

# AI2502SB1

## Product Brief



### FEATURE

#### ● Platform Features

##### General

- Integrated voice-band, audio-band and base-band analog front-end
- Integrated full-featured power management unit

##### MCU subsystem

- ARM7EJ-S TM 32-bit RISC processor
- Java hardware acceleration for fast Java-based games and applets
- High-performance multi-layer AHB bus
- Dedicated DMA bus with 16 DMA channels
- On-chip boot ROM for factory flash programming
- Watchdog timer for system crash recovery
- 3 sets of general-purpose timers
- Circuit switch data coprocessor
- Division coprocessor

##### Serial flash

- SPI serial flash 128Mbit inside

##### User interfaces

- Micro SIM slot on module
- Real-time clock (RTC) operating with a low-quiescent-current power supply

##### Security

- Supports security key and chip random ID

##### Connectivity

- 1 UARTs with hardware flow control and supports baud rate up to 921,600 bps
- FS/LS USB 1.1 device controller
- I2C master interface for peripheral management including image sensors

##### Power management

- Li-ion battery charger
- Thermal overload protection
- Under-voltage lock-out protection
- Over-voltage protection
- Different levels of power-down modes with sophisticated software control enables excellent power saving performance.

#### ● Modem Features

##### Modem CODEC

- Supports GSM/GPRS modem
- GSM quad vocoders for adaptive multirate (AMR), enhanced full rate (EFR), full rate (FR) and half rate (HR)
- GSM channel coding, equalization and A5/1, A5/2 and A5/3 ciphering
- GPRS GEA1, GEA2 and GEA3 ciphering
- GPRS packet switched data with CS1/CS2/CS3/CS4 coding schemes

## FEATURE

- GPRS Class 12
- Supports SAIC (single antenna interference cancellation) technology

## ● GSM/GPRS RF Features

### Receiver

- Dual single-ended LNAs support Quad band Quadrature RF mixer
- Fully integrated channel filter
- High dynamic range ADC
- 12dB PGA gain with 6dB gain step

### Transmitter

- Transmitter outputs support quad bands.
- Highly precise and low noise RF transmitter for GSM/GPRS applications

### Frequency synthesizer

- Programmable fractional-N synthesizer
- Integrated wide range RFVCO
- Integrated loop filter
- Fast settling time suitable for multi-slot GPRS applications

### Digitally-Controlled Crystal Oscillator (DCXO)

- On-chip programmable capacitor array for coarse-tuning
- On-chip programmable capacitor array for fine-tuning
- Low power mode supports 32K crystal removal

## ● Bluetooth Features

### Radio features

- Fully compliant with Bluetooth specification 4.0
- Low out-of-band spurious emissions support simultaneous operation with GPS and GSM/GPRS worldwide radio systems
- Low-IF architecture with high degree of linearity and high order channel filter
- Integrated T/R switch and Balun
- Fully integrated PA provides 7.5dBm output power
- -95dBm sensitivity with excellent interference rejection performance
- Hardware AGC dynamically adjusts receiver performance in changing environments

### Baseband features

- Up to 4 simultaneous active ACL links
- Up to 4 simultaneous active BLE links
- Up to 1 simultaneous SCO or eSCO link with CVSD coding
- Supports eSCO
- BT Scatternet support: Up to 4 piconets simultaneously with background inquiry/page scan
- Supports sniff mode
- AFH and PTA collaborative support for WLAN/BT coexistence
- Idle mode and sleep mode enables ultra-low power consumption.
- Supports PCM interface and built-in programmable transcoders for linear voice with re-transmission
- Built-in hardware modem engine for access code correlation, header error correction, forward error correction, CRC, whitening and encryption
- Channel quality driven data rate adaptation
- Channel assessment for AFH

### Platform features

- Embedded processor for Bluetooth protocol stack with built-in memory system
- Fully verified ROM based system with code patch for feature enhancement

