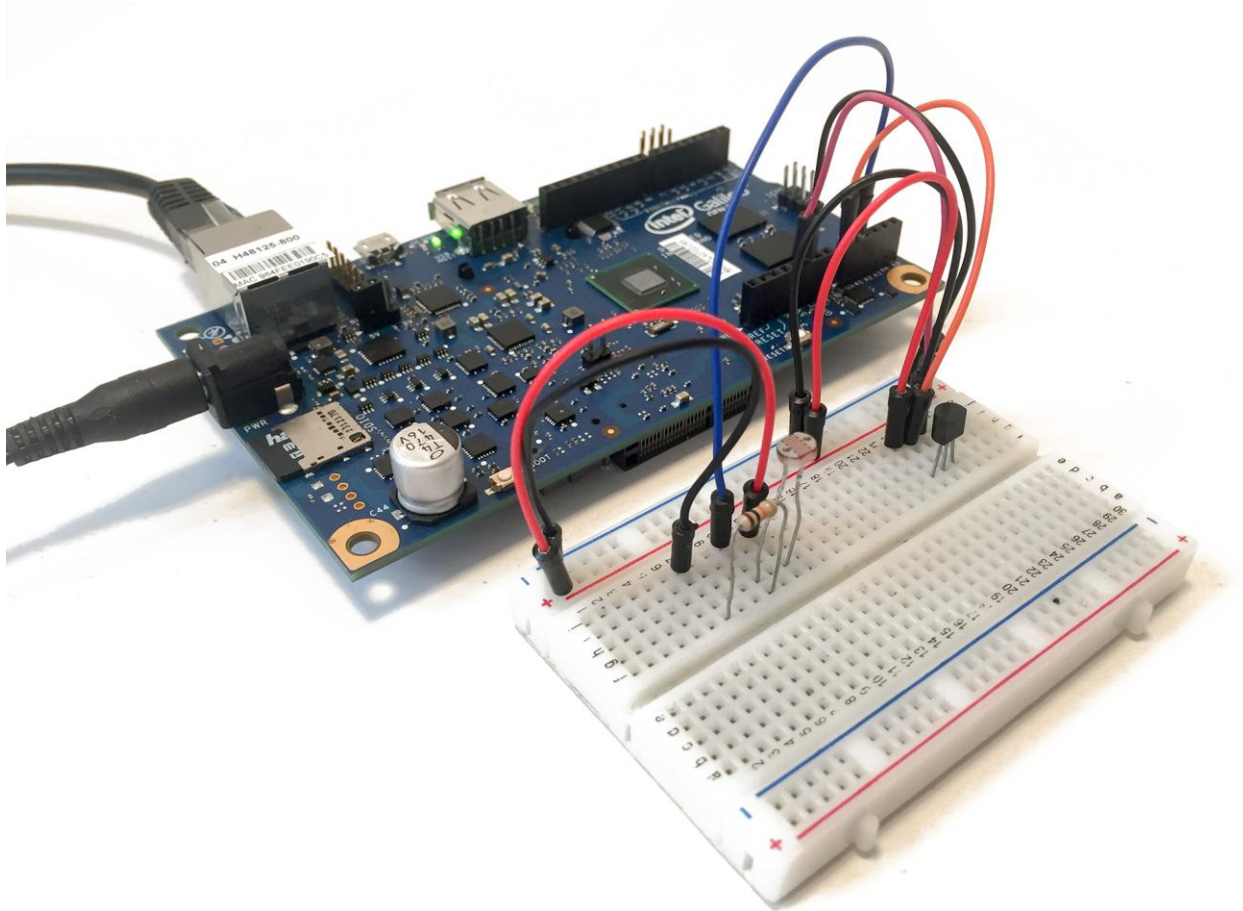
The state of pin 0 is 1020.

```
2015-04-21T09:13:27.140+0200 I JOURNAL [initandlisten] journal dir=/data/db/journal
2015-04-21T09:13:27.142+0200 I JOURNAL [initandlisten] recover : no journal files present, no recovery needed
2015-04-21T09:13:27.158+0200 I JOURNAL [durability] Durability thread started
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] MongoDB starting : pid=12936 port=27017 dbpath=/data/db 64-bit host=macbookpro.local
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] ** WARNING: You are running this process as the root user, which is not recommended.
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten]
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten]
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] ** WARNING: soft rlimits too low. Number of files is 256, should be at least 1000
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] db version v3.0.2
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] git version: nogitversion
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] build info: Darwin yosemitevm.local 14.3.0 Darwin Kernel Version 14.3.0: Mon Mar 23 11:
59:05 PDT 2015; root:xnu-2782.20.48~5/RELEASE_ARM_T8040 x86_64 BOOST_LIB_VERSION=1_49
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] allocator: system
2015-04-21T09:13:27.158+0200 I CONTROL [initandlisten] options: {}
2015-04-21T09:13:27.159+0200 I JOURNAL [journal writer] Journal writer thread started
2015-04-21T09:13:27.377+0200 I NETWORK [initandlisten] waiting for connections on port 27017
```

```
{ _id: 55360333b9d6eae3a94b9c2,
  pin: 0,
  value: 1020,
  date: Tue Apr 21 2015 09:58:43 GMT+0200 (CEST),
  __v: 0 }
{ _id: 55360346cda79cfe3acaf857,
  pin: 0,
  value: 1020,
  date: Tue Apr 21 2015 09:59:02 GMT+0200 (CEST),
  __v: 0 }
```



