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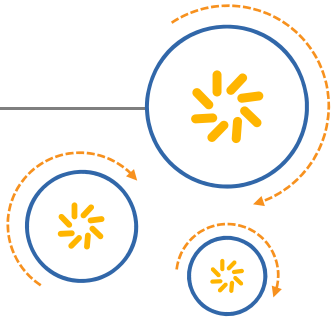

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Bluecore CSRB534x

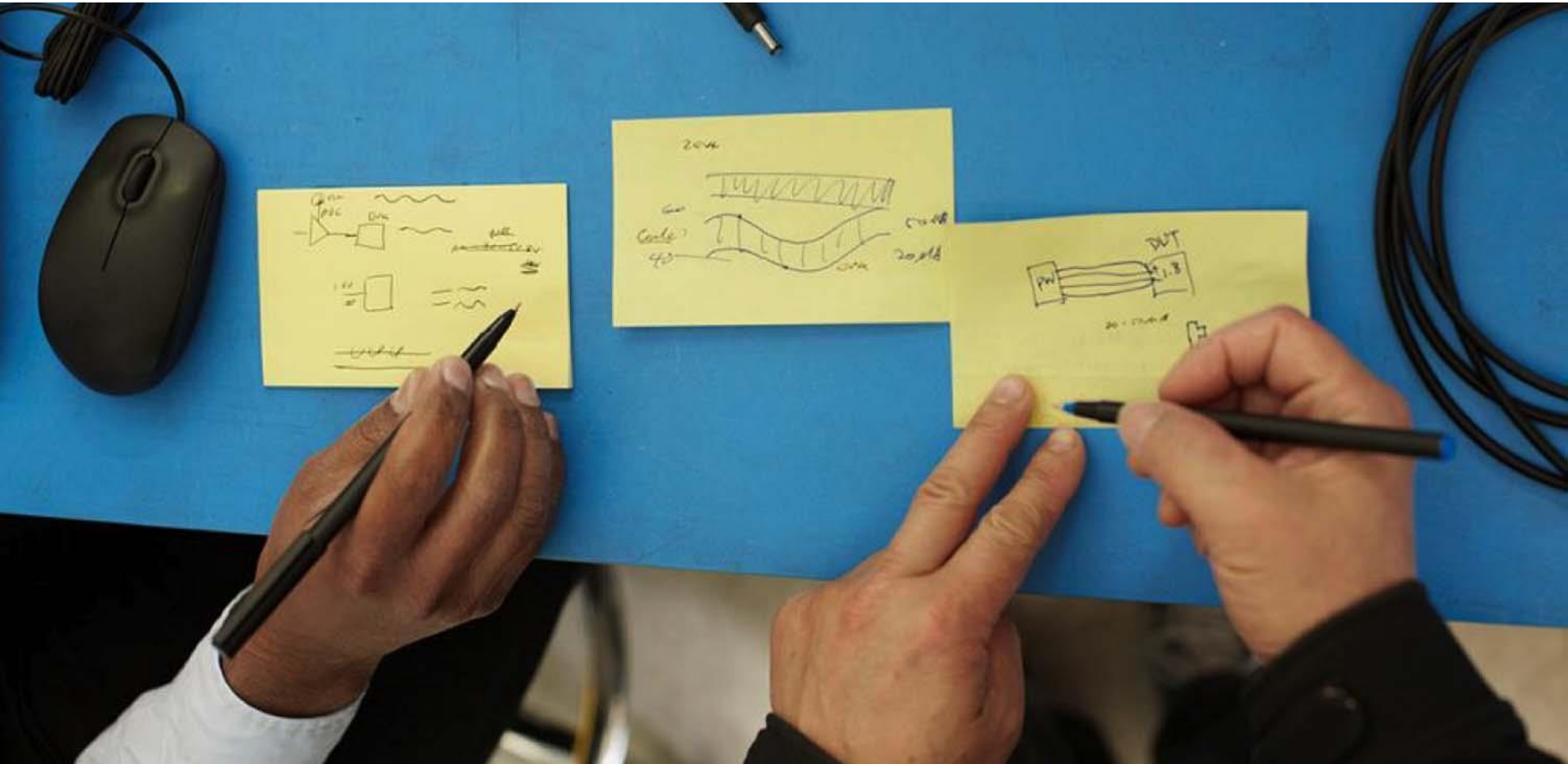
Dual Mode Differentiated Platforms

CSR

Push every boundary.®

July 30th 2015

Mark Cullum



Agenda

- An introduction to CSR Bluecore® CSRB534x
- Turnkey IoT applications with CSRB534x
- Minimizing BoM and real estate in Bluetooth designs
- Key features of the SDK
- Development kit ordering information
- Summary
- Q&A

Bluecore® CSRB534x

Differentiated Platforms

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Bluecore® CSRB534x
Differentiated Platforms

