

BLE113 DEVELOPMENT KIT

QUICK START

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1 Introduction

This document is a getting started guide for the Bluegiga BLE113 development kit. The guide instructs you how to set up the BLE113 development kit, power it up and access the BLE113 using the BLEGUI software.

2 What is BLE113 Bluetooth Smart Module

BLE113 is a *Bluetooth* smart module targeted for small and low power sensors and accessories. It integrates all features required for a *Bluetooth* smart application: *Bluetooth* radio, software stack and GATT based profiles. BLE113 *Bluetooth* smart module can also host end user applications, which means no external micro controller is required in size or price constrained devices. BLE113 *Bluetooth* smart module also has flexible hardware interfaces to connect to different peripherals and sensors. BLE113 *Bluetooth* smart module can be powered directly from a standard 3V coin cell battery or pair of AAA batteries. In lowest power sleep mode it consumes only 500nA and will wake up in few hundred microseconds.

2.1 Key features

- *Bluetooth* v.4.0, single mode compliant
 - Supports master and slave modes
 - Up to 8 simultaneous connections
- Integrated *Bluetooth* Smart stack
 - GAP, GATT, L2CAP and SMP
 - *Bluetooth* Smart profiles
- Radio performance
 - Transmit power : +0 dBm to -23 dBm
 - Receiver sensitivity: up to -93 dBm
- Ultra low current consumption
 - Transmit: 18.2 mA (0 dBm)
 - Transmit: 14.3 mA (0 dBm with DC/DC)
 - Receive: 14.3 mA
 - Sleep mode 3: 0.4uA
- Flexible peripheral interfaces
 - UART or SPI
 - I2C
 - PWM, GPIO
 - 12-bit ADC
- Host interfaces
 - UART
- Programmable 8051 processor for stand-alone operation
 - Simple Bluegiga BGScript™ scripting language for quick application development
 - Bluegiga Profile Toolkit™ allowing the quick development of GATT based profiles
 - Free Software Development Kit
- *Bluetooth*, CE, FCC, IC, Japan and South-Korea qualified

3 BLE113 Development Kit contents

The BLE113 development kit is a ready-to-use hardware development platform for the Bluegiga BLE113 *Bluetooth* Smart module. The development kit consists of a single BLE113 development board, programming cables, two BLE113 modules and a BLED112 USB dongle.

DKBLE113 development kit contents

- 1 x Bluegiga BLE113 development board containing
 - BLE113 *Bluetooth* Smart module
 - Display
 - Accelerometer (Freescale MMA8451QT)
 - Altimeter (Freescale MPL3115A2)
 - Potentiometer
 - USB to UART bridge and micro USB connector
 - CR2032 battery holder
 - DC/DC converter (Texas Instruments TPS62730)
 - Debug interface
 - IO headers
- 2 x BLE113 *Bluetooth* Smart modules
- 1 x BLED112 USB dongle
- 1 x USB cable
- 1 x CR2032 battery
- 1 x Firmware programming cable (CC Debugger)
- Documentation

