Setting up Sensor Tag (CC2650) for Linux & MAC

1   Setting up your environment

1.1   Ubuntu User

1.1.1   Installing Contiki OS sources

```
git clone https://github.com/contiki-ng/contiki-ng.git --recursive
```

1.1.2   Install ARM GCC compiler

```
sudo apt-get install gcc-arm-none-eabi
```

1.2   MAC User

1.2.1   Installing Contiki OS sources

```
git clone https://github.com/contiki-ng/contiki-ng.git --recursive
```

1.2.2   Install Xcode compiler

```
xcode-select --install
```

1.2.3   Install ARM GCC Toolchain

```
brew install --cask gcc-arm-embedded
```

If you have any past installations and see "Error: It seems there is already a Binary at '/usr/local/bin/arm-none-eabi-as'" You need to clean your old files and retry. Please refer to the following commands for the same:

cd ~

cd /usr/local/bin

cd rm -r arm-none-eabi-*

You should be able to find the compiler eventually. You can verify by running:

```
arm-none-eabi-gcc --version
```

2 Setting up UniFlash

You can find it here https://www.ti.com/tool/download/UNIFLASH

Under Downloads option, choose UniFlash Linux Installer/MAC OS Installer and proceed with installation steps

3   Running your program

3.1   Compiling

Navigate to the folder /contiki-ng/examples/hello-world/. Enter the following command to compile the hello world program. This command applies to both Linux and MAC.

```
make TARGET=cc26x0-cc13x0 BOARD=sensortag/cc2650 hello-world
```

Important Note for MAC Users:
If you see an error, `../../Makefile.include:9: *** GNU Make version 4.0 or newer is required.  Stop.` Follow the following steps:

a. `brew install make`
b. `Make --version`
   - If you see make 3.81 as the version, follow the remaining steps
c. `vi ~/.bash_profile`
d. In your .bash_profile, add the following line:

   `export PATH="/usr/local/opt/make/libexec/gnubin:$PATH"`

e. `source ~/.bash_profile`

## 3.2   Flashing the SensorTag with the binary file

Make sure that your Debugger is fixed to the sensor tag as shown below. Connect your sensor tag to your computer.
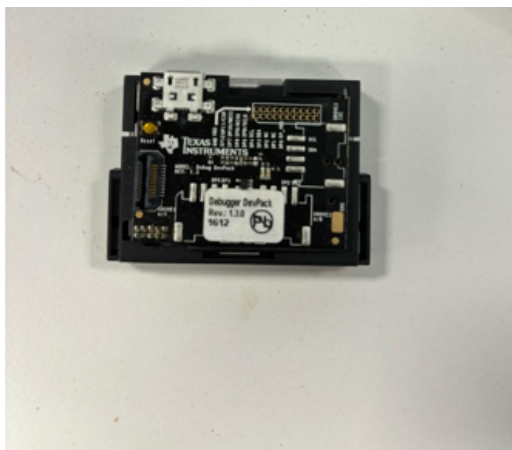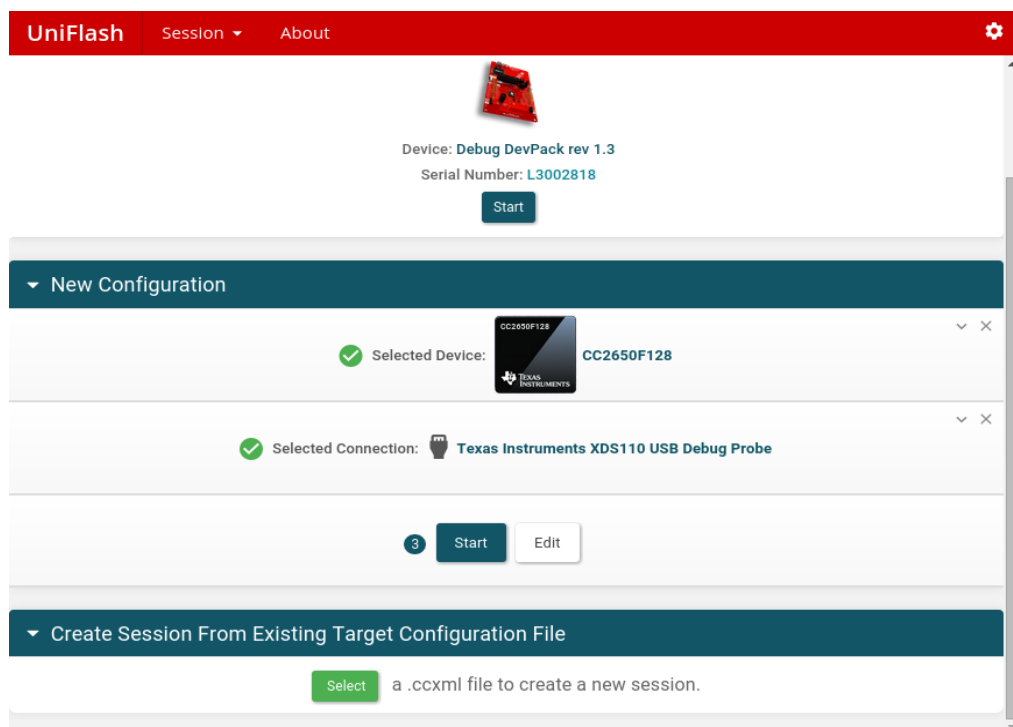

