

Bluetooth[®] Smart Software v.1.4

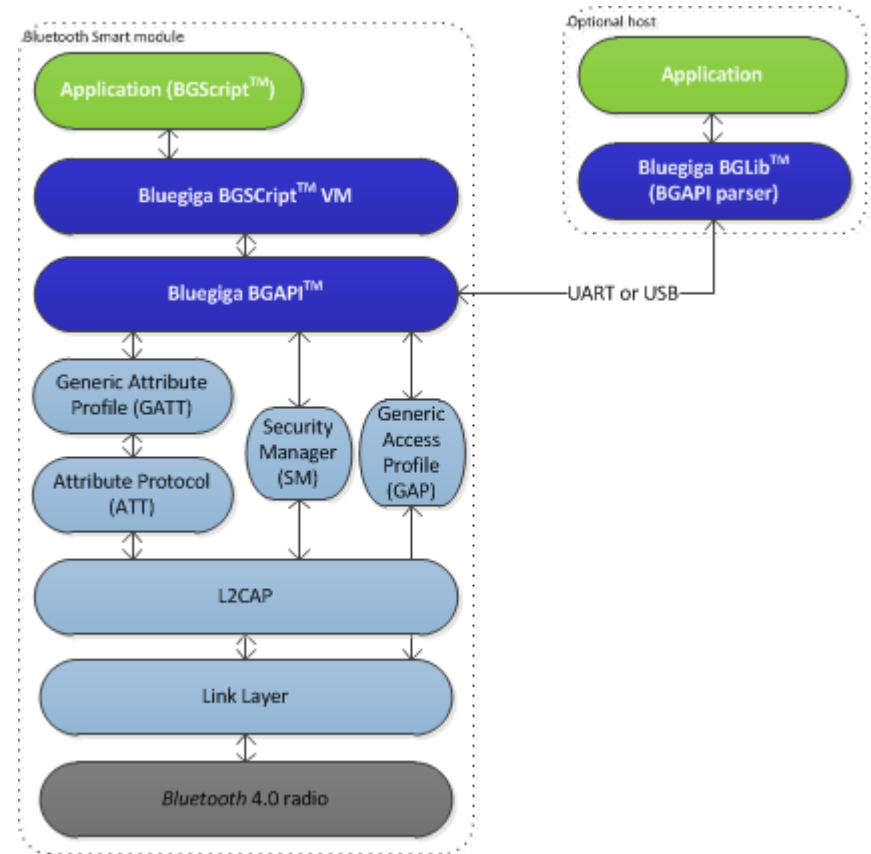
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Introduction to *Bluetooth* Smart Software

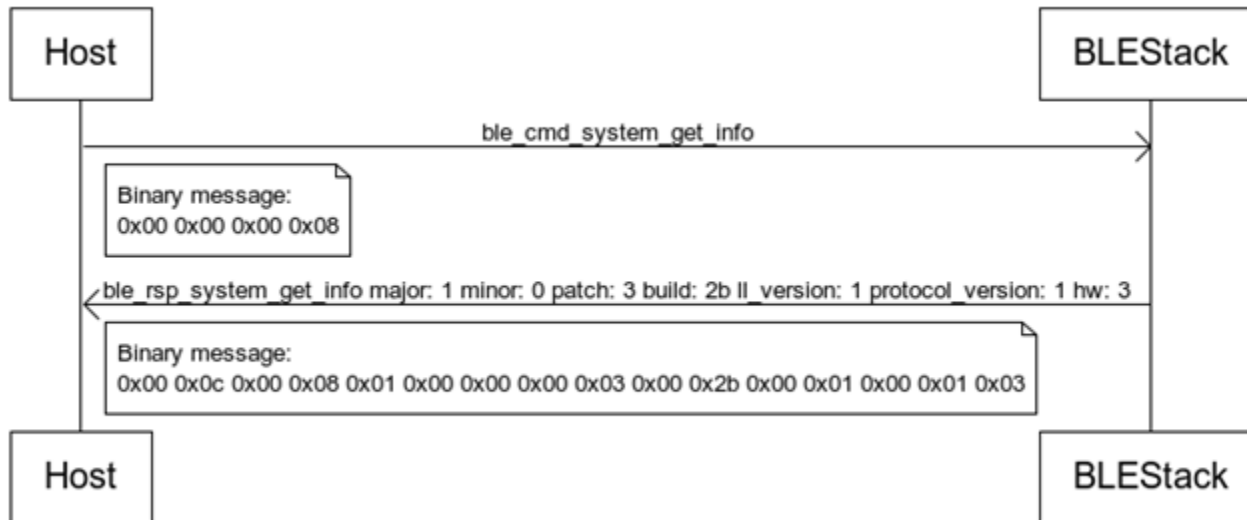
- **Bluetooth v.4.0, single mode compliant**
 - Supports master and slave modes
 - Up to 8 simultaneous connections
 - 100 kbps peak throughput
- **Implements all *Bluetooth* Smart functionality**
 - GAP, L2CAP, ATT, GATT
 - Security manager: bonding, encryption
 - *Bluetooth* Smart profiles
- **Simple API for external host processors**
 - BGAPI™ : A simple protocol over UART or USB interfaces
 - BGLIB™ : A C library for host processors implementing BGAPI
- **Supports standalone applications as well**
 - BGScript™ : A simple scripting language for writing applications
 - Native C applications developed with IAR Embedded Workbench
 - **No separate host needed**
- **Over-the-Air firmware upgrade**
 - Stack updates
 - Application and GATT updates
- **Bluetooth Smart Profile Toolkit™**
 - XML based development tool for Bluetooth Smart profiles
 - Fast and simple profile development
- **Small memory requirements**
 - ~4-6kB RAM
 - ~80-100kB flash (depending of used features/profiles)
- **Bluetooth qualified**



