



T-MOBILE | IoT

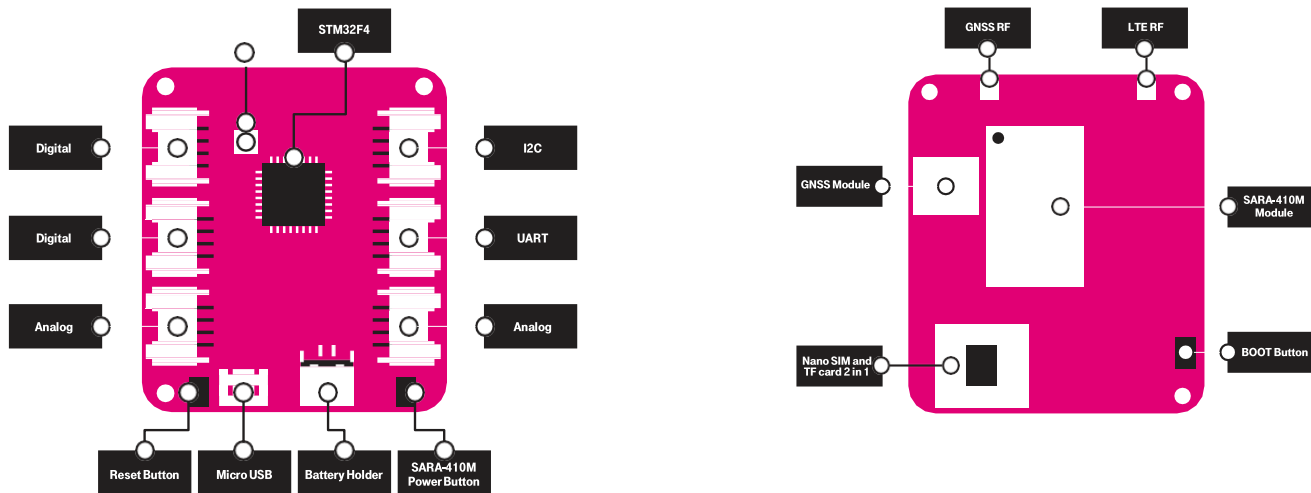
QUICK START GUIDE

# Twilio Narrow Band DevKit



# Development Hardware Setup

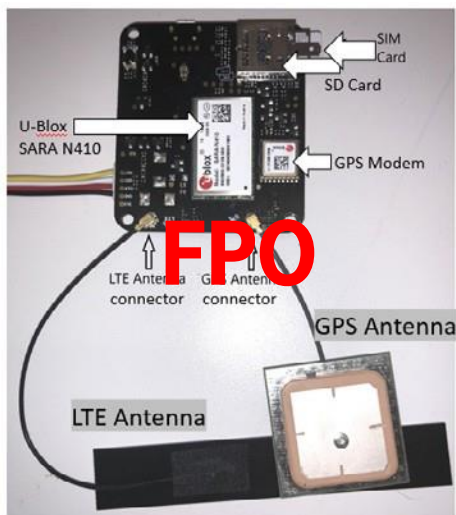
## Hardware Overview



## Hardware Connection

Before you start, connect the following components to the dev-kit:

- GPS Antenna
- Cellular Antenna & SIM Card
- Sensors (Button on D38, Temperature & Humidity Sensor on D20)
- Battery



# Development Environment Setup

## Install USB driver

### Windows Users

Most versions of Windows won't automatically load the built-in driver for USB com ports. You'll have to download ST's USB driver:

- Non-Windows XP Users download version 1.4.0 drivers. Unzip the file, run the executable, and then go to C:\Program Files (x86)\STMicroelectronics\Software\Virtual comport driver in Windows Explorer and double-click either dpinst\_amd64.exe for 64bit systems, or dpinst\_x86.exe for 32 bit. (For Windows 10, run as administrator)
- Windows XP Users download version 1.3.1 drivers. Unzip the file, run VCP\_V1.3.1\_Setup.exe, and then go to C:\ProgramFiles\STMicroelectronics\Software\Virtual comport driver in Windows Explorer and double-click the executable.