Session configuration

Open UniFlash. Choose your device by typing **CC2650** in the search field and select **CC2650F128**.
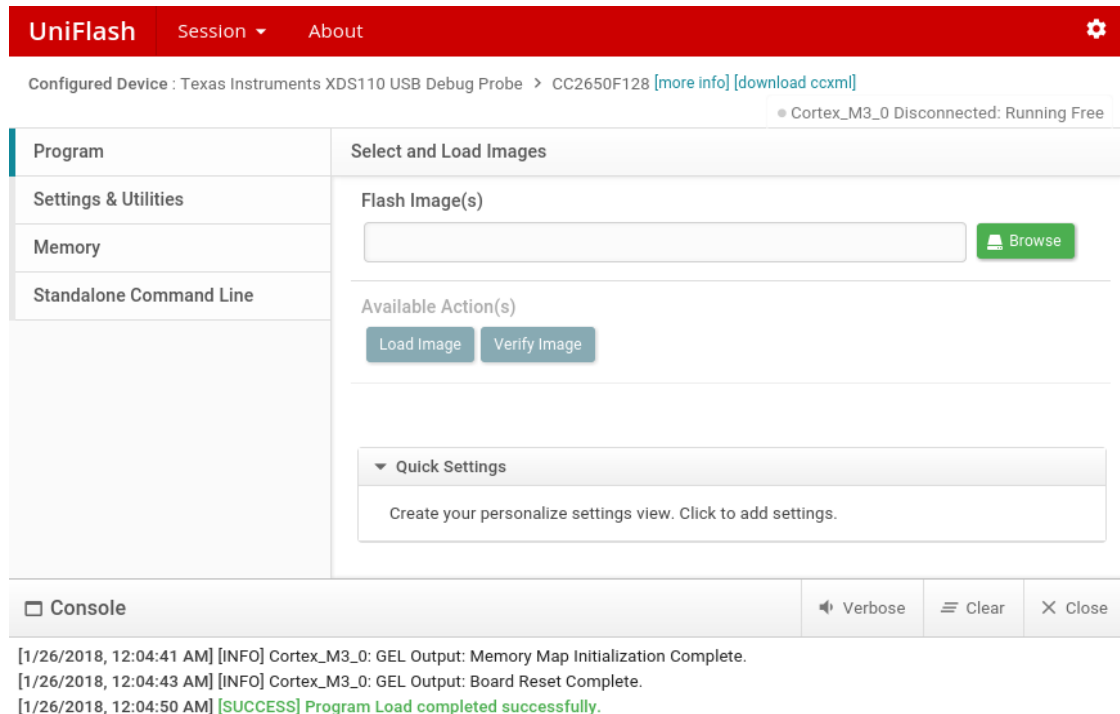
Important Note: Even if your device is not detected, you can directly proceed with choose your device step
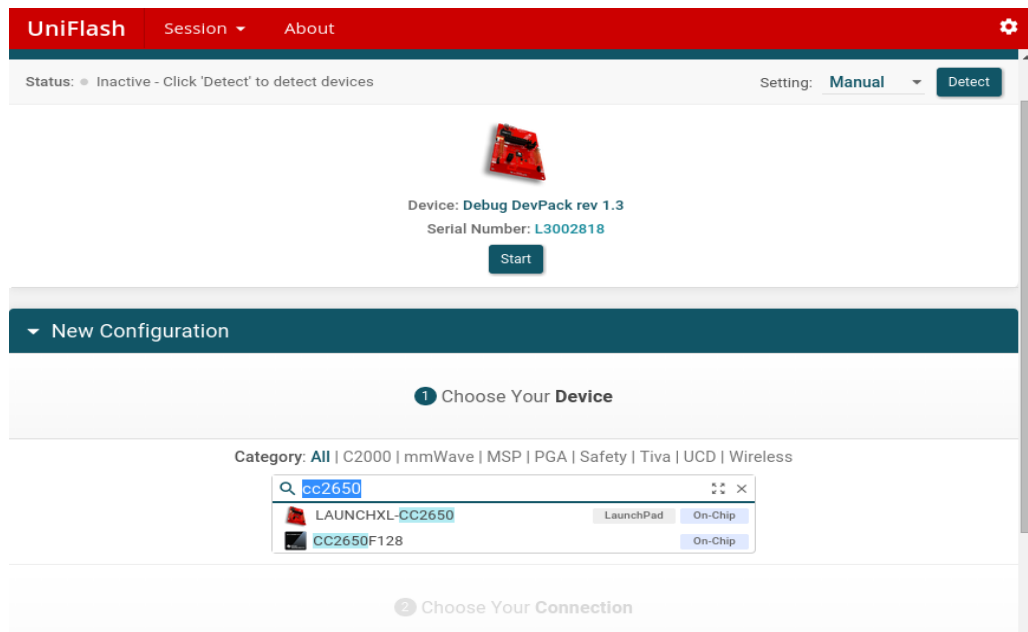
Next, choose the **Texas Instruments XDS110 USB Debug Probe** and hit the **Start** button as shown below.

