IoT Compute and Wireless Roadmap
Q3 2019
Cypress IoT – Flexible IoT Solutions for Compelling Products

Cypress provides a proven platform for leading IoT OEMs and ODMs
## Why Cypress is the Ideal MCU + Connectivity Solution for IoT

| Software Solutions | • End-to-end SW Portability: API-based solutions for RTOS and Linux driver source  
|                    | • Flexibility: IDE, OS, MCU, middleware, cloud, security  
|                    | • Framework Ecosystems: Mbed OS, Amazon FreeRTOS |
| Processing         | • IoT Focus: Designed for low power with end node compute and connectivity  
|                    | • System Integration: Host MCU (M4 and FPU) resources with connectivity  
|                    | • Security Integration: HW isolation (M0+), root-of-trust, secure cloud key storage |
| Connectivity       | • Quality: Range, low power, interoperability  
|                    | • Product Leadership: BLE, BT, .11n, .11ac, .11ax  
|                    | • Partner Ecosystem: Modules, VARs, engineering services, cloud integration, ODMs |
| Security           | • Designed for IoT: Integrated, tested, turnkey devices with cloud security  
|                    | • Industry Aligned: Arm®, Amazon FreeRTOS |

Cypress delivers a quality production-worthy end-to-end solution providing the flexibility to balance time-to-market, product differentiation, and lifetime product costs.
## IoT Software Solutions for RTOS and Linux

### WICED® Studio
- Integrated Eclipse IDE with a comprehensive SDK supporting ThreadX and FreeRTOS
- Rich APIs, code examples, and middleware supporting Wi-Fi, BT, and connectivity SoCs
- Enabling embedded applications from sensor to cloud

### ModusToolbox™
- Unifying SW Toolbox for CY MCU, wireless connectivity, and USB devices providing options for customers to utilize a multitude of tools, libraries, and middleware
- Includes a set of SDKs with integrated or external tools options with certified platform support such as Mbed OS and Amazon FreeRTOS
- Configuration tools for fast SW development can be used with any IDE

### Linux
- Open source FMAC Wi-Fi Host driver (x86, ARM)
  - Wi-Fi: SDIO, PCIe, USB support
  - Bluetooth: UART support
- Rich Enterprise Features: Roaming, WPA3, Coex, enterprise Voice and security
The easy-to-use WICED Framework simplifies designs and reduces development time.

- Built-in applications to get you started
  - Cloud services and audio-over-BT/Wi-Fi
  - Code snippets for understanding WICED APIs
  - Applications for manufacturing/certification and direct access to low-level drivers

Highly integrated, pre-tested, and continuously updated IDE provides end-to-end connectivity solutions from product to the cloud.
## WICED Studio 6.4 Features – Released July 2019

<table>
<thead>
<tr>
<th>Feature</th>
<th>Target Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLE Mesh stack update</td>
<td>20706, 20719, 20735</td>
</tr>
<tr>
<td>Audio re-distribution stability improvements</td>
<td>43907</td>
</tr>
<tr>
<td>Alibaba Cloud update for WICED</td>
<td>all</td>
</tr>
<tr>
<td>HomeKit ADK porting to WICED Studio - Wi-Fi &amp; Bluetooth</td>
<td>43907, 4343w, 20719</td>
</tr>
<tr>
<td>WPA3-Personal support</td>
<td>43438, 4343w, 43907</td>
</tr>
<tr>
<td>BT Designer enhancements</td>
<td>20706, 20719, 20735, 43012</td>
</tr>
<tr>
<td>SuperMux enhancements</td>
<td>20719, 20735</td>
</tr>
<tr>
<td>WICED Power Estimator application</td>
<td>20719, 43907, CYW9MCU7X9N364</td>
</tr>
</tbody>
</table>
**ModusToolbox™ Suite**

- Comprehensive development environment for IoT platforms
  - Supporting converged MCU and wireless systems
- Validated and qualified reference flows using Software Development Kits
  - PSoc SDK, BT SDK, Mbed SDK, Amazon FreeRTOS SDK
- Configuration tools streamline personalization
  - Bluetooth®, CapSense®, USB, Smart IO, QSPI
  - Device: pins, clocks, peripherals, etc.
- Arm PSA certified security software
  - Cryto, TLS, and FOTA support
## ICW Software Roadmap – ModusToolbox™

<table>
<thead>
<tr>
<th></th>
<th>ModusToolbox SDKs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SDKs</strong></td>
<td><strong>Amazon FreeRTOS SDK</strong></td>
</tr>
<tr>
<td>Development Environment*</td>
<td>Amazon Console MTB IDE (Eclipse)</td>
</tr>
<tr>
<td>Wi-Fi Driver</td>
<td>WHD – WICED Host Driver</td>
</tr>
<tr>
<td>Bluetooth Stacks</td>
<td>CY BT/BLE</td>
</tr>
<tr>
<td>RTOS</td>
<td>FreeRTOS</td>
</tr>
<tr>
<td>Additional / Key Feature Support</td>
<td>• BT and Device Configurators, CapSense, Amazon Device Management</td>
</tr>
<tr>
<td>Release</td>
<td>v2.1 November 2019</td>
</tr>
</tbody>
</table>

* Customers can download any SDK and utilize the IDE of their choice
Cypress ICW Linux Solution

- Complete HW & SW solution for Linux Kernel 3.10+
- Open source FMAC Hosted Wi-Fi driver featuring:
  - Fast roaming support with `wpa_supplicant`
  - WPA3-Personal & WPA3-Enterprise Security
  - Thermal throttling for extreme temperature
  - Voice Enterprise certified
  - CLM download integrated
  - SoftAP with multi-client
  - Firmware Off-loaded Roaming: Ability to set different RSSI roam thresholds in Wi-Fi device
  - Power Management including: WMM-PS, OOB Host Wake, WOWL, ARP Offload
  - Suspend/Resume, EAP-FAST, LEAP, PEAP, EAP-TLS
- Bluetooth® stack (BSA) and advanced features including BLE Mesh, AoA/AoD
# Linux Roadmap

## VARAN Release
(Released WW1918 / May 2019)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>WPA3-Enterprise support</td>
<td>various</td>
</tr>
<tr>
<td>VSDB STA-STA support</td>
<td>4373</td>
</tr>
<tr>
<td>Idle Clock DS0 over FMAC</td>
<td>43012</td>
</tr>
<tr>
<td>Thermal Throttling</td>
<td>43455, 43438</td>
</tr>
<tr>
<td>Roaming Enhancements (FMAC)</td>
<td></td>
</tr>
<tr>
<td>1. Channel Utilization</td>
<td>43455</td>
</tr>
<tr>
<td>2. RSSI Measurement Control</td>
<td>43455</td>
</tr>
<tr>
<td>3. Scan Channel List</td>
<td>43455</td>
</tr>
<tr>
<td>Software Diversity</td>
<td>4373</td>
</tr>
</tbody>
</table>

## KONG Release
(End of 2019)

Planned features in review
Cypress’ PSoC® 6 portfolio bridges the gap between application processors and standard microcontrollers

- Dual-core Arm® Cortex®-M4 and M0+, running at 150-MHz and 100-MHz, ultra-low-power 40-nm architecture
- Industry-leading ultra-low-power design that consumes as little as 22-μA/MHz in active power mode and 4.5-μA in Deep Sleep modes
- Best-in-class flexibility with wired and wireless connectivity options, software-defined peripherals and industry-leading CapSense®
- Integrated, hardware-based secure execution environment with secure data storage
PSoC 6: Industry’s Most Flexible MCU Architecture for the IoT

- Most flexible, dual-core architecture designed specifically for the IoT
  - Multiple wired and wireless connectivity options, including BLE\(^1\), Wi-Fi\(^2\), and USB, to support cloud-based services
  - Software-defined peripherals to create custom AFEs\(^3\) and to support last-minute design changes while minimizing PCB re-spins
  - CapSense, the industry’s best capacitive sensing solution, to support sleek, next-generation user-interfaces
  - Flexible dual-core architecture to optimize system power consumption and performance

**PSoC 6 Dual-Core MCU Architecture**

**Cortex-M4**
- Usage Examples:
  - RTOS
  - Displays
  - Sensor Analytics
  - Audio Interface
  - USB/BLE HCI\(^4\)

**Cortex-M0+**
- Usage Examples:
  - BLE Stack
  - CapSense
  - Secure Functions
  - I/O Data Control
  - Sensor Aggregation

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\(^1\) Bluetooth Low Energy
\(^2\) PSoC 6 as host MCU with Cypress’ wireless radio products (WICED)
\(^3\) Analog front ends
\(^4\) Host Controller Interface
\(^5\) Secure Digital High Capacity
\(^6\) Arm-based SPM available in PSoC 64 line
<table>
<thead>
<tr>
<th>Programmable Line</th>
<th>Performance Line</th>
<th>Connectivity Line</th>
<th>Security Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSoC 61</td>
<td>PSoC 62</td>
<td>PSoC 63</td>
<td>PSoC 64</td>
</tr>
<tr>
<td>Arm® Cortex®, M4</td>
<td>Arm Cortex-M4, M0+</td>
<td>Arm Cortex-M4, M0+</td>
<td>Arm Cortex-M4, M0+</td>
</tr>
<tr>
<td>Up to 2MB Flash, 1MB SRAM</td>
<td>Up to 2MB Flash, 1MB SRAM</td>
<td>Up to 1MB Flash, 288KB SRAM</td>
<td>Up to 2MB Flash, 1MB SRAM</td>
</tr>
</tbody>
</table>

- Secure Processing Environment (SPE)
- Non-Secure Processing Environment (NSPE)
- Hardware-based Root-of-Trust (RoT) and Trusted Services

- Bluetooth® Low Energy
- Dynamic Voltage and Frequency Scaling

- CapSense®, SAR ADC, DAC, LP COMP, Opamps, UDBs, SCBs, TCPWMs, QSPI, I2S, PDC-PCM, USB, LCD, DMA, RTC, eFuse, PLLs, OSCs, GPIOs, Smart I/O, Crypto

- **Hardware Features**
- **Secure Firmware**
PSoC® 64 Secure MCUs

NON-SECURE PROCESSING ENVIRONMENT (NSPE)

The Cortex-M4 MCU enables you to develop your application and utilize IoT platform software libraries to establish a secure cloud connection.

SECURE PROCESSING ENVIRONMENT (SPE)

The Cortex-M0+ is used to establish an isolated processing environment for trusted applications.

HARDWARE-BASED ROOT-OF-TRUST (RoT) AND TRUSTED SERVICES

Further isolated from the SPE is a hardware-based root-of-trust with trusted services. The root-of-trust is an immutable, unclonable identity. It securely stores keys and performs security services such as secure boot, attestation, and firmware over-the-air (FOTA) updates.
## PSoC® 64 Secure MCU Portfolio

<table>
<thead>
<tr>
<th></th>
<th>Bare Metal</th>
<th>Secure Boot</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSoC</td>
<td>PSoC 62, PSoC 63</td>
<td>PSoC 64</td>
<td>PSoC 64</td>
</tr>
<tr>
<td>Flash Memory</td>
<td>512KB – 2MB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware-accelerated Crypto</td>
<td>Symmetric: AES, 3DES; Asymmetric: RSA, ECC; SHA-256, SHA-512; TRNG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arm PSA Certified</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>NSPE</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SPE</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Root-of-Trust</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Secure Bootloader</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Attestation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cloud-specific Secure Functions</td>
<td></td>
<td></td>
<td>Amazon AWS</td>
</tr>
<tr>
<td>Availability</td>
<td>Sampling Today</td>
<td></td>
<td>Q1 2020</td>
</tr>
</tbody>
</table>
## PSoC 6 Arm Cortex-M4 MCUs for IoT

**Ultra-Low-Power | Built-in Security | High-Performance**

### Features and Flash

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Features</th>
<th>Flash Sizes</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PSoc 64</strong> Secure MCU with Root-of-Trust</td>
<td>CYB064xA&lt;br&gt;(Secure Boot)</td>
<td>512KB Flash/256KB SRAM&lt;br&gt;Opamps, VDAC, UDBs</td>
<td>1MB Flash/512KB SRAM</td>
<td>S: 1Q20&lt;br&gt;MP: 1Q20&lt;br&gt;Production</td>
</tr>
<tr>
<td><strong>PSoc 63</strong> Integrated BLE</td>
<td>CYB064x7&lt;br&gt;(Secure Boot)</td>
<td>1MB Flash/288KB SRAM&lt;br&gt;Opamps, VDAC, UDBs</td>
<td>1MB Flash/512KB SRAM</td>
<td>S: 1Q20&lt;br&gt;MP: 1Q20&lt;br&gt;(Standard Secure AWS)</td>
</tr>
<tr>
<td><strong>PSoc 62</strong> Dual-Core M0+/M4</td>
<td>CYB064x7BL&lt;br&gt;(Secure Boot with BLE)</td>
<td>2MB Flash/1MB SRAM&lt;br&gt;Opamps, VDAC, UDBs</td>
<td>2MB Flash/1MB SRAM</td>
<td>S: 1Q20&lt;br&gt;MP: 1Q20&lt;br&gt;MP: 4Q19&lt;br&gt;Production</td>
</tr>
<tr>
<td><strong>PSoc 61</strong> Single-Core M4</td>
<td>CYB064x7BL&lt;br&gt;(Secure Boot)</td>
<td>512KB Flash/128KB SRAM&lt;br&gt;Opamps, VDAC, UDBs</td>
<td>1MB Flash/512KB SRAM</td>
<td>S: 1Q20&lt;br&gt;MP: 1Q20&lt;br&gt;MP: 4Q19&lt;br&gt;Production</td>
</tr>
</tbody>
</table>