## FEATURE

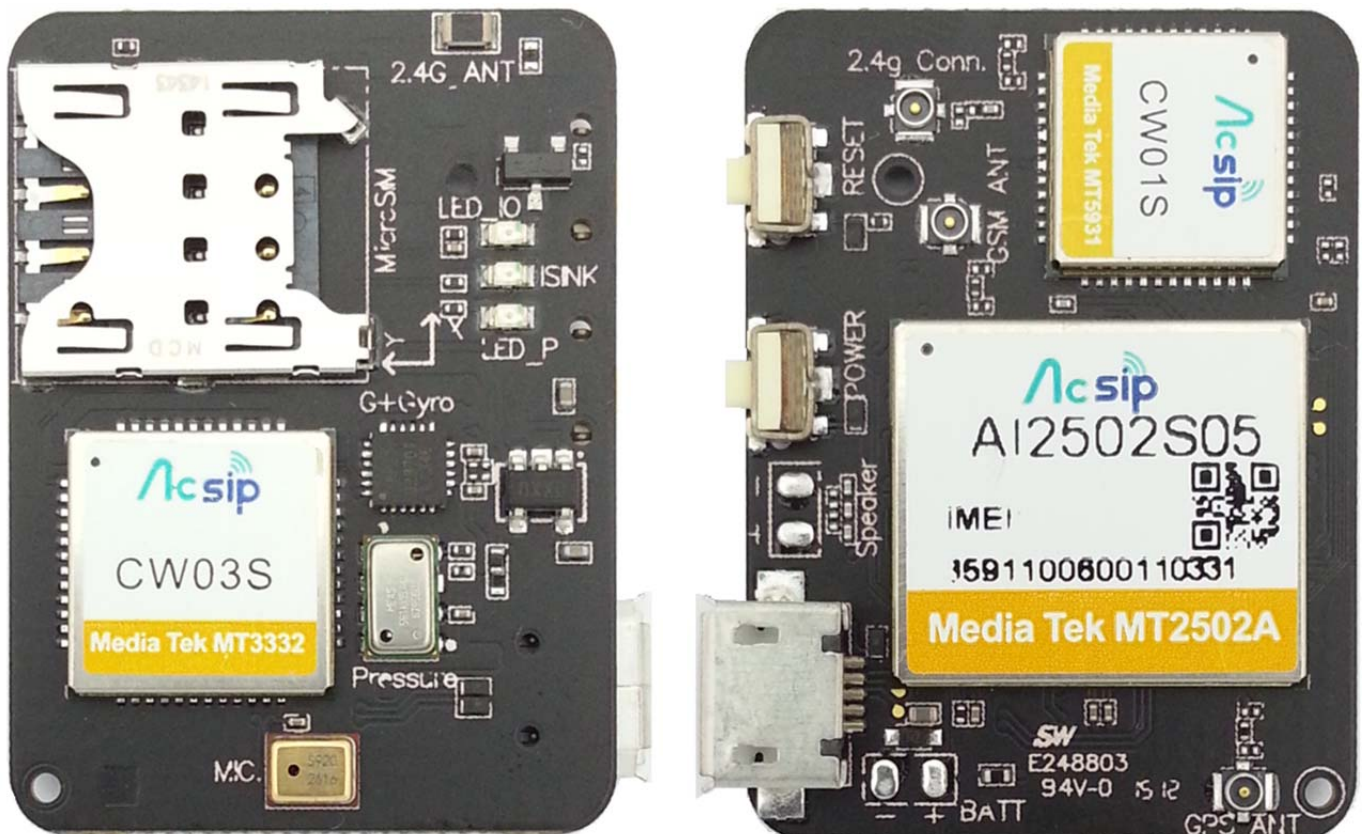
- **Wi-Fi Features**

- Support Orthogonal Frequency Division Multiplexing(OFDM), Complementary Code Keying(CCK), and Direct Sequence Spread Spectrum(DSSS) to provide a variety of data rates
- Support AP/STA/ad-hoc mode
- IEEE 802.11n (HT20 MCS7), IEEE 802.11g(OFDM 54Mbps) and IEEE 802.11b(DSSS 11Mbps)
- Support Wi-Fi Direct (WFA P-2-P Standard)
- Security: WFA WPA/WPA2 personal, WPS2.0, WAPI (Hardware)
- QoS: WFA WMM, WMM PS
- Support Bluetooth co-existence
- Support low power consumption sleep mode via 32 kHz clock

- **Small size : 24 mm X 35 mm**

- **RoHS & Halogen free compliant / Lead free**