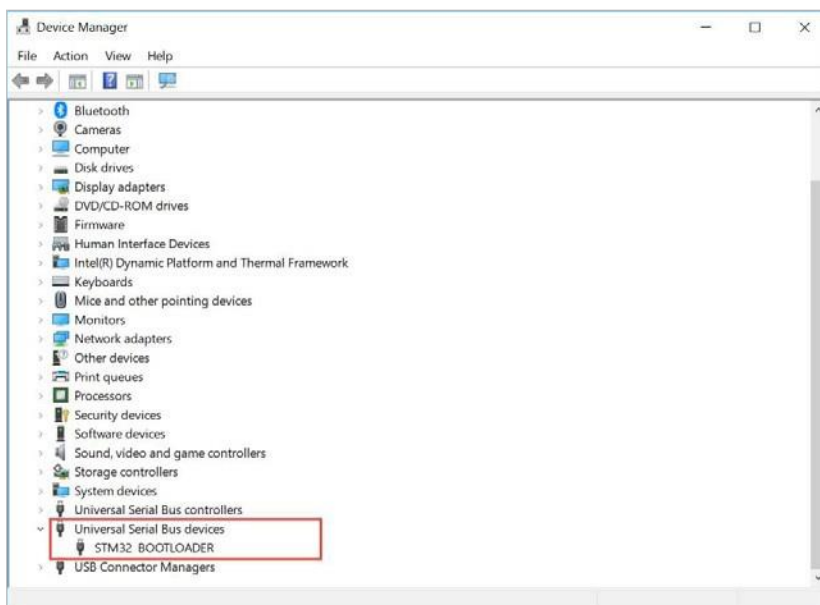
### Linux users

Ensure that you have the correct permissions to connect as a normal user you'll need to copy the file 45-espruino.rules to /etc/udev/rules.d, reload rules with udevadm control -reload-rules, and ensure your user is in the plugdev group (you can check by typing groups). You add it by typing sudo adduser \$USER plugdev and then logging out and back in. Arch Linux users need to add their user to uucp and lock groups instead.

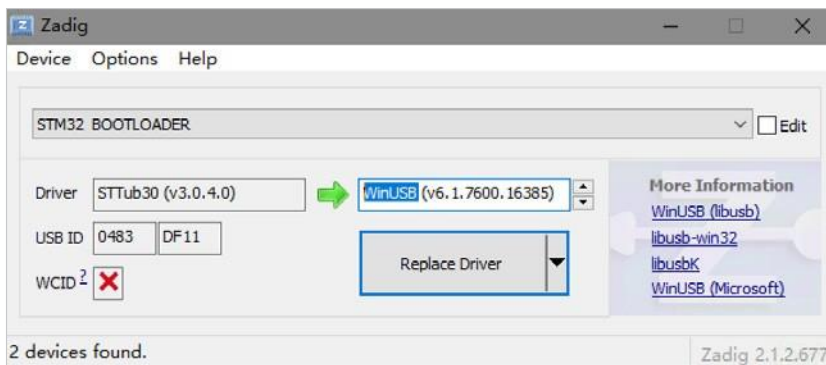
### Mac OS X and Chromebook Users

The board will just plug in and work, without drivers!

## Install USB driver



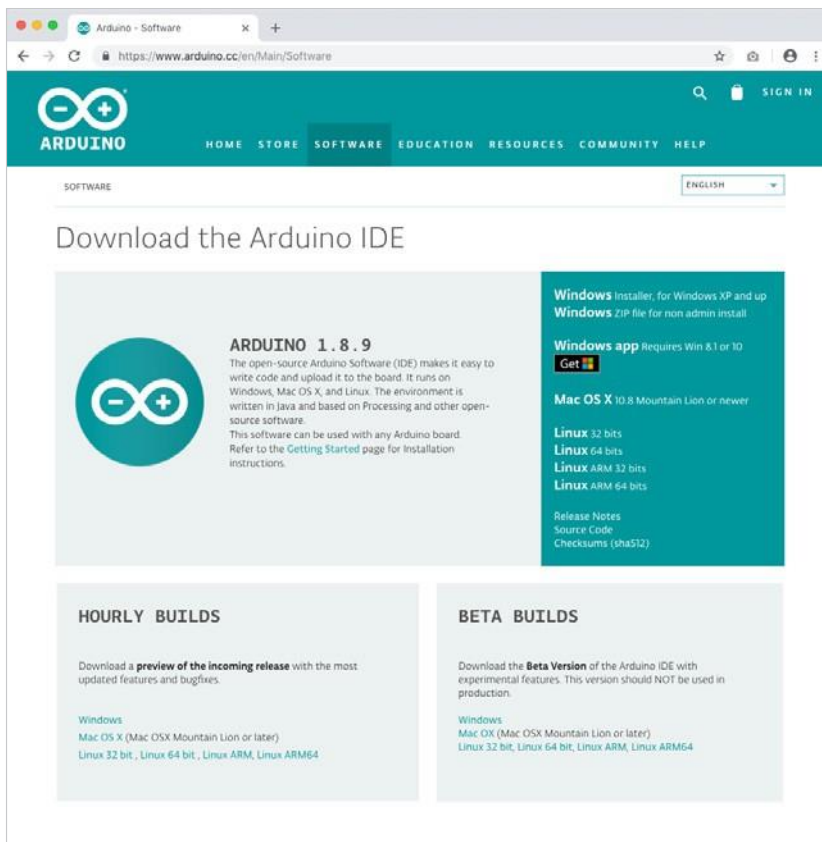
For windows users: Connect the dev kit to computer, press and hold both BOOT0 and RST buttons, release the RST button then the BOOT0 button, you will see **STM32 Device** in **DFU Mode** at device manager



You need to use [Zadig xx.exe](#) (For Windows 10, run as administrator) to change DFU driver from **STTub30** to **WinUSB** as below.