### Additional Information

- **Development**
- **Sampling**
- **Concept**
- **Production**

**CYPRESS** EMBRACED IN TOMORROW
Cypress is committed to providing the industry's most comprehensive portfolio of high-performance, easy-to-use Bluetooth solutions providing efficient customer development cycles

- World-class RF performance
  - Industry best Bluetooth radio, providing superior range and connection robustness
  - Dual-mode Bluetooth BR/EDR and BLE support allows for increased throughput, audio support, and backward compatibility

- Installed base provides unmatched interoperability
  - Most widely deployed Bluetooth stack in the world (interoperability assurance)
  - The best device-device and device-smartphone interoperability of any IoT supplier

- Industry's most comprehensive Bluetooth portfolio
  - From cost-optimized BR/EDR/BLE radios to enhanced dual-core high power solutions, Cypress can meet your application needs
  - Cypress silicon and modular BT solutions provide greater flexibility, design options, and system design expertise

- Advanced features
  - Extensive offering of BLE Mesh qualified kits, devices, modules, and software
  - Audio support
    - Support for EDR audio source and sink
    - Wireless Audio Stereo Synchronization (WASS) solution offers high-performance, low power, True Wireless application
## Bluetooth Portfolio and Roadmap

<table>
<thead>
<tr>
<th>More Features</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dual Mode Bluetooth</strong></td>
<td></td>
</tr>
<tr>
<td><strong>BT5.0/BLE</strong></td>
<td><strong>20704</strong></td>
</tr>
<tr>
<td><strong>HCI-USB/UART</strong></td>
<td><strong>BT5.0/BLE</strong></td>
</tr>
<tr>
<td><strong>CM3 SoC</strong></td>
<td><strong>20706</strong></td>
</tr>
<tr>
<td><strong>10 dBm Tx</strong></td>
<td><strong>BT5.0/BLE</strong></td>
</tr>
<tr>
<td><strong>BLE Mesh</strong></td>
<td></td>
</tr>
<tr>
<td><strong>BT5.0/BLE</strong></td>
<td><strong>20735</strong></td>
</tr>
<tr>
<td><strong>CM3 SoC</strong></td>
<td></td>
</tr>
<tr>
<td><strong>10 dBm Tx</strong></td>
<td><strong>ULP BT5.0/BLE</strong></td>
</tr>
<tr>
<td><strong>BLE Mesh</strong></td>
<td></td>
</tr>
<tr>
<td><strong>BT5.0/BLE</strong></td>
<td><strong>20819</strong></td>
</tr>
<tr>
<td><strong>CM4 SoC</strong></td>
<td><strong>MP: 1Q20</strong></td>
</tr>
<tr>
<td><strong>4 dBm Tx</strong></td>
<td><strong>BLE Mesh</strong></td>
</tr>
<tr>
<td><strong>BLE Mesh</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ULP BT5.0/BLE</strong></td>
<td><strong>20820</strong></td>
</tr>
<tr>
<td><strong>CM4 SoC</strong></td>
<td><strong>S: 4Q19</strong></td>
</tr>
<tr>
<td><strong>10 dB Tx</strong></td>
<td><strong>BLE Mesh</strong></td>
</tr>
<tr>
<td><strong>BLE Mesh</strong></td>
<td></td>
</tr>
<tr>
<td><strong>BT5.0/BLE</strong></td>
<td><strong>20719</strong></td>
</tr>
<tr>
<td><strong>CM4 SoC w/ flash</strong></td>
<td><strong>BLE Mesh</strong></td>
</tr>
<tr>
<td><strong>4 dBm Tx</strong></td>
<td><strong>BLE Mesh</strong></td>
</tr>
<tr>
<td><strong>BLE Mesh</strong></td>
<td></td>
</tr>
<tr>
<td><strong>BT5.0/BLE</strong></td>
<td><strong>20721</strong></td>
</tr>
<tr>
<td><strong>CM4 SoC w/ flash</strong></td>
<td><strong>S: 2Q20</strong></td>
</tr>
<tr>
<td><strong>4 dBm Tx</strong></td>
<td><strong>Audio</strong></td>
</tr>
</tbody>
</table>

| **Bluetooth Low Energy-Only** |  |
| **BT4.1** | **20736** |
| **CM3** | **BT4.1 Secure** |
| **CM3** | **20737** |
| **BT4.2** | **PSoc 4 BLE** |
| **CM0 SoC w/ flash** | **PSoc 6-1M w/BLE 5.0** |
| **3 dBm Tx** | **CM4 and CM0+ SoC w/ flash** |
| **Prog Analog and Digital** | **4 dBm Tx** |
| **Prog Analog and Digital** | **PSoc 6-2M BLE** |
| **PSoc 6-2M w/BLE 5.0** | **CM4 and CM0+ SoC** |
| **2M flash, 1M RAM, 4 dBm Tx** | **Prog Analog and Digital** |
# Bluetooth Module Portfolio and Roadmap

## More Features

<table>
<thead>
<tr>
<th>Cost Optimized</th>
<th>Size Optimized</th>
<th>External Antenna</th>
<th>Extended Range (XR) and Temp (XT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYBLE-0130xx-00 BLE 4.1 w/ EZ-S CM3 128K Flash</td>
<td>CYBLE-x220xx-0x BLE 4.2 w/ EZ-S CM0 256K Flash</td>
<td>CYBLE-202013-11 BLE 4.2 w/ EZ-S CM0 256K Flash</td>
<td>CYBLE-212006-01 BLE 4.2 w/ EZ-S CM0 256K Flash XR</td>
</tr>
<tr>
<td>CYBLE-x120xx-0x BLE 4.2 w/ EZ-S CM0 256K Flash</td>
<td>CYBLE-x140xx-0x BLE 4.2 w/ EZ-S 11x11 CM0 256K Flash</td>
<td>CYBLE-x220xx-0x BLE 4.2 w/ EZ-S CM0 256K Flash</td>
<td>CYBLE-x220xx-0x BLE 4.2 w/ EZ-S CM0 256K Flash XR</td>
</tr>
<tr>
<td>CYBLE-343026-01 BLE/BT 5.0 w/ EZ-S CM3 512K Flash</td>
<td>CYBLE-353027-02 BLE/BT 5.0 9x9 CM3 512K Flash</td>
<td>CYBLE-333027-02 BLE/BT 5.0 CM3 512K Flash</td>
<td>CYBLE-333047-02 BLE/BT 5.0 CM3 512K Flash</td>
</tr>
<tr>
<td>CYBLE-213043-02 BLE/BT 5.0 CM4 256K Flash</td>
<td>CYBLE-243053-02 BLE/BT 5.0 CM4 256K Flash</td>
<td>CYBLE-213043-02 BLE/BT 5.0 CM4 1MB Flash</td>
<td>CYBLE-213043-02 BLE/BT 5.0 CM4 1MB Flash</td>
</tr>
<tr>
<td>CYBLE-413034-02 BLE/BT 5.0 CM4 1MB Flash</td>
<td>CYBLE-416045-02 BLE 5.0 w/ EZ-S CM4 1MB Flash</td>
<td>CYBLE-423028-02 BLE/BT 5.0 11x11 CM4 1MB Flash</td>
<td>CYBLE-438039-02 BLE/BT 5.0 CM4 1MB Flash XR</td>
</tr>
</tbody>
</table>

**Note:**
- **MP:** 1Q20
- **S:** 4Q19
Cypress Wi-Fi

- **World Class RF Performance**
  - Advanced RF designs and embedded signal processing provide 3-6 dB increased link budget
  - Scheduling of network activity and advanced sleep allows for lowest device power management
  - Resulting in 2x better range performance, faster throughput, and lower power

- **Installed Base Provides Un-matched Interoperability**
  - By far the most established and reliable Wi-Fi solution for the IoT
  - Cypress radio architecture has shipped over 1 billion nodes over the past 15 years
  - Provides the best device-device interoperability of any IoT supplier

- **Advanced Features**
  - Cypress Real-time Simultaneous Dual-Band (RSDB) technology offers advanced audio, video, and data networking
  - Integrated security including WPA3 and network performance features including voice and fast-roaming
  - Device management for authentication, security, and medium access allows for efficient high-density networks
  - ULP devices deliver 10x-50x reduction in receive, transmit and sleep power
# IoT Wi-Fi and Combo Portfolio and Roadmap

## More Features

<table>
<thead>
<tr>
<th>Wi-Fi + BT Combo</th>
<th>Wi-Fi</th>
<th>Wi-Fi MCU</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Image" alt="4343x" /> 1x1n SB w/ SDIO 72-Mbps, BT4.2</td>
<td><img src="Image" alt="43384" /> 1x1n SB w/ SDIO 72-Mbps</td>
<td><img src="Image" alt="43903" /> 1x1n SB 160-MHz R4</td>
</tr>
<tr>
<td><img src="Image" alt="43455" /> 1x1ac DB w/ SDIO 433-Mbps, BT5.0</td>
<td><img src="Image" alt="43143" /> 1x1n SB w/ USB 150-Mbps</td>
<td><img src="Image" alt="43907" /> 1x1n DB 320-MHz R4</td>
</tr>
<tr>
<td><img src="Image" alt="4373" /> 1x1ac, w/USB, SDIO 433-Mbps, BT5.0</td>
<td><img src="Image" alt="43012" /> 1x1n DB w/ SDIO 78Mbps, BT5.0, ULP</td>
<td><img src="Image" alt="54907" /> 1x1ac DB 320-MHz R4</td>
</tr>
<tr>
<td><img src="Image" alt="43364" /> 2x2ac DB, w/PCIe 867-Mbps, BT5.0</td>
<td><img src="Image" alt="5459" /> 1+1ac, RSDB, 2x2 MIMO w/ SDIO 867-Mbps, BT5.0</td>
<td><img src="Image" alt="65909" /> 1x1n DB, 78Mbps ULP SDIO, BLE5.2, 200MHz M33</td>
</tr>
<tr>
<td><img src="Image" alt="4356" /> 1+1ac, w/USB, SDIO 433-Mbps, BT5.0</td>
<td><img src="Image" alt="5556x" /> 2x 11ac w/PCIe SDIO, 1.2Gbps, BT5.2</td>
<td></td>
</tr>
</tbody>
</table>
Partner Ecosystem
Partners Provide Everything Needed to Get Customers to Market

- **Hardware**
  - RF tested regulatory certified robust modules reducing TTM, engineering costs, and risks while improving quality
  - Antenna design, rapid form factor prototyping, custom housing, custom connectors, packaging and more

- **Embedded, cloud and mobile application SW services**
  - Expertise in Linux, WICED, Android, iOS, HomeKit, Amazon FreeRTOS, AWS, IBM Cloud, Google Cloud, and much more
  - Mature tested SW solutions for an entire portfolio of connectivity options
  - Robust enterprise security solutions with end-to-end encryption
  - Expertise across a broad range of markets including medical, automation, energy management, lighting, white goods, audio, video, etc.

