

# EtherMind Bluetooth 5.3

Comprehensive, production proven and qualified  
Bluetooth Stack and Profiles IP



# Introduction

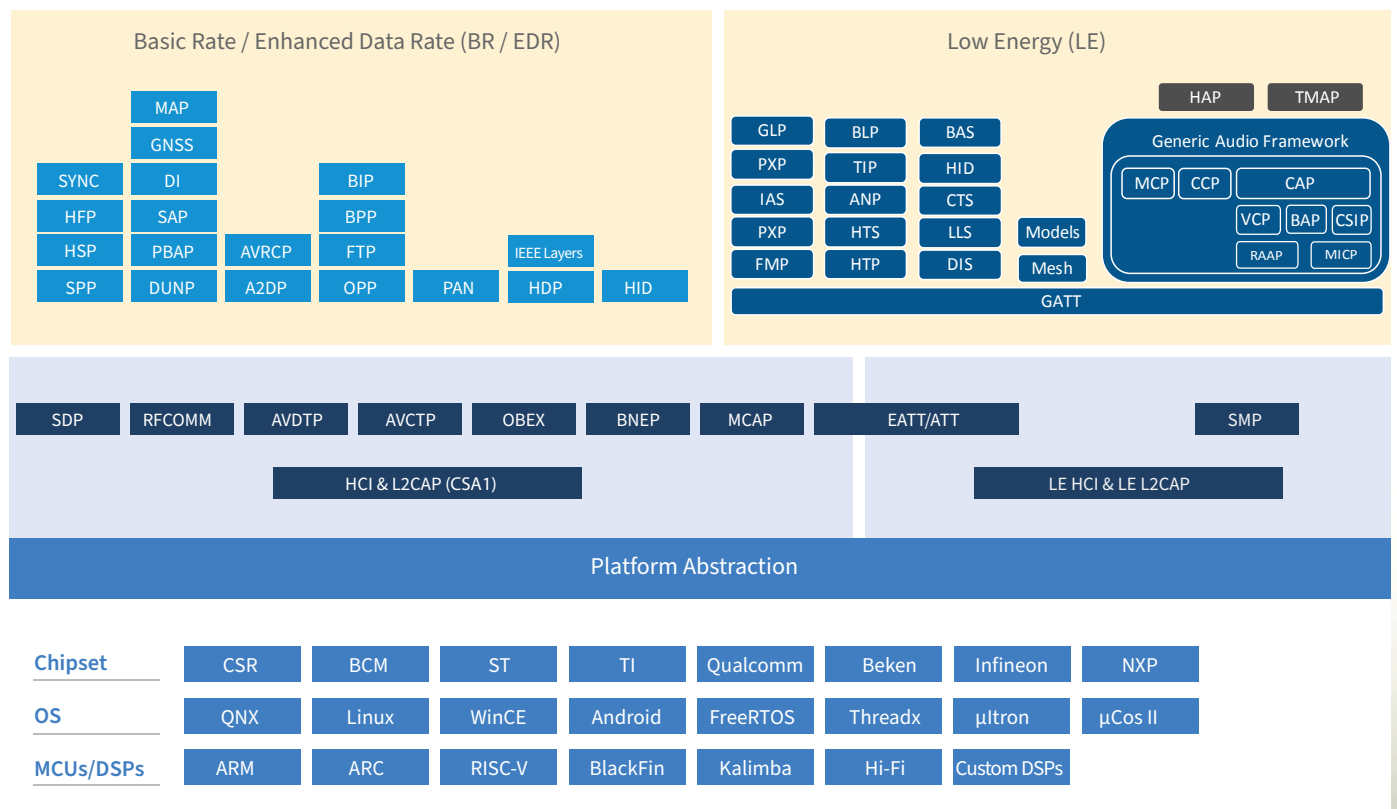
LTIMindtree is acknowledged by the Bluetooth SIG as one of the creators of the Bluetooth version 4.x and 5.x specification. We have been building and licensing Bluetooth IP solutions since 2000, over the years, we have consistently certified generations of our silicon and software IP by the Bluetooth SIG.

LTIMindtree’s EtherMind Dual Mode Stack and Profiles has been widely licensed to numerous semiconductor companies and OEMs across the globe. Today EtherMind is licensed to more than 60+ customers spanning across audio, automotive, wearables, hearables and IOT market segments. The v5.x, and v4.x has been licensed to Multiple OEMs and Semiconductor companies.

EtherMind Bluetooth low energy Stack and Profiles has been hardened in many consumer devices including mobile phones and mono headsets as it simplifies maintenance, builds reliable functioning and takes a holistic view to increase quality of service (QoS).

EtherMind Bluetooth Stack and Profiles supports all the mandatory and optional features of the Bluetooth specification. EtherMind is optimized for embedded applications and offers significant savings in hardware “Bill of Materials”. EtherMind requires just 1/10th the memory of competitive stacks that have been designed for PC and mobile phone applications.