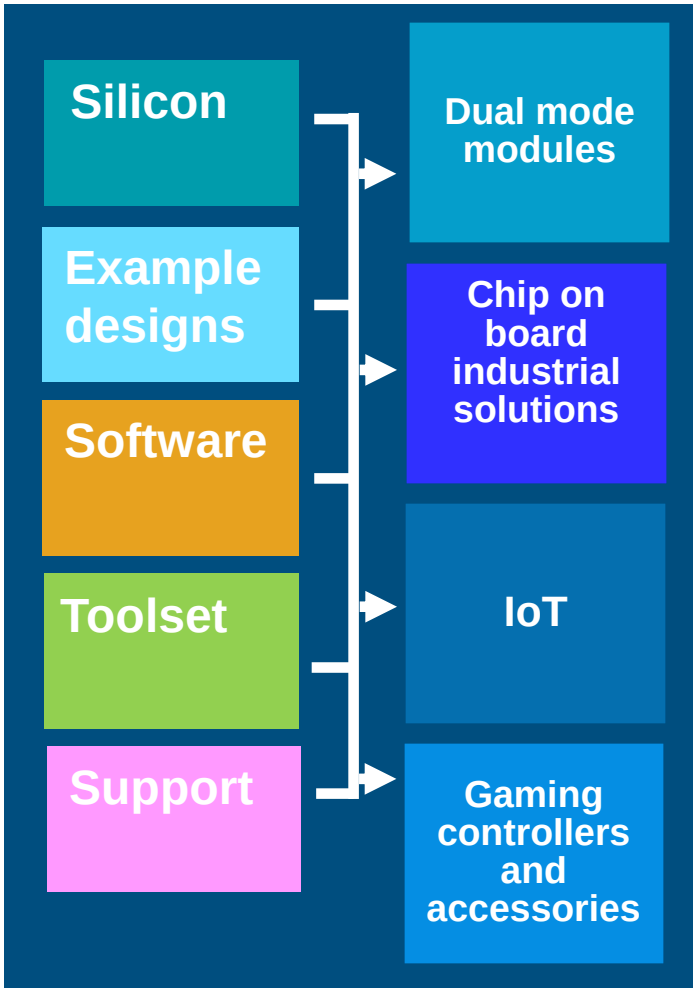
The new may of developing embedded Bluetooth designs..

Bluecore® CSRB534x

- Dual mode Bluetooth
- Peripheral Rich
- Flexible and Fast Development

Dual Mode Differentiated Platforms

CSRB534x Platform Approach



Added value for our customers:

Feature	Benefits
Single silicon source	Complementary technologies
	Simplified BOM
	Reduced supplier base
Ready to use designs	Reduced time to market
	Reduced development cost
	Reduced risk
Advanced and unique technologies	Enables superior performance
	Enables differentiating features
	Unique features sell end products

CSRB534x
Dual Mode Differentiated Platforms

Dual mode Bluetooth

- Bluetooth v4.1 qualified
- Robust support of BT classic and BLE topologies

Ultra Low-Power

- Super sleep 60µA
- Standby <0.15 mA
- Operating <1 mA

Fast Development

- Market-leading Bluetooth stack
- Dedicated SDK and dev. board
- MFi® pre-certified
- Android and Windows support

Peripheral Rich

- 22 fully configurable digital
- 22 analogue I/O
- External SQI Flash interface
- USB battery charging*

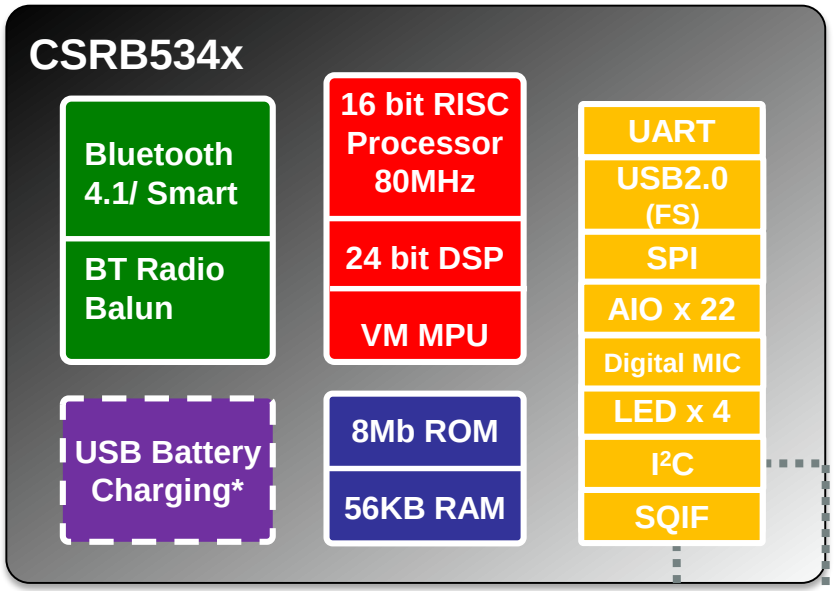
High Performance

- 80MHz Embedded MCU
- 40MHz Embedded DSP
- Low latency by hardware enabled I/O scanning
- HID over GATT
- OTA updates