- **Regulatory RF certification services**
  - In-house and external EMC testing and certifications expertise significantly reduce risk and TTM ensuring customer regulatory success

- **Support**
  - As OS updates, protocols, standards, and security changes are made, Cypress’ partner network helps customers stay up to date in a multitude of markets

- **Complete turnkey custom solutions**
  - Cypress partners provide end-to-end custom turnkey solutions including custom SW features, RF chip on board, industrial design, and manufacturing
Partners

A global partner ecosystem enables support and development for your IoT application

Module Makers

- Design, build and sell RF modules with limited software and hardware certification support

Technology Partners

- Cloud-, mobile- and middleware-engineering services

Value-Added Resellers

- Provide certified, ready-to-use modules with integrated software and custom services

ODMs

- Integrate modules, software and plastics into a finished product with customization options
Product Detail / Backup
The PSoC 6 MCU Architecture\textsuperscript{10} reduces energy consumption without sacrificing performance with:

- Dynamic voltage and frequency scaling enabling both performance- and power-critical processing
- A dual-core architecture, where the Cortex\textsuperscript{®}-M0+ can be used as an offload engine for power efficiency, allowing the main Cortex-M4 core to sleep
- An ultra-low-power system, where the Cortex-M4 consumes 22 µA/MHz and the Cortex-M0+ consumes 15 µA/MHz

\textbf{PSoC 6 sets a new, industry-leading low-power benchmark for today’s IoT devices}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
\textbf{Power Mode} & \textbf{Current Consumption} & \textbf{Code Execution} & \textbf{Digital Peripherals Available} & \textbf{Analog Peripherals Available} & \textbf{Clock Sources Available} & \textbf{Wake-Up Sources} & \textbf{Wake-Up Time} \\
\hline
Active (M4) & 5.82 mA @ 150 MHz (LP\textsuperscript{1}) & Yes & All & All & All & - & - \tabularnewline & 1.43 mA @ 50 MHz (ULP\textsuperscript{2}) & & & & & & \\
Active (M0+) & 3.43 mA @ 100 MHz (LP) & Yes & All & All & All & - & - \tabularnewline & 0.75 mA @ 25 MHz (ULP) & & & & & & \\
Low-Power Active (M4) & 380 µA @ 8 MHz & Yes & All & All & 8-MHz IMO\textsuperscript{3} & - & - \\
Deep-Sleep & 7.0 µA & No & WDT\textsuperscript{4}, SCB\textsuperscript{5} & Comparator, POR\textsuperscript{6}, BOD\textsuperscript{7} & 32-kHz ILO\textsuperscript{8} & Comparator, GPIO, WDT, DS-SCB & 25 µs, 25 µs\textsuperscript{9} \\
Hibernate & 300 nA & No & No & Comparator, POR & No & Comparator, GPIO, RTC & 500 µs \\
\hline
\end{tabular}
\end{table}

\textsuperscript{1} Low-power active mode (1.1-V operation)  
\textsuperscript{2} Ultra-low-power active mode (0.9-V operation)  
\textsuperscript{3} Internal main oscillator  
\textsuperscript{4} Watchdog timer serial communications block  
\textsuperscript{5} Serial communications block  
\textsuperscript{6} Power-on-reset  
\textsuperscript{7} Brownout detect  
\textsuperscript{8} Internal low-speed oscillator  
\textsuperscript{9} Low-power active and active modes, respectively  
\textsuperscript{10} Built on a 40-nm ultra-low-power process, providing the lowest power, most flexibility, and most secure architecture for the IoT
PSoC® 64 Secures Data via Isolation

- Hardware-based isolation achieved with Protection Units:
  - Memory Protection Units (MPUs)
  - Shared Memory Protection Units (SMPUs)
  - Peripheral Protection Units (PPUs)

- Protection Units use access attributes to allow/restrict bus transfers:
  - Address range, read/write, execute (for code access), user/privileged (such as OS/kernel vs. task/thread)

- Inter-Processor Communication (IPC) channels enable communication between isolated environments
  - Cortex-M4 dedicated to NSPE
  - Cortex-M0+ dedicated to SPE
Managing Trusted IoT Devices

Secure Device Management

Middleware supporting PSA APIs

Cypress PSoC 64 Secure MCUs with hardware-based resource isolation that is PSA certified

PSoC 64 delivers a complete IoT platform
## PSoC® 64 Value Comparison

<table>
<thead>
<tr>
<th>Value</th>
<th>PSoC 64 Secure MCU</th>
<th>PSoC 61/62/63 MCU</th>
<th>Discrete Secure Element + MCU</th>
<th>M33 with TrustZone MCU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Secure supply chain</strong> without restrictive non-cancel non-return terms</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>?</td>
</tr>
<tr>
<td>Isolate <strong>secure firmware and credentials</strong> from the non-secure application firmware</td>
<td>Yes</td>
<td>Possible with user FW</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Securely authenticate firmware</strong> upon power-up</td>
<td>Yes</td>
<td>Possible with user FW</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Securely attest to and upgrade the non-secure application firmware in a device</td>
<td>Yes</td>
<td>Possible with user FW</td>
<td>Possible as user application</td>
<td>Possible with user FW</td>
</tr>
<tr>
<td>Securely attest to and upgrade the <strong>secure firmware</strong> in a device</td>
<td>Yes</td>
<td>Possible with user FW</td>
<td>Possible as user application</td>
<td>No</td>
</tr>
<tr>
<td>Isolate credentials in a <strong>non tamper-resistant</strong> enclave (e.g. eSE, eHSM)</td>
<td>Yes</td>
<td>Possible with user FW</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Isolate credentials in a <strong>fully tamper-resistant</strong> enclave (e.g. eSIM)</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
PSoC® 4 Portfolio

Features

- PSoC 4A00 Analog Coprocessor
- PSoC 4700 Sense Anything
- PSoC 4500 Performance
- PSoC 4200 Programmable Digital
- PSoC 4100 Intelligent Analog
- PSoC 4000 Entry-level

Flash Capacity

On-chip Bluetooth® Low Energy

Programmable Analog Block
Inductive and capacitive sensing
Motor control accelerator
Intelligent analog features plus programmable digital blocks, USB 2.0, CAN
Entry-level features plus programmable analog blocks, up to 1-MspS ADC
Entry-level family with CapSense®
# PSoC® 4 Portfolio

## Flexibility | CapSense® | Ease-of-Use

<table>
<thead>
<tr>
<th>Entry Level</th>
<th>Intelligent Analog PSoC 4100</th>
<th>Programmable Digital PSoC 4200</th>
<th>Motor Control PSoC 4500</th>
<th>Sensing Anything PSoC 4700</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSoC 4000</td>
<td>BL = BLE-Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S = S-Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M = M-Series</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L = L-Series</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Entry Level
- **PSoC 4000**

### Intelligent Analog PSoC 4100
- **CY8C4014-PS**
  - 16-MHz M0, 16K/2K
  - CMP, ADC, SCB
  - IDAC, Smart I/O

### Programmable Digital PSoC 4200
- **CY8C4247-M**
  - 48-MHz M0, 256K/32K
  - CMP, Opamp, ADC, SCB
  - IDAC, BLE

### Motor Control PSoC 4500
- **CY8C4547**
  - 48-MHz M0+, 128K/32K
  - MCA, CMP, Opamp
  - ADC, SCB, IDAC
  - Smart I/O, ECO

### Sensing Anything PSoC 4700
- **CY8C47xxS**
  - 48-MHz M0+, 32K/4K
  - CapSense, MagSense
  - CMP, SCB, IDAC

---

### Flash KB/ SRAM KB
1

### Comparator
2

### Current-output DAC
3

### Embedded programmable digital logic in the I/O subsystem
4

### Serial communication block
5

### Universal digital block
6

### Bluetooth Low Energy
7

### Controller area network
8

### Motor control accelerator
9

### Status Availability

<table>
<thead>
<tr>
<th>Concept</th>
<th>Development</th>
<th>Sampling</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>QQYY</td>
<td>QQYY</td>
</tr>
</tbody>
</table>

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PSoC® 4
Robust Touch Sensing Solutions

Senzei™ suite of sensing solutions

- CapSense®, the industry’s leading self- and mutual-capacitive sensing solution for touch buttons and sliders, proximity detection, and liquid-level sensing
- MagSense™ inductive sensing solution senses minute deflections or movements of metal, enabling sleek and futuristic user interfaces with metallic overlays
- MagSense and CapSense can co-exist, even as one sensor, and provide a foolproof solution that can not only detect any kind of object but also reject false touches due to stress, wear and tear, and environmental changes
# Key Wi-Fi Performance Factors – Cypress vs Competitor

<table>
<thead>
<tr>
<th>IoT Device Wi-Fi Connectivity Needs</th>
<th>Cypress Performance vs. Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you cannot <strong>connect your IoT device to the AP</strong>, it is unusable</td>
<td>Device connects up to <strong>2x+ the distance</strong></td>
</tr>
<tr>
<td>Once you are connected, your device should be able to <strong>communicate efficiently</strong></td>
<td>Provides up to <strong>3x throughput at same distance</strong></td>
</tr>
<tr>
<td>It’s great to perform well when you are alone out there. But, IoT requires a device to perform well in a congested spectrum with other devices for good <strong>network efficiency</strong></td>
<td><strong>900% better spectrum utilization at range</strong> – transfers faster, using less power and with <strong>much lower impact on other devices</strong></td>
</tr>
<tr>
<td>Wi-Fi in an IoT device needs to <strong>coexist</strong> with wireless technologies such as Bluetooth</td>
<td><strong>90% lower throughput loss</strong> in presence of Bluetooth</td>
</tr>
</tbody>
</table>

**Cypress connectivity solutions enable successful IoT real world solutions!**
The distance at which a device can connect to the AP is determined by two key factors:

- **Transmit power** – impacts ability of the AP to hear the device
  - **Power Amplifier Pre-Distortion** – Cypress proprietary solution linearizing the output of the chip's internal power amplifier providing higher output power
  - **Transmit Power Control** – Cypress proprietary solution enables transmission up to the power limit restrictions without overshooting them while avoiding regulatory violations (FCC, ETSI, etc.)
  - **Transmit Beamforming** – focus device’s transmitted power in the direction of the receiver in 11ac

- **Receive sensitivity** – impacts ability of the device to hear the AP
  - Efficient signal processing to detect Wi-Fi packet preambles and demodulate their payload even w/ low Signal-to-Noise ratio (SNR)
  - Cypress Wi-Fi largely outperforms IEEE 802.11-2016 receiver’s recommended minimum sensitivity

- Every **6dB improvement in Tx power and Rx sensitivity doubles the range** (assuming free space loss propagation model)

**Connecting to the Access Point – Cypress vs. WLAN Spec**

Cypress CYW4343W receive sensitivity vs IEEE guideline

IEEE 802.11-2016 Table 17-18

CYW4343W Typical Sensitivity

Approximately 20 dBm better Rx sensitivity + Tx Power

Cypress IoT has 2x-4x better range

Cypress radio architecture and DSP algorithms provide the best coverage in the industry!
Most IoT devices are deployed in an environment with other IoT devices and multimedia devices.

In an efficient Wi-Fi network, devices are able to communicate without wasting available spectrum and without a significant degradation of device performance.

Poor network efficiency is caused by:
- High latency
- High packet error rate
- Low throughput

The effect of poor network efficiency is:
- All devices perform poorly on the network
- Limited number of nodes can be deployed
- Throughput, latency and power performance are all degraded

Low throughput, high latency, and higher packet error rate degrade the entire network!
Network Efficiency – Cypress vs The Competition

Cypress device is 3x more efficient than our competitor – lower latency and longer battery life!

<table>
<thead>
<tr>
<th></th>
<th>Competitor Throughput</th>
<th>Cypress Throughput</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Range (-80 dBm)</td>
<td>6 Mbps</td>
<td>17.25 Mbps</td>
</tr>
<tr>
<td>Far Range (-90 dBm)</td>
<td>1 Mbps</td>
<td>3 Mbps</td>
</tr>
</tbody>
</table>

Cypress is ~3x more efficient in transferring data

Maximum throughput = 3*X

CyW4343W vs Competitor

Increase data rate/modulation
Increase range (transmit power, receive sensitivity)
Network Efficiency – Cypress vs Competitor PER

OTA RvR Test

- Comp Device
- CYW Device

Access Point Linksys R7000 11n Channel 6

Green - < 30% PER
(130% airtime compared to 10% PER)

Yellow - > 30% < 90% PER
(130% to 900% airtime compared to 10% PER)

Red - > 90% PER
(more than 900% airtime compared to 10% PER)

Cypress device performs up to 800% better compared to competition in airtime utilization!
A common cause of poor spectrum utilization is when a device needs to retransmit a message again and again due to higher packet error rate and creates poor Wi-Fi performance for the entire network.

<table>
<thead>
<tr>
<th>Network scenario</th>
<th>Airtime usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wi-Fi Packet Error Rate (PER)</td>
<td>~10%</td>
</tr>
<tr>
<td>Network airtime usage at given PER&lt;sup&gt;1&lt;/sup&gt;</td>
<td>9% per sec</td>
</tr>
<tr>
<td>Airtime usage compared to 10% PER</td>
<td>-</td>
</tr>
</tbody>
</table>

Higher PER will cause your multimedia and other device to suffer


---

<sup>1</sup> Average packet size = 1000 bytes, 20 nodes sending one packet per second

---

Devices with 90% PER take 900% more air time compared to 10% PER devices!
IoT devices often require Wi-Fi and Bluetooth wireless technologies to be co-located.

The challenge is they operate in the same frequency band, so if they are not coordinated, they can clobber each other.

Bad coexistence means Wi-Fi throughput suffers significantly caused by inefficient coexistence used by the Wi-Fi device.

Cypress has invested hundreds of man-years in creating coexistence algorithms that make real-time decisions in granting the medium to either or both radio.