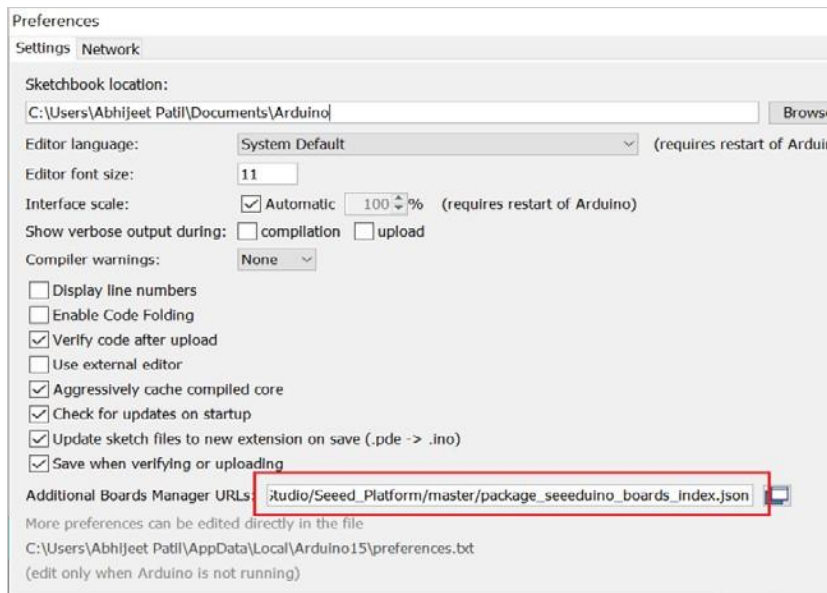
- Select *Options* -> *List All Devices*
- Choose STM32 BOOTLOADER from the list of devices and Replace Driver

## Install Arduino IDE



Go to the [Arduino Website Software Page](#) and download the latest IDE for your Operating system.

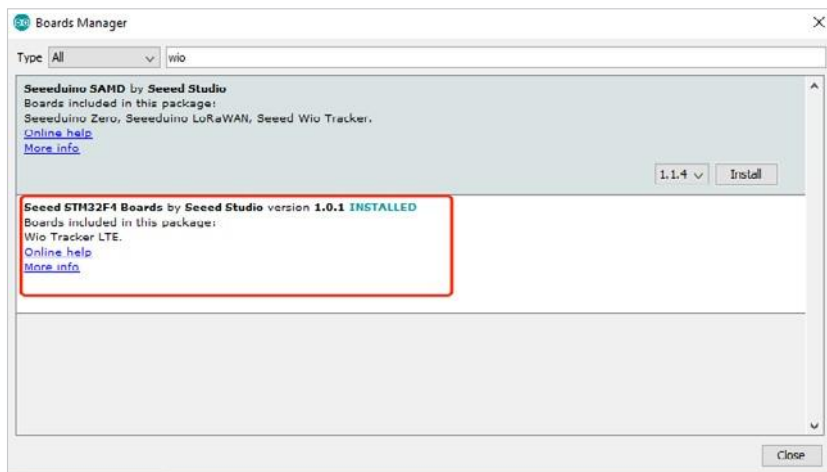
## Install Seed STM32F4 Board



### Step 1

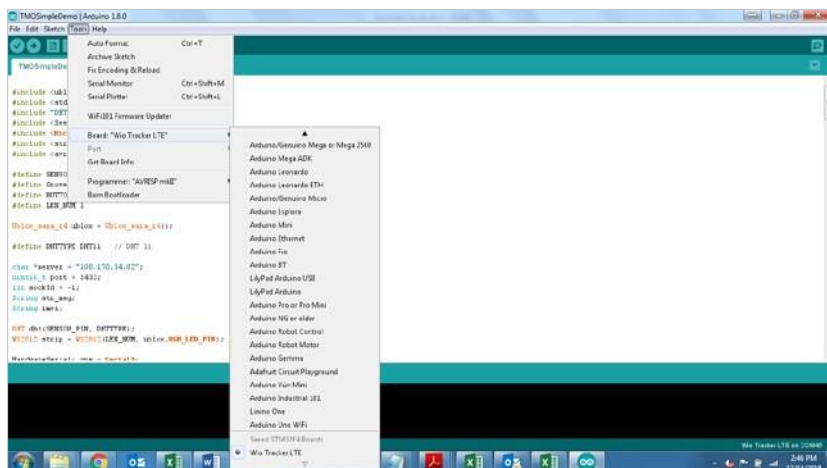
Copy the URL below, open the Arduino IDE, navigate to *File -> Preferences* and paste the URL in "Additional Board Manager URLs".

[https://raw.githubusercontent.com/Seeed-Studio/Seeed\\_Platform/master/package\\_seeeduino\\_boards\\_index.json](https://raw.githubusercontent.com/Seeed-Studio/Seeed_Platform/master/package_seeeduino_boards_index.json)



### Step 2

Next navigate to *Tools -> Boards -> Board Manager*, filter with keyword "Wio" and install Seeed STM32F4 Boards upon version 1.2.x (Latest).