*CSRB5342

CSRB534x Overview

- **Dual mode Bluetooth**
  - Bluetooth v4.1 compliant
  - BT Class 1*
  - Embedded system in ROM
  - Application in Flash
  - On chip Balun/ Filters
  - Key profiles include HID, SPP. GATT and HID over GATT (HOG)
- **Memory**
  - 8Mb ROM, 56 KB RAM
  - External serial Flash up to 64Mb
- **I/O**
  - 22 digital I/O, 22 analogue I/O
- **Power consumption**
  - Standby <0.15 mA
  - Operating 1 mA
- **Operating temperature**
  - -20°C to +70°C
- **Packages**
  - QFN88, 10x10x0.9mm, 0.4mm pitch
  - BGA105, 6x6xmm, 0.5mm pitch*

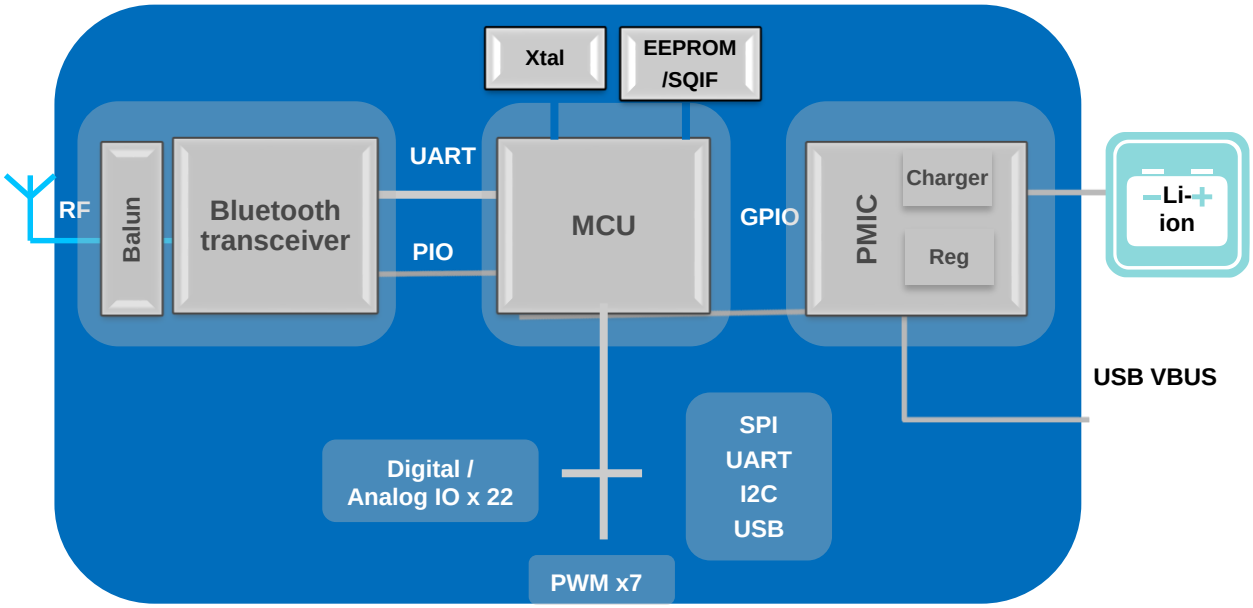


- **Power Management**
  - Integrated linear regs.
  - Power on reset - low voltage detect
- **Battery Charger***
  - Li-Ion battery charger with instant-ON support
  - Charge support up to 200mA – no external devices
    - Higher charge currents using external pass device – up to 750 mA

**CSRB5342/8*

CSRB534x vs. HCI chips

- **No need for external MCU**
  - DSP can be used for customer applications
- **Lower latency when reading peripherals**
  - Since no HCI interface!
- **Simple SPP application**
  - Built-in, no need for any coding, just PS Keys!



Bluecore® CSRB534x
Dual Mode *Differentiated* Platforms

CSRB534x

BT v4.1 SoC
MCU + DSP + Smart Analogue

CSRB5341

- Bluetooth v4.1

- Low system cost

CSRB5342

- Battery charging

CSRB5348

- ***Industrial Temp***
- ***Class 1***

Entry level platform

Mid range platform

High end platform

Mass production now!