- Their decision is based on a deep understanding of Bluetooth and Wi-Fi protocols, and use cases (Bluetooth A2DP vs eSCO vs BLE).
- They optimize the performance of both Bluetooth and Wi-Fi to give the user an experience of exclusive access to the medium.
- RF chains of Wi-Fi and Bluetooth radios are optimally controlled to minimize the interference seen and maximize performance.
Cypress performed coexistence test on Cypress and a competitors device
- Clear RF Chamber – same distance from AP for both devices, ~ -70dB RSSI
- Run iPerf TCP on 2G Wi-Fi while maintaining a 30ms BLE Connection Interval
- Both devices used a shared PCB antenna between Wi-Fi and BLE

<table>
<thead>
<tr>
<th></th>
<th>Wi-Fi Only</th>
<th>Wi-Fi + 30ms BLE Connection</th>
<th>% Tput Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cypress Wi-Fi Throughput</td>
<td>13.3 Mbit/s</td>
<td>12.5 Mbit/s</td>
<td>6%</td>
</tr>
<tr>
<td>Competitor Wi-Fi Throughput</td>
<td>3.52 Mbits/s</td>
<td>0.15 Mbits/s</td>
<td>96%</td>
</tr>
</tbody>
</table>

Cypress device has significantly improved Wi-Fi performance in the presence of Bluetooth!
PSoc 6 Device Detail
PSoC® 61 Line

Applications
Wearables, portable medical, smart home, and general embedded control

Features
- **MCU Subsystem**
  - 120-MHz Arm® Cortex®-M4
  - Ultra-low-power (0.9 V) and low-power (1.1 V) operation mode
  - Up to 2MB flash and 1MB SRAM with a DMA controller
- **Analog Blocks**
  - Two low-power comparators (CMPs), 12-bit SAR ADC (1-Msps)
- **Digital Blocks and Communication Interfaces**
  - Ten 16-bit and two 32-bit timer/counter/pulse-width modulator (TCPWM) blocks
  - Five serial communication blocks (SCBs), deep sleep SCB
  - One Secure Digital High Capacity (SDHC), two controller area networks (CANs)
- **I/O Subsystem**: Up to 76 GPIOs
- **Packages**: 100-LQFP

Collateral
Preliminary Datasheet: [PSoC 6 Community](#)

1 Configurable as a 8-bit, 16-bit timer, or 32-bit counter or PWM  
2 Configurable as a UART, SPI or I²C interface  
3 Single-precision floating-point unit

Go back to IoT Portfolio Roadmap
**Applications**

IoT gateways, smart home, home appliances, HMI, audio processing, and industrial concentrators

**Features**

- **MCU Subsystem**
  - Dual-core architecture: 150-MHz Arm® Cortex®-M4 and 100-MHz Arm Cortex-M0+
  - Ultra-low-power (0.9 V) and low-power (1.1 V) operation mode
  - Up to 2MB flash and 1MB SRAM with a DMA controller
- **Analog Blocks**
  - Two opamps, two low-power comparators (CMPs), 12-bit SAR ADC (1-Msp)
  - 12-bit DAC, CapSense® capacitive-sensing block
- **Digital Blocks and Communication Interfaces**
  - Twelve universal digital blocks (UDBs): custom digital peripherals
  - Twenty-four 16-bit and eight 32-bit timer/counter/pulse-width modulator (TCPWM) blocks
  - Eight serial communication blocks (SCBs), deep-sleep SCB
  - I²S and PDM-PCM converter, SMIF
  - USB 2.0 (host and device)
- **Security Features**
  - Advanced cryptographic coprocessor (Crypto)
  - True random number generator
  - One-time programmable eFuse for secure key storage
  - Secure over-the-air (OTA) firmware update with read-while-write flash technology for firmware updates
- **I/O Subsystem**: Up to 104 GPIOs
- **Packages**: 124-BGA, 80-WLCSP

**Collateral**

Preliminary Datasheet: [PSoc 6 Product Page](#)

---

1 Configurable as a 8-bit, 16-bit timer, or 32-bit counter or PWM
2 Configurable as a UART, SPI or I²C interface
3 Digital microphone interface
4 Serial memory interface for execute-in-place, encrypted Quad-SPI
5 One-time programmable bits for secure key storage
6 Single-precision floating-point unit

**Availability**

Sampling: Now Production: Now

Go back to IoT Portfolio Roadmap
PSOC® 63 Line with Bluetooth Low Energy (BLE)

**Applications**

Wearables, portable medical, industrial IoT, and smart home

**Features**

- **MCU Subsystem**
  - Dual-core architecture: 150-MHz Arm® Cortex®-M4 and 100-MHz Arm Cortex-M0+
  - Ultra-low-power (0.9 V) and low-power (1.1 V) operation mode
  - Up to 1MB Flash, 288KB SRAM with a DMA controller
- **Analog Blocks**
  - Two opamps, two low-power comparators (CMPs), 12-bit SAR ADC (1-Mbps)
  - 12-bit DAC, CapSense® capacitive-sensing block
- **Digital Blocks and Communication Interfaces**
  - Twelve universal digital blocks (UDBs): custom digital peripherals
  - Twenty-four 16-bit and eight 32-bit timer/counter/pulse-width modulator (TCPWM) blocks
  - Eight serial communication blocks (SCBs)
  - I²S and PDM-PCM converter, SMIF
- **Bluetooth Smart Connectivity**
  - Bluetooth Low Energy (BLE) 5.0 radio with 2-Mbps data throughput
- **Security Features**
  - Advanced cryptographic coprocessor (Crypto), true random number generator
  - One-time programmable eFuse for secure key storage
  - Secure over-the-air (OTA) firmware update with read-write flash technology for firmware updates
- **I/O Subsystem**: Up to 78 GPIOs
- **Packages**: 104-M-WLCSP, 116-BGA

**Collateral**

**Preliminary Datasheet**: PSoC 6 Product Page

---

1 Configurable as an 8-bit, 16-bit timer, or 32-bit counter or PWM
2 Configurable as a UART, SPI or I²C interface
3 Digital microphone interface
4 Serial memory interface for execute-in-place, encrypted Quad-SPI
5 One-time programmable bits for secure key storage
6 Single-precision floating-point unit

**Availability**

Sampling: Now  Production: Now

Go back to IoT Portfolio Roadmap
**PSoC® 64 Secure Boot MCU Line**

### Applications
- Wearables, portable medical, industrial IoT, and smart home

### Features
- **MCU Subsystem**
  - 150-MHz Arm® Cortex®-M4 with ultra-low-power (0.9-V) and low-power (1.1-0V) operation mode
  - Shared memory: Up to 2MB Flash, 1MB SRAM with DMA
- **Secure Co-Processor**
  - Hardware isolated, 100-MHz Arm Cortex-M0+ with privileged access to memory and peripherals
  - Hardware isolated keys, cryptographic functions and trusted applications
  - Hardware root-of-trust providing secure device identity
  - Secure boot with attestation and anti-rollback
  - Advanced hardware cryptographic acceleration and True Random Number Generator (TRNG)
- **Analog Blocks**
  - 2 x opamps, 2 x low-power comparators (CMP), 12-bit SAR ADC (1-MspS)
  - 12-bit DAC, CapSense® capacitive-sensing block
- **Digital Blocks and Communication Interfaces**
  - 12 x universal digital blocks (UDBs): custom digital peripherals
  - 24 x 16-bit and 8 x 32-bit timer/counter/pulse-width modulation blocks (TCPWM)\(^1\)
  - 2 x SDHC blocks\(^6\), 8 x serial communication blocks (SCBs)\(^2\), deep-sleep SCB
  - I2S and PDM-PCM\(^3\) converter, SMIF\(^4\)
  - USB 2.0 (Host and Device)\(^6\) or Bluetooth Low Energy 5.0\(^5\)
- **I/O Subsystem**: Up to 104 GPIOs, Smart I/O
- **Packages**: 124-BGA, 116-BGA, 68-QFN

### Collateral
- Preliminary Datasheet: Contact Sales

### Availability
- Sampling: Q3 2019
- Production: Q4 2019

---

1 Configurable as an 8-bit, 16-bit timer, or 32-bit counter or PWM
2 Configurable as a UART, SPI, or I2C interface
3 Digital microphone interface
4 Serial memory interface for execute-in-place, encrypted Quad-SPI
5 Available on 1MB Flash device only
6 Available on 2MB and 512KB Flash devices only

---

Go back to IoT Portfolio Roadmap
CYW20704
HCI-Over-USB/UART–Based Bluetooth Connectivity

Applications
HCI-based Bluetooth and dongle

Features
- Bluetooth v4.2, Basic Rate/Enhanced Data Rate/Bluetooth Low Energy
  - Class 1 (100 meters), Class 2 (10 meters) support
  - Global coexistence interface (GCI)
  - Host controller interface (HCI) over UART and USB
- Packages
  - 49-pin FCBGA (4.5 x 4.0 mm)

Collateral
Datasheet: CYW20707 Silicon
Module Selector Guide: IoT Solutions Guide
Software: Linux Driver

Availability
Production: Now

Go back to IoT Portfolio Roadmap
CYW20706
Embedded Bluetooth MCU

Applications
Speaker/Headset, Bluetooth gateway, automation gateway

Features
- Bluetooth v4.2, Basic Rate/Enhanced Data Rate/Bluetooth Low Energy
  - Industry's most widely deployed Bluetooth stack
  - Global coexistence interface (GCI)
  - Class 1 (100 meters), Class 2 (10 meters) support
- Packages
  - 49-pin FBGA (4.5 x 4.0 mm)
- Module Partner
  - SPIL, Alinket, Cypress
- Supported in WICED STUDIO

Collateral
Datasheet: CYW20706 Silicon
Module Selector Guide: IoT Solutions Guide
Software: WICED STUDIO

Availability
Production: Now

Go back to IoT Portfolio Roadmap
CYW20735B1
Bluetooth Low Energy and Basic Rate Connectivity MCU with integrated power amplifier

Applications
Remote controls, BR-gateways

Features

- Bluetooth v5.0, Basic Rate + Bluetooth Low Energy
  - Industry’s most widely deployed Bluetooth stack
  - 2-Mbps LE Phy
  - Secure over-the-air (OTA) firmware upgrade
  - RSA, X.509, SHA, AES128
  - Integrated power amplifier (up to 10 dbm)

- MCU Subsystem
  - 96-MHz Cortex®-M4
  - 384KB SRAM

- Packages
  - 60-pin QFN (7 x 7 mm)

- Supported in WICED STUDIO

Collateral
Datasheet: Coming Soon
Software: Coming Soon

Availability
Production: Now

Go back to IoT Portfolio Roadmap
CYW20719
High-Performance Bluetooth MCU w/Security

Applications
Medical, home automation, wearables, POS, audio

Features
- Bluetooth v5.0, Basic Rate + Enhanced Data Rate + Bluetooth Low Energy
  - Industry’s most widely deployed Bluetooth stack
  - Industry’s lowest-power radio
  - 2-Mbps LE support
  - Secure over-the-air (OTA) firmware upgrade
- MCU Subsystem
  - 96-MHz Cortex®-M4
  - 512KB SRAM, 1MB Flash
- Module Partner
  - Cypress, Murata (supports 40 GPIOs)
- Packages
  - 40-pin QFN (5 x 5 mm)
- Supported in WICED STUDIO

Collateral
Datasheet: CYW20719 datasheet
Product Guide: CYW20719 Product Guide
Module Selector Guide: IoT Solutions Guide
Software: WICED STUDIO

CYW20719: High-Performance Bluetooth MCU w/Security

 MCU Subsystem
- 96-MHz ARM Cortex®-M4
- SRAM (512KB)
- Flash (1MB)
- JTAG Debug

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

 Bluetooth Subsystem
- BR/BLE/2-Mbps MAC, PHY (Bluetooth 5.0)
- ROM (2MB)
- Security Engine (ECDH, AES)

 Communication Interfaces
- HCI-UART x1
- PUART x1
- I2C/SPI Master
- SPI/Quad SPI/MIPI

I/O Subsystem
- GPIO x40 /x17

Applications
- Bluetooth
- Internal Bus/IP

Broad Market Availability
Production: Now

Go back to IoT Portfolio Roadmap
**CYW20721**

**High-Performance Bluetooth MCU w/Security for Audio**

**Applications**
- Audio

**Features**
- Bluetooth v5.0, Basic Rate + Enhanced Data Rate + Bluetooth Low Energy
  - Industry’s most widely deployed Bluetooth stack
  - Industry’s lowest-power radio
  - 2-Mbps LE support
  - Secure over-the-air (OTA) firmware upgrade
- MCU Subsystem
  - 96-MHz Cortex®-M4
  - 512KB SRAM, 1MB Flash
- Packages
  - 40-pin QFN (5 x 5 mm)
- Supported in WICED STUDIO - Pro

**Collateral**
- Datasheet: Contact sales
- Module Selector Guide: Not Available
- Software: WICED STUDIO – Pro (Contact sales)

**Availability**
- Production: Now

**Go back to IoT Portfolio Roadmap**
CYW20819/CYW20820
High-Performance Bluetooth MCU

Applications
Medical, home automation, wearables, POS, audio

Features
- Bluetooth v5.0, Basic Rate + Enhanced Data Rate + Bluetooth Low Energy
  - Industry’s most widely deployed Bluetooth stack
  - Industry’s lowest-power radio
  - 2-Mbps LE support
  - Secure over-the-air (OTA) firmware upgrade
  - 4 dBm-Tx on CYW20819 and 10-dBm Tx on CYW20820
- MCU Subsystem
  - 96-MHz Cortex®-M4
  - 176KB SRAM, 256KB Flash
- Packages
  - 62-pin 4.5x4.5x0.5 BGA
  - 112-pin 6.5x6.5x0.5 BGA
  - 48-pin 7x7 QFN

Collateral
Datasheet: CYW20819 Datasheet
Software: ModusToolbox IDE

Availability
| CYW20819 | Samples: New | Production: Q4 2019 |
| CYW20820 | Samples: Q3 2019 | Production: Q4 2019 |

Go back to IoT Portfolio Roadmap
PSoc® 4200BLE-Series
PSoc 4 MCU Programmable Line with BLE

Applications
Sports and fitness monitors, wearable electronics, medical devices, home automation solutions, game controllers, and sensor-based low-power systems for the Internet of Things (IoT)