Chapter 7- Cloud Data Monitoring



```
UPLOADING: Uploading project bundle to IoT device.  
[ Upload Complete ]  
Intel XDK - Message Received: run  
Light level: 77.64 %  
Temperature: 25.00 C
```

```
https://dweet.io/dweet/for/galileo_5etr6b?temperature=25&light=84.96
{ this: 'succeeded',
  by: 'dweeting',
  the: 'dweet',
  with:
    { thing: 'galileo_5etr6b',
      created: '2015-04-21T10:26:39.543Z',
      content: { temperature: 25, light: 84.96 } } }
```

Intel XDK – Message Received: stop

My Freeboards

[Create New](#)

Home	Public	Edit
Test	Public	Edit
CC3200	Public	Edit
Raspberry Pi	Public	Edit
Galileo	Public	Edit
ESP8266	Public	Edit

freeboard

DATASOURCES

+ ADD PANE
ADD

←
↑
→

DATASOURCE

A datasource for connecting to things at dweet.io.

TYPE

NAME

THING NAME

Example: salty-dog-1

KEY

If the thing is not locked, you can ignore this field

SAVE

CANCEL

WIDGET

TYPE

TITLE

VALUE

+ DATASOURCE

JS EDITOR

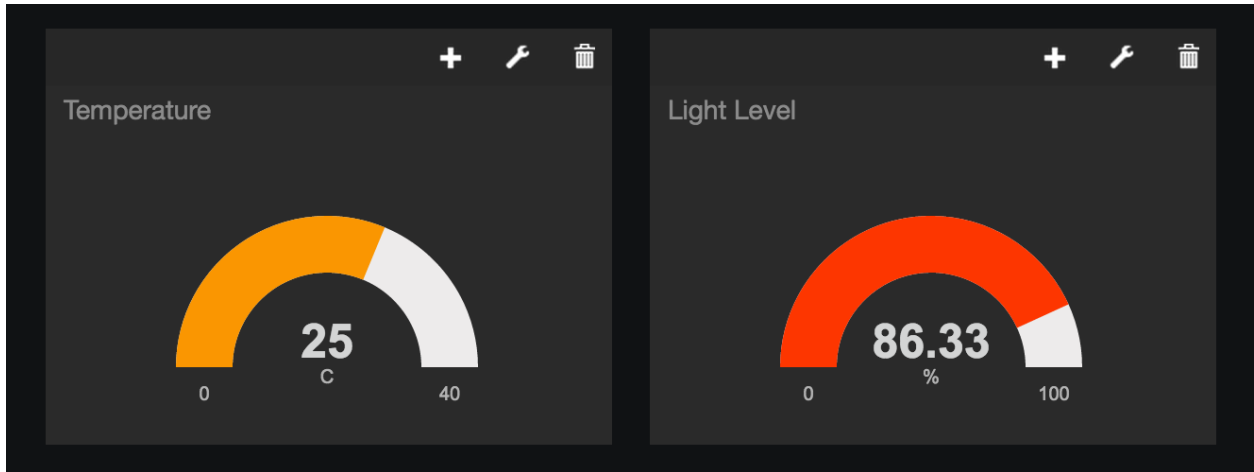
UNITS

MINIMUM

MAXIMUM

SAVE

CANCEL



New Project

Project name ?