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Bluecore® CSRB534x

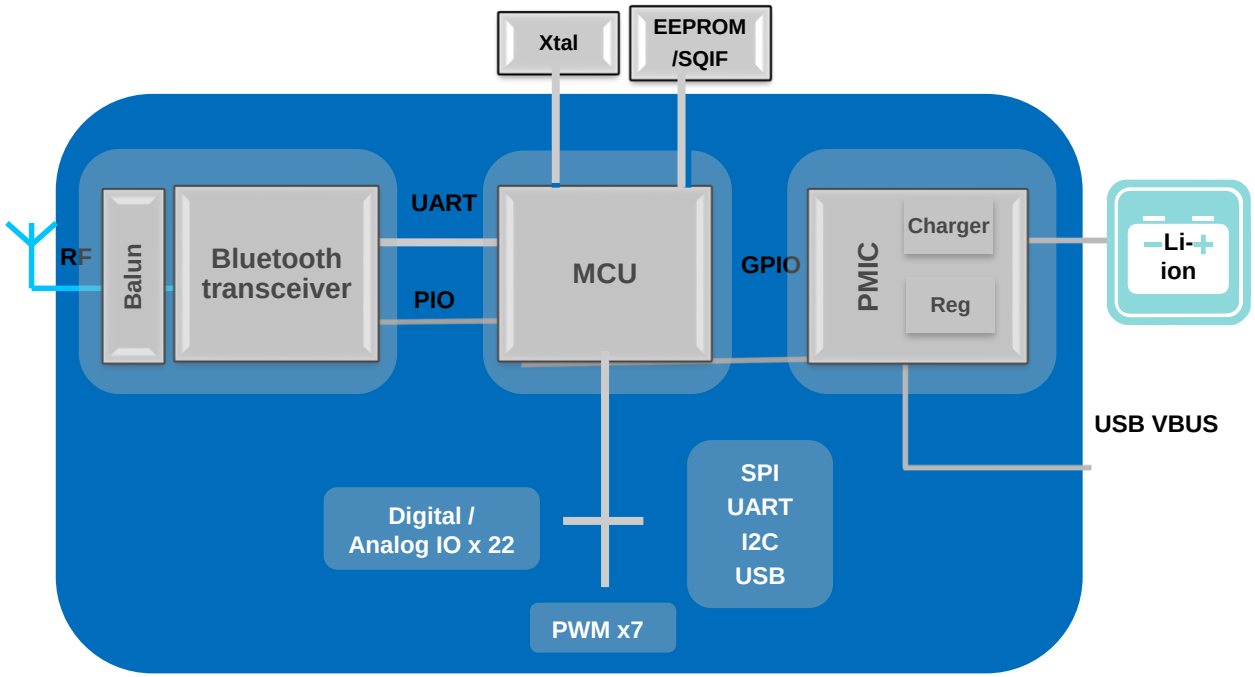
Differentiated Platforms

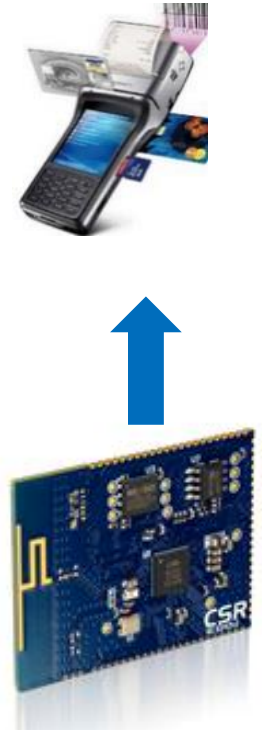
Bluecore® CSRB534x Applications

- **Consumer**
  - Gaming accessories
  - Toys
- **Industrial Embedded**
  - HVAC
  - Access and security
  - EPOS
  - Industrial automation
  - Keypads
- **Dual mode Modules**
  - Bluetooth® v4.1 modules

CSRB5342/8 Embedded Solution

- **No external MCU required**
- **Feature Rich**
  - Extensive list of I/Os and physical interfaces for design flexibility
  - Built-in SPP
  - GATT and HID/HoG profiles used with SDK, stored/ executed in SQIF





CSR Home entertainment ecosystem

CSR

CSR Mesh for Home Control/Sensor

CSR CSR1010

Wi-Fi Co-Ex

CSR CSR1011

Smart Remote Control

CSR CSRB534x

BT Game Controller Solutions

CSR CSR1011

BLE Game Controller

apt X LOW LATENCY csr

CSR CSR1011

Keyboards / Touchpad

CSR CSR1010

Active 3D Glasses (Unlimited)