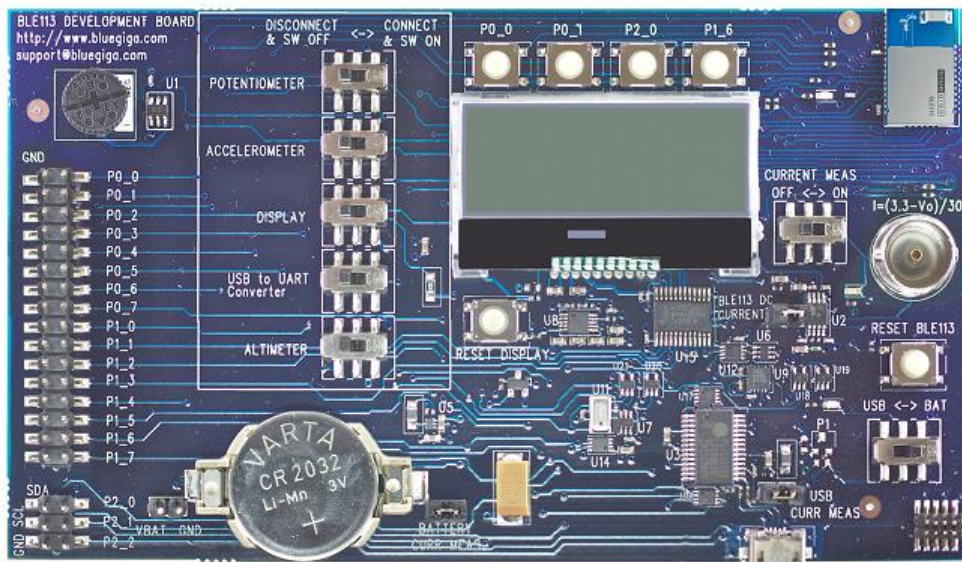


Figure 1: BLE113 development board

4 Getting started with BLE113

4.1 Development overview

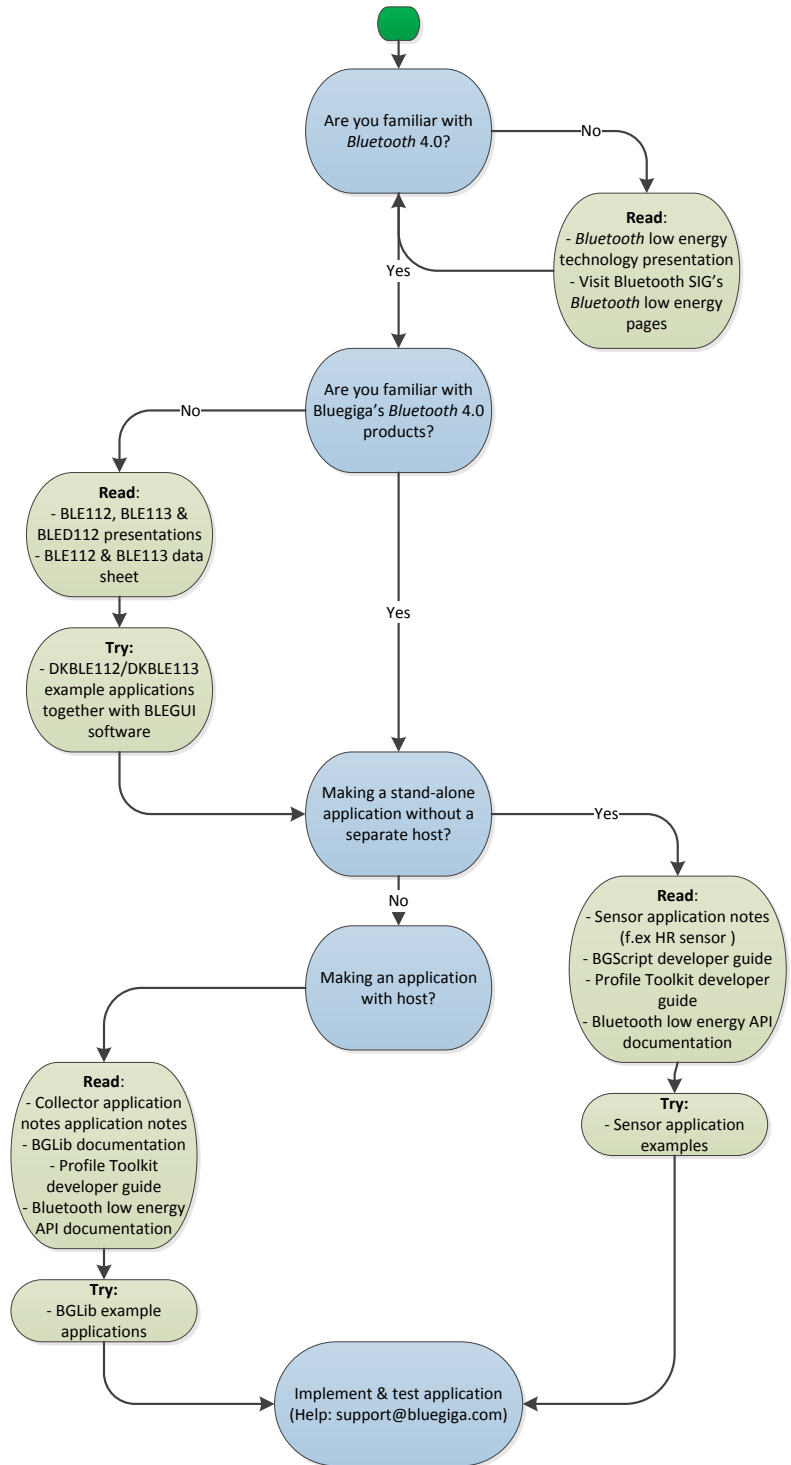


Figure 2: Development path

4.2 Preparations

1. Log in to Bluegiga Tech Forum at: <http://techforum.bluegiga.com>
 - a. If you do not have an account yet, you can create one at http://techforum.bluegiga.com/create_account
2. Download all BLE113 documentation, *Bluetooth* Smart SDK and software tools