Features
- 32-bit MCU Subsystem
  - 48-MHz Arm® Cortex®-M0 CPU
  - Up to 256KB flash and 32KB SRAM
- Programmable Analog Front Ends (AFEs)
  - Four opamps, configurable as programmable gain amplifiers (PGAs), comparators (CMPs), filters, etc.
  - One 12-bit/1-Msps SAR ADC
- CapSense® with SmartSense™ Auto-Tuning
  - Industry’s No. 1 capacitive-sensing solution including one Capacitive Sigma-Delta™ (CSD) controller with touchpad capability
- Programmable Digital Logic
  - Four universal digital blocks (UDBs): custom digital peripherals
  - Four configurable 16-bit timer/counter/pulse-width modulator (TCPWM) blocks
  - Two serial communication blocks (SCBs) configurable as I²C master or slave, SPI master or slave, or UART
- Packages
  - 56-pin QFN and 68-pin CSP
- Bluetooth Connectivity with Bluetooth 4.1 or Bluetooth 4.2
  - Royalty-free stack and GUI-based Component to configure profiles, 2.4-GHz BLE radio with integrated balun

Collateral
Datasheet: PSoC 4 BLE (CY8C4XX7 BLE)

Go back to IoT Portfolio Roadmap
**MCU PORTFOLIO – MILN**

**PSOC® 63 Line with Bluetooth Low Energy (BLE)**

**Applications**
- Wearables, portable medical, industrial IoT, and smart home

**Features**
- **MCU Subsystem**
  - Dual-core architecture: 150-MHz Arm® Cortex®-M4 and 100-MHz Arm Cortex-M0+
  - Ultra-low-power (0.9 V) and low-power (1.1 V) operation mode
  - Up to 1MB Flash, 288KB SRAM with a DMA controller
- **Analog Blocks**
  - Two opamps, two low-power comparators (CMPs), 12-bit SAR ADC (1-Mbps)
  - 12-bit DAC, CapSense® capacitive-sensing block
- **Digital Blocks and Communication Interfaces**
  - Twelve universal digital blocks (UDBs): custom digital peripherals
  - Eighteen 16-bit timer/counter/pulse-width modulator (TCPWM) blocks
  - Eight serial communication blocks (SCBs)
  - I²S and PDM-PCM converter, SMIF
- **Bluetooth Smart Connectivity**
  - Bluetooth Low Energy (BLE) 5.0 radio with 2-Mbps data throughput
- **Security Features**
  - Advanced cryptographic coprocessor (Crypto), true random number generator
  - One-time programmable eFuse for secure key storage
  - Secure over-the-air (OTA) firmware update with read-write flash technology for firmware updates
- **I/O Subsystem**
  - Up to 78 GPIOs
- **Packages**
  - 104-M-WLCSP, 116-BGA

**Collateral**
- Preliminary Datasheet: [PSoC 6 Product Page](#)

**Availability**
- Sampling: Now
- Production: Now

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1. Configurable as an 8-bit, 16-bit timer, or 32-bit counter or PWM
2. Configurable as a UART, SPI or I²C interface
3. Digital microphone interface
4. Serial memory interface for execute-in-place, encrypted Quad-SPI
5. One-time programmable bits for secure key storage
6. Single-precision floating-point unit
CYW20737
Bluetooth Low Energy Connectivity MCU w/Security

Applications
Wearables, medical, home automation, toys

Features
- Bluetooth Low Energy v4.1
  - Industry's most widely deployed BLE stack
  - Simultaneous multiple master and slave (1M, 3S)
  - Proprietary Low Energy (LE) audio support
  - Secure over-the-air (OTA) firmware upgrade
  - RSA, X.509, SHA, AES128
- Packages
  - 32-pin QFN (5 x 5 mm)
  - 80-ball CSP (2.2 x 2.2 mm)
- FCC- and CE-certified Modules From Cypress
  - 6.5 x 6.5 x 1.2 mm
- Supported in WICED SMART SDK

Collateral
Datasheet: CYW20737 Silicon
CYW20737L Module
Software: WICED SMART SDK

Availability
Production: Now

Go back to IoT Portfolio Roadmap
CYW20736 Bluetooth Low Energy Connectivity MCU

Applications
Beacons, tags, toys, industrial/home automation

Features
- Bluetooth Low Energy v4.1
  - Industry’s most widely deployed BLE stack
  - Simultaneous multiple master and slave (1M, 3S)
  - Over-the-air (OTA) firmware upgrade
- Packages
  - 32-pin QFN (5 x 5 mm)
  - 80-ball CSP (2.2 x 2.2 mm)
- FCC- and CE-certified Modules From Cypress
  - 5 x 6.5 x 1.2 mm
- Module Partner
  - Alinket
- Supported in WICED SMART SDK

Collateral
Datasheet: CYW20736 Silicon
CYW20736S Module
Module Selector Guide: IoT Solutions Guide
Software: WICED SMART SDK

Availability
Production: Now

Go back to IoT Portfolio Roadmap
BT/BLE Portfolio Module Detail
**EZ-BLE™ Creator Modules CYBLE-x220xx-0x**

**Space-Optimized Bluetooth Low-Energy (BLE) Modules**

### Applications
- Connectivity, medical, industrial, PC accessories, toys, and smartphone accessories

### Features

- **Qualification and Certification**
  - Bluetooth SIG QDID\(^1\), FCC, CE, KC\(^2\), MIC\(^3\), and ISED\(^4\)

- **Small Footprint**
  - 10 mm x 10 mm x 1.8 mm, 21/22-pad SMT with 16 GPIOs

- **Bluetooth Smart Connectivity with BLE 4.1 and 4.2**
  - 2.4-GHz BLE radio and baseband
  - -91-dBm Rx sensitivity, +3-dBm Tx output power

- **1.3-µA Deep Sleep, 150-nA Hibernate, 60-nA Stop Power Modes**

- **Highly Integrated Solution**
  - Two crystals, chip antenna, passives, shield
  - 128KB and 256KB flash sizes
  - Preprogrammed with EZ-Serial firmware

- **CYBLE-x220xx-EVAL Evaluation Board Interface**
  - Easy interface to CY8CKIT-042-BLE Pioneer Kit
  - Enables testing of CapSense®, buttons, GPIOs, over-the-air (OTA)

### Availability
- **Sampling (4.1/128KB, 4.1/256KB, 4.2):** Now
- **Production (4.1/128KB, 4.1/256KB, 4.2):** Now

### EZ-BLE Creator Module Family: CYBLE-x220xx-0x

- **Power/Ground**
- **32.768-kHz Crystal**
- **24-MHz Crystal**
- **Chip Antenna**
- **SWD/PIO**
- **SPI/FC/UART/CapSense/ADC/PWM/GPIO**

### Collateral

- **Datasheets**
  - CYBLE-022001-00 Datasheet
  - CYBLE-222005-00 Datasheet
  - CYBLE-222014-01 (BT 4.2) Datasheet
  - BLE Silicon Datasheet

- **App Notes/Evaluation Kit User Guides**
  - Getting Started With EZ-BLE™ Module (AN96841)
  - PSoC Creator
  - PSoC Programmer
  - CySmart\(^7\), Windows Host Emulation Tool
  - CySmart iOS and Android Apps

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\(^1\) Bluetooth Special Interest Group Qualification Design ID  
\(^2\) Korea certification  
\(^3\) Ministry of Internal Affairs and Communications (Japan)  
\(^4\) Innovation, Science and Economic Development Canada  
\(^5\) Serial wire debug communication protocol  
\(^6\) VREF only available on 256KB module  
\(^7\) A GUI-based software tool that installs on your PC to test and debug BLE functionality; also available in iOS and Android mobile applications

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Go back to IoT Portfolio Roadmap
**EZ-BLE Creator Modules CYBLE-x140xx-0x**

BLE Modules Designed to Maximize System Integration with Integrated Analog Functionality

### Applications

- Sports and fitness monitors, medical devices, wearable, electronics, home automation solutions, and game controllers

### Features

- **Qualification and Certification**
  - Bluetooth SIG QDID, FCC, CE, KC, MIC, and ISED
- **Small Footprint**
  - 11 mm x 11 mm x 1.8 mm, 32-SMT, 25 GPIOs
- **Bluetooth Smart Connectivity with Bluetooth 4.1 and 4.2**
- **Highly Integrated Solution**
  - Two crystals, trace antenna, passives, shield
  - 128KB and 256KB flash sizes, with over-the-air (OTA) firmware upgrades
  - Preprogrammed with EZ-Serial firmware
- **Programmable Analog Blocks**
  - Four opamps and one 12-bit, 1-Msps SAR ADC
- **Programmable Digital Blocks**
  - Four universal digital blocks (UDBs): custom digital peripherals
  - Four configurable TCPWM blocks: 16-bit timer, counter, or PWM
  - Two configurable serial communication blocks for I²C/SPI/UART
- **1.3-µA Deep Sleep, 150-nA Hibernate, 60-nA Stop Power Modes**
- **CYBLE-x140xx-EVAL Kit for Fast Evaluation and Development**

### Availability

- **Sampling (4.1/128KB, 4.1/256KB, 4.2):** Now
- **Production (4.1/128KB, 4.1/256KB, 4.2):** Now

### Collateral

- **Datasheets**
  - CYBLE-014008-00 Datasheet
  - CYBLE-214009-00 Datasheet
  - CYBLE-214015-01 (BT 4.2) Datasheet
  - BLE Silicon Datasheet

- **App Notes/Evaluation Kit User Guides**
  - Getting Started With EZ-BLE™ Module (AN96841)
  - PSoC Creator
  - PSoC Programmer
  - CySmart® Windows Host Emulation Tool
  - CySmart iOS and Android Apps

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1 Bluetooth Special Interest Group Qualification Design ID
2 Korea Certification
3 Ministry of Internal Affairs and Communications (Japan)
4 Innovation, Science and Economic Development Canada
5 Successive approximation register
6 Successive approximation register
7 Serial wire debug communication protocol
8 Timer/counter/pulse-width modulator
9 BLE functionality; also available in iOS and Android mobile applications

**Go back to IoT Portfolio Roadmap**
EZ-BLE Creator Modules CYBLE-x120xx-xx
Cost-Optimized Bluetooth Low-Energy (BLE) Modules

Applications
Connectivity, medical, industrial, PC accessories, toys, and smartphone accessories

Features
- **Qualification and Certification**
  - Bluetooth SIG QDID¹ (CYBLE-012011-00/CYBLE-212019-00), FCC, CE, KC², MIC³, and ISED⁴
- **Small Footprint**
  - 14.5 mm x 19.2 mm x 2.0 mm, 31-pad SMT with 23 GPIO
- **Bluetooth Smart Connectivity with Bluetooth 4.1 and 4.2**
  - 2.4-GHz BLE radio and baseband
  - -91-dBm Rx sensitivity, +3-dBm Tx output power
- **Power Modes**
  - 1.3-μA Deep Sleep, 150-nA Hibernate, and 60-nA Stop
- **Highly Integrated Solution**
  - Two crystals, trace antenna, passives, shield⁵
  - Preprogrammed with EZ-Serial firmware
- **CYBLE-x120xx-EVAL Adapter Board Interface**
  - Easy interface to CY8CKIT-042-BLE Pioneer Kit
  - Enables testing of CapSense, buttons, GPIOs, over-the-air (OTA)

Availability
- **Sampling (4.1/128KB, 4.1/256KB, 4.2): Now**
- **Production (4.1/128KB, 4.1/256KB, 4.2): Now**

Collateral
- **Datasheets**
  - CYBLE-012011-00 Datasheet
  - CYBLE-212019-00 Datasheet
  - CYBLE-212020-01 (BT 4.2) Datasheet
  - BLE Silicon Datasheet
- **App Notes/Evaluation Kit User Guides**
  - Getting Started With EZ-BLE™ Module (AN96841)
- **Tools**
  - PSoC Creator
  - PSoC Programmer
  - CySmart
  - CySmart: Windows Host Emulation Tool
  - CySmart iOS and Android Apps

¹ Bluetooth Special Interest Group Qualification Design ID
² Korea Certification
³ Ministry of Internal Affairs and Communications (Japan)
⁴ Innovation, Science and Economic Development Canada
⁵ CYBLE-012012-10 does not include metal shield
⁶ Serial wire debug communication protocol
⁷ A GUI-based software tool that installs on your PC to test and debug BLE functionality; also available in iOS and Android mobile applications

Go back to IoT Portfolio Roadmap
EZ-BLE Creator XR\(^1\) Modules CYBLE-2x20xx-x1

Cost-Optimized Bluetooth Smart Ready WICED Modules Supporting External Antenna

### Applications
BLE connectivity, lighting, industrial, and medical

### Features

- **Qualification and Certification**
  - Bluetooth SIG QDID\(^2\), FCC, CE, MIC\(^3\), KC\(^4\), and ISED\(^5\)
- **Small Footprint**
  - 15.0 mm x 23.0 mm x 2.0 mm, 30-pad SMT with 19 GPIOs
- **Bluetooth Smart Connectivity with Bluetooth 4.2**
  - 2.4-GHz BLE radio and baseband
- **Industrial Temperature Range**
  - Operating temperature range from -40°C to +85°C
- **Long Range**
  - +7.5-dBm Tx output power, 400 meters line-of-sight range
  - -93-dBm Rx sensitivity
- **Highly Integrated Solution**
  - Two crystals, trace antenna (optional), power amplifier, passives
  - Preprogrammed with EZ-Serial firmware
- **CYBLE-2x20xx-EVAL Adapter Board Interface**
  - Easy interface to CY8CKIT-042-BLE Pioneer Kit
  - Enables testing of CapSense, buttons, GPIOs, over-the-air (OTA)