Tablet

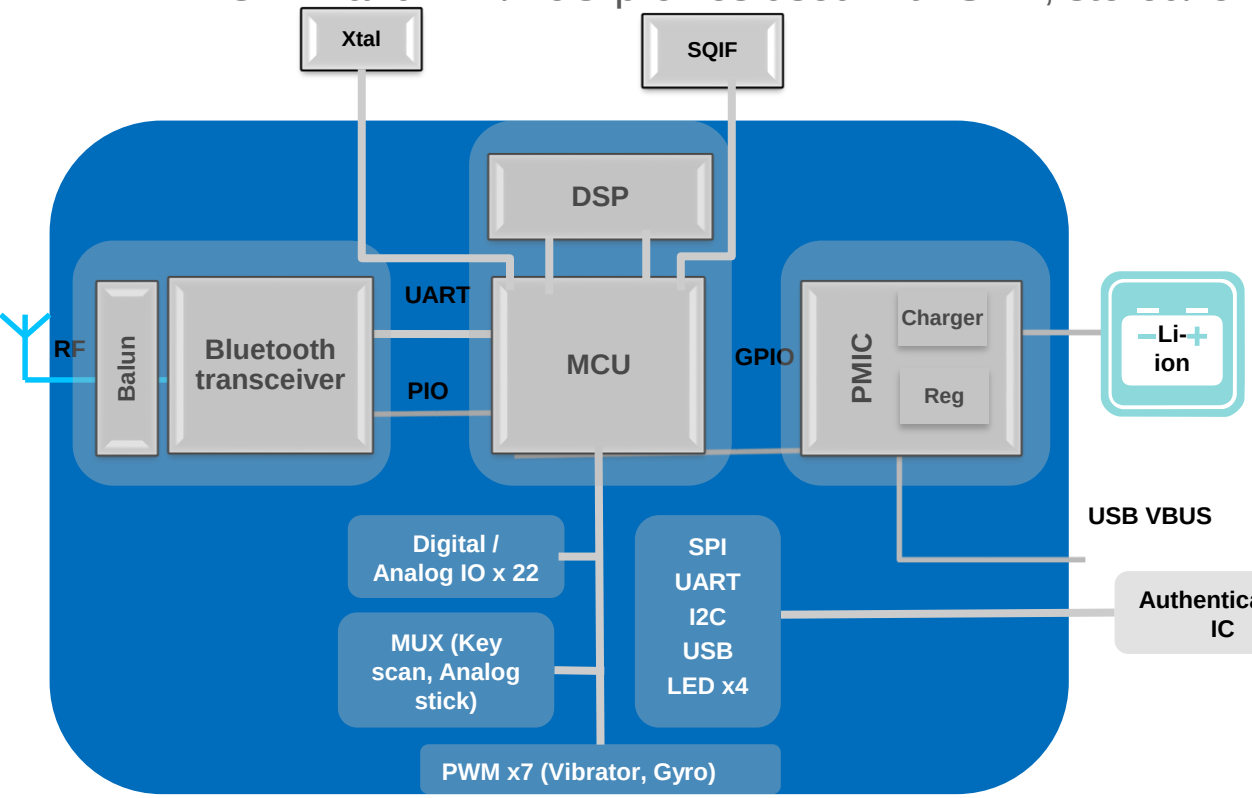
Mobile Phone

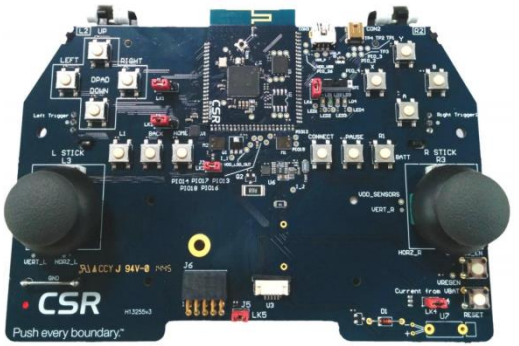
CSR CSR8670

Soundbar Solutions DDFA / MAP-X

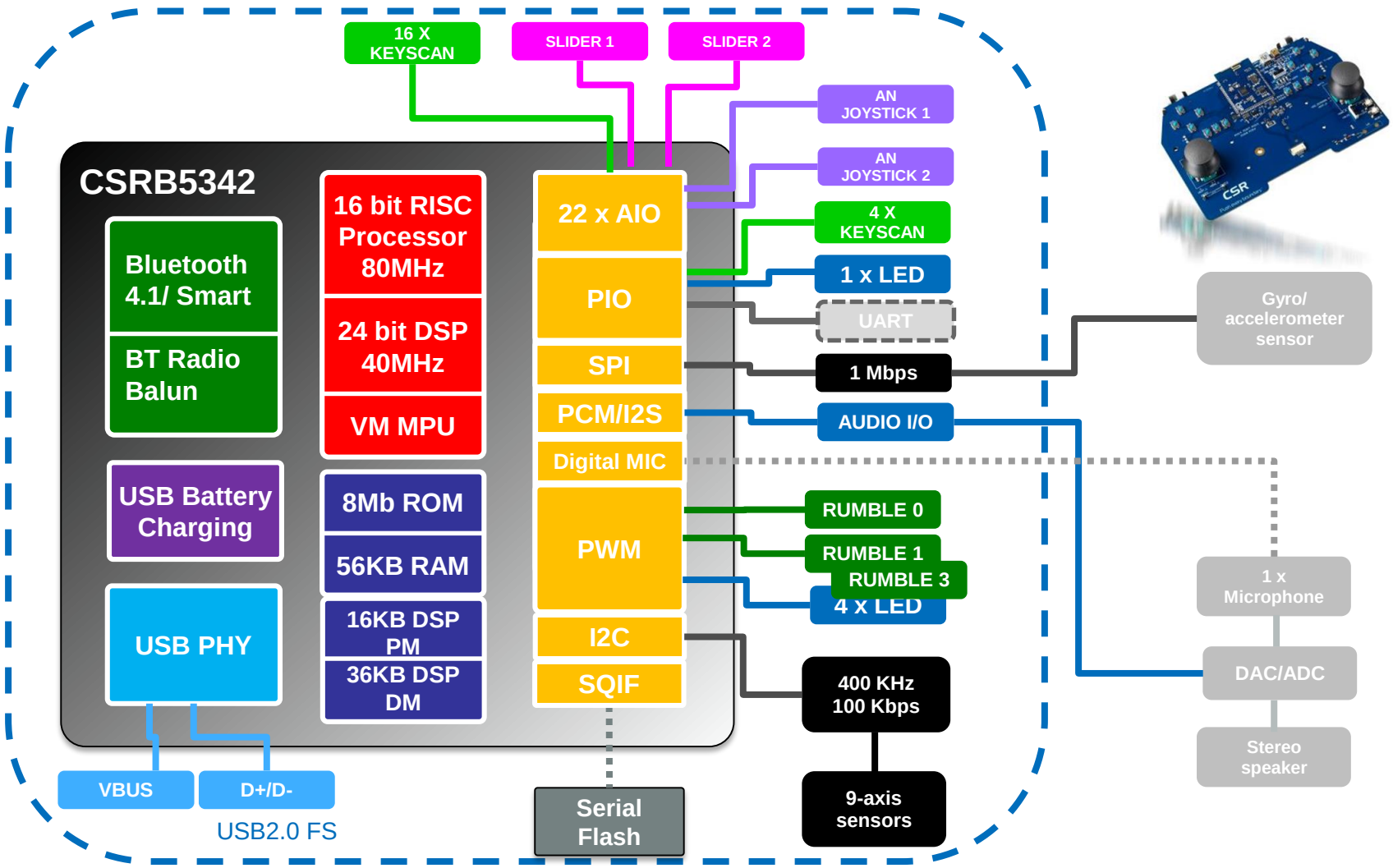
CSRB5342 Gaming Accessory Solution

- **Combines Dual mode Bluetooth®, MCU and DSP SOC**
- **Feature Rich**
  - Extensive list of I/Os and physical interfaces for design flexibility
  - Built-in SPP
  - GATT and HID/HoG profiles used with SDK, stored/ executed in SQIF





CSRB5342 capability example



- No external MCU required and no external charger required
- DSP can be used for customer applications