**Bluegiga Bluetooth®
Smart Software**

Introduction to *Bluetooth* Smart Software

- **BGAPI™ protocol** : A simple binary command, response and event protocol between the host and the stack
 - Used when a separate host (MCU) is used to control *Bluetooth* stack over UART/USB
 - Very small memory requirements size requirement and low implementation overhead



Introduction to *Bluetooth* Smart Software

- **BGLIB™ library** : A portable ANSI C library, which implements the BGAPI protocol
 - Easy to port to various architectures such as : ARM Cortex, PIC16/32 etc, Coldfire+ etc.
 - Uses fuction–call back architecture

C Functions

```
/* Function */
void ble_cmd_gap_connect_direct(
    bd_addr address ,
    uint8 addr_type ,
    uint16 conn_interval_min ,
    uint16 conn_interval_max ,
    uint16 timeout
);

/* Callback */
void ble_rsp_gap_connect_direct(
    uint16 result ,
    uint8 conn
);
```

Introduction to *Bluetooth* Smart Software

- **BGScript™ scripting language** : A very simple BASIC-like application scripting language
 - Used when applications are implemented on the Bluetooth radios MCU
 - Enables very fast application development and allows programs to be executed directly on the *Bluetooth* radio without the need of an external MCU

```
# System boot event listener : Executed when BLE112 is started
event system_boot(major ,minor ,patch ,build ,ll_version ,protocol_version ,hw )

    # Configure ADV interval to 1000ms and start advertisements on all channels
    call gap_set_adv_parameters(1600, 1600, 7)

    # Start generic advertisement and enable connections
    call gap_set_mode(2,2)

    #Start a continuous software timer, which generates interrupts every 1000ms
    call hardware_set_soft_timer(32768, 1, 0)
end
```

Introduction to *Bluetooth* Smart Software

- **Why to use BGScript™?**
- **Very simple to use**
 - Fast development of simple *Bluetooth* Smart applications
 - Examples: Pairing, simple user interfaces, simple sensors
- **Free software development tools**
 - Code developed with any text or source code editor
 - Code compiled with Bluegiga's free compiler
- **Several example scripts available**
 - Heart Rate sensor
 - Proximity reporter
 - FindMe tag
 - Medical devices such as blood glucose
- **Cuts out the need for external MCU**
 - Reduced product eBoM
 - Smaller footprint
 - Faster time-to-market