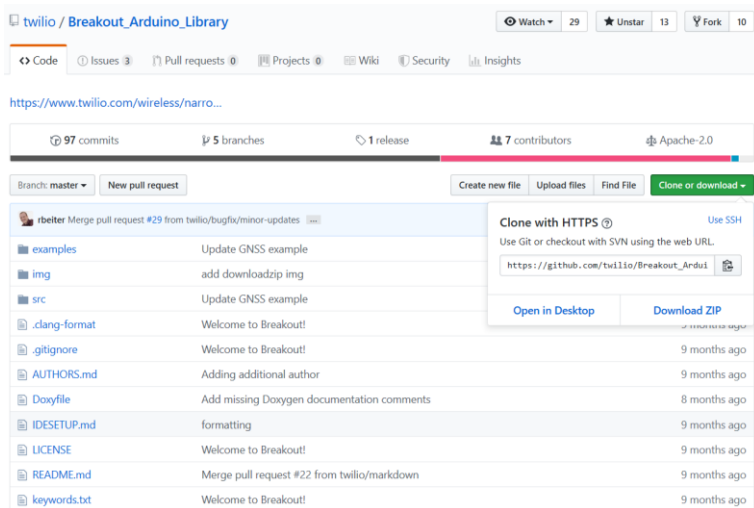


### Step 3

Navigate to *Tools -> Board* and select "Wio Tracker LTE". You are now ready to compile and upload sketches to the dev kit.



## Install Twilio Breakout SDK

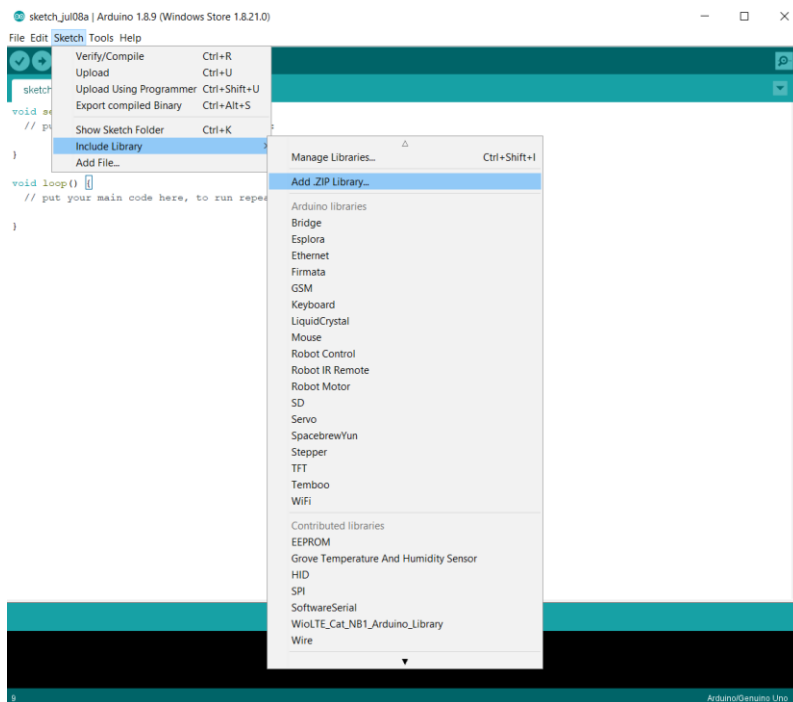


### Step 1

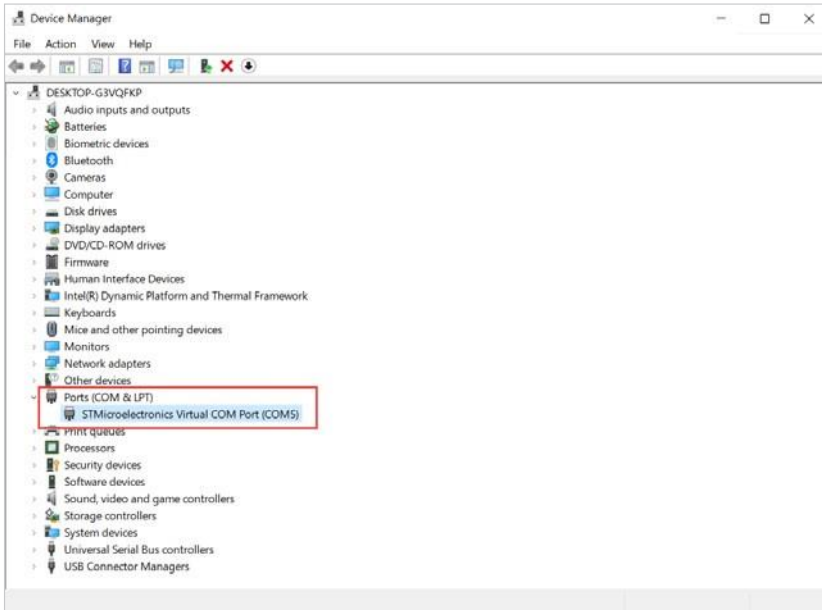
Twilio's Breakout SDK allows your dev kit to send M2M commands to the Twilio dashboard over the T-Mobile NB-IoT dashboard. Download it from [GitHub](https://github.com/twilio/Breakout_Arduino_Library).

### Step 2

Click *Sketch* -> *Include Library* -> *Add .ZIP library* and navigate to the location of the Breakout SDK. Click *Open*.