Galileo App

Project ID ?

ecstatic-cosmos-92210




[Show advanced options...](#)

I agree that my use of any [services and related APIs](#) is subject to my compliance with the applicable [Terms of Service](#).

Create

Cancel




 [Disable API](#)

Drive API

Enabled Drive API [Dismiss](#)

[Overview](#) [Usage](#) [Quotas](#)

The Drive API allows clients to access resources from Google Drive.


- [Learn more](#) 
- [Explore this API](#) 
- [View reports in API Console](#) 

INPUT

[Save Profile](#)

ClientID
The Client ID provided by Google after registering your application.

Scope
A space-delimited list of scopes to requests access for. See Choreo notes for a list of valid scopes.
▶ OPTIONAL INPUT

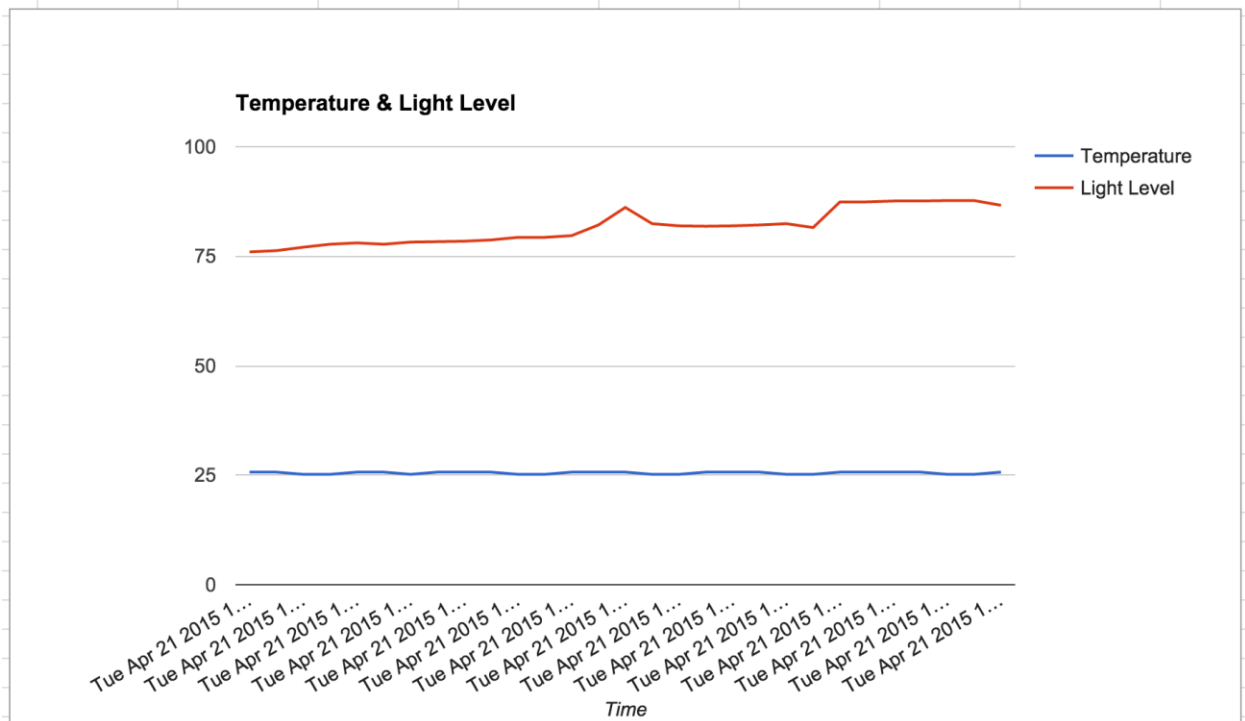
[Run](#) 

AccessToken
The access token for the user that has granted access to your application.

```
ya29.XAFnqI2BMhMob1 ov9Vu3jFFWTcn6wz627OgR3quvS6FGPyRqyY2KfHn_H2rNa5TSHICqTMaxj  
mwn0g
```

[COPY](#)

	A	B	C
1	Date	Temperature	Light Level
2	Tue Apr 21 2015 11:31:13 GMT+0000 (UTC)	25.7	75.98
3	Tue Apr 21 2015 11:31:24 GMT+0000 (UTC)	25.7	76.27
4	Tue Apr 21 2015 11:31:34 GMT+0000 (UTC)	25.2	77.05
5	Tue Apr 21 2015 11:31:44 GMT+0000 (UTC)	25.2	77.73



1

2

3

Give a meaningful name to your device. It will be easier to find.