### Availability

- **Sampling:** Now
- **Production:** Now

### EZ-BLE Creator Module Family: CYBLE-2x20xx-x1

#### EZ-BLE Creator XR Module
- 32.768-kHz Crystal
- 24-MHz Crystal
- Power Amplifier
- PCB Antenna
- SWD/GPIO
- SPI/UART
- XRES
- VREF

#### Collateral

- **Datasheets**
  - CYBLE-2x20xx-x1 (BT 4.2) Datasheet
  - BLE Silicon Datasheet

- **App Notes/Evaluation Kit User Guides**
  - Getting Started With EZ-BLE™ Module (AN96841)
  - PSoC Creator
  - PSoC Programmer
  - CySmart\(^7\) Windows Host Emulation Tool
  - CySmart iOS and Android Apps

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1 Extended range
2 Bluetooth Special Interest Group Qualification Design ID
3 Ministry of Internal Affairs and Communications (Japan)
4 Korea Certification
5 Innovation, Science and Economic Development Canada
6 Serial wire debug communication protocol
7 A GUI-based software tool that installs on your PC to test and debug BLE functionality; also available in iOS and Android mobile applications

Go back to IoT Portfolio Roadmap
EZ-BLE Creator XT/XR1 Modules CYBLE-22411x-0x
Long-Range Bluetooth Low-Energy (BLE) Modules Supporting Extended Temperatures

Applications
Connectivity, lighting, industrial, and medical

Features

- **Qualification and Certification**
  - Bluetooth SIG QDID², FCC, CE, MIC³, KC⁴, and ISED⁵
- **Small Footprint**
  - 9.5 mm x 15.4 mm x 1.8 mm, 32-pad SMT with 25 GPIOs
- **Bluetooth Smart Connectivity with Bluetooth 4.1 and 4.2**
  - 2.4-GHz BLE radio and baseband
- **Extended Industrial Temperature Range**
  - Operating temperature range from -40°C to +105°C
- **Long Range**
  - +9.5-dBm Tx output power, 400 meters line-of-sight range
  - -95-dBm Rx sensitivity
- **Highly Integrated Solution**
  - Two crystals, trace antenna, power amplifier, passives, shield
  - Preprogrammed with EZ-Serial firmware
- **CYBLE-22411x-EVAL Adapter Board Interface**
  - Easy interface to CY8CKIT-042-BLE Pioneer Kit
  - Enables testing of CapSense, buttons, GPIOs, over-the-air (OTA)

Availability

- **Sampling (4.1/128KB, 4.2/256KB):** Now
- **Production (4.1/128KB, 4.2/256KB):** Now

Collateral

- **Datasheet**
  - CYBLE-224110-00 Datasheet
  - BLE Silicon Datasheet
  - CYBLE-224116-01 (BT 4.2) Datasheet
- **App Notes/Evaluation Kit User Guides**
  - Getting Started With EZ-BLE™ Module (AN96841)
  - PSoC Creator
  - PSoC Programmer
  - CySmart® Windows Host Emulation Tool
  - CySmart iOS and Android Apps

1 Extended temperature/extended range
2 Bluetooth Special Interest Group Qualification Design ID
3 Innovation, Science and Economic Development Canada
4 Ministry of Internal Affairs and Communications (Japan)
5 Serial wire debug communication protocol

Go back to IoT Portfolio Roadmap
EZ-BLE Creator Modules CYBLE-416045-02
Ultra-Low-Power Bluetooth Low-Energy (BLE) Module

**Applications**
BLE connectivity, lighting, industrial, and medical

**Features**

- **Qualification and Certification**
  - Bluetooth SIG QDID\(^1\), FCC, CE, MIC\(^2\), and ISED\(^3\)
- **Small Footprint**
  - 14.0 mm x 18.5 mm x 2.0 mm, 43-pad SMT with 36 GPIOs
- **Bluetooth Smart Connectivity with Bluetooth 5.0**
  - 2.4-GHz BLE radio and baseband
  - +4.0-dBm Tx output power, -95-dBm Rx sensitivity
- **Industrial Temperature Range**
  - Operating temperature range from -40°C to +85°C
- **Power Modes**
  - 5.7-mA TX (0 dBm) and 6.7-mA RX (2 Mbps) current with 3.3-V battery and internal SIMO Buck converter
  - Deep Sleep mode current with 64K SRAM retention is 7 μA with 3.3-V external supply and internal buck
  - On-chip Single-In Multiple Out (SIMO) DC-DC Buck converter, <1 μA quiescent current
- **Highly Integrated Solution**
  - One crystal, trace antenna, passives

**Availability**
Sampling: Now
Production: Now

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**EZ-BLE Creator Module Family: CYBLE-416045-02**

**Collateral**

- Datasheets
  - CYBLE-416045-02 Datasheet
  - BLE Silicon, PSoC 6 MCU: PSoC 63 with BLE Datasheet
- App Notes/Evaluation Kit User Guides
  - Getting Started With EZ-BLE™ Module (AN96841)
  - PSoC Creator
  - PSoC Programmer
  - CySmart\(^4\) Windows Host Emulation Tool
  - CySmart iOS and Android Apps

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\(^1\) Bluetooth Special Interest Group Qualification Design ID
\(^2\) Ministry of Internal Affairs and Communications (Japan)
\(^3\) Innovation, Science and Economic Development Canada
\(^4\) Serial wire debug communication protocol
\(^4\) Serial wire debug communication protocol

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Go back to IoT Portfolio Roadmap
EZ-BLE WICED Modules CYBLE-0130xx-00
Cost-Optimized Bluetooth Low-Energy (BLE) WICED Modules

**Applications**
- Connectivity, medical, industrial, PC accessories, toys, and smartphone accessories

**Features**
- **Qualification and Certification**
  - Bluetooth SIG QDID\(^1\), FCC, CE, MIC\(^2\), and ISED\(^3\)
- **Small Footprint**
  - 14.5 mm x 19.2 mm x 2.0 mm, 31-pad SMT with 16/18 GPIO
- **Bluetooth Smart Connectivity with Bluetooth 4.1**
  - 2.4-GHz BLE radio and baseband
  - -93-dBm Rx sensitivity, +4-dBm Tx output power
- **Highly Integrated Solution**
  - One crystal, 128KB flash (CYBLE-013025-00), PCB antenna, shield
  - Simultaneous multiple Master and Slave (1M, 3S)
  - Security engine
  - Secure over-the-air (OTA) firmware upgrade (CYBLE-013025-00)
  - Preprogrammed with EZ-Serial firmware
- **CYBLE-013025-EVAL Arduino Evaluation Board**

**Availability**
- Sampling: Now
- Production: Now

**Collateral**
- **Datasheets**
  - CYBLE-0130xx-00 Datasheet
- **Evaluation Kit User Guide**
  - CYBLE-013025-EVAL Evaluation Board
  - WICED SMART SDK (Software)
  - WICED SMART SDK 2.x (Quick Start Guide)

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

Go back to IoT Portfolio Roadmap
EZ-BT WICED Module CYBT-343026-01
Cost-Optimized Bluetooth Smart Ready WICED Modules

Applications
Bluetooth audio, POS, medical, industrial, PC accessories, toys, and smartphone accessories

Features
- Qualification and Certification
  - Bluetooth SIG QDID\(^1\), FCC, CE, MIC\(^2\), and ISED\(^3\)
- Small Footprint
  - 12.0 mm x 15.5 mm x 1.95 mm, 24-pad SMT with 11 GPIOs
- Bluetooth Smart Ready with Bluetooth 5.0
  - BR/EDR: -93.5-dBm Rx sensitivity, +12-dBm Tx output power
  - BLE: -96.5-dBm Rx Sensitivity, +9-dBm Tx output power
- Bluetooth SIG Mesh Supported
- Highly Integrated Solution
  - One crystal, 512KB flash, PCB antenna
  - Two-wire Global Coexistence Interface (GCI)
  - PCM/IPS audio interface with wideband speech support
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware

Availability
Sampling: Now
Production: Now

Datasheets
CYBT-343026-01 Datasheet
Evaluation Kit User Guide
CYBT-343026-EVAL Evaluation Board
WICED Studio

Collateral

Go back to IoT Portfolio Roadmap

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\(^1\) Bluetooth Special Interest Group Qualification Design ID
\(^2\) Ministry of Internal Affairs and Communications (Japan)
\(^3\) Innovation, Science and Economic Development Canada
EZ-BT WICED Module CYBT-3330xx-02
Cost-Optimized Bluetooth Smart Ready WICED Modules Supporting External Antenna

Applications
Bluetooth audio, POS, medical, industrial, PC accessories, toys, and smartphone accessories

Features
- Qualification and Certification
  - Bluetooth SIG QDID\(^1\), FCC, CE, MIC\(^2\), and ISED\(^3\)
- Small Footprint
  - 12.0 mm x 15.5 mm x 1.95 mm, 24-pad SMT with 11 GPIOs
- Bluetooth Smart Ready with Bluetooth 5.0
  - BR/EDR: -93.5-dBm Rx sensitivity, +12-dBm Tx output power
  - BLE: -96.5-dBm Rx Sensitivity, +9-dBm Tx output power
- Bluetooth SIG Mesh Supported
- Highly Integrated Solution
  - One crystal, 512KB flash, PCB antenna
  - Two-wire Global Coexistence Interface (GCI)
  - PCM/PS audio interface with wideband speech support
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware

Availability
Sampling: Now
Production: Q2 2019

Collateral
Datasheets
CYBT-333032-01 Datasheet
CYBT-333047-01 Datasheet

Evaluation Kit User Guide
CYBT-343047-EVAL Evaluation Board
WICED Studio

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

Go back to IoT Portfolio Roadmap
EZ-BT WICED Module CYBT-343151-02
Cost-Optimized Bluetooth Smart Ready WICED Modules Supporting Extended Temperatures

Applications
Connectivity, lighting, industrial, and medical

Features
- Qualification and Certification
  - Bluetooth SIG QDID\(^1\), FCC, CE, MIC\(^2\), and ISED\(^3\)
- Small Footprint
  - 12.0 mm x 15.5 mm x 1.95 mm, 24-pad SMT with 11 GPIOs
  - Drop-in compatible with CYBT-343026-01
- Bluetooth Smart Ready with Bluetooth 5.0
  - BR/EDR: -93.5-dBm Rx sensitivity, +12-dBm Tx output power
  - BLE: -96.5-dBm Rx Sensitivity, +9-dBm Tx output power
- Extended Industrial Temperature Range
  - Operating temperature range from -40°C to +105°C
- Bluetooth SIG Mesh Supported
- Highly Integrated Solution
  - One crystal, 512KB flash, PCB antenna
  - Two-wire Global Coexistence Interface (GCI)
  - PCM/I\(^2\)S audio interface with wideband speech support
  - Simultaneous multiple Master and Slave
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware

Availability
Sampling: Now
Production: Now

Datasheets
CYBT-343151-02 Datasheet
Evaluation Kit User Guide
CYBT-343026-EVAL Evaluation Board
WICED Studio

Collateral

\(^1\) Bluetooth Special Interest Group Qualification Design ID
\(^2\) Ministry of Internal Affairs and Communications (Japan)
\(^3\) Innovation, Science and Economic Development Canada
EZ-BT WICED Module CYBT-353027-02
Size-Optimized Bluetooth 5.0 WICED Module

Applications
Bluetooth speaker, POS, medical, industrial, PC accessories, toys, and smartphone accessories

Features
- Qualification and Certification
  - Bluetooth SIG QDID\(^1\), FCC, CE, MIC\(^2\), and ISED\(^3\)
- Small Footprint
  - 9 mm x 9 mm x 1.75 mm, 19-pad SMT with 8 GPIOs
- Bluetooth Smart Ready with Bluetooth 5.0
  - BR/EDR: -93.5-dBm Rx sensitivity, +12-dBm Tx output power
  - BLE: -96.5-dBm Rx sensitivity, +9-dBm Tx output power
- Bluetooth SIG Mesh Supported
- Highly Integrated Solution
  - One crystal, 512KB flash, chip antenna
  - Two-wire Global Coexistence Interface (GCI)
  - PCM/I\(^2\)S audio interface with wideband speech support
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware

Availability
Sampling: Now
Production: Now

Datasheets
CYBT-353027-02 Datasheet
Evaluation Kit User Guide
CYBT-353027-EVAL Board
WICED Studio

Collateral

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

Go back to IoT Portfolio Roadmap
**EZ-BT WICED Module CYBT-423028-02**

**Ultra-Low-Power Size-Optimized Bluetooth 5.0 WICED Module**

### Applications

Bluetooth audio, mesh, sensor hubs, POS, medical, industrial, toys, and PC/smartphone accessories

### Features

- **Qualification and Certification**
  - Bluetooth SIG QDID¹, FCC, CE, MIC², and ISED³

- **Small Footprint**
  - 11 mm x 11 mm x 1.70 mm, 28-pad SMT with 17 GPIOs

- **Bluetooth Smart Ready with Bluetooth 5.0**
  - BR/EDR: -92.0-dBm Rx sensitivity, 0-dBm Tx output power
  - BLE: -95.5-dBm Rx sensitivity, 4-dBm Tx output power