# Connecting dev kit to PC



## Step 1

Connect the dev kit with your PC via USB Cable

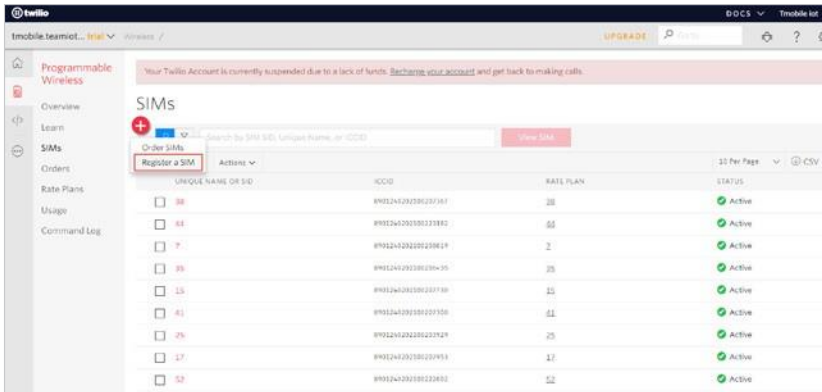
## Step 2

Identify the port number for the dev kit in the Device Manager

# Twilio Registration and Usage

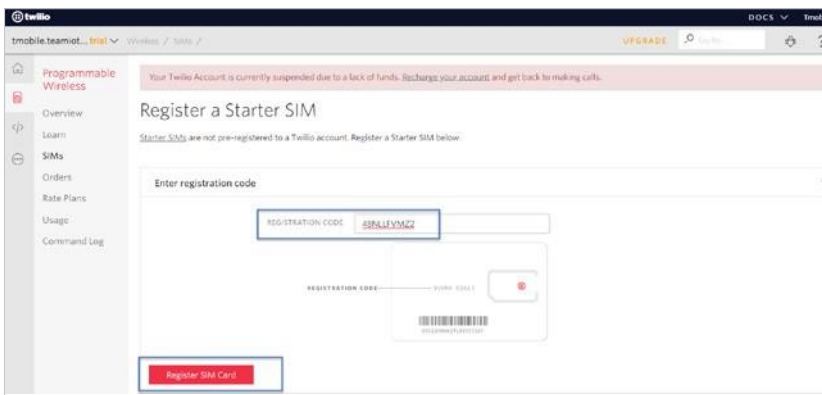
## Step 1

Open [twilio.com/sim/register](https://twilio.com/sim/register) -> *Sims* -> + -> *Register a Sim*



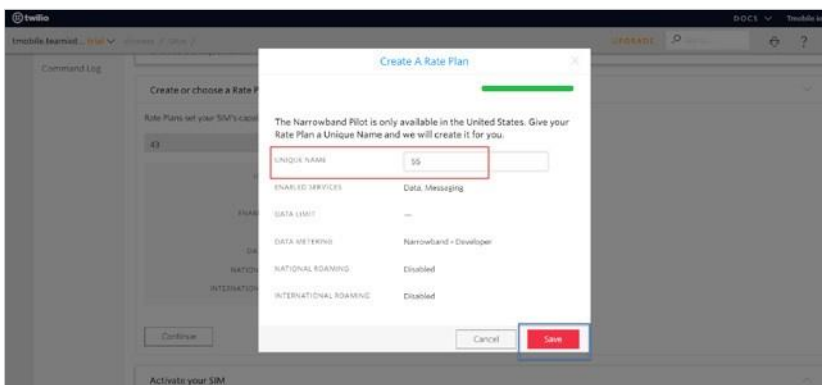
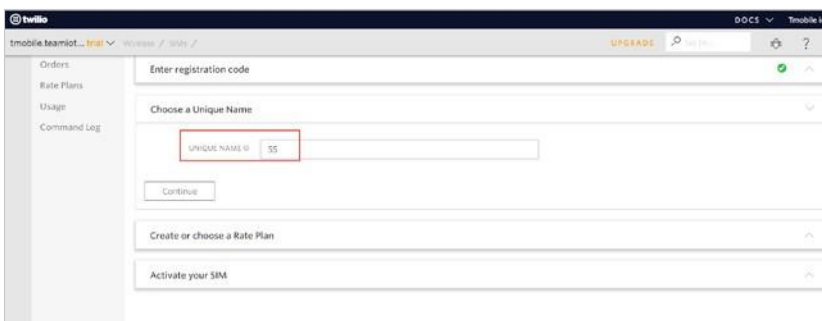
## Step 2

Enter the registration code mentioned on the sim card and click Register SIM Card