Here some examples

- Kitchen light
- Garage lock
- Bedroom thermostat

Define the device name

Set device name

> Confirm device name

Settings



Device details

ID TRUE

553638c35323764ccd00001c

SECRET

swuEE79PDsrBBeqL2ydbpPRPbcnpC0s9

TYPE

Basic Light

Relay Control

Settings



Off

a minute ago from marcolivier.schwartz@gmail.com



Turn on



Turn off



Status off

Relay Control

Settings



On

a few seconds ago from physical



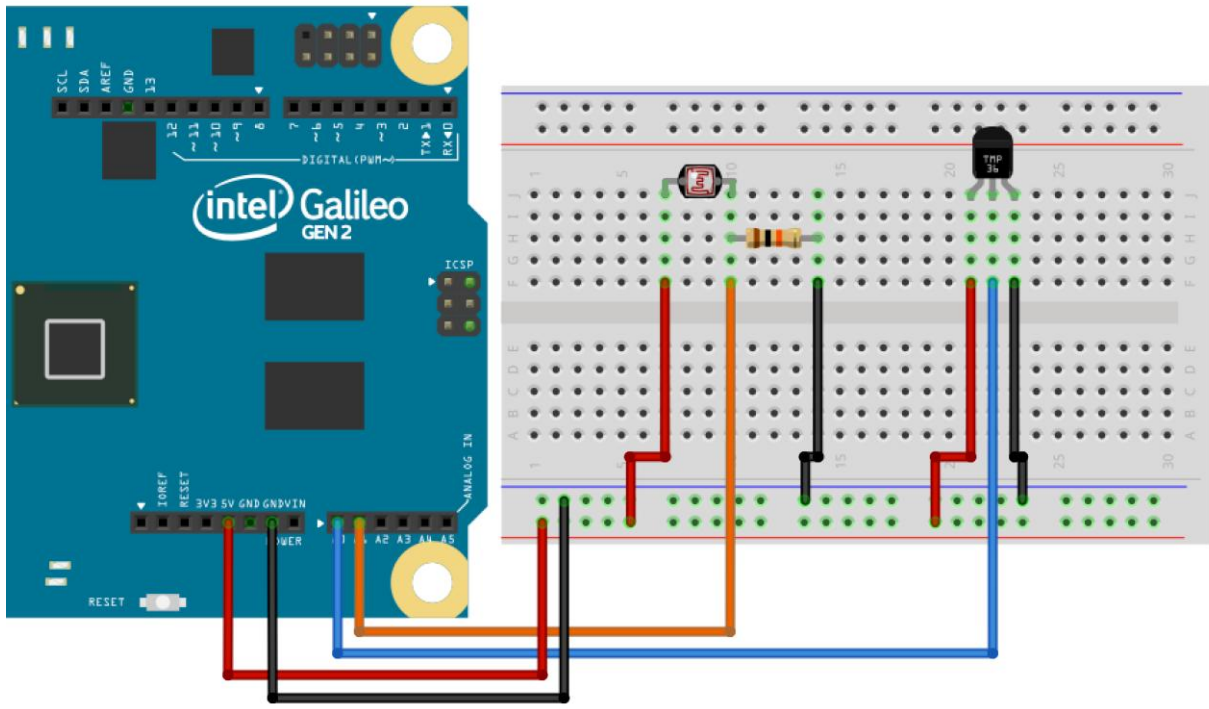
Turn on



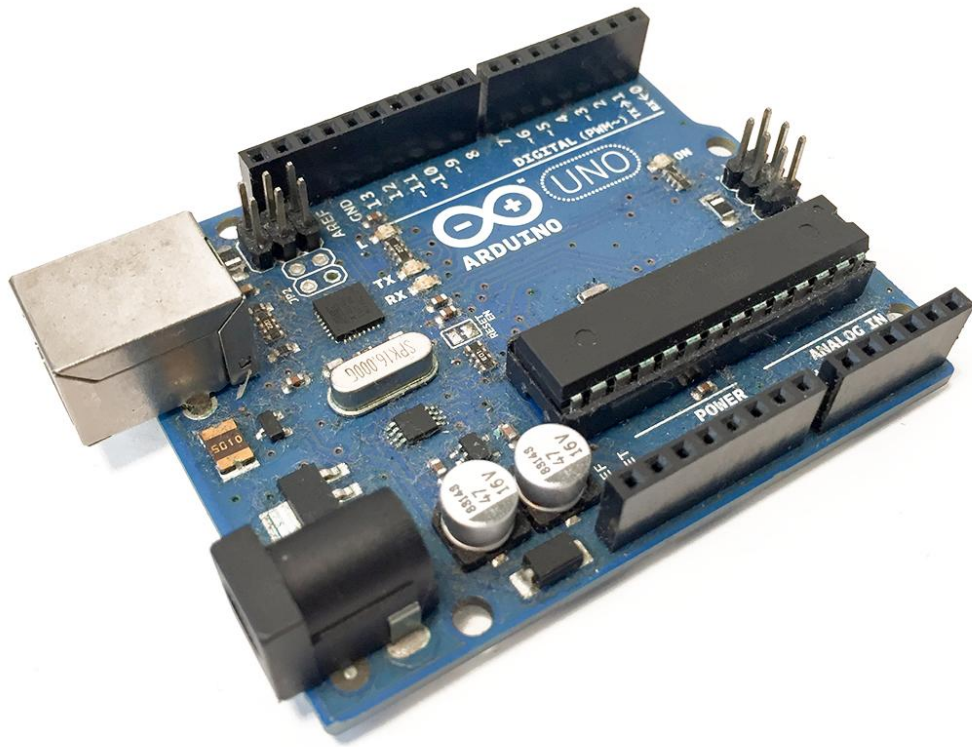
Turn off

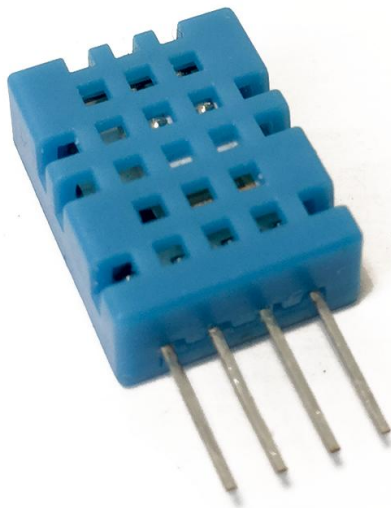
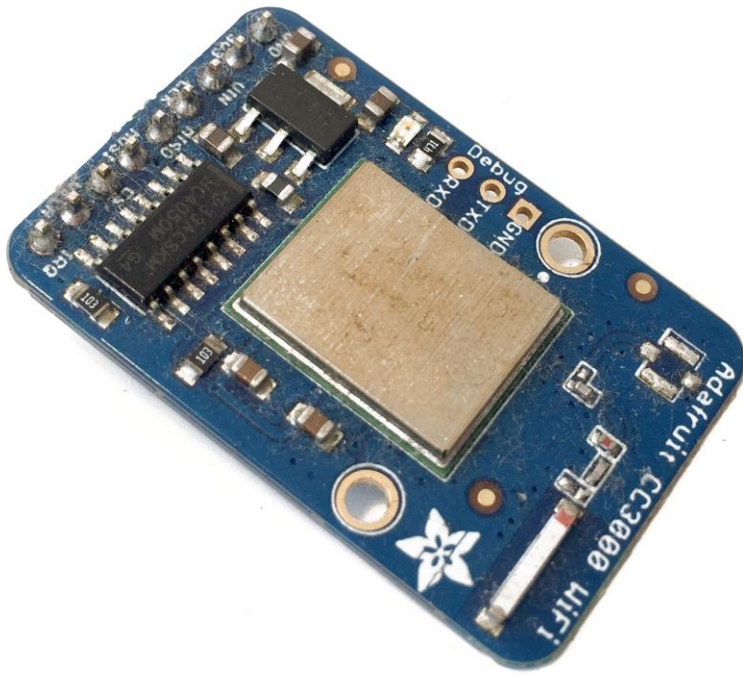


