How to Design With Bluetooth Mesh

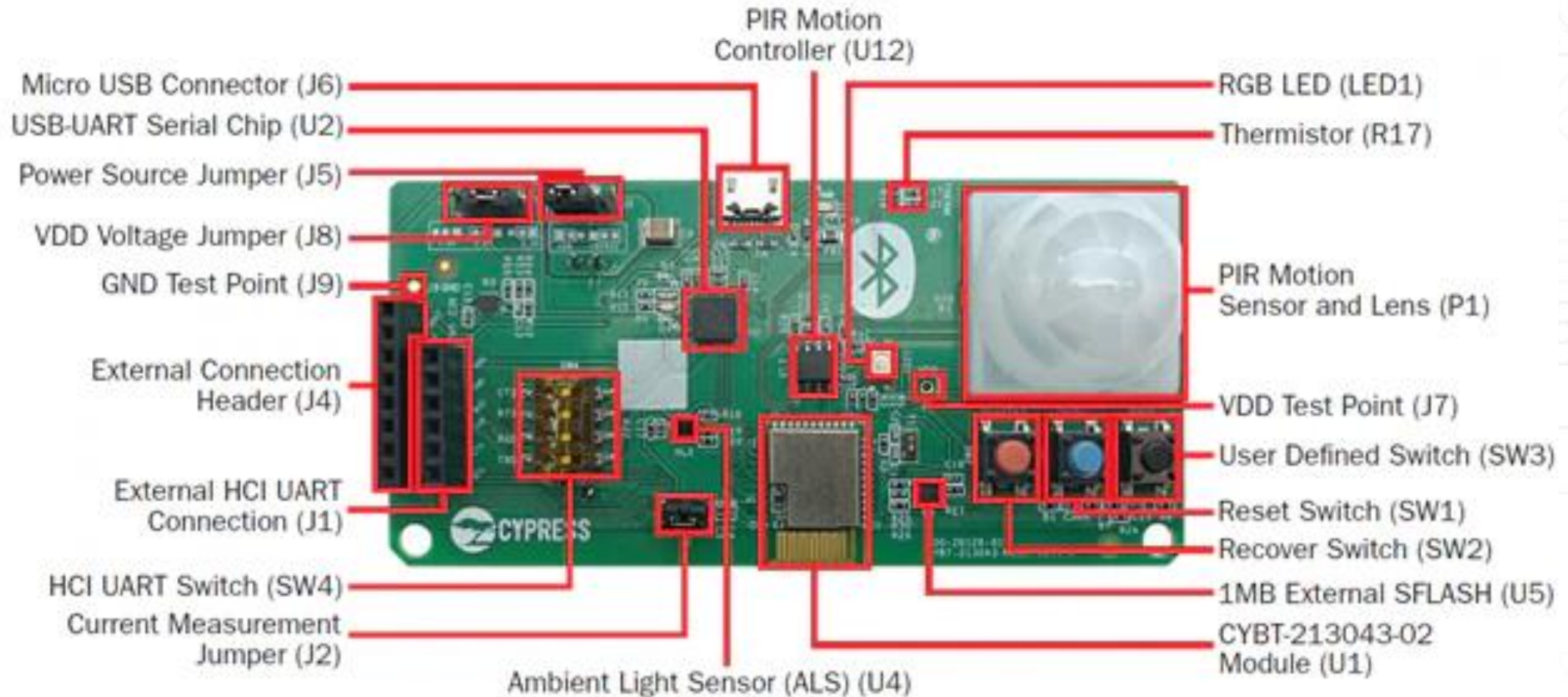**https://iotexpert.com/**

EZ-BT™ Mesh Evaluation Kit CYBT-213043-MESH

- One CYBT-213043-MESH kit contains 4 Bluetooth Mesh boards.

EZ-BT™ Mesh Evaluation Kit CYBT-213043-MESH

- CYBT-213043-02 Bluetooth Mesh Module utilizes Cypress CYW20819 silicon device.

