Bluetooth 5

About LM Technologies

LM Technologies is a key enabler of both the Internet of Things (IoT) and cable-free integrator

LM Technologies designs, develops and manufactures a range of wireless products Our focus is in Bluetooth®, WiFi™,based products although were starting Sigfox research and looking to add this technology to our range.

LM supply products to: HP, Honeywell, GE, BOSCH, PayPal, Unipart, and a wide range of POS based manufactures.

M2M, Industrial Automation, Point of Sale (POS), Automotive, Healthcare, Consumer Lifestyle, Home Automation, Location Products, Lighting etc.

LM Technologies has offices in London, China and Hong Kong.

About TOP-electronics

Technical driven distributor and representative of electronic modules and components
Offices in the Netherlands and the USA

Product lines:

M2M & Wireless
Motion Control
Precision Analog
Power Conversion
Active and Passive Components
Test and Measurement

Bluetooth Low Energy 4.0

Bluetooth 4.0

First Bluetooth low energy version – published 2010

The big news was that Bluetooth 4.0 gave us all an introduction into the new band known as:

Low Energy

Introduction of Dual Mode
Which gave us Classic & Low Energy

Quickly adopted by handset manufactures

Bluetooth Low Energy 4.1

Bluetooth 4.1

First update to the working spec – published 2013

LM930

LM931

Main features:

LE Dual Mode Topology – devices can be central and peripherals at the same time - scatter nets

LE L2CAP Connection Oriented Channel Support **Improved data transfer**

- by using dedicated communication channel with flow control

- Updated Privacy 1.1

Bluetooth® 4.2
Changes over BT 4.1

Bluetooth 4.1 Update

Smart Connectivity

Allows manufacturers to specify reconnection time-out intervals.

Improved Data Transfer

- Peripheral devices can be a client and a server simultaneously. Allowing peripheral devices to be independent to the master devices.

- Useful for a smart watch and sensor to send data between each over and then send the aggregated data to the master device.

Bluetooth 4.2 Update

Enables Internet Access
Options over IPv6 / Bluetooth 6LoWPAN

**Improved security
(by enabling Elliptic Curves)**
with FIPS-compliant encryption

Improved privacy
Improved power efficiency

Even Faster
2.5 times faster data transfer rate
10 times larger packet size

LM TECHNOLOGIES®

TOP ELECTRONICS

DESIGN AUTOMATION EMBEDDED SYSTEMS
FPGA - EMBEDDED - INTERNET OF THINGS - PCB TECHNOLOGIEËN

Hardware changes

Bluetooth 4.1 – 5

Chipset vendors such as Cypress (Broadcom) with their CYW20704 IC release claim :

'Supports Broadcom proprietary 2 Mbps low energy mode'

For some hardware vendors therefore Bluetooth 5 is mainly a stack update.

BCM20704

Single-Chip Bluetooth Transceiver and Baseband Processor

GENERAL DESCRIPTION

The Broadcom® BCM20704 is a monolithic, single-chip, Bluetooth 4.1+ HS-compliant, stand-alone baseband processor with an integrated 2.4 GHz transceiver. Manufactured using the industry's most advanced 40 nm CMOS low-power process, the BCM20704 employs the highest level of integration, eliminating all critical external components, and thereby minimizing the device's footprint and costs associated with the implementation of Bluetooth solutions.

The BCM20704 is the optimal solution for voice and data applications that require a Bluetooth SIG standard Host Controller Interface (HCI) via USB, UART H4, and PCM audio interface support.

The BCM20704 transceiver's enhanced radio performance meets the most stringent industrial

FEATURES

- Complies with Bluetooth Core Specification Version 4.1+ HS with provisions for supporting future specifications

- Bluetooth Class 1 or Class 2 transmitter operation

- Supports extended synchronous connections (eSCO), for enhanced voice quality by allowing for retransmission of dropped packets

- Adaptive frequency hopping (AFH) for reducing radio frequency interference

- Interface support, host controller interface (HCI) using a USB or high-speed UART interface and PCM for audio data

- USB2.0 full-speed with LPM support (12 Mbps)
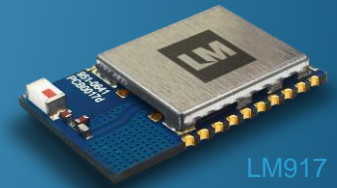
- Supports Broadcom proprietary 2 Mbps low energy mode.

Bluetooth Low Energy 4.2

LM products using CYW20704 BT 4.1 HS

Updatable to BT 4.2

Support for BT 5

HCI based Chipset

LM1017

LM917

Bluetooth 5 Quadruples Range from BT 4.2

Bluetooth 4.2

50 to 100 m line of sight with LE 1 Mbps PHY

Bluetooth 5

4x (estimated 400m) range due to coded
PHY transmission

But at the cost of reduced throughput (what level of cost is as of this moment untested)

Application Wise
Leverages Bluetooth for Home Automation allowing a wider range of connections and devices.

Doubles Throughput

Bluetooth 4.2:

LE 1 Mbps PHY (700kbps Actual Data Throughput)

Bluetooth 5:

Optional LE 2 Mbps PHY

LE 1 Mbps PHY must still be supported for backwards compatibility

Increases data broadcasting capacity

Bluetooth 4.2

Non connectable advertising data (beacon data) limited to 31 bytes payload.

Advertising interval limited to not less than 100 ms.