Finally, browse for the compiled file *hello-world.cc26x0-cc13x0* in your hello-world directory and click on load image.

While choosing the flash image, click the "Show Options" button and enable "All Files" type to be able to select the compiled file

If you encounter an **error** while flashing, go to Settings & Utilities and then perform *Erase entire flash*. After this, go back to program tab and load your image.
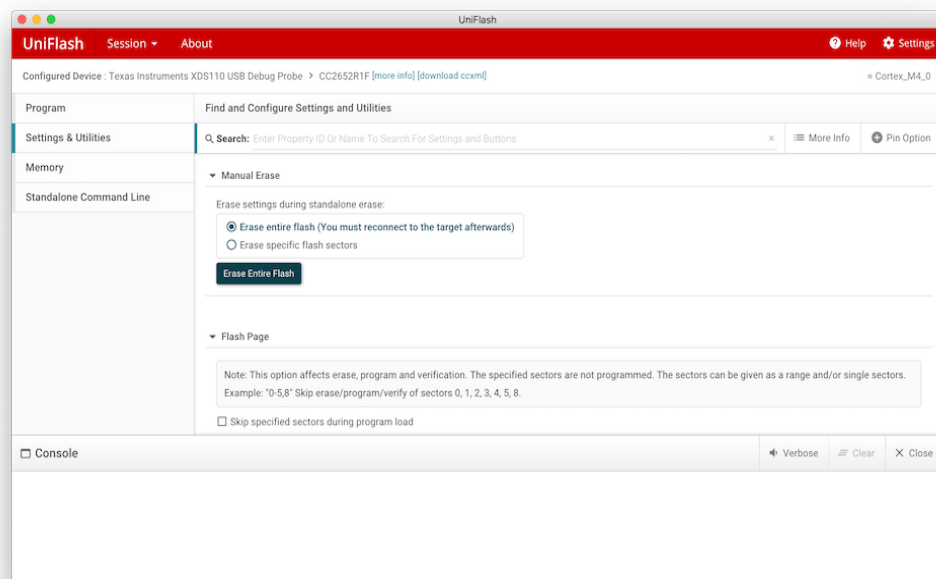
3.3   Showing the result