CYW20819 New Product Introduction

High Growth Use Cases That Are Adapting Bluetooth

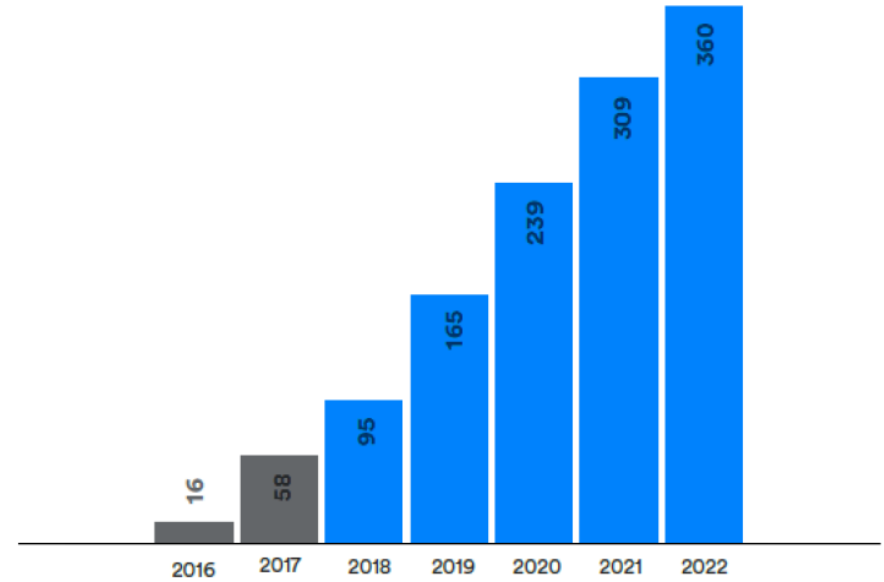Location services gain significant traction

Connected lighting emerges as a key use case in automation

Retail, healthcare, airports and museums are early proving grounds for smart buildings

360 million[1]
annual Bluetooth shipments

Source: ABI Research 2018

Shipment Trends Show Acceptance of Bluetooth in IoT!

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Challenges Customers Face

- Need for low-power LE and Classic Bluetooth
  - All battery powered applications such as sensors, locks etc need ultra-low-power BLE
  - Remote controls and other voice activated HIDs for entertainment and automation use cases need both Bluetooth Classic (EDR/BR) and BLE without compromising on power
- Need for higher transmit power
  - Majority of the applications require up to 10 dBm Tx power
- Limited resources and time for firmware development
  - Most projects are resource constraint and time-to-market is critical
- Limited expertise in RF hardware design and high cost of certification
  - RF certifications are costly and time consuming
  - Low volumes and lack of RF experience make chip-on-board designs economically unviable
- Need for a cost-competitive BLE-only solution
  - Some applications require a low-cost BLE-only solution
- Need for Bluetooth Mesh
  - Smart home, building automation and asset tracking applications require Bluetooth Mesh support
  - Other Mesh solutions require costly Hubs to connect to a Smartphone