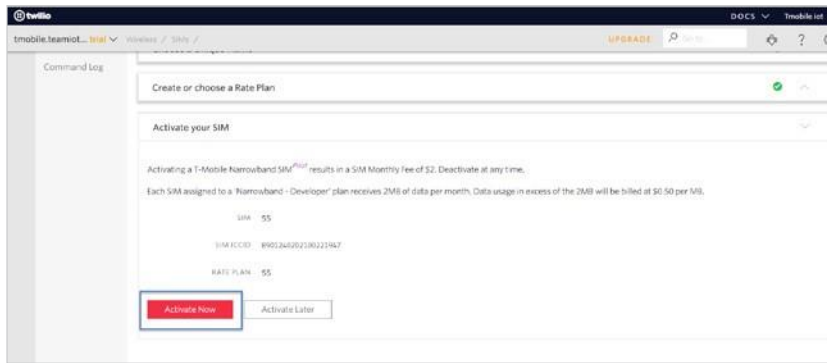


## Step 3

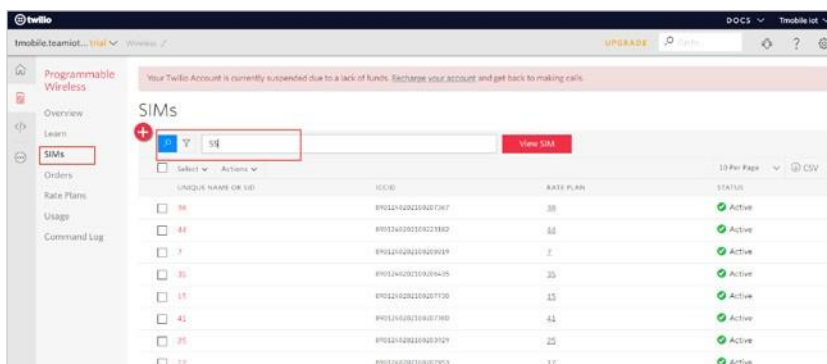
Give Unique Name and Rate plan to the SIM -> *Save*



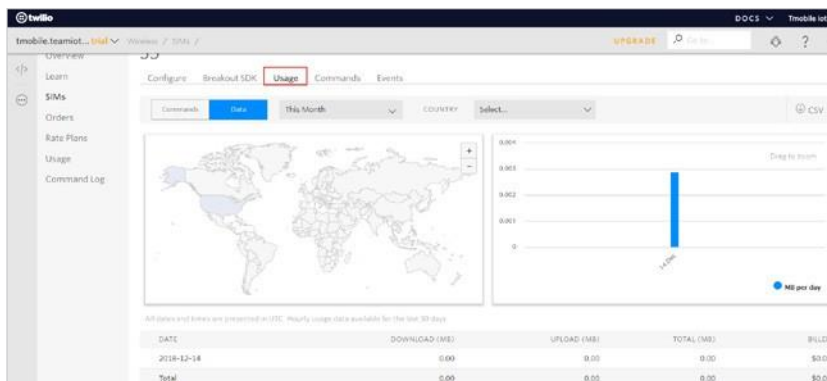


**Step 4**

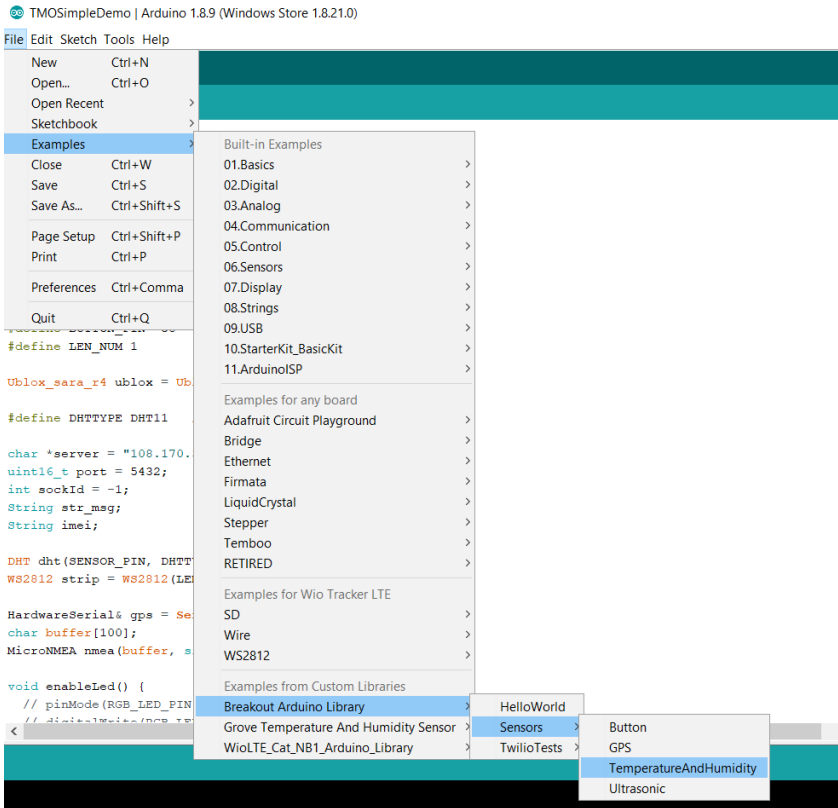
Verify details and click *Activate Now*.