4.3 Using the DKBLE113 for the first time

Step 1: Power on the BLE113 development board

If powering the BLE113 development board via **USB**:

1. Make sure the display switch on the BLE113 development board is turned **ON**
2. Check the **USB CURR MEAS** jumper is in place.
3. Make sure the power switch is in **USB** position
4. Connect the BLE113 development board using the supplied micro USB cable to a PC
5. Check that the green power led turns on

If powering the BLE113 development board with a **CR2032** battery:

1. Make sure the display switch on the BLE113 development board is turned **ON**
2. Make sure the **USB to UART converter** switch is turned **OFF**
3. Check the **BATTERY CURR MEAS** jumper is in place.
4. Make sure the power switch is in **BAT** position

Note:

If the factory default configuration the BLE113 development kit has a pre-programmed firmware that will start *Bluetooth* low energy advertisement and display information on the display. Also the UART interface is disabled by default.

Note:

If CR2032 battery is connected to the BLE113 development board and the power switch is turned to the **USB** mode a led will turn on, which will slowly drain the CR2032. It's recommended the CR2032 is fully removed or the **BATTERY CURR MEAS** jumper disconnected.

Step 2: Connect BLED112 USB dongle to a PC and install driver

1. Connect the BLED112 USB dongle to a Windows PC.
2. Windows will recognize the BLED112 USB dongle and prompt for a driver.
3. The USB driver is in the *Bluetooth* Smart SDK's **windriv** folder.
4. Once the driver has been installed, the BLED112 USB dongle should appear as a virtual COM port in Windows device manager.

Step 3: Start BLEGUI software and discover the BLE113 development kit

- 1 When the BLE113 development board is powered the display will show the following text: **“DKBLE113”**
“Temp. : <temperature in Celsius>.C
- 2 The sample firmware also starts *Bluetooth* low energy advertisements.
- 3 To discover the BLE113 development board, start the **BLEGUI application** included in the *bin* folder of the *Bluetooth Smart SDK*.
- 4 In BLEGUI application, select the Bluegiga **Bluetooth Low Energy COM** port and press **Attach**. Make sure the status changes to **Connected**.
- 5 Start **Generic scan** operation and you start to receive Advertisement packets in the **BLEGUI** application.
- 6 Read *Health Thermometer Profile application* note to learn more about the demo.