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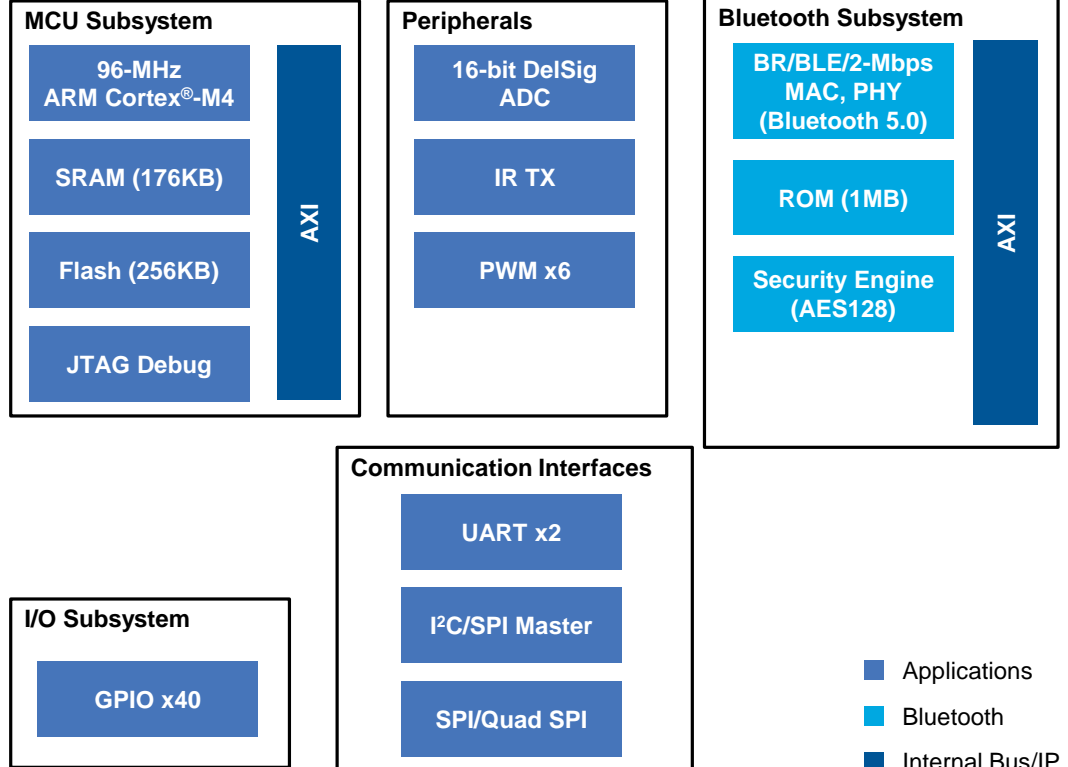# CYW208xx Offers ULP BLE and Classic with up to 10 dBm Tx
Ultra-Low-Power Bluetooth 5.0 MCU

Features

- **Bluetooth v5.0, Basic Rate + Enhanced Data Rate + Bluetooth Low Energy and BLE Mesh**
  - Industry's most widely deployed Bluetooth stack
  - 2-Mbps LE support
  - 1 MB ROM for Bluetooth stack, Mesh, Threadx and other key libraries to let most applications fit in small flash footprint

- **Ultra low power BLE amd EDR**
  - BLE - 6.9 mA Tx @ 4 dBm and 5.9 mA Rx
  - EDR - 12.8 mA Tx and 7.5 mA Rx

- **High transmit power to achieve long range**
  - CYW20820 -10 dBm Tx BLE mode and 5 dBm Tx in EDR
  - CYW20819 - 4 dBm Tx BLE mode and 0 dBm Tx in EDR

- **MCU Subsystem**
  - 96-MHz Cortex®-M4
  - 176KB SRAM, 256KB Flash

- **Packages**
  - 62-ball 4.5x4.5x0.5 BGA and 112-ball 6.5x6.5x0.5 BGA

**CYW20819/CYW20820:** Ultra-Low-Power Bluetooth 5.0 MCU

CYW20819/CYW20820

MCU Subsystem
- 96-MHz ARM Cortex®-M4
- SRAM (176KB)
- Flash (256KB)
- JTAG Debug
- AXI

Peripherals
- 16-bit DelSig ADC
- IR TX
- PWM x6

Bluetooth Subsystem
- BR/BLE/2-Mbps MAC, PHY (Bluetooth 5.0)
- ROM (1MB)
- Security Engine (AES128)
- AXI

Communication Interfaces
- UART x2
- I²C/SPI Master
- SPI/Quad SPI

I/O Subsystem
- GPIO x40

- Applications
- Bluetooth
- Internal Bus/IP

CYW208xx Provides The Ideal Compute, Low Power, and Long Range Solution

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# ModusToolbox™ 1.1 Software Suite w/ Included Design Examples

