

# nBlue<sup>™</sup> Bluetooth<sup>®</sup> 4.0

## nBlue<sup>™</sup> iBeacon Configuration Tool User's Guide



***AT HOME. AT WORK. ON THE ROAD. USING BLUETOOTH WIRELESS TECHNOLOGY MEANS TOTAL FREEDOM FROM THE CONSTRAINTS AND CLUTTER OF WIRES IN YOUR LIFE.***

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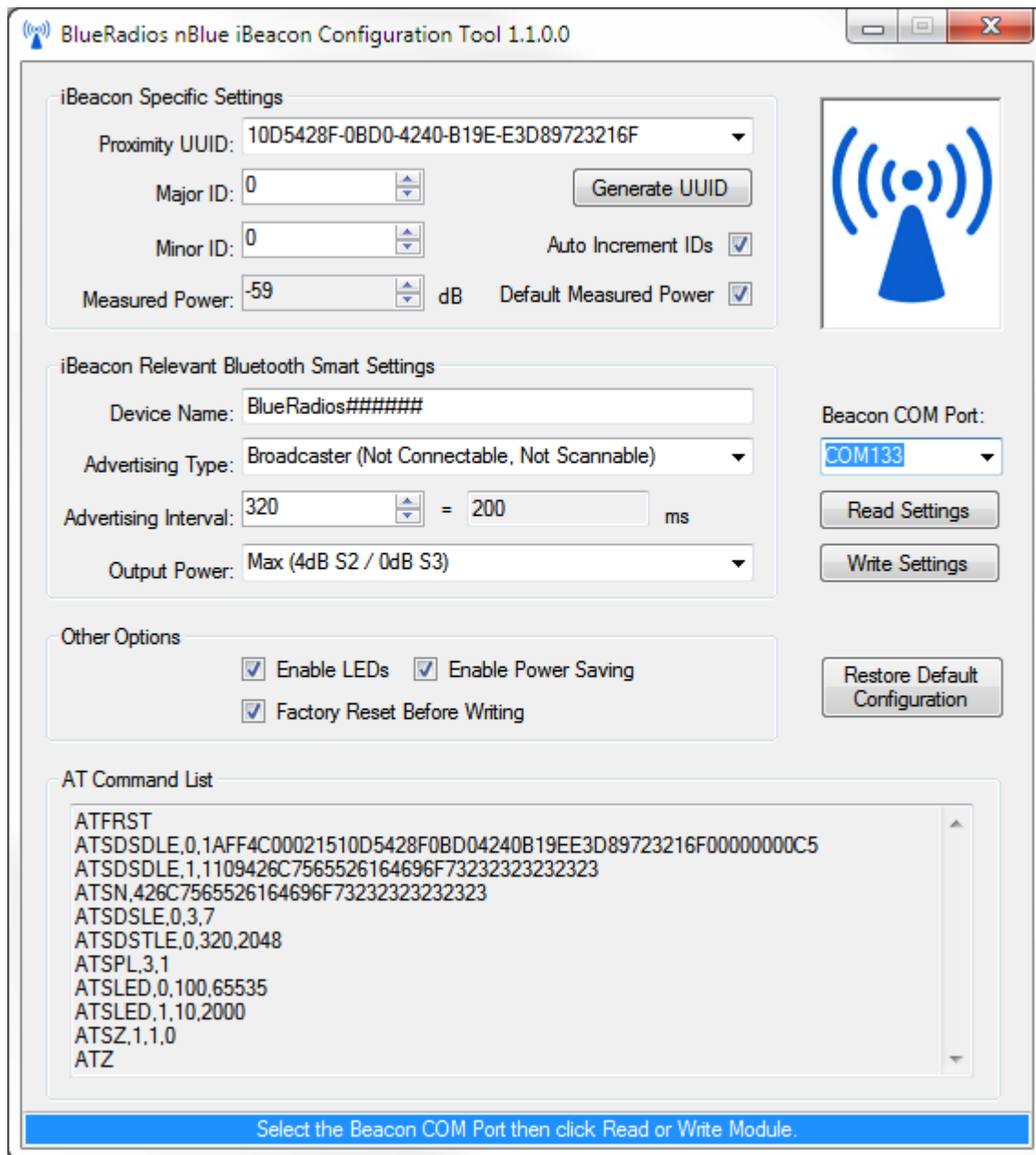
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## Revision History

