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RA Ecosystem Partner Solution
BT/BLE/Wi-Fi Protocol Stacks

Solution Summary

The Clarinox wireless protocol stacks, debugger and reference applications simplify the development of connected devices. The Bluetooth, Bluetooth Low Energy and Wi-Fi software is suitable for the Renesas RA6 MCUs. Clarinox software is ported to all major RTOS/OS and a good range of wireless chipsets to provide flexibility for developers enabling an out of box experience on their choice of target RTOS and wireless hardware. The solution is suitable for products with more demanding connectivity requirements across a range of applications.

Features/Benefits

Market Advantage
- Support for latest BT/BLE/Wi-Fi specifications
- Flexible & Portable – OS agnostic
- Smaller application code
- Reference applications for all use cases
- Easier, faster development

- Powerful ClariFi debugger
- Handle complex use cases
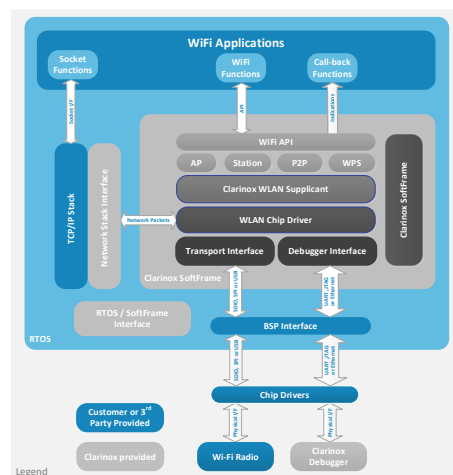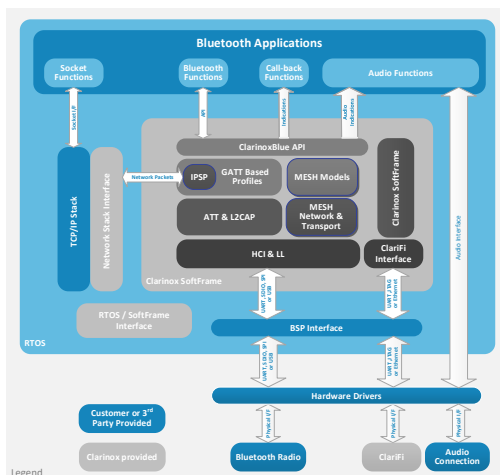- All profiles/roles available
- Simultaneous profiles/roles

Technical Features
- Based on Renesas' RA6 microcontroller family using Renesas e2studio and FreeRTOS
- Support for other toolchains and other RTOS
- ClariFi provides memory leak detection, Wi-Fi, Bluetooth protocol analysis
- ClariFi automated test tools allow interactive testing without recompiling the target firmware
- Both blocking and non-blocking API calls for single or multiple thread applications
- Remote Procedure Mode to separate application and stacks into two CPUs
- Single mode or dual mode Bluetooth Classic/Low Energy stacks
- Support for all Bluetooth use cases including HFP/A2DP audio, BLE AOA/AOD, BLE isochronous audio
- Support for BLE Mesh Provisioner/network nodes with Friend, Low Power, Relay & Proxy roles and models
- Wi-Fi supports simultaneous AP, STA and P2P roles for 2.4/5GHz with personal and enterprise security

Target Markets and Applications

- Industrial, IoT, Smart Building, Appliance (Home/Office), Wearables, Healthcare, Transportation, Metering

Diagrams/Graphics

Clarinox BT/BLE/Wi-Fi Protocol Stacks

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Clarinox is a *software solution provider* in the domain of Bluetooth Classic, Bluetooth Low Energy and Wi-Fi connectivity.

Established in 2001 with the vision of providing tools & expertise to help reduce the technical risks for companies designing wireless products. Member of Renesas Partner Alliance.

ClarinoxBlue™ Bluetooth Protocol Stack empowers embedded developers with a simple, robust, and flexible solution to free the development engineer from learning all the inner workings of Bluetooth technology.
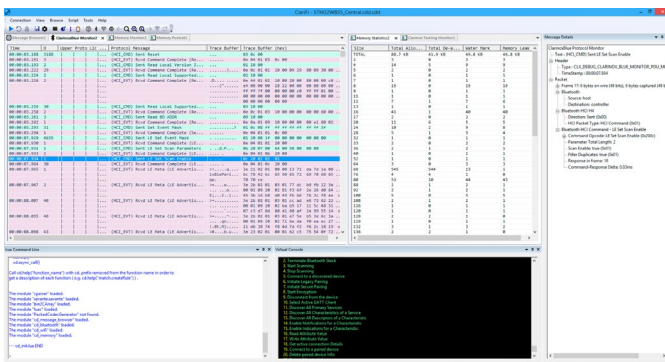
With the same key features as our Bluetooth Classic stack, the **ClarinoxBlue™ BLE stack** was designed for those requiring complex and robust developments.

Clarinox provides more than 50 qualified profiles and services across the Classic and Low Energy specifications. In addition, ClarinoxBlue includes MESH implementation, caters for custom profiles and custom services, and provides for auto-generation of GATT profiles.

The ClarinoxBlue protocol stack significantly reduces development times and human errors.
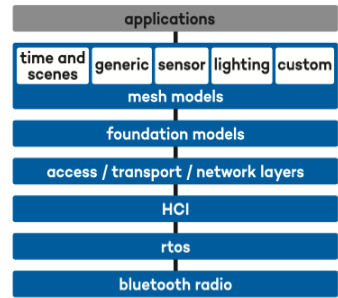
ClarinoxBlue Bluetooth Key features
• Support for single/dual mode Classic/BLE
• Multiple simultaneous profiles/roles
• Processing on single or across processors
• Supports blocking and non-blocking API calls
• Allows single and multi-threaded applications
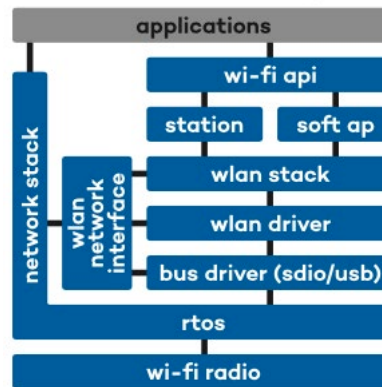• Award-winning ClariFi Debugger

ClarinoxBlue BLE MESH enables the creation of a scalable network utilizing mesh topology by providing both Provisioner (generator of network keys) and Provisionee (holder of network keys) roles.

ClarinoxBlue BLE MESH Block Diagram

ClarinoxWiFi Block Diagram

ClarinoxWiFi Protocol Stack, with coverage for all core standards, including WPA Enterprise certificate based security options on RA Processors is a comprehensive solution across a large range of RTOS.

ClarinoxWiFi Key features
• Supports AP, STA, P2P and GO modes
• Supports 2.4GHz and 5GHz bands
• Supports multiple simultaneous roles
• Isolation of application from lower layers
• Modular architecture: Supports a wide range OS/RTOS and TCP/IP stack
• Support for blocking and non-blocking API calls
• Implementation covers Security Architecture, SoftAP, SoftMAC, and Supplicant

ClariFi debugger provides protocol analyzer tools to simplify debugging, memory diagnostic tools to optimize memory allocation/deallocation, and threading tools to monitor the timings of critical tasks in an application. ClariFi may be used in two distinct modes, as an advanced logger, or as an interactive tool to run tests on a target device using ClariFi Test Architecture. ClariFi Test Architecture platform provides an automated test environment for embedded developers to quickly run tests on their target device, without the need for recompilation.

For more information, please visit:
https://www.clarinox.com/company/partners/renesas/