**Step 5**

To check usage -> Enter unique name of the SIM and open *Usage* tab

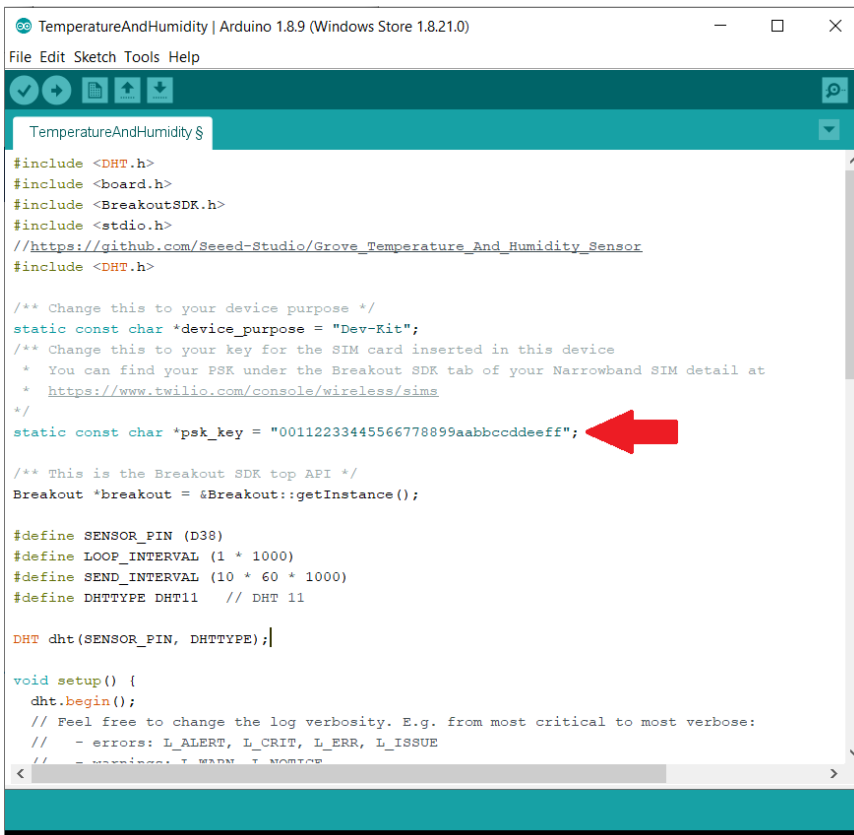


# Uploading/Executing Demo Sketch



## Step 1

Click *File -> Examples -> Breakout Arduino Library -> TemperatureAndHumidity*



## Step 2

Find the Pre-shared Key for the SIM you registered on the Twilio Dashboard. Navigate to *Programmable Wireless -> Wireless SIM Cards*. Click on the name of your SIM card and then the *Breakout SDK* tab. Copy the value of the Pre-shared Key.

## Step 3

In the Arduino IDE, change the `psk_key` variable line so that it is assigned to PSK you just copied. Save the sketch.

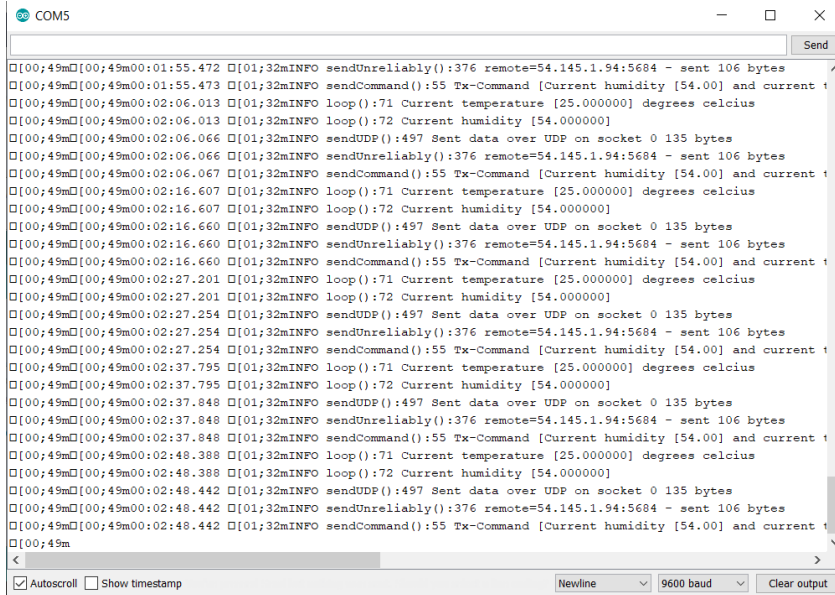
## Step 4

Click Verify (the check mark icon in the upper left corner) to attempt to compile your sketch. If it compiles with no issues, click Upload (the arrow next to Verify).

## Step 5

Once the sketch upload has completed, click the RST button on the dev kit to start running the sketch.