Rev #	Date	Description
1.0.0.0	2/7/2014	<b>Initial Release</b>
1.1.0.0	2/14/2014	<ul style="list-style-type: none"><li>- Added Restore Default Configuration Button</li><li>- Updated ToolTips</li><li>- Minor bugfixes and UI changes</li></ul>

## 1 Introduction

nBlue™ iBeacon Configuration Tool (nBiBCT) is a Windows application that allows BlueRadios® nBlue™ Bluetooth 4.0 modules to be configured as iBeacons. It requires the .NET Framework 4, which can be downloaded from: <http://www.microsoft.com/en-us/download/details.aspx?id=17851>.



BlueRadios nBlue iBeacon Configuration Tool 1.1.0.0

**iBeacon Specific Settings**

Proximity UUID: 10D5428F-0BD0-4240-B19E-E3D89723216F

Major ID: 0

Minor ID: 0

Measured Power: -59 dB

Auto Increment IDs

Default Measured Power

Generate UUID

**iBeacon Relevant Bluetooth Smart Settings**

Device Name: BlueRadios#####

Advertising Type: Broadcaster (Not Connectable, Not Scannable)

Advertising Interval: 320 = 200 ms

Output Power: Max (4dB S2 / 0dB S3)

Beacon COM Port: COM133

Read Settings

Write Settings

**Other Options**

Enable LEDs  Enable Power Saving

Factory Reset Before Writing

Restore Default Configuration

**AT Command List**

```
ATFRST
ATSDSDL,0,1AFF4C00021510D5428F0BD04240B19EE3D89723216F00000000C5
ATSDSDL,1,1109426C7565526164696F73232323232323
ATSN,426C7565526164696F73232323232323
ATSDSLE,0,3,7
ATSDSTLE,0,320,2048
ATSPL,3,1
ATSLED,0,100,65535
ATSLED,1,10,2000
ATSZ,1,1,0
ATZ
```

Select the Beacon COM Port then click Read or Write Module.

---

## 2 iBeacon Background

iBeacon is a positioning system that Apple Inc. calls "a new class of low-powered, low-cost transmitters that can notify nearby iOS 7 devices of their presence." They can also be used by the Android operating system. The technology enables an iOS device or other hardware to send push notifications to iOS devices in close proximity.

The iBeacon works on *Bluetooth Low Energy (BLE)*, also known as *Bluetooth 4.0* or *Bluetooth Smart*. In a real life scenario it would be more of a location-aware, context-aware, pervasive small wireless sensor beacon that could pinpoint your location in a store: iBeacons could send you notifications of items around you that are on sale or items you may be looking for, and it could enable payments at the point of sale (POS) where you don't need to remove your wallet or card to make a payment.

It works by using *Bluetooth low energy Proximity sensing* to transmit a *universally unique identifier* picked up by a compatible app or operating system that can be turned into a physical location or trigger an action on the device such as a Check-in on social media.

## 3 iBeacon Advertising Data Format

iBeacon advertising packets consist of the following fields:

- **Proximity UUID:** A UUID (Universally Unique Identifier) used to identify a set of beacons in a certain location or region.
- **Major ID:** A value used to identify a group of related beacons.
- **Minor ID:** A value used to identify a specific beacon within its Major group.
- **Measured Power:** A value containing the average RSSI measured at 1m from the beacon. This is used by iOS to estimate the distance to the beacon, so it should be measured and set for each beacon in its intended installation location. Set to default of -59 (0x5C) if unknown. [1 byte]

### 3.1.1 House Example

In this example we will define a set of beacons for a house.