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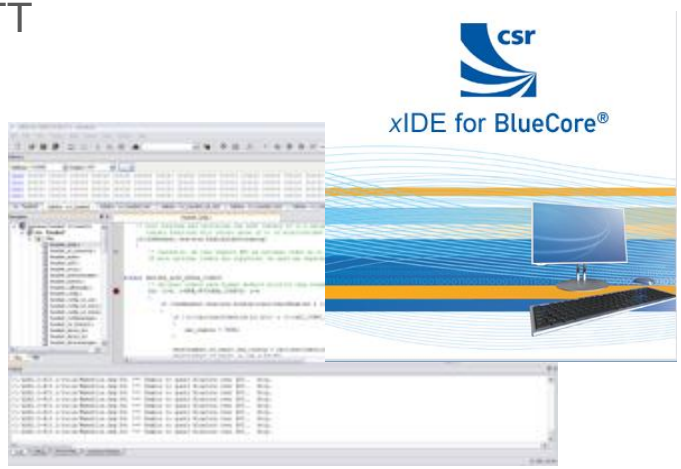
Bluecore® CSRB534x

Differentiated Platforms

CSRB534x SDK

- **Comprehensive CSR SDK platform**
  - Accelerate the development of a range of wireless devices
- **xIDE development environment, compiler and tool chain**
  - Allows quick development time
- **Complete SPP production ready application in ROM**
  - Allows ultra rapid prototyping and production of cable replacement solutions
- **Supports SPP and BLE compliant serial over GATT**
  - Enables flexible data transfer including HID over GATT

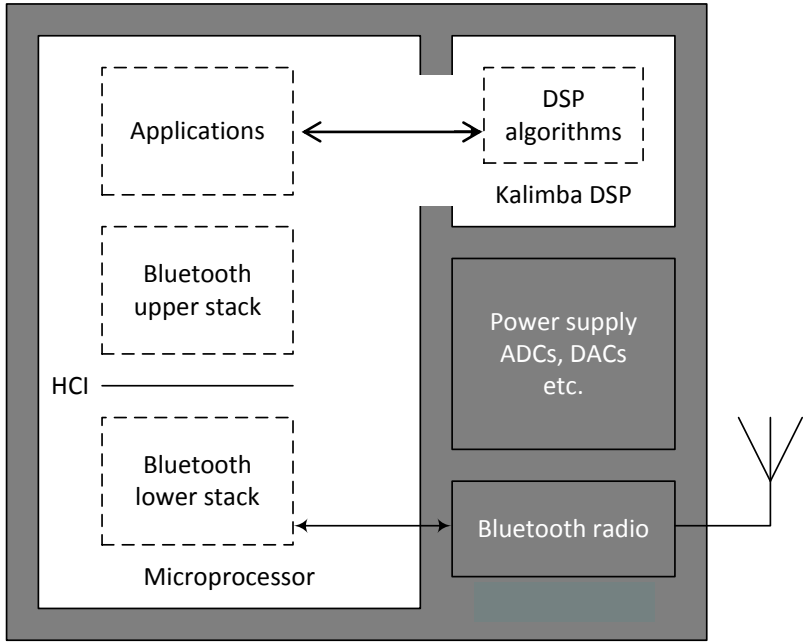


CSRB534x SDK Features (2)