- **Bluetooth SIG Mesh Supported**

- **Highly Integrated Solution**
  - One crystal, 1MB flash, chip antenna
  - Two-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 (Q4 2019)

### Availability

**Sampling:** Now

**Production:** Now

---

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

---

**Collateral**

**Datasheets**
CYBT-423028-02 Datasheet

**Evaluation Kit User Guide**
CYBT-423028-EVAL Board
WICED Studio

---

Go back to IoT Portfolio Roadmap
**EZ-BT WICED Module CYBT-413034-02**

**Ultra-Low-Power Cost-Optimized Bluetooth 5.0 WICED Module**

### Applications
- Bluetooth audio, mesh, 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 16.3 mm x 1.70 mm, 30-pad SMT with 17 GPIOs
- **Bluetooth Smart Ready with Bluetooth 5.0**
  - BR/EDR: -92.0-dBm Rx sensitivity, 0-dBm Tx output power
  - BLE: -95.5-dBm Rx sensitivity, 4-dBm Tx output power
- **Bluetooth SIG Mesh Supported**
- **Highly Integrated Solution**
  - One crystal, 1MB flash, PCB antenna
  - Two-wire Global Coexistence Interface (GCI)
  - Simultaneous multiple Master and Slave
  - PCM/I\(^2\)S audio interface with wideband speech support
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware (Q4 2019)

### Availability
- **Sampling:** Now
- **Production:** Now

### Collateral
- **Datasheets**
  - CYBT-413034-02 Datasheet
- **Evaluation Kit User Guide**
  - CYBT-413034-EVAL Board
  - WICED Studio

---

\(^1\) Bluetooth Special Interest Group Qualification Design ID
\(^2\) Ministry of Internal Affairs and Communications (Japan)
\(^3\) Innovation, Science and Economic Development Canada
EZ-BT WICED Module CYBT-213043-02
Ultra-Low-Power Cost-Optimized Bluetooth 5.0 WICED Module

Applications
- Bluetooth audio, mesh, 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, 35-pad SMT with 22 GPIOs
- Bluetooth Smart Ready with Bluetooth 5.0
  - BR/EDR: -92.0 dBm Rx sensitivity, 0 dBm Tx output power
  - BLE: -95.5 dBm Rx sensitivity, 4 dBm Tx output power
- Bluetooth SIG Mesh Supported
- Highly Integrated Solution
  - One crystal, 256KB flash, PCB antenna
  - Two-wire Global Coexistence Interface (GCI)
  - Simultaneous multiple Master and Slave
  - PCM/IFS audio interface with wideband speech support
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware (Q4 2019)

Availability
- Sampling: Now
- Production: Q3 2019

Collateral
Datasheets
- CYBT-213043-02 Datasheet
Evaluation Kit User Guide
- CYBT-213043-MESH Kit
- WICED Studio

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

Go back to IoT Portfolio Roadmap
EZ-BT WICED Module CYBT-483039-02
Ultra-Long Range Bluetooth 5.0 WICED Module

Applications
Bluetooth audio, mesh, sensor hubs, and industrial

Features
- Qualification and Certification
  - Bluetooth SIG QDID\(^1\), FCC, CE, MIC\(^2\), and ISED\(^3\)
- Small Footprint
  - 12.75 mm x 18.59 mm x 1.8 mm, 34-pad SMT with 15 GPIOs
- Bluetooth Smart Ready with Bluetooth 5.0
  - BLE Tx output power up to 20 dBm for U.S. (FCC)
- Bluetooth SIG Mesh Supported
- Highly Integrated Solution
  - One crystal, 1MB flash, chip antenna
  - Two-wire Global Coexistence Interface (GCI)
  - Simultaneous multiple Master and Slave
  - PCM/PS audio interface with wideband speech support
  - Secure over-the-air (OTA) firmware upgrade
  - Preprogrammed with EZ-Serial firmware (Q4 2019)

Availability
Sampling: Now
Production: Now

Collateral
Datasheets
CYBT-483039-02 Datasheet
CYBT-483039-EVAL Board
Datasheet
Evaluation Kit User Guide
WICED Studio

\(^1\) Bluetooth Special Interest Group Qualification Design ID
\(^2\) Ministry of Internal Affairs and Communications (Japan)
\(^3\) Innovation, Science and Economic Development Canada
EZ-BLE/EZ-BT Module Product Selector Guide

EZ-BLE Module Part Numbering Decoder

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**Device Identification #:**
Unique sequential product number for each module

**EZ-BT Module Type:**
2/4 = PSoC 4 Module, 3 = WICED Module, 6 = PSoC 6 Module

**Antenna Type:**
0 – No Antenna, Standard Range
1 – PCB Antenna, Standard Range
2 – Chip Antenna, Standard Range
3 – No Antenna, Long Range (internal PA)
4 – PCB Antenna, Long Range (internal PA)
5 – Chip Antenna, Long Range (internal PA)
6 – No Antenna, Long Range (external PA/LNA)
7 – PCB Antenna, Long Range (external PA/LNA)
8 – Chip Antenna, Long Range (external PA/LNA)

**Flash Size:**
0 = 128KB, 2 = 256KB, 3 = 512KB, 4 = 1024KB

**Marketing Code:**
BLE = BLE Only Product, BT = Dual-Mode BT/LE Product

**Company ID:**
CY = Cypress

**Temperature Range:**
0 = Industrial, 1 = Extended Industrial

**Integration Type:**
0 = Full Integration with Shield, 1 = No Shield

**Bluetooth Version:**
0 = Bluetooth 4.1, 1 = Bluetooth 4.2, 2 = Bluetooth 5.0
Wi-Fi Portfolio Device Detail
CYW43364
802.11n Low-Power Wi-Fi Connectivity

Applications
Low-cost WLAN connectivity for consumer/commercial IoT

Features
- 802.11n-compliant Wi-Fi
  - Industry’s most widely deployed Wi-Fi IP
  - 72.2-Mbps data rate
  - Single band (2.4 GHz)
  - 2-wire global coexistence interface (GCI) SECI¹, 3-/4-wire legacy SECI
- Communication Interfaces
  - SDIO 2.0
  - UART
- Packages
  - 74-ball WLBGA (4.87 x 2.87 mm)
- Module Partners
  - Murata, Inventek, Anaren, SPIL, USI, Lierda
- Supported in WICED STUDIO

Collateral
Datasheet: CYW43364
Module Selector Guide: IoT Solutions Guide
Software: WICED STUDIO
Linux Driver

Availability
Production: Now

Go back to IoT Portfolio Roadmap

¹ Serial-enhanced coexistence interface
² WPA, WAPI STA, WPA2, AES, TKIP security features
CYW43143
802.11n MAC/Baseband/Radio + SDIO/USB Connectivity Solution

Applications
Consumer electronics, printers

Features
- **802.11n-compliant Wi-Fi**
  - Industry’s most widely deployed Wi-Fi IP
  - 72.2-Mbps data rate
  - Single band (2.4 GHz)
  - 2-/3-/4-wire global coexistence interface (GCI) / serial enhanced coexistence interface (SECI)
- **Communication Interfaces**
  - SDIO 2.0
  - UART
  - USB 2.0
- **Packages**
  - 56-pin QFN (7 x 7 mm)

Collateral
- Datasheet: CYW43143
- Software: Linux Driver

Availability
Production: Now

Go back to IoT Portfolio Roadmap
**CYW4343W: 802.11n Wi-Fi and Bluetooth 4.2 Low-Power Combo**

**Applications**
Portable consumer/commercial IoT and wearables

**Features**

- **802.11n-compliant Wi-Fi**
  - Industry's most widely deployed Wi-Fi IP
  - 72.2-Mbps data rate
  - Single band (2.4 GHz)
  - SDIO 2.0
  - 2-wire global coexistence interface (GCI) SECI\(^1\), 3-/4-wire legacy SECI

- **Bluetooth 4.2\(^3\)**
  - Class 1 (100 m) and Class 2 (10 m) operation
  - HCI-over-UART and PCM/P\(^2\)S for audio

- **Packages**
  - 63-ball WLBGA A (4.87 x 2.87 mm), 74-ball WLBGA (4.87 x 2.87 mm)
  - 153-ball WLCSP (4.87 x 2.87 mm)

- **Module Partners**
  - Murata, Inventek, LSR, SPI, Alinket, Azurewave, B-Link, CEL, Lierda

- **Supported in WICED STUDIO**

**Collateral**

- **Datasheet:** [CYW4343W](#)
- **Module Selector Guide:** [IoT Solutions Guide](#)
- **Software:**
  - [WICED STUDIO](#)
  - [Linux Driver](#)

**Availability**

**Production:** Now

---

1. Serial-enhanced coexistence interface
2. WPA, WAPI STA, WPA2; AES, TKIP security features
3. Bluetooth 4.2’s LE Secure Connections supported on host

---

**Go back to IoT Portfolio Roadmap**
CYW43903
802.11n Single-Band Wi-Fi System-on-Chip with Embedded Application Processor

**Applications**
- Consumer, home appliances, HID

**Features**
- **802.11n-compliant Wi-Fi**
  - Industry's most widely deployed Wi-Fi IP
  - 72.2-Mbps data rate
  - Single band (2.4 GHz)
  - 2-wire global coexistence interface (GCI) SECI¹

- **High-performance MCU Subsystem**
  - 160-MHz Cortex®-R4 w/1MB SRAM

- **Rich Set of Communication Interfaces**
  - Quad-SPI interface with 40-Mbps transfer rate
  - SDIO 3.0

- **Packages**
  - 151-ball WLBGA (4.91 x 5.85 mm)

- **Module Partners**
  - Inventek

- **Supported in WICED STUDIO**

**Collateral**
- **Datasheet:** CYW43903
- **Module Selector Guide:** IoT Solutions Guide
- **Software:** WICED STUDIO

**Availability**
- **Production:** Now

---

¹ Serial-enhanced coexistence interface

² WPA, WAPI STA, WPA2, AES, TKIP security features

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Go back to IoT Portfolio Roadmap
CYW43907
802.11n Dual-Band Wi-Fi System-on-Chip with Embedded Application Processor

Features

- 802.11n-compliant Wi-Fi
  - Industry's most widely deployed Wi-Fi IP
  - 150-Mbps data rate
  - Dual band (2.4/5 GHz)
  - 2-wire global coexistence interface (GCI) SECI
- High-performance MCU Subsystem
  - 320-MHz Cortex®-R4 w/2MB SRAM
- Rich Set of Communication Interfaces
  - Quad-SPI interface with 40-Mbps transfer rate
  - USB 2.0, Ethernet (RMII/MII), SDIO 3.0
- Packages
  - 316-ball WLCSP (4.58 x 5.53 mm)
- Module Partners
  - Murata, SPIL, USI, Inventek, Azurewave, Lantronix,
- Supported in WICED STUDIO

Datasheet: CYW43907
Module Selector Guide: IoT Solutions Guide
Software: WICED STUDIO

Availability
Production: Now

Go back to IoT Portfolio Roadmap
CYW54907
802.11ac Dual-Band Wi-Fi System-on-Chip with Embedded Application Processor

Applications
Embedded audio, medical, home-automation/industrial-automation gateways

Features
- **802.11ac-compliant Wi-Fi**
  - Industry's most widely deployed Wi-Fi IP
  - 433.3-Mbps data rate
  - Dual band (2.4/5 GHz)
  - 2-wire global coexistence interface (GCI) SECI
- **High-performance MCU Subsystem**
  - 320-MHz Cortex®-R4 w/2MB SRAM
  - On-chip PLL to generate clock for external microphone/audio-CODEC
- **Rich Set of Communication Interfaces**
  - Quad-SPI interface
  - USB 2.0, Ethernet (RMII/MII), SDIO 3.0
- **Packages**
  - 316-ball WLCSP (4.58 x 5.53 mm)
- **Module Partners**
  - Murata, SPIL, USI

Collateral
- Datasheet: CYW54907 datasheet
- Product Guide: CYW54907 Product Guide
- Module Selector Guide: IoT Solutions Guide
- Software: WICED STUDIO

Availability
Production: Now

Go back to IoT Portfolio Roadmap

* Serial-enhanced coexistence interface  
  ^2 WPA, WAPI STA, WPA2, AES, TKIP security features
CYW43455
802.11ac Dual-Band Wi-Fi and Bluetooth 5.0 High-Performance Combo

Applications
High-performance, space-constrained consumer/commercial IoT

Features
- **802.11ac-compliant Wi-Fi**
  - Industry's most widely deployed Wi-Fi IP
  - 433.3-Mbps data rate
  - Dual band (2.4/5 GHz)
  - SDIO 3.0
  - PCIe 3.0
  - 2-wire global coexistence interface (GCI) SECI1, 3-wire legacy SECI

- **Bluetooth 5.0**
  - Class 1 (100 m) and Class 2 (10 m) operation
  - HCI-over-UART
  - PCM/IPS for audio

- **Module Partners**
  - USI, Azureware, Murata, Iton

- **Supported in WICED STUDIO**

Collateral
- **Datasheet:** CYW43455
- **Module Selector Guide:** IoT Solutions Guide
- **Software:** WICED STUDIO, Linux Driver