1. First a Proximity UUID would be generated to group all of the beacons in the house, for example:

F5DA8F6E-CDEA-4B93-84F6-992103233A65

2. Then Major ID's could be assigned to group the iBeacons on each level of the house:

0=Basement, 1=Main Floor, 2=Second Floor.

3. Next Minor ID's could be assigned to individual beacons for each room in the house:

Basement: 0=Media Room, 1=Utility Room.

Main Floor: 0=Garage, 1=Kitchen, 2=Family Room.

Second Floor: 0 = Master Bedroom, 1=Guest Bedroom, 2=Office.

A beacon for the Family Room would then have a Proximity UUID of F5DA8F6E-CDEA-4B93-84F6-992103233A65, Major ID = 1, and Minor ID = 2. If the average RSSI of the beacon at 1m was measured to be -55dB, the Measured Power would be set to -55.

A beacon for the Master Bedroom would then have a Proximity UUID of F5DA8F6E-CDEA-4B93-84F6-992103233A65, Major ID = 2, and Minor ID = 0. If the average RSSI of the beacon at 1m was measured to be -57dB, the Measured Power would be set to -57.

## 4 Using nBlue iBeacon Configuration Tool

### 4.1 Usage Overview

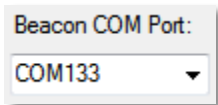
Using nBlue iBeacon Configuration Tool is simple:

1. Open nBiBCT.exe.
2. Connect your module (USB Dongle) to your PC and the module's COM port will automatically be selected.
3. Configure your settings.
4. Click Write settings to configure your iBeacon.

Your settings will be retained by nBiBCT upon closing the app.

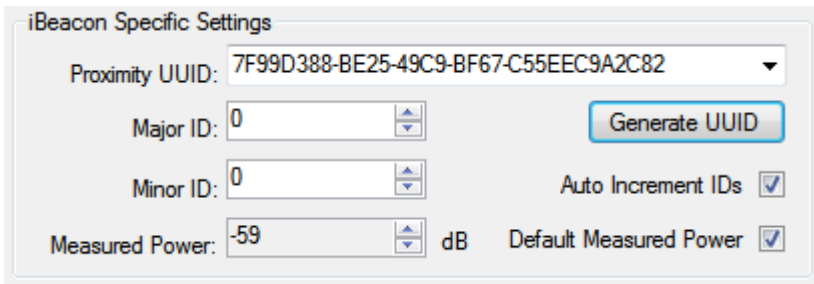
### 4.2 Usage Details

#### 4.2.1 Beacon COM Port



The COM Port that the module to be configured is attached to. If a new COM Port is detected it will automatically be selected, so connect your device after launching nBiBCT and it will automatically be selected.

#### 4.2.2 iBeacon Specific Settings



##### 4.2.2.1 Proximity UUID

The Proximity UUID can be entered manually in the standard xxxxxxxx-xxxx-Mxxx-Nxxx-xxxxxxxxxxxx format or a new UUID can be generated by clicking the Generate UUID button. Once a UUID has been used (by clicking Write Settings) it will be stored in the Proximity UUID drop down menu for future access.

##### 4.2.2.2 Major ID

The Major ID can be a value between 0 and 65535.

##### 4.2.2.3 Minor ID

The Minor ID can be a value between 0 and 65535.

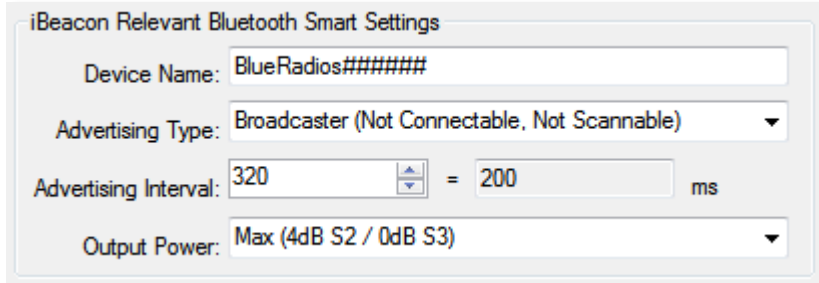
##### 4.2.2.4 Auto Increment IDs

If this box is checked the Minor ID will automatically increment each time an iBeacon is configured. The Major ID will automatically increment if the Minor ID rolls over from 65535 to 0.