## Opening the serial monitor



```

[00;49m[00;49m00:01:55.472 [01;32mINFO sendUnreliably():376 remote=54.145.1.94:5684 - sent 106 bytes
[00;49m[00;49m00:01:55.473 [01;32mINFO sendCommand():55 Tx-Command [Current humidity [54.00] and current t
[00;49m[00;49m00:02:06.013 [01;32mINFO loop():71 Current temperature [25.000000] degrees celcius
[00;49m[00;49m00:02:06.013 [01;32mINFO loop():72 Current humidity [54.000000]
[00;49m[00;49m00:02:06.066 [01;32mINFO sendUDP():497 Sent data over UDP on socket 0 135 bytes
[00;49m[00;49m00:02:06.066 [01;32mINFO sendUnreliably():376 remote=54.145.1.94:5684 - sent 106 bytes
[00;49m[00;49m00:02:06.067 [01;32mINFO sendCommand():55 Tx-Command [Current humidity [54.00] and current t
[00;49m[00;49m00:02:16.607 [01;32mINFO loop():71 Current temperature [25.000000] degrees celcius
[00;49m[00;49m00:02:16.607 [01;32mINFO loop():72 Current humidity [54.000000]
[00;49m[00;49m00:02:16.660 [01;32mINFO sendUDP():497 Sent data over UDP on socket 0 135 bytes
[00;49m[00;49m00:02:16.660 [01;32mINFO sendUnreliably():376 remote=54.145.1.94:5684 - sent 106 bytes
[00;49m[00;49m00:02:16.660 [01;32mINFO sendCommand():55 Tx-Command [Current humidity [54.00] and current t
[00;49m[00;49m00:02:27.201 [01;32mINFO loop():71 Current temperature [25.000000] degrees celcius
[00;49m[00;49m00:02:27.201 [01;32mINFO loop():72 Current humidity [54.000000]
[00;49m[00;49m00:02:27.254 [01;32mINFO sendUDP():497 Sent data over UDP on socket 0 135 bytes
[00;49m[00;49m00:02:27.254 [01;32mINFO sendUnreliably():376 remote=54.145.1.94:5684 - sent 106 bytes
[00;49m[00;49m00:02:27.254 [01;32mINFO sendCommand():55 Tx-Command [Current humidity [54.00] and current t
[00;49m[00;49m00:02:37.795 [01;32mINFO loop():71 Current temperature [25.000000] degrees celcius
[00;49m[00;49m00:02:37.795 [01;32mINFO loop():72 Current humidity [54.000000]
[00;49m[00;49m00:02:37.848 [01;32mINFO sendUDP():497 Sent data over UDP on socket 0 135 bytes
[00;49m[00;49m00:02:37.848 [01;32mINFO sendUnreliably():376 remote=54.145.1.94:5684 - sent 106 bytes
[00;49m[00;49m00:02:37.848 [01;32mINFO sendCommand():55 Tx-Command [Current humidity [54.00] and current t
[00;49m[00;49m00:02:48.388 [01;32mINFO loop():71 Current temperature [25.000000] degrees celcius
[00;49m[00;49m00:02:48.388 [01;32mINFO loop():72 Current humidity [54.000000]
[00;49m[00;49m00:02:48.442 [01;32mINFO sendUDP():497 Sent data over UDP on socket 0 135 bytes
[00;49m[00;49m00:02:48.442 [01;32mINFO sendUnreliably():376 remote=54.145.1.94:5684 - sent 106 bytes
[00;49m[00;49m00:02:48.442 [01;32mINFO sendCommand():55 Tx-Command [Current humidity [54.00] and current t
[00;49m

```

In the Arduino IDE, click *Tools -> Serial Monitor* to monitor logs from your dev kit. If no logs are shown, make sure that you have the correct COM port selected.

# Viewing Commands on Twilio

devkit2

<a href="#">Configure</a> <a href="#">Breakout SDK</a> <a href="#">Usage</a> <a href="#">Commands</a> <a href="#">Events</a>						
DE599804ad80788b8a5f4c2810b8820b74		Direction	Status	Filter		
DATE	COMMAND SID	COMMAND	SIM SID	DIRECTION	TRANSPORT	STATUS
20:46:11 UTC 2019-07-08	DC291516d13ee67833e77642c0cb345070	Current humidity [53.00] and current ...	DE5998...820b74	From SIM	IP	Received
20:46:05 UTC 2019-07-08	DC133164ccca9a96a18be02a208b60898	Current humidity [53.00] and current ...	DE5998...820b74	From SIM	IP	Received
20:45:50 UTC 2019-07-08	DC44ca0bb1ad95565a655d5e7eddbab83d	Current humidity [53.00] and current ...	DE5998...820b74	From SIM	IP	Received
20:45:45 UTC 2019-07-08	DC1592856438435ceb7522ee240c3f7d	Current humidity [53.00] and current ...	DE5998...820b74	From SIM	IP	Received
20:45:29 UTC 2019-07-08	DC7d5207a1d55789e152a2b02eac9a6e29	Current humidity [53.00] and current ...	DE5998...820b74	From SIM	IP	Received
20:45:19 UTC 2019-07-08	DC0e0cc411558e3a79ae2f183773456511	Current humidity [53.00] and current ...	DE5998...820b74	From SIM	IP	Received
20:45:08 UTC 2019-07-08	DCcc848721ba8f14086fa53459581b132e	Current humidity [53.00] and current ...	DE5998...820b74	From SIM	IP	Received


On the Twilio dashboard, navigate to *Programmable Wireless* -> *Wireless SIM Cards*. Click on the name of your SIM card and then the *Commands* tab. You will see a list of commands received from your dev kit.

## Specifying a Callback URL

devkit2


<a href="#">Configure</a>	<a href="#">Breakout SDK</a>	<a href="#">Usage</a>	<a href="#">Commands</a>	<a href="#">Events</a>
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
Properties

UNIQUE NAME  devkit2

SID DE599804ad80788b8a5f4c2810b8820b74

SIM ICCID 89012A0202100196420



RATE PLAN First Rate Plan  [Choose](#) [View Rate Plan](#)

STATUS  Active   
[See the documentation](#)

CREATED Thu, 06 Jun 2019 19:08:50 GMT

LAST UPDATED Sat, 06 Jul 2019 19:14:55 GMT

Commands

 COMMANDS CALLBACK URL  HTTP POST 

You can specify a command callback URL to route your commands to an external API. Click the *Configure* tab and paste in the API route. Click *Save*.



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