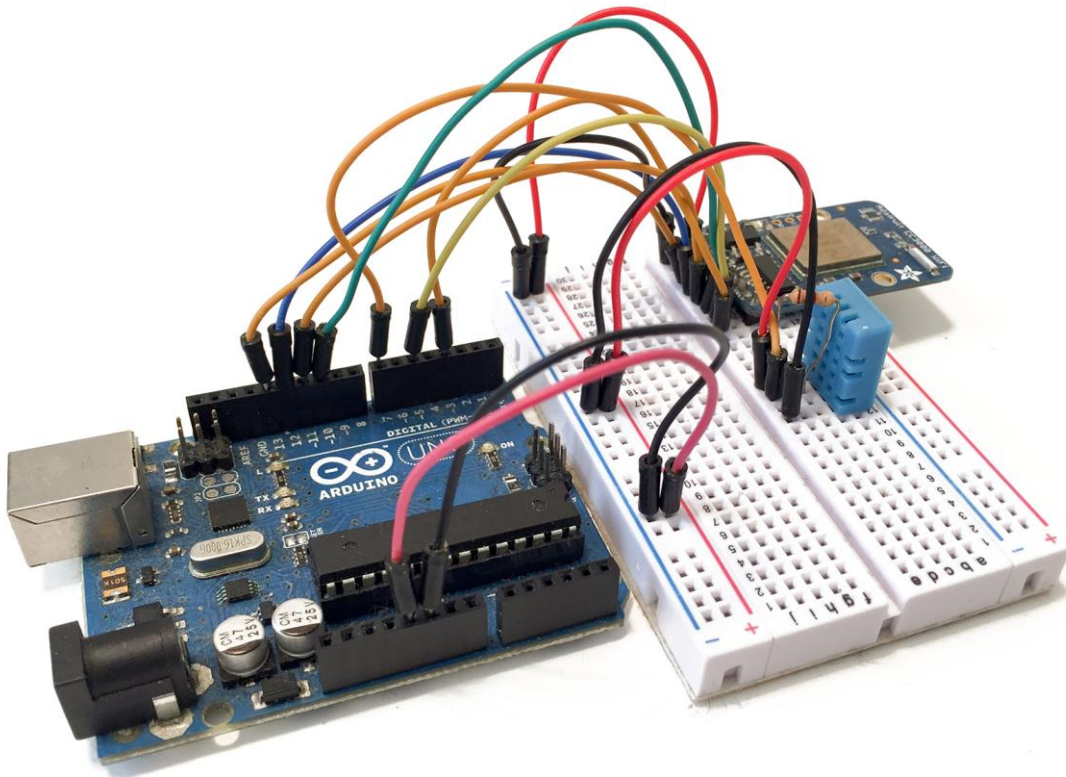
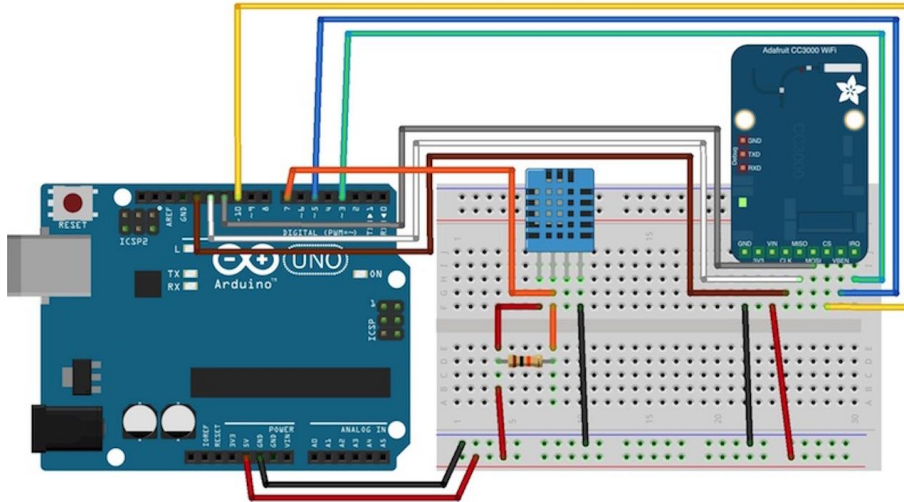
Status on