Bluetooth 5

Increase payload size on advertising channels up to 255 bytes. Eliminate the interval restriction. Extra caution must be taken on interference.
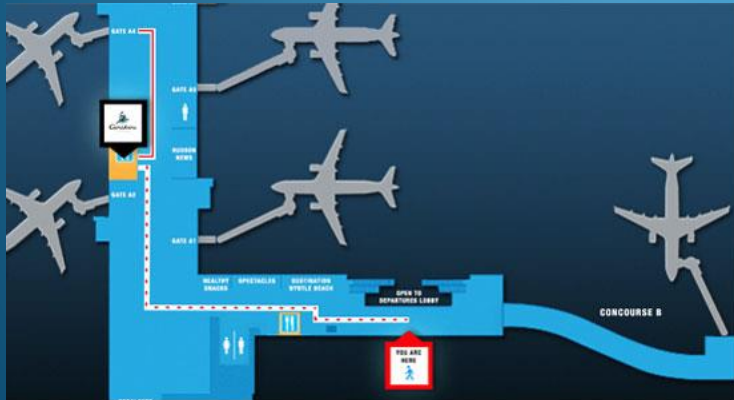
Connectionless IoT scenarios

Beacons in markets
You can send full URLs instead of shortened versions in beacons.

You can add small descriptions without the need to go online.

Beacons for location
More information can be sent to locate yourself indoor.

Bluetooth 5!

Is this the end of Bluetooth Classic as Bluetooth Low Energy starts a new generation ?

With the new speed and bandwidth available from Bluetooth 5, its enables developers to start planning Low Energy applications that can drive some key functions away from Classic profile applications.

Mike Sims, LM Technologies and TOP-electronics

Bluetooth 5 Support by all OS

Supported by:

- iOS7
- Android

The module can be connected via a HCI connection with driver compatibility for:
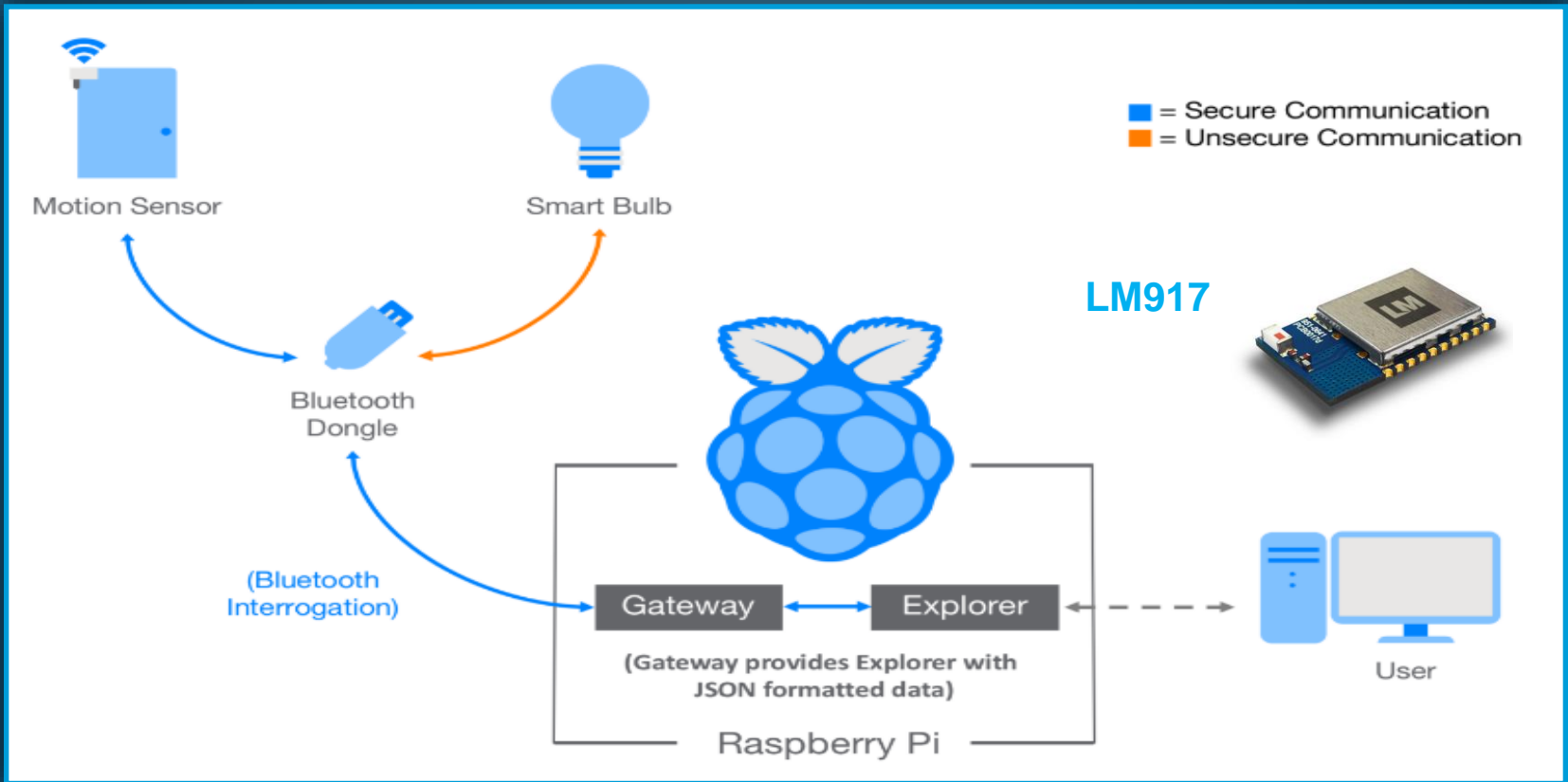
- Linux or
- Win10

iOS 7

Linux™

Windows 10

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Demonstration

Data Bridge between Classic to Bluetooth 4.1+ gateway

Thanks for your attention !