- **Production ready firmware for CSRB534x**
  - Qualified and listed (BT4.1 for CSRB534x)
- **Qualification tested against PTS - SPP, HID qualifiable**
- **Over the air updates (OTA)**
  - Upgrade applications after product launch
- **iAP2 SDK bolt-on**

SDK on CSRB534x

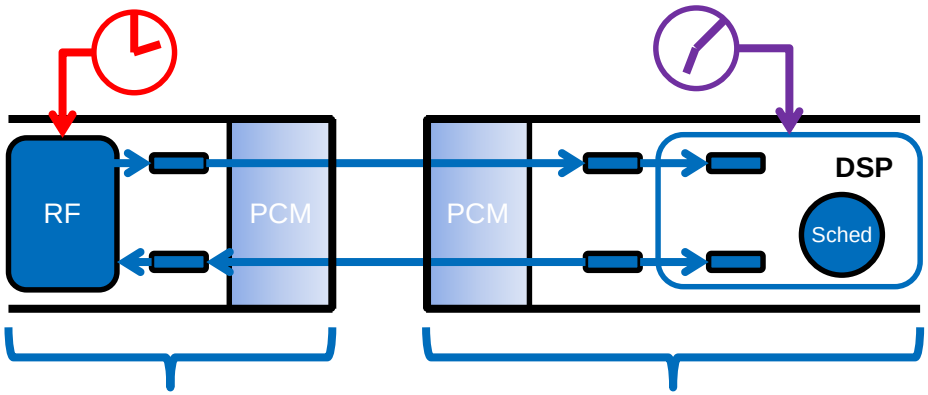
- **The SDK bundles the entire BT stack, example applications and DSP algorithms**
  - Application layer (including Connection Lib and BT profiles) provided as source code
  - Customer is free to customise apps and DSP
- **Ongoing software development**
  - Each major release requires detailed development across all layers in the S/W architecture
- **Software running on a single microprocessor**
  - Latency is critical for both BT and performance so code is highly optimised
- **Lowest possible latency**
  - Synch gaming I/O buttons to BT sniff interval



HCI

Divided System Architecture

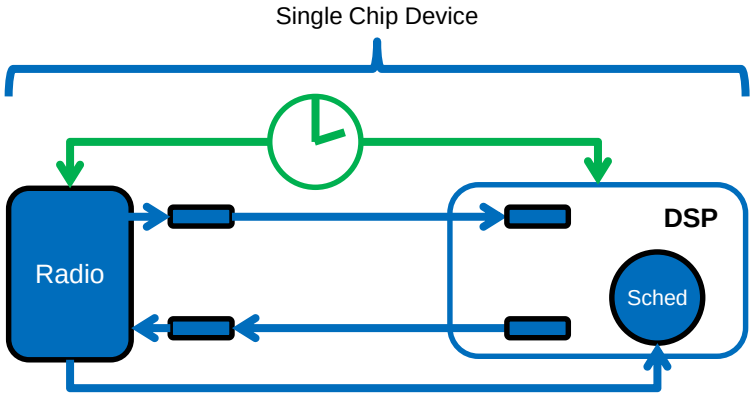
- Achieving synchronisation drives poor latency



- Separate BT and DSP clocks. Data buffering required at both ends for synchronisation at the expense of low latency

Unified System Architecture

- Lower latency from sharing common clock between host and radio

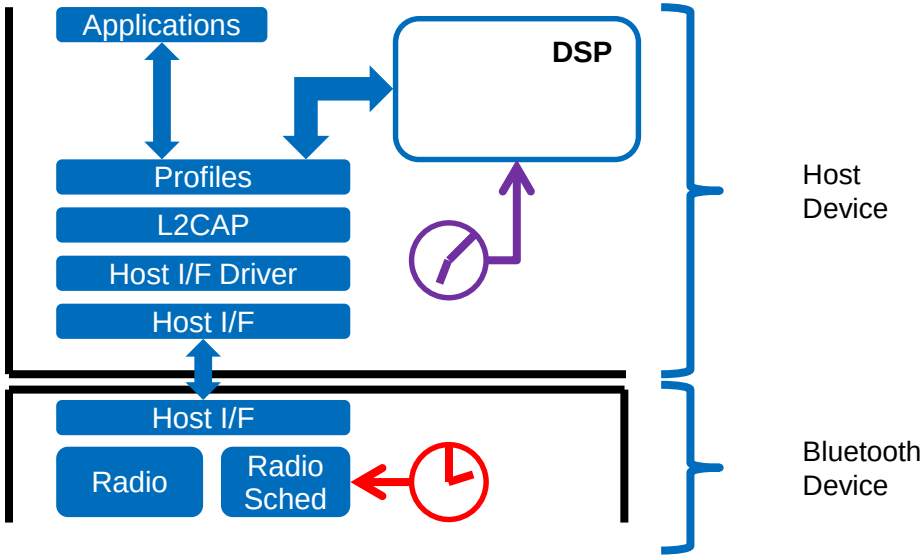


- Single Common Clock across the system
- Radio can directly signal to DSP scheduling when events will happen
- Fewer buffers & less buffered data with known event timings means much lower latency
- Host can sleep through DSP activity, allowing significant power savings