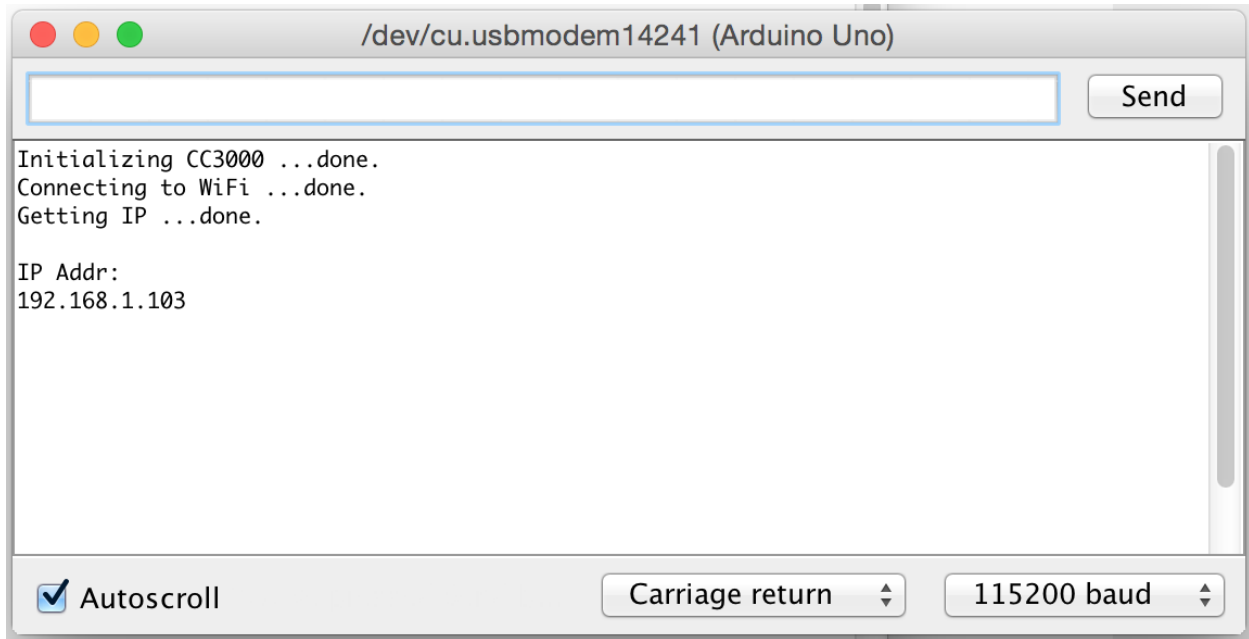


Chapter 8- Building a Home Automation System









Listening on port 3000

Sending request to address: 192.168.1.103 for variable id

Sending request to address: 192.168.1.105 for variable id

Device added with ID: 2

Device added with ID: 1

Home Automation Interface

Sensor 1	Temperature: 27	Humidity: 31	Online
----------	-----------------	--------------	--------

Sensor 2	Temperature: 22	Humidity: 39	Online
----------	-----------------	--------------	--------

Home Automation Interface

Sensor 1	Temperature: 26	Humidity: 32	Online
----------	-----------------	--------------	--------

Sensor 2	Temperature: 22	Humidity: 39	Online
----------	-----------------	--------------	--------

External	Temperature: 11.95	Humidity: 75	
----------	--------------------	--------------	--

ngrok

(Ctrl+C to quit)

Tunnel Status

```
Version 1.7/1.7
Forwarding http://4681858b.ngrok.com -> 192.168.1.103:3000
Forwarding https://4681858b.ngrok.com -> 192.168.1.103:3000
Web Interface 127.0.0.1:4040
# Conn 0
Avg Conn Time 0.00ms
```

http://429324b.ngrok.com

Home Automation Interface

Sensor 1	Temperature: 26	Humidity: 32	Online
Sensor 2	Temperature: 22	Humidity: 39	Online