Introduction to *Bluetooth* Smart Software

- **Bluetooth Smart Profile Toolkit™**: A tool for creating *Bluetooth* Smart profiles
 - *Bluetooth* Smart profiles are very simple
 - Can be describes with a single file of XML
 - Profile toolkit is a Simple description language of *Bluetooth* Smart Profiles
- **Several example profiles and services available**
 - Heart Rate Sensor
 - Proximity Reporter
 - FindMe
 - Blood Glucose
 - Heath Thermometer
 - Battery Service
 - Vendor Specific services

```
<service uuid="1800">
  <description>Generic Access Profile</description>

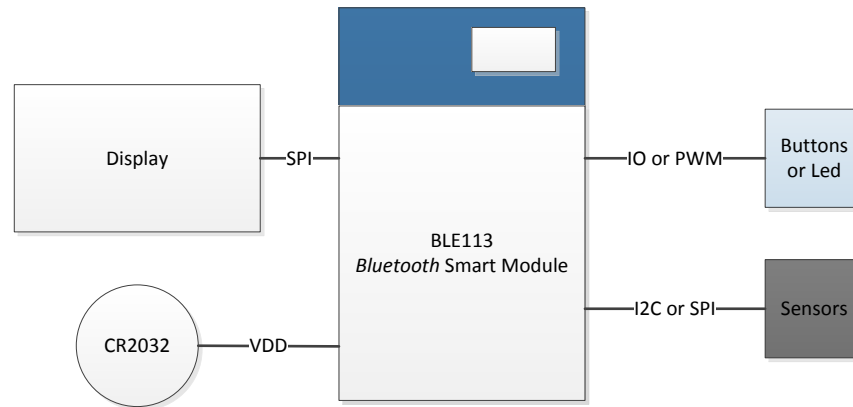
  <characteristic uuid="2a00">
    <properties read="true" const="true" />
    <value>BG Demo</value>
  </characteristic>

  <characteristic uuid="2a01">
    <properties read="true" const="true" />
    <value type="hex">4142</value>
  </characteristic>
</service>
```


Introduction to *Bluetooth* Smart Software

- **Standalone architecture example using Bluegiga BLE113 module**

- Sensors and peripherals are directly connected to the BLE113 via the IO interfaces
- Application executed on the on-board 8051
- Application developed with BGScript™ or C SDK and services and profiles with Profile Toolkit™

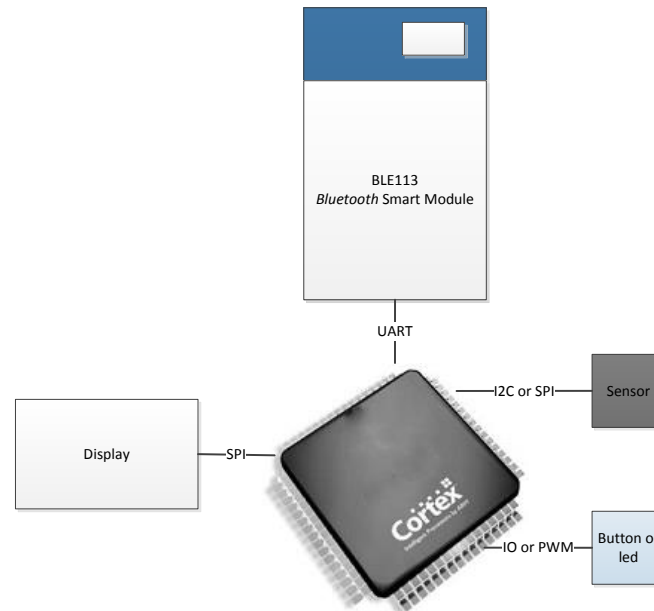


Applications: sport and fitness, medical and health care, smart energy, home automation, security, proximity and presence etc.

Introduction to *Bluetooth* Smart Software

- **Hosted architecture example using Bluegiga BLE113 module**

- Sensors and peripherals are directly connected to the MCU via the IO interfaces
- BLE113 connected to the MCU via UART or USB
- Application developed on the MCU and interfacing to BLE113 done using BGAPI™ protocol (BGLib™ can be used on the host)
- Profile developed with Profile Toolkit™





Bluetooth® Smart Software v.1.4

Feature Highlights

Highlight Features

- **New APIs**
 - Added API command to change the random MAC address
 - New API *ble_cmd_set_initiating_con_parameters* added for configuring scanning parameters for Initiating State (establish connection)
 - Added API to allow temporarily disabling of slave latency during runtime
- **BGScript**
 - Increased maximum BGScript size from ~30KB to 62 KB
 - Multiple listeners for a single event in BGScript
- **Other**
 - Bluetooth v4.2 specification compliant devices bonding support added
 - Watchdog support added



Thank You