#### 4.2.2.5 Measured Power

The Measured Power can be set from -127 to 20dB.

#### 4.2.3 iBeacon Relevant Bluetooth Smart Settings



##### 4.2.3.1 Device Name

The *Bluetooth* Device Name can be up to 20 characters long. '#' characters will be auto populated with the lower part of the *Bluetooth* Device Address to easily create a unique name for each device.

*Note: The name is irrelevant if using the Broadcaster Advertising Type.*

##### 4.2.3.2 Advertising Type

The Advertising Type determines how the beacon will advertise and how other devices can interact with it. iBeacons are intended to be passive broadcasting devices, so connectivity and scannability are not necessary, but the options are provided if needed.

- **Broadcaster** (Not Connectable, Not Scannable) – This is the default and recommended mode for an iBeacon. In this mode the device is not connectable or scannable and will be the most power efficient.
- **Scannable Broadcaster** (Not Connectable, Scannable) – In this mode the beacon is still not connectable, but will be scannable – allowing other devices to read its Device Name.
- **Peripheral** (Connectable, Scannable) – In this mode the beacon is connectable and scannable.  
*Note: This mode is not recommended for iBeacon deployments.*

##### 4.2.3.3 Advertising Interval

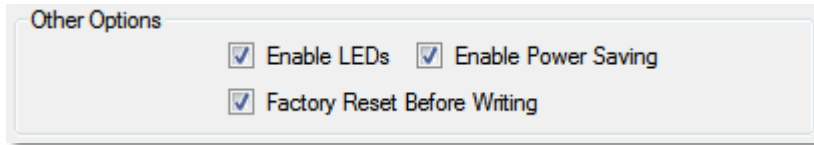
The Advertising Interval is in units of .625ms and can be set from 32 to 16384 which equals 20 to 10240ms. A lower advertising interval will result in the beacon being discovered faster by iOS devices and faster location updates, but will result in higher power consumption.

##### 4.2.3.4 Output Power

The output power can be adjusted based on the application. A higher output power will provide greater range, but will result in higher power consumption. If the output power is changed the Measured Power should be recalibrated.



## 4.2.4 Other Options



Other Options

Enable LEDs     Enable Power Saving

Factory Reset Before Writing

### 4.2.4.1 Enable LEDs

If checked PIO\_5 (Green LED) will flash once every 2 seconds when the module is advertising and PIO\_2 (Blue LED) will turn on when the module has been connected too.

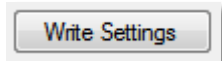
### 4.2.4.2 Enable Power Saving

If checked sleep mode will be enabled in the module to conserve power in battery powered applications.

### 4.2.4.3 Factory Reset Before Writing

Check this box to automatically factory reset the module prior to writing. In case the module has been previously modified using AT commands, this will guarantee it will be properly configured as an iBeacon.

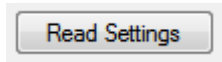
## 4.2.5 Writing Settings



Write Settings

Click this button to write the settings to the module attached to the Beacon COM port.

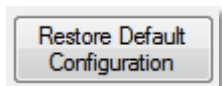
## 4.2.6 Reading Settings



Read Settings

Click the Read Settings button to read back the settings from a module previously configured as an iBeacon.

## 4.2.7 Restoring Default Application Configuration



Restore Default  
Configuration

Click the Restore Default Configuration to reset all of the application settings to their default values. This will not write the defaults to your device unless you click Write Settings afterward.

## 4.2.8 AT Command List

The AT command list displays the set of AT commands that will be sent to the module when Write Settings is clicked.

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## 5 Common Errors

### 5.1 Failed To Open COM

- Make sure the selected COM port isn't opened in another application.

### 5.2 Communication Timeout

- Make sure the module is connected to the selected COM port.

### 5.3 Read Failed

- The module has not been configured as a beacon yet, or the settings have been externally modified, so the settings cannot be read.