



# Ensigma Whisper

## Bluetooth / Bluetooth Low Energy Baseband IP

### Bluetooth and Bluetooth Low Energy up to v5.0

Ensigma™ Whisper is a family of lower power wireless connectivity IPs for standards such as Bluetooth Low Energy (BLE), Bluetooth Dual-Mode, IEEE 802.15.4 and Wi-Fi. Specifically designed to meet the communications requirements for emerging low-power consumption markets such as the Internet of Things (IoT) and wearables, Ensigma Whisper implements all of the connectivity requirements of tomorrow's complex low-power System-on-Chips (SoCs).

Ensigma Whisper BT/BLE IP includes the Controller Stack in Firmware, with the Baseband Accelerators and Multi-standard Modem as Soft Macros. The Whisper IP can be controlled through either the Host Processor (on the same SoC) or an External Control (via USB/UART or other) or Fully Embedded (Application and Host Stack running on the IP).

The Whisper IP enables compact ultra-small form factor solutions which can be easily integrated in an SoC. The IP utilises a number of design optimisations to deliver the lowest active and idle power, ensuring that power is not consumed unnecessarily when IP blocks are not active. This extends the system battery life while maintaining consistent connectivity with a rich set of features.

### Bluetooth Standards Support

<b>BT Classic</b>	Basic Data Rate (BR)/Enhanced Data Rate(EDR)
<b>BT Dual Mode</b>	BR + EDR + BLE
<b>BLE Mode</b>	Supports up to BLE v5.0

### Features

- Multi-standard Demodulation and Connectivity Platform
- Support for BT and BLE modes (up to BLE 5.0)
- Flexible Baseband and RF interfaces
- Industry-leading performance
- Ultra-low power
- Small die area
- Patchable ROM based firmware

### Benefits

- Complete Baseband IP solution
- End to End Solution when paired with Imagination's BT/BLE RF IP
- Silicon proven solution that minimises risk and reduces time-to-market
- Easy integration into an SoC

### Applications

- Digital TV and set-top boxes
- Tablets/smartphones
- Connected consumer products
- Internet of Things

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### General Features

- Complies with 802.11 b/g/n SISO
- Extreme low power: the system enters low power mode at every opportunity, thus maximising battery life
- Seamless dual-mode operation: through optimised baseband resource management
- Robust WLAN co-existence with maximal throughput using
  - Imagination Technologies WLAN IP
  - External WLAN IP via the Packet Traffic Arbitration interface
- Customisable, both HW and Firmware can be tailored to exactly suit a range of use-cases, thus requiring a minimum of resources whilst maximising performance
- Choice of suppliers: the Baseband hardware presents a firmware-configurable interface to the modem and RF/AFE, allowing these items to be sourced separately.
- Range of SoC layout options: the Baseband, Modem and RF/AFE components can be integrated into one SoC, or distributed across chip boundaries.
- Choice of Host interface transport layers: Shared memory, USB or UART

- RSSI
- Simple pairing
- BR/EDR Secure Connection
- Enhanced power control

### LE Features

- GFSK modulation
- LL 4.2
  - Advertising/Scanning/Initiation roles
  - Master/Slave roles
  - Authentication/Encryption (with pause/resume)
  - Frequency hopping
  - LE Data Length Extension
  - Secure Connections
  - LL Privacy
  - LL Extended Scanner Filter Polices
- LL 5.0
  - LE Advertising Packet Length Extension
  - 2Mbps LE PHY
  - LE Long Range

### Classic Features

- GFSK,  $\pi/4$ -DQPSK, 8DPSK modulation
- BB:
  - AFH Adaptive frequency hopping
  - BR/EDR 1,2 or 3 Mbps
  - ACL, SCO, eSCO
  - EDR ACL, EDR eSCO
  - 1/3/5 slot packets
  - Interlaced scan
  - Sniff sub rating mode
- LMP:
  - Authentication/Encryption (with pause/resume)
  - Hold, Sniff and Park modes
  - Master/Slave roles in multiple piconets

### Software

- Works with open source Bluetooth host stack implementations such as BlueZ , Blue Droid
- Partnership with Leading Stack Providers to provide a well proven and optimized solution

### Frequency Reference Options

- Works with open source Bluetooth host stack implementations such as BlueZ , Blue Droid
- On-chip 32.768 kHz crystal oscillator and RC oscillator for Sleep Mode
- Option for an external 40 MHz external clock

### BT-SIG Certification

- BT-SIG certified

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