## EtherMind Bluetooth 5.3 – Product Features



## Key Advantages

### Complete Bluetooth 5.3 Protocol Stack and profiles

- Bluetooth LE Audio Profiles and Services (Annexure 1)
- Bluetooth LE Profiles (Annexure 2)
- Classic Bluetooth Profiles (Annexure 3)

### Proven interoperability

- Proven at different Unplug Fests.
- Tested for interoperability with more than 200 smart phone models.
- Pre-Integrated into PTS test tools.

### Easy portability

- MCUs/DSPs – ARM, ARC, RISC-V, MCUs with DSP extensions, Hi-Fi, Kalimba, custom DSPs etc.
- Operating systems – QNX, Windows CE, Android, FreeRTOS, Linux, etc.
- Bluetooth chipsets – CSR/Qualcomm, BCM, Beken, NXP, Infineon

## Key Deliverables

- Dual Mode/Single Mode Bluetooth Stack for core specification 5. x
- Bluetooth Profiles
  - ▶ Bluetooth LE Audio Profiles
  - ▶ Traditional Profiles
  - ▶ GATT-based specifications
- Source code for the abstraction layers with modification rights for easy portability
- Source code of sample application to illustrate the use of APIs
- EtherMind architecture document, software programmer manual, IP user guide and API Documentation

## Key Benefits

### Reduced development risk

- Robust, interoperable, and optimized implementation.
- Leverages 20+ years of experience helping product companies engineer low- footprint products.
- Complete implementation in ANSI C with clear abstraction layers to enable easy portability across processors of choice.
- Platform and operating system (OS)-agnostic.

### Reduced product costs

- Low memory footprint of EtherMind reduces product BOM for customers.
- Highly configurable to suit the product needs of OEMs

### Competitive differentiation

- All mandatory and optional feature support
- Helps customers win business by implementing custom profiles, feature licensing.
- Modular configurable non-blocking architecture – enables multiple parallel operations.
- Two task or single task mode UART, USB, 3-wire, SDIO and software transport
- Feature/compilation flags to enable/disable features of Core Stack, Profiles and Role

### Easy Maintenance

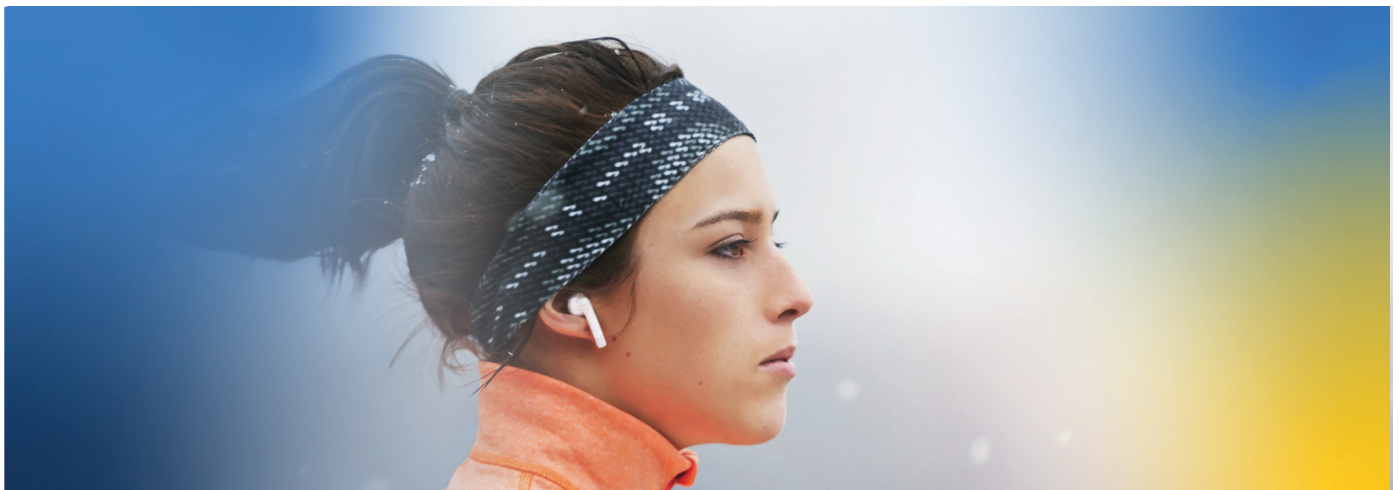
- Bug fixes can be easily integrated into the IP.
- Over-the-air firmware (FOTA) upgrades

### Low memory footprint

- Typical Dual Mode Stack & Profiles (RAM) ~25KB
- Typical Dual Mode Stack & Profiles (ROM) ~240 KB
- Sizes include the core Stack, typical Audio Profiles such as A2DP, AVRCP, HFP, PBAP,MAP and SBC encoder