HCI

Divided System Architecture

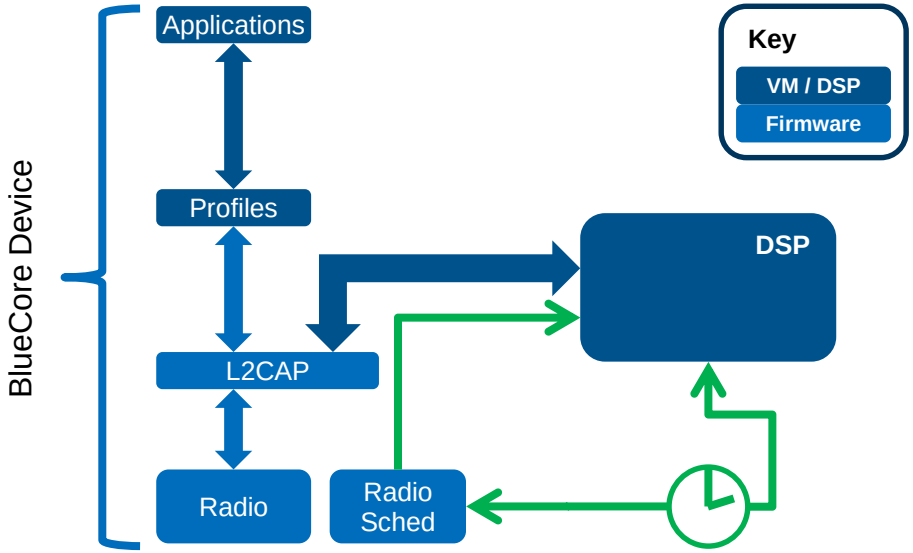
- L2CAP based profiles incur risk of retransmissions due to lack of synchronisation between DSP and radio



- Accommodating retransmissions consumes air-time
- More latency needs to be added to allow retransmissions

Unified System Architecture

- Risk of retransmissions is reduced with DSP/ RF synchronisation. DSP knows when to expect next packet



- Reduced latency and ability to support complex use-cases

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Bluecore® CSRB534x

Differentiated Platforms

CSRB534x Development Hardware

Kit contents:

- CSRB534x carrier board
- CSRB5341/ 2/ 8 populated example design
- USB PC connection cables 1x mini and 1x micro (CSRB5342 /8)
- 560mAh Li-ion battery (CSRB5342/ 8)
- 2x AA/ AAA mounted alkaline batteries (CSRB5341)

Design database on CSR support:

- Schematics
- Layout
- BOM

Bluetooth® on CSR support:

- All tools and software for CSRB534x

csrsupport.com/CSRB534x

CSRB534x Development Hardware

- **Common development board**
  - Debug SPI
  - Standard serial SPI
  - I^2C
  - USB
  - UART
  - SQI flash
  - 10-pin connector for MFi module

- **Example design**
  - Minimum required circuitry and connections
  - Power supply connections including the possibility to avoid external regulators in the simplest circuit implementation
  - Signals for an external battery charging circuit (in addition to the internal charger)

CSRB534x Part Numbers

Series	Production part numbers	Description
CSRB5341	CSRB5341A11-IQQU-R	Gaming controller/ HID/ HCI Chip, no charger QFN 10x10x0.9mm, 0.4mm pitch
CSRB5342	CSRB5342A11-IBVE-R	Gaming controller/ HID/ HCI Chip, charger BGA 6x6mm, 0.5mm pitch
CSRB5342	CSRB5342A11-IQQU-R	Gaming controller/ HID/ HCI Chip, charger QFN 10x10x0.9mm, 0.4mm pitch
CSRB5348	CSRB5348A11-IBVE-R	HID/ HCI Chip, charger, Industrial temperature grade BGA 6x6mm, 0.5mm pitch

Hardware Kits

Series	Order info.	Description
CSRB5341 QFN	DK-CSRB5341-10229-1A	Development board
CSRB5342 BGA	DK-CSRB5342-10230-1A	Development board
CSRB5348 BGA	DK-CSRB5348-10203-1A	Development board

Compiler Dongle

Series	Order info.	Description
CSRB534x	DM-KCOMP-10159-1A	Compiler dongle

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Bluecore® CSRB534x

Differentiated Platforms

Bluecore® CSRB534x

- **Dual Mode Bluetooth SoC**
  - Bluetooth Smart Ready - V4.1 qualified
- **High Performance**
  - 80MHz embedded RISC MCU
  - 40MHz DSP
- **Peripheral Rich**
  - Versatile I/O and smart analogue
- **Fast Development**
  - Turnkey example design
  - MFi pre-qualified
- **Ultra Low Power**
  - < 60µA
- **Future Proof**
  - OTA updates

Made for iPhone

csrsupport.com/CSRB534x

Bluecore® CSRB534x

- Dual Mode Bluetooth SoC
- High Performance
- Peripheral Rich
- Fast Development
- Ultra Low Power
- Future Proof

QUESTIONS?

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Bluecore® CSRB534x

csr.com/products/bluecore-csrb5348

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Push every boundary.®