Check your installation by reading output from the SensorTag over the USB link. In order to establish serial connection with your Sensortag, you can use serialdump/cat/... or any other application to read from the serial port of the SensorTag.

For Ubuntu you can try this:

1. Find the usb name that belongs to the sensortag, using the following command:

   `ls /dev/ttyACM*`

2. Say the sensor tag is connected to ttyACM0. Set the baud rate to 115200:

   `sudo stty -F /dev/ttyACM0 115200`

3. Finally, enter the following the command to display the output:

   `cat /dev/ttyACM0`

For Mac user you can try this:

I.   Option A: To check the sensor Tag output:

   a. `ls /dev/tty* | grep usb` to check the port number. You should see something like `/dev/tty.usbmodemLXXXXXXXX`

   b. `screen /dev/tty.usbmodemLXXXXXXXX 115200` to stream the sensor tag output. Here replace the port number with the one you observe on your system in the previous step. Here 115200 is the baud rate and can be adjusted if needed.

   c. You can exit the screen using Ctrl+A+D

   d. Follow [here](#) to terminate the screen

II.   Option B:

   a. Navigate to /contiki-ng/examples/hello-world/

   b. `make TARGET=cc26x0-cc13x0 BOARD=sensortag/cc2650 PORT=/dev/tty.usbmodemL30028471 login`

3.4   Expected Output

Press the reset button (highlighted using red circle) on your sensor tag to read the following output:

In Ubuntu:

In MAC:

OPTION1:

```
                                            [INFO: Main
   ] Node ID: 10241

                  [INFO: Main      ] Link-layer address: 0012.4
b00.0c4b.2801
                              [INFO: Main      ] Tentative link
-local IPv6 address: fe80::212:4b00:c4b:2801

                                        [INFO: CC26x0/CC13
x0] TI CC2650 SensorTag
                              [INFO: CC26x0/CC13x0]
RF: Channel 26, PANID 0xABCD

                           Hello, world@@Hello, worldHello, w
orldHello, world@Hello, world
```

OPTION2:

```
(base) kanav@ı       -172 hello-world % make TARGET=cc26x0-cc13x0 BOARD=sensortag/cc265
0 PORT=/dev/tty.usbmodemL30028471 login
rlwrap ../../tools/serial-io/serialdump -b115200 /dev/tty.usbmodemL30028471
connecting to /dev/tty.usbmodemL30028471 [OK]
[INFO: Main     ] Starting Contiki-NG-develop/v4.9-580-g149146b67
[INFO: Main     ] - Routing: RPL Lite
[INFO: Main     ] - Net: sicslowpan
[INFO: Main     ] - MAC: CSMA
[INFO: Main     ] - 802.15.4 PANID: 0xabcd
[INFO: Main     ] - 802.15.4 Default channel: 26
[INFO: Main     ] Node ID: 10241
[INFO: Main     ] Link-layer address: 0012.4b00.0c4b.2801
[INFO: Main     ] Tentative link-local IPv6 address: fe80::212:4b00:c4b:2801
[INFO: CC26x0/CC13x0] TI CC2650 SensorTag
[INFO: CC26x0/CC13x0]  RF: Channel 26, PANID 0xABCD
Hello, world??Hello, worldHello, worldHello, worldHello, worldHello, world
```

 Note: If the output is in unreadable format, change the baud rate of your sensor tag. Ideal baud rate is 115200.