## Annexure 1 - Bluetooth LE Audio Profiles and Services

Profile	Specification Name	Version
CAP	Common Audio Profiles	1.0
CAS	Common Audio Service	1.0
BAP	Basic Audio Profile	1.0
PACS	Published Audio Capabilities Service	1.0
ASCS	Audio Stream Control Service	1.0
BASS	Broadcast Audio Scan Service	1.0
MCP	Media Control Profile	1.0
MCS	Media Control Service	1.0
CCP	Call Control Profile	1.0
TTBS	elephony Bearer Service	1.0
CSIP	Coordinated Set Identification Profile	1.0
CSIS	Coordinated Set Identification Service	1.0
MICP	Microphone Control Profile	1.0
MICS	Microphone Control Service	1.0
VCP	Volume Control Profile	1.0
VCS	Volume Control Service	1.0
VOCS	Volume Offset Control Service	1.0
AICS	Audio Input Control Service	1.0
HAP	Hearing Access Profile	1.0
HAS	Hearing Access Service	1.0
TMAP	Telephony and Media Audio Profile	1.0
PBP	Public Broadcast Profile	1.0



## Annexure 2 – Bluetooth Low Energy Profiles

Profile	Specification Name	Profile version Number
ANP	Alert Notification Profile	1
AIOP	Automation IO Profile	1
BAS	Battery Service	1.1
BCS	Body Composition Service	1
BLP	Blood Pressure Profile	1.1.1
BMS	Bond Management Service	1.1.1
BSP	Binary Sensor Profile	1
CGMP	Continuous Glucose Monitoring Profile	1.0.2
CHP	BR/EDR Connection Handover Profile	1
CPP	Cycling Power Profile	1.1
CSCP	Cycling Speed and Cadence Profile	1
CTS	Current Time Service	1.1
DIS	Device Information Service	1.1
DTP	Device Time Profile	1
EMCS	Emergency Configuration Service	1
EMP	Emergency Profile	1
ESP	Environmental Sensing Profile	1
FMP	Find Me Profile	1
FTMP	Fitness Machine Profile	1
GLP	Glucose Profile	1.0.1
HOGP	HID over GATT Profile	1.1
HPS	HTTP Proxy Service	1
HDP	Insulin Delivery Profile	1.0.1
IPS	Indoor Positioning Service	1
IPSP	Internet Protocol Support Profile	1
LLS	Link Loss Service	1.0.1
LNP	Location and Navigation Profile	1
OTP	Object Transfer Profile	1
PAMP	Physical Activity Monitor Profile	1
PLXP	Pulse Oximeter Profile	1.0.1
PXP	Proximity Profile	1.0.1
RCP	Reconnection Configuration Profile	1.0.1
RSCP	Running Speed and Cadence Profile	1
TDS	Transport Discovery Service	1.1
UDS	User Data Service	1.1
WSP	Weight Scale Profile	1



## Annexure 3 – Classic Bluetooth Profiles

Profile	Specification Name	Profile version Number
A2DP	Advanced Auto Distribution Profile	1.4
AVRC	Audio / Video Remote Control Profile	1.6.2
BIP	Basic Imaging Profile	1.2.1
BPP	Basic Printing Profile	1.2
DI	Device Identification Profile	1.3
DUN	Dial-up Networking Profile	1.2
FTP	File Transfer Profile	1.3.1
GAVDP	Generic Audio / Video Distribution Profile	1.3
GNSS	Global Navigation Satellite System Profile	1.0
GOEP	Generic Object Exchange Profile	2.1.1
HDP	Health Device Profile	1.1
HFP	Hands-Free Profile	1.8
HID	Human Interface Device Profile	1.1.1
HSP	Headset Profile	1.2
MAP	Message Access Profile	1.4.2
MPS	Multi Profile Specification	1.0
OPP	Object Push Profile	1.2.1
PAN	Personal Area Networking Profile	1.0
PBAP	Phone Book Access Profile	1.2.3
SAP	SIM Access Profile	1.1.1
SPP	Serial Port Profile	1.2
SYNCH	Synchronization Profile	1.2.1

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### About LTIMindtree

LTIMindtree is a global technology consulting and digital solutions company that enables enterprises across industries to reimagine business models, accelerate innovation, and maximize growth by harnessing digital technologies. As a digital transformation partner to more than 700 clients, LTIMindtree brings extensive domain and technology expertise to help drive superior competitive differentiation, customer experiences, and business outcomes in a converging world. Powered by 82,000+ talented and entrepreneurial professionals across more than 30 countries, LTIMindtree — a Larsen & Toubro Group company — combines the industry-acclaimed strengths of erstwhile Larsen and Toubro Infotech and Mindtree in solving the most complex business challenges and delivering transformation at scale. For more information, please visit <https://www.ltimindtree.com/>