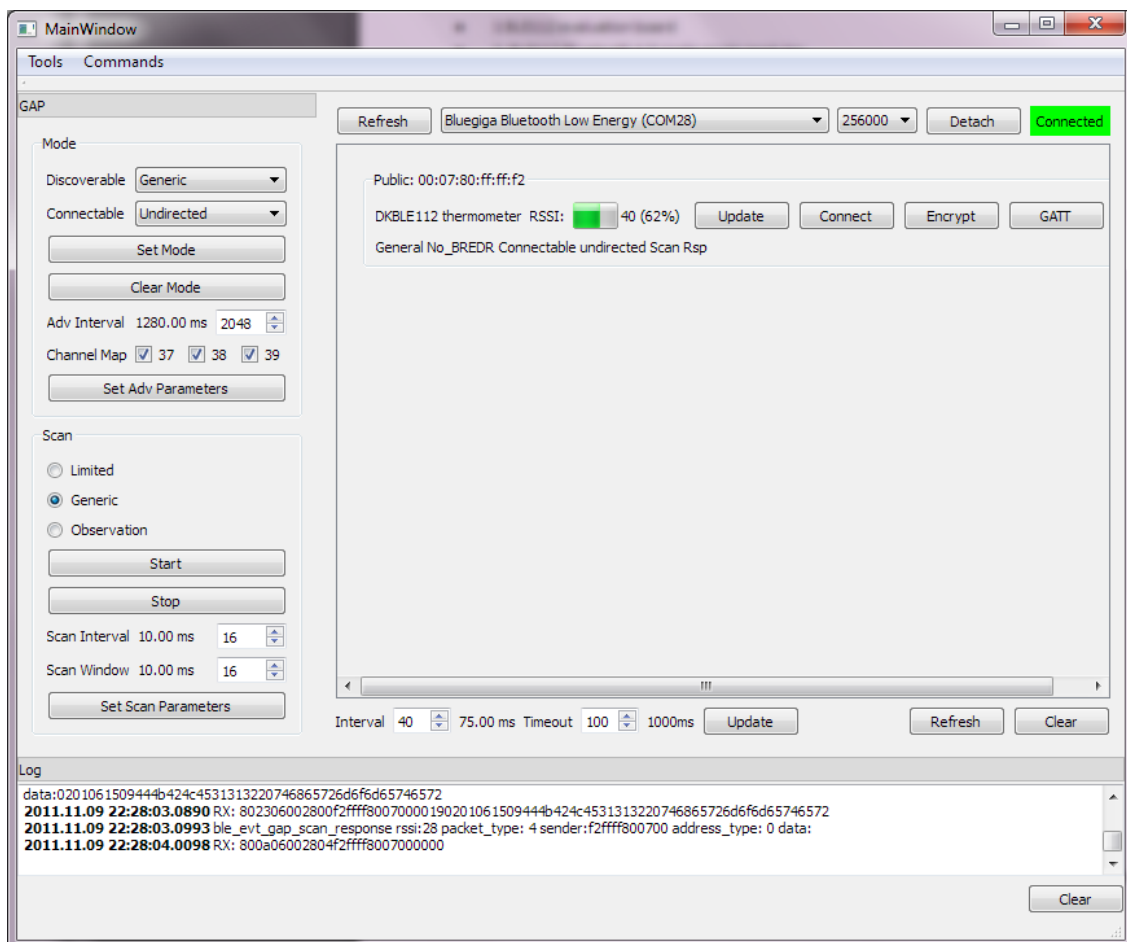


Figure 3: Discovering DKBLE113

5 Bluegiga Bluetooth Smart Tools

- **BLEGUI:** This application can be used to control BLE112, BLE113 or BLED112 over UART or USB. BLEGUI is a terminal like program that sends the BGAPI command to the *Bluetooth* Smart module and parses the responses. It's a useful tool to get familiar with the products and try out *Bluetooth* low energy applications.
- **BLE Update:** This tool can be used to compile and install *Bluetooth* Smart SDK projects into Bluegiga *Bluetooth* Smart products using the CC debugger programming cable.
- **iOS reference application:** The iOS reference application implements the Heart Rate Collector and Cable Replacement (CR) collector profiles for Apple's Bluetooth 4.0 compatible iOS devices and is available as a source code.
- **BGBuild:** BGBuild application compiles the hardware configuration file, GATT database, BGScript and the *Bluetooth* Smart stack into a single binary image (.hex), which can be installed into BLE112, BLE113 or BLED112 hardware.
- **DFUTool:** DFUTool can be used to update the firmware of BLE112, BLE113 or BLED112 using USB DFU protocol.
- **Thermometer-demo:** Thermometer demo is a Windows command line application, which implements Thermometer collector using BGLib. It can scan *Bluetooth* 4.0 single-mode devices, and read temperature values from them.
- **Collector demo:** Collector demo implements a simple Windows HR collector application, which scans, connects and reads HR and Battery status values from a HR sensor

6 Bluetooth Smart Documentation

- **Bluetooth low energy - getting started** : This document, describes the very basics of *Bluetooth* Smart technology and related Bluegiga *Bluetooth* Smart products
- **BGScript developer guide**: Describes the BGScript scripting language, its features and limitations. Contains also a lot of practical BGScript examples.
- **Profile developer toolkit developer guide**: Describes the basics of *Bluetooth* Smart profile development, as well the features and syntax of hardware and GATT XML files. Contains also practical examples.
- **Bluetooth Smart stack API reference**: This document contains the BGAPI, BGLib and BGScript API. Describes the available commands, responses, events and their parameters. API reference document also explains the basics of *Bluetooth* low energy technology.
- **BLEGUI User Guide**: The document describes how the BLEGUI application works and how to use it
- **Application notes**: Various application notes describe specific use cases like for example Heart Rate Sensor or Health Thermometer collector and walk through the necessary development steps required to implement those.

7 Contact Information

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