- A single package that includes all required tools for application development and debugging with ease
- Included SDK offers several code examples to provide a kick-start to your application development
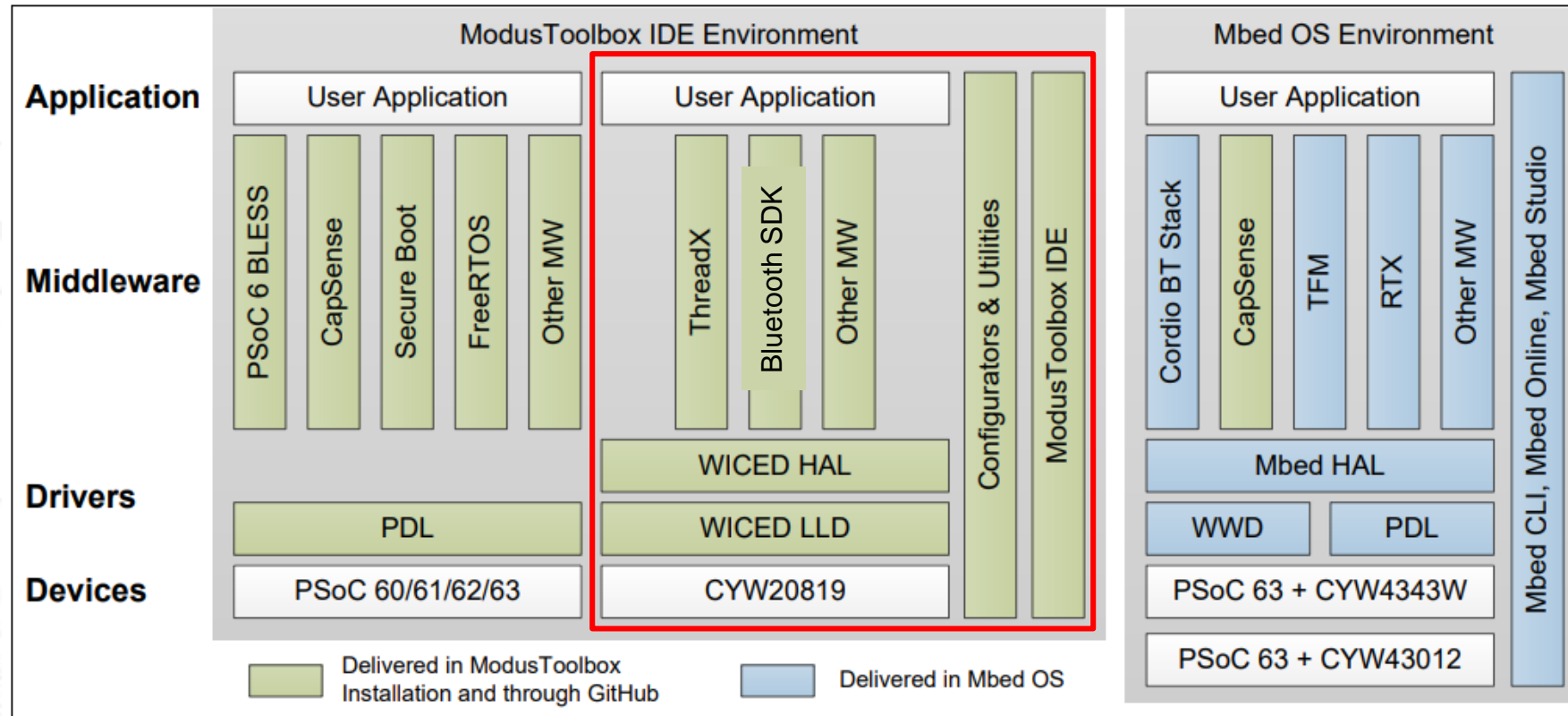
ModusToolbox and WICED SDK are Purpose-Built to Reduce Development Time!

Cypress Manufactured, Fully-Certified Modules

- Cypress also manufactures Bluetooth modules

- Cypress Bluetooth modules are fully certified (FCC, ISED, MIC and CE) that abstracts the RF complexity, removes costs involved with certifications and greatly cut the time to market

- Single source and same software development tools for silicon and modules provides an easy migration path from module to silicon during product's lifecycle

- Ez-Serial firmware platform provides an easy-to-use method for accessing the most common hardware and communication features (Support if planned in future)

  - No RF design or Bluetooth stack knowledge required

  - No IDE required for development

  - Out-of-the-box support for CYSPP mode
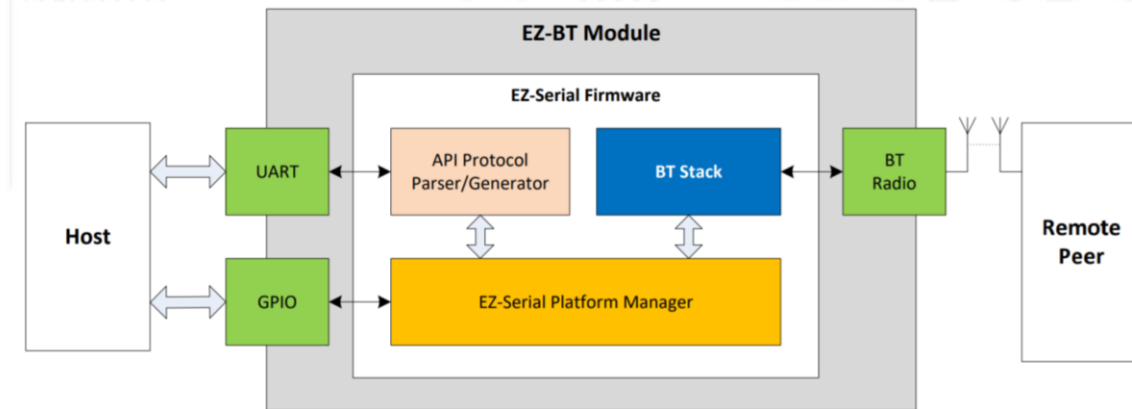
Cypress Bluetooth Modules Provide The Fastest Path From Concept To Production!

EZ-BT WICED Module CYBT-213043-02
Ultra-Low-Power Cost-Optimized Bluetooth 5.0 WICED Module

Applications

Smart home, industrial automation, sensor hubs, POS, medical, industrial,, toys, and PC/smartphone accessories

Features

- **Qualification and Certification**
  - Bluetooth SIG QDID[1], FCC, CE, MIC[2] and ISED[3]
- **Small Footprint**
  - 12 mm x 16.61 mm x 1.70 mm, 30-pad SMT with 22 GPIO
- **Bluetooth Smart Ready with Bluetooth 5.0**
  - EDR: -93.5 dBm (2M)/-87 dBm (3M) Rx sensitivity, 0 dBm Tx output Power
  - BLE: -95 dBm Rx Sensitivity, 4 dBm Tx output power
- **Bluetooth SIG Mesh Supported**
- **Highly Integrated Solution**
  - 1 crystal, 256 KB flash, PCB antenna
  - 2-wire Global Coexistence Interface (GCI)
  - Simultaneous multiple Master and Slave
  - PCM/I²S Audio interface with wideband speech support
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware (Q3'18)
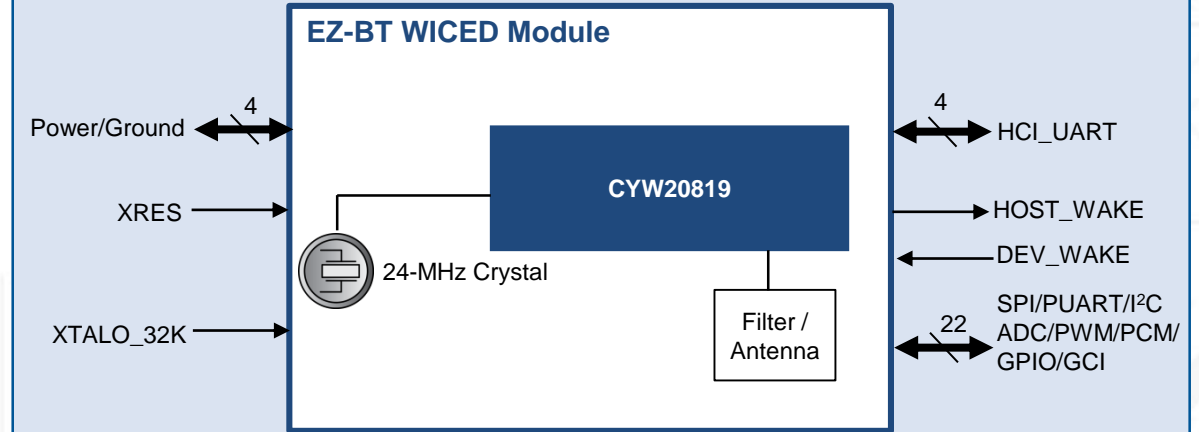
Availability