Availability
- **Production:** Now

Get started with CYW43455:

- **Datasheet:** CYW43455
- **Module Selector Guide:** IoT Solutions Guide
- **Software:** WICED STUDIO, Linux Driver

**Features**

- **802.11ac-compliant Wi-Fi**
  - Industry's most widely deployed Wi-Fi IP
  - 433.3-Mbps data rate
  - Dual band (2.4/5 GHz)
  - SDIO 3.0
  - PCIe 3.0
  - 2-wire global coexistence interface (GCI) SECI1, 3-wire legacy SECI

- **Bluetooth 5.0**
  - Class 1 (100 m) and Class 2 (10 m) operation
  - HCI-over-UART
  - PCM/IPS for audio

- **Module Partners**
  - USI, Azureware, Murata, Iton

- **Supported in WICED STUDIO**

**Availability**

- **Production:** Now

**Go back to IoT Portfolio Roadmap**

---

1 Serial-enhanced coexistence interface
2 WPA, WAPI STA, WPA2, AES, TKIP security features
3 LE Secure connections and LE Data Packet Length Extensions supported
CYW4373
802.11ac Dual-Band Wi-Fi Over USB Hub/SDIO/PCIe With Bluetooth 5.0 and s/dBT

Applications
High-performance, space-constrained consumer/commercial IoT

Features
- **802.11ac-compliant Wi-Fi**
  - Industry’s most widely deployed Wi-Fi IP
  - 20-/40-/80-MHz channels
  - 433.3-Mbps PHY data rate
  - Dual band (2.4/5 GHz)
  - Internal PA and LNA
  - 2.4-GHz ingress tunnel router (iTR) / 5-GHz egress tunnel router (eTR)

- **Bluetooth 5.0 w/ all 4.2 optional features**
  - Class 1 (100 m) and Class 2 (10 m) operation
  - Dedicated Bluetooth (BT) path for best coexistence performance
  - BT RX path shared with WLAN RX path for reduced antenna count
  - Host controller interface (HCI)-over-UART

- **Packages**
  - 128-ball WLBGA (4.51 x 5.43 mm; 0.4-mm ball pitch)

Collateral
- **Datasheet:** CYW4373 (Contact Sales)
- **Software:** Linux Driver

Availability
**Production:** Now

CYW4373: 802.11ac Dual-Band Wi-Fi over USB Hub/SDIO/PCIe with BT 5.0

Bluetooth Subsystem
- BT 5.0 Link Layer, PHY
- ARM Cortex®-M3
- SRAM (384KB)
- ROM (1,088KB)
- JTAG/SWD Debug

Communication Interfaces
- Wi-Fi/BT: USB Hub
- Wi-Fi: PCIe 3.0
- BT: SDIO 3.0
- BT: UART
- BT: PS/PCM
- BT: SPI

Wi-Fi Subsystem
- 802.11ac MAC, PHY, 1x1 Dual-Band Radio (2.4/5 GHz)
- Security Engine
- ARM Cortex®-R4
- SRAM (896KB)
- ROM (896KB)
- JTAG/SWD Debug

I/O Subsystem
- GPIOs

1 Serial-enhanced coexistence interface
2 WPA, WAPI STA, WPA2, AES, TKIP security features

Go back to IoT Portfolio Roadmap
CYW43012
802.11n/802.11ac-Friendly™ Dual-Band Wi-Fi and Bluetooth 5.0 Combo

Applications
Smart-home hub for IoT applications

Features
- Ultra-Low-Power Wi-Fi and Bluetooth Combo
  - 802.11n-compliant Wi-Fi
    - Industry’s most widely deployed Wi-Fi IP
    - Up to 72.2-Mbps data rate
    - Dual band (2.4/5 GHz) with on-chip power amplifiers and LNA (both bands)
    - SDIO 3.0 interface (up to 50 MBps)
  - Low-power 802.11ac compliance in 5 GHz
    - 256-QAM support on 20-MHz channels in the 5-GHz band
    - MCS8 enables up to 78-Mbps data rate
  - Bluetooth 5.0
    - All Bluetooth 4.2 optional features and Bluetooth 5.0 2-Mbps LE data rate
    - Class 1 (100 m) and Class 2 (10 m) operation
    - Host controller interface (HCI)-over-UART
- Packages
  - 251-ball WLCSP (3.8 x 4.47 mm)

Collateral
Datasheet: CYW43012 (Contact Sales)
Software: Coming Soon

Availability
Samples: Now
Production: Now

CuYW3012: 802.11n Dual-Band Wi-Fi and BT 5.0 Combo

Bluetooth Subsystem
- BT 4.2/5.0 Link Layer, PHY
- ARM Cortex®-M4
- SRAM (388KB)
- ROM (1,192KB)
- JTAG/SWD Debug

Communication Interfaces
- Wi-Fi: SDIO 3.0
- BT: UART
- BT: I²S/PCM

Wi-Fi Subsystem
- 802.11n MAC, PHY, Dual-Band Radio (2.4/5 GHz)
- Security Engine
- ARM Cortex®-M3
- SRAM (640KB)
- ROM (1,280KB)
- JTAG/SWD Debug

I/O Subsystem
- GPIO x16

1 WPA, WAPI STA, WPA2, AES, TKIP security features

Go back to IoT Portfolio Roadmap
**CYW4356**

802.11ac Dual-Band 2x2 MIMO Wi-Fi and Bluetooth 5.0 Over UART Combo

**Features**

- **802.11ac-compliant Wi-Fi**
  - Industry’s most widely deployed Wi-Fi IP
  - 2x2 multiple-input multiple-output (MIMO)
  - 867-Mbps data rate
  - Dual band (2.4/5 GHz)
  - 2/3/4-wire global coexistence interface (GCI) SECI
- **Bluetooth 5.0**
  - Class 1 (100 m) and Class 2 (10 m) operation
  - HCI-over-UART
  - PCM/I²S for audio
  - Shared WLAN and Bluetooth receiver minimizes antennas
- **Packages**
  - 192-ball WLBGA (4.87 x 7.67 mm)
  - 395-ball WLCSP (4.87 x 7.67mm)

**Collateral**

- **Datasheet:** CYW4356
- **Software:** Linux Driver

**Availability**

- **Production:** Now

**Bluetooth Subsystem**

- BT 5.0 Link Layer, PHY
- ARM Cortex®-M3
- SRAM (200KB)
- ROM (608KB)
- JTAG/SWD Debug

**Communication Interfaces**

- Wi-Fi: SDIO 3.0
- Wi-Fi: PCIe 3.0
- BT: I²S/PCM
- BT: UART

**Wi-Fi Subsystem**

- 802.11ac MAC, PHY, 2x2 Dual-Band Radio (2.4/5 GHz)
- Security Engine
- ARM Cortex®-R4
- SRAM (768KB)
- ROM (640KB)
- JTAG/SWD Debug

**I/O Subsystem**

- GPIO x16

---

1 Serial-enhanced coexistence interface
2 WPA, WAPI STA, WPA2, AES, TKIP security features
3 Bluetooth 4.2’s LE Secure Connections can be supported on host

**Go back to IoT Portfolio Roadmap**
CYW5459
Dual-band 2x2 MIMO/1+1 RSDB 802.11ac over PCIe/SDIO with Bluetooth 5.0

Features

Wi-Fi/WLAN Features
- 802.11b/g/n/ac compliant², Dual-band (2.4/5 GHz)
- Dual MAC Architecture: 2x2 MIMO or 1+1 RSDB modes
- 20/40/80-MHz channels, up to 867Mbps PHY data rate
- VHT20/40/80 for 5 GHz, HT20 for 2.4 GHz, Legacy rates
- Internal PA/LNA for WLAN/BT
- MU-MIMO (Wave 2) support in STA mode
- Memory provision for 802.11ai, DFS+RSDB, 10+ client support, NAN

Bluetooth Features
- Bluetooth 5.0 (BR + EDR + BLE): Supports LE-2Mbps, LE-Long Range, LE-Advertising Extensions, Slot Availability Masks
- Support for future Bluetooth standards
- Dedicated Bluetooth path for best coex performance

Interfaces
- PCIe Gen1 (3.0 Compliant) and SDIO 3.0 for WLAN
- HCI-UART, PCM/I2S for BT

Coexistence
- Built-in advanced algorithms for BT/WLAN coexistence
- 3-wire GCI⁴/2-wire SECI³ for external BT/LTE/GPS radios

Package
- 194-ball WLBGA (0.4mm ball pitch)

2-and 3-Antenna Configurations

Automotive Wireless Connectivity Family | CYW5459

WLAN Subsystem
- 5GHz RF PA, LNA
- 802.11ac PHY 2x2/1+1
- 802.11ac MAC

ARM® Cortex® R4 160MHz
SRAM (896KB) ROM (896KB)
Security Engine¹
JTAG

Advanced On-Chip BT/WLAN Coexistence

SDIO 2.0/3.0

Bluetooth Subsystem
- 2.4GHz RF PA, dLNA
- Bluetooth 5.0 PHY
- Bluetooth 5.0 Link Layer

ARM® Cortex® M4 96MHz
SRAM (256KB) ROM (1600KB)
JTAG

PCle 3.0 (Gen 1)

Coexistence Interfaces
3-Wire GCI⁴
2-Wire SECI³

UART
PCM I²S

³ Global Coexistence Interface
² Wave 2

Go back to IoT Portfolio Roadmap
PSoC 6: Getting Started

- Visit the [PSoC 6 Product Page](#) and review datasheets, application notes, technical reference manuals, and watch videos
- Purchase the [PSoC 6 BLE Pioneer Kit](#), [PSoC 6 WiFi-BT Pioneer Kit](#), or [PSoC 6 Wi-Fi BT Prototyping Kit](#)
- Join the [PSoC 6 Community](#) to interact with us
- PSoC 6 BLE Pioneer Kit provides:
  - Capacitive-sensing CapSense slider and buttons and 512Mb QSPI NOR flash memory
  - Compatible form factor with Arduino® shields and Digilent® Pmod™ daughter cards
- PSoC 6 WiFi-BT Pioneer Kit provides:
  - Capacitive-sensing CapSense slider and buttons and 512Mb QSPI NOR Flash memory
  - Compatible form factor with Arduino shields and Digilent Pmod daughter cards
  - Murata LBEE5KL1DX-TEMP Module (CYW4343W) that provides IEEE 802.11a/b/g/n WLAN + Bluetooth
- PSoC 6 Wi-Fi BT Prototyping Kit provides:
  - Snappable peripherals: Capacitive-sensing CapSense slider and buttons, Digilent Pmod interface, 512Mb QSPI NOR flash, uSD card, PDM-PCM microphone, thermistor
  - Bread-board compatible form-factor
  - Murata LBEE5KL1DX-TEMP Module (CYW4343W) that provides IEEE 802.11a/b/g/n WLAN + Bluetooth

$99 PSoC 6 WiFi-BT Pioneer Kit (CY8CKIT-062-WiFi-BT)

$75 PSoC 6 BLE Pioneer Kit (CY8CKIT-062-BLE)

$30 PSoC 6 Wi-Fi BT Prototyping Kit (CY8CPROTO-062-4343W)
PSoC 4: Getting Started

Make It Smarter

Intelligent Analog Kits

$25 PSoC 4 M-Series Pioneer Kit (CY8CKIT-044)

$10 PSoC 4100PS Prototyping Kit (CY8CKIT-147)

Make It Connected

Bluetooth® Low Energy (BLE) Kits

$49 PSoC 4 BLE Pioneer Kit (CY8CKIT-042-BLE-A)

$20 CySmart BLE USB Dongle (CY5677)

PSoC 4 BLE Modules* with PCB or external antenna

* Modules can be used independently or with PSoC Pioneer kits

Make It Easy to Use

HMI Kits for Capacitive Sensing

$15 PSoC 4000S Prototyping Kit (CY8CKIT-145-40xx)

$20 CapSense Proximity Shield (CY8CKIT-024) (Used with PSoC 4 Pioneer Kits)

PSoC 4 Kit Selector: www.cypress.com/psoc4kits
PSoC 4: Getting Started with Inductive Sensing

1. Download the PSoC Creator IDE software
2. Purchase a PSoC 4700 kit
3. Visit the PSoC 4700 Product Page and review datasheets, design guide and code examples

PSoC Creator IDE with Graphical Front Ends
www.cypress.com/Creator

PSoC 4700 Inductive Sensing Evaluation Kit

www.cypress.com/Creator
### Cypress Bluetooth Kits

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**Features**
- Arduino® Headers
- On-Board Programming/Debug
- PCB Antenna
- Certified module

**Availability**
- Now
- Now, Now, Q1 2019
## Cypress Wi-Fi and WiFi + Bluetooth Combo Kits

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<td>STM32F411 + CYW4343W SIP</td>
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<tr>
<td>BCM43364WCD1_EVB</td>
<td>STM32F411 + CYW43364 SIP</td>
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<td>CYW43907 AEVAL1F</td>
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<td>CYW54907 AEVAL1F</td>
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<td>CY8CKIT-062-WIFI-BT</td>
<td>CYW4343W 1DS module PSoC 6 w/ 1MB flash</td>
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<td>PSoc6 Wi-Fi-BT Pioneer Kit</td>
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<td>PSoc6 Wi-Fi-BT Prototyping Kit</td>
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