



software

bluetooth and wifi
protocol stacks



Clarinox was founded with the vision of providing the tools and expertise to help reduce the technical risks for companies designing wireless IoT electronics.



ClarinoxBlue Bluetooth Protocol Stack empowers embedded developers with a simple, robust yet flexible solution, enabling the engineer to spend more time on their application logic rather than learning all the inner workings of Bluetooth technology.

Key features

- Support for single-mode or dual-mode Classic/BLE
- Multiple simultaneous profiles/roles
- Modular architecture separates application from profiles
- Processing on single or across processors using RPC (Remote Procedure Call)
- Support blocking and non-blocking API calls
- Allows single and multi-threaded applications
- Integrates command/response based APIs
- Award-winning Clarinox Debugger for fast development
- Suitable for consumer, home automation, industrial, automotive, health and medical applications

Profiles

Clarinox provides an abundance of profiles so that you have more freedom to develop leading edge designs.

A2DP	AVRCP	BIP	BPP	CTN	DI
FTP	GAP	GAVDP	HCRP	HDP	HFP
HID	HSP	MAP	MPS	OPP	PAN
PBAP	SDAP	SPP			

Protocols

AVCTP	AVDTP	BNEP	HCI	L2CAP
MCAP	OBEX	RFCOMM	SDP	

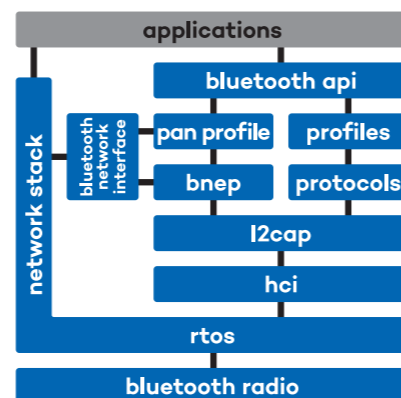
Versions

2.0, 2.1+EDR, 3.0, 4.0, 4.1, 4.2 & 5

Qualification

Declaration ID B012420, B014172, B014173, D023635, D023636, D033635

ClarinoxBlue Block Diagram



Since 2001 Clarinox has facilitated more efficient cloud connectivity solutions. The company has developed a range of technologies by following international standards such as those published by the Bluetooth SIG and IEEE802.11 specifications.

Clarinox has developed middleware, software tools and protocol stacks. Using these proven resources, engineers can efficiently design, implement and debug complex embedded wireless products or systems.

BT classic, BLE, Mesh and Wi-Fi all run within the same framework, simultaneously if required, with co-existence and interoperability handled.

Clarinox has access to cutting-edge research from our close ties with top universities, and participates in the partner programs of ARM, Express Logic, Green Hills Software, IAR, Intel, Mentor Graphics, NXP, Renesas, STMicroelectronics, Texas Instruments and Wind River.

Clarinox has a solid portfolio of Fortune 100 clients spread across various industry sectors.



With the same key features as the ClarinoxBlue Bluetooth Classic stack, the ClarinoxBlue BLE stack will assist you to get a robust BLE product to market sooner than the major alternatives.

All major profiles and services of the Specification are implemented within the ClarinoxBlue™ Bluetooth Low Energy protocol stack in addition to support for Mesh, custom profiles and custom services. Featuring auto-generated GATT and Bluetooth SIG profiles, the ClarinoxBlue protocol stack significantly reduces development times and human errors. Via the innovative SoftFrame architecture ClarinoxBlue™ supports a range of OS/RTOS, CPUs and wireless vendor chips. A change of target is easily facilitated without a lengthy porting process. Dual-mode Bluetooth Classic/BLE; or single-mode BLE is available.

Profiles/Services

AIOP	AIOS	ANP	ANS	BAS	BCS	BMS
BLP	BLS	CGMP	CGMS	CPP	CPS	CSCP
CSCS	CTS	DIS	ESP	ESS	FMP	GAP
GLP	GLS	HIDS	HOGP	HPS	HRP	HRS
HTP	HTS	IAS	IPS	IPSP	LLS	LNP
LNS	NDCS	OTP	OTS	PASP	PASS	PLXP
PLXS	PXP	RSCP	RSCS	RTUS	ScPP	SCPS
TIP	TDS	TPS	UDS	WSP	WSS	Mesh
Custom						



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Protocols

ATT	GATT	SM	Mesh
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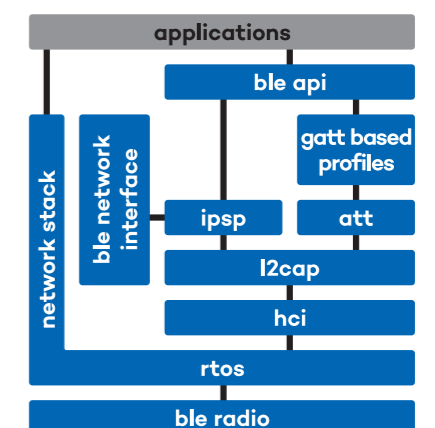
Versions

Implemented at core specification v4.0, v4.1, v4.2 and v5

Qualification

Declaration ID D023635, D023636, D033635

ClarinoxBlue BLE Block Diagram





ClarinoxBlue Bluetooth Low Energy Protocol Stack includes an implementation of the long awaited many-to-many device communication supporting a mesh topology. This software is ideally suited to a range of IoT and Industry 4.0 applications including home and building automation.

Clarinox provides both Provisioner (generator of network key) and node (holder of network key) roles providing the flexibility to construct a range of scenarios utilizing mesh topology.

Key features

- Support for BLE mesh Provisioner and network node roles
- Support for Mesh standard (Bluetooth SIG) and custom models
- Support for mesh network and application level security

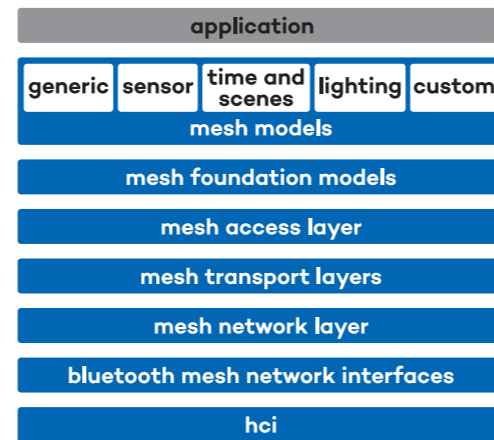
Version

5

Mesh Models

- Generic
- Sensors
- Time and scenes
- Lighting
- Custom

ClarinoxBlue BLE MESH Block Diagram



With coverage for all major core protocols, the ClarinoxWiFi Protocol Stack is a comprehensive solution across a large range of RTOS/MCU – including WPA Enterprise certificate based security options on RTOS/MCU

Key features

- Supports AP, STA and P2P modes
- Supports 2.4GHz and 5GHz bands
- Supports multiple simultaneous roles
- Isolation of application from lower layers
- Modular architecture: many OS/RTOS and TCP/IP stack
- Supports a wide range of embedded platforms
- Enables single and multi-threaded applications
- Support for blocking and non-blocking API calls
- Built-in protocol analysis tool
- Suitable for a range of IoT applications such as infotainment, navigation, video streaming, data transfer and health & medical devices
- Implementation covers Security Architecture, SoftAP, SoftMAC, and Supplicant
- Compliant to Revisions: 2007, 2009, 2012

Core Protocol

IEEE802.11a/b/g/n/ac/i/r/h

Roles

AP, STA, P2P client and GO

Security*

WPA/WPA2 Personal, Enterprise 802.11x authentications with EAP-TLS/PEAP, CCMP, TKIP, WPS

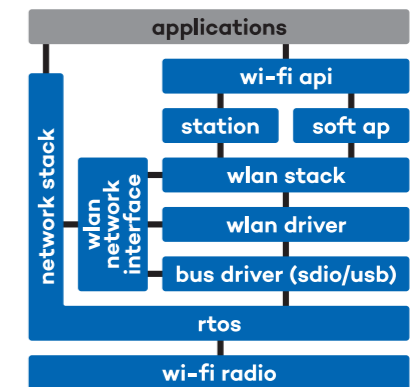
Supported Chipset Vendors

Texas Instruments WiLink8
Marvell 88w8xxx
Realtek RTL8723D, RTL882X

Roadmap

Revision IEEE802.11 s,
Wi-Fi Aware, Wi-Fi Mesh

ClarinoxWiFi Block Diagram



*Please see www.clarinox.com for the full list of supported protocols.



Clarinox Softframe secure wireless platform - Facilitates the fast development of robust Bluetooth, BLE and Wi-Fi MCU/RTOS based devices.

Key features

- Authentication (including certificate based security), Encryption (allows customer defined cypher suite), Secure connection support
- Support for multiple target platforms, same stack, same API across targets
- Memory leak detection
- Innovative Debugger for improved system visibility
- Interprocess communication to enable separation of application and protocol stack across two CPUs

Supported hardware

Altera, Atmel/Microchip, Analog Devices BlackFin, ARM Cortex M0 / M3 / M4, Cypress, Dialog Semiconductor, Intel x86 / Atom / Quark, Marvell, Mediatek, MIPS, NXP LPCxx / i.MX / Kinetis, PowerPC, Qualcomm, Realtek, Renesas, Risc-V, SPARC-LEON, STMicro STM32F4x, TI DSP / MSP / OMAP / Tiva, Xilinx

OS/RTOS

Android, AUTOSAR, eCos, embOS, FreeRTOS/SafeRTOS, INTEGRITY, Linux, mbed RTOS, MQX, Nucleus, QNX, RTX, TI-RTOS, ThreadX, uC/OS-III®, uITRON, VxWorks, Windows 7 / 8 / 10, WP7 / WP8



*Debugging can be like finding a black cat in a dark room...
... Turn on the lights so the black cat is easily seen.*

Clarinox debug tools provide in-built protocol analyser support for faster debugging of complex wireless devices. In addition, it offers threading, memory usage and memory leak analysis. Together these tools support the tuning of applications and aid in the communication of issues. The user is able to add custom plug-ins as required, with a console interface via a single physical medium.

The Clarinox Debugger may be used in two distinct modes. Firstly, as an advanced logger, and secondly as an interactive tool to run required tests on the target device.

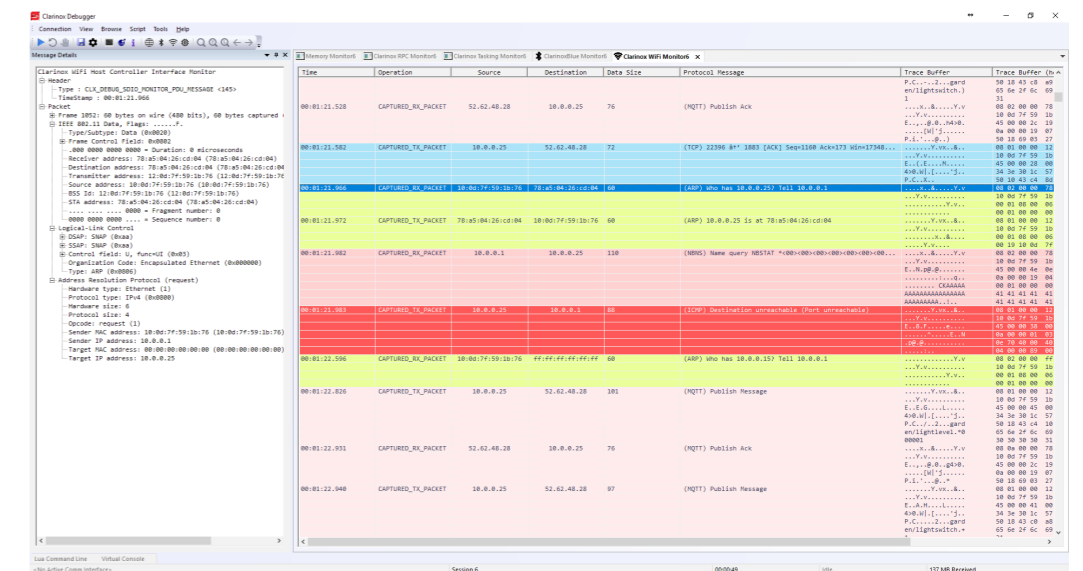
Interaction with the target device may be achieved via Clarinox Lua debugging interface which enables Lua scripts to run in the Clarinox Debugger environment.

Users communicate possible issues by storing and exchanging debugger log files with their team members or with Clarinox.

Plug-ins can pass specific messages to the debug tools sent by the debug target. By defining plug-ins via the plug-in interface, flexibility is provided for developers to add their own debugging functionality.

Key features

- Detailed analysis of the implementation
- Capture debugging data on demand
- Protocol/application performance analysis
- Interactive testing without re-compile
- Connect via Ethernet, JTAG, UART
- Post processing for test results debugging
- API messaging between processors when using RPC
- Debugging rare occurring issues
- Analyzing memory use and leakage
- Analyzing performance
- Plugins may be developed in C++ or Lua
- Simple to use and easy to follow
- Every engineer has access
- Reduce overall debug times



The comprehensive Clarinox Debugger and Protocol Analyzer bring robust devices into production faster. Our power to solve problems is your competitive advantage.