Sampling: April 2019   **Production:** Q4 2019

EZ-BT WICED Module Family: CYBT-213043-02

Collateral

Datasheets
CYBT-213043-02 Datasheet
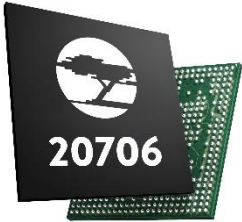
App Notes/Evaluation Kit User Guide
CYBT-213043-EVAL Board
ModusToolbox

[1] Bluetooth Special Interest Group Qualification Design ID
[2] Ministry of Internal Affairs and Communications (Japan)
[3] Innovation, Science and Economic Development Canada

Bluetooth Portfolio

Product Feature	Devices					
Dual-mode Bluetooth MCUs	**20706** BT5.0 (BLE/BR/EDR) CM3, 105 C 10 dBm Tx Mesh	**20735** BLE5.0 (BLE/BR) CM4 w/ FPU 10 dBm Tx Mesh	**20819** BLE5.0 (BLE/BR/EDR) CM4 4 dBm Tx ULP Radio Flash, Mesh 125 C planned **Sampling** – April **Production** – Q3	**20820** BLE5.0 (BLE/BR/EDR) CM4 10 dBm Tx ULP Radio Flash, Mesh 125 C planned **Sampling** – Q2 **Production** – Q3	**20719** BT5.0 (BLE/BR/EDR) Low-Power CM4 w/ FPU & Flash 4 dBm Tx Mesh	**20721** BT5.0 (BLE/BR/EDR) Low-Power CM4 w/ FPU & Flash, Audio
BLE-Only Bluetooth MCUs	**20736** BLE4.1 CM3	**20737** BLE4.1 Secure CM3	**PSoC 4 BLE** BLE4.2 CM3 CapSense, UDBs	**PSoC 6 BLE** BLE5.0 ULP, CM4 and CM0+ CapSense, UDBs		

Features/Integration →

Cypress Has Ideal Bluetooth Classic and LE Solutions For Every Application!

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CYW20819 Includes Bluetooth Mesh Support

- The easy-to-use Bluetooth SDK within ModusToolbox simplifies designs and reduces development time

- SDK includes several design examples for key BLE Mesh models
  - Abstracts not only the mesh specification implementation but also application layer complexity
  - Allows complete application implementation within minutes that work the very first time

- Additional code examples are provided on GitHub for other Mesh models
  - Complete application level design examples for Mesh Evaluation Kit
  - Code snips for Mesh models provide handlers for the application level actions

- Android, iOS and Windows applications are provided with source code
  - Used to provision the nodes in the Mesh network and communicate with the mesh network

- Purpose-built CYBT-213043-MESH kit makes Bluetooth Mesh evaluation and development easy

Highly Integrated Easy-to-Use SDK with Complete Application Specific Code Examples Enable Rapid BLE Mesh Product Development!

How to Design With Bluetooth Mesh

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How to Design With Bluetooth Mesh

MOUSER BLUETOOTH MESH: L0 INTRODUCTION

BY ALAN HAWSE • CYBT-213043-MESH, CYW20819, MOUSER BLUETOOTH MESH • 25 MAY 2019

Summary

Register for my Bluetooth Mesh Virtual Workshop on May, 29 at 11:00AM Eastern Time!!

Hello everyone. This is lesson 0 of a series of 10 lessons about creating Bluetooth Mesh applications for the Cypress EZ Bluetooth Mesh Evaluation Kit CYBT-213043-MESH. This class is called "How to Design with Bluetooth Mesh" because that is exactly what we are going to do – make some applications. No powerpoint in sight.

- https://iotexpert.com/2019/05/25/mouser-bluetooth-mesh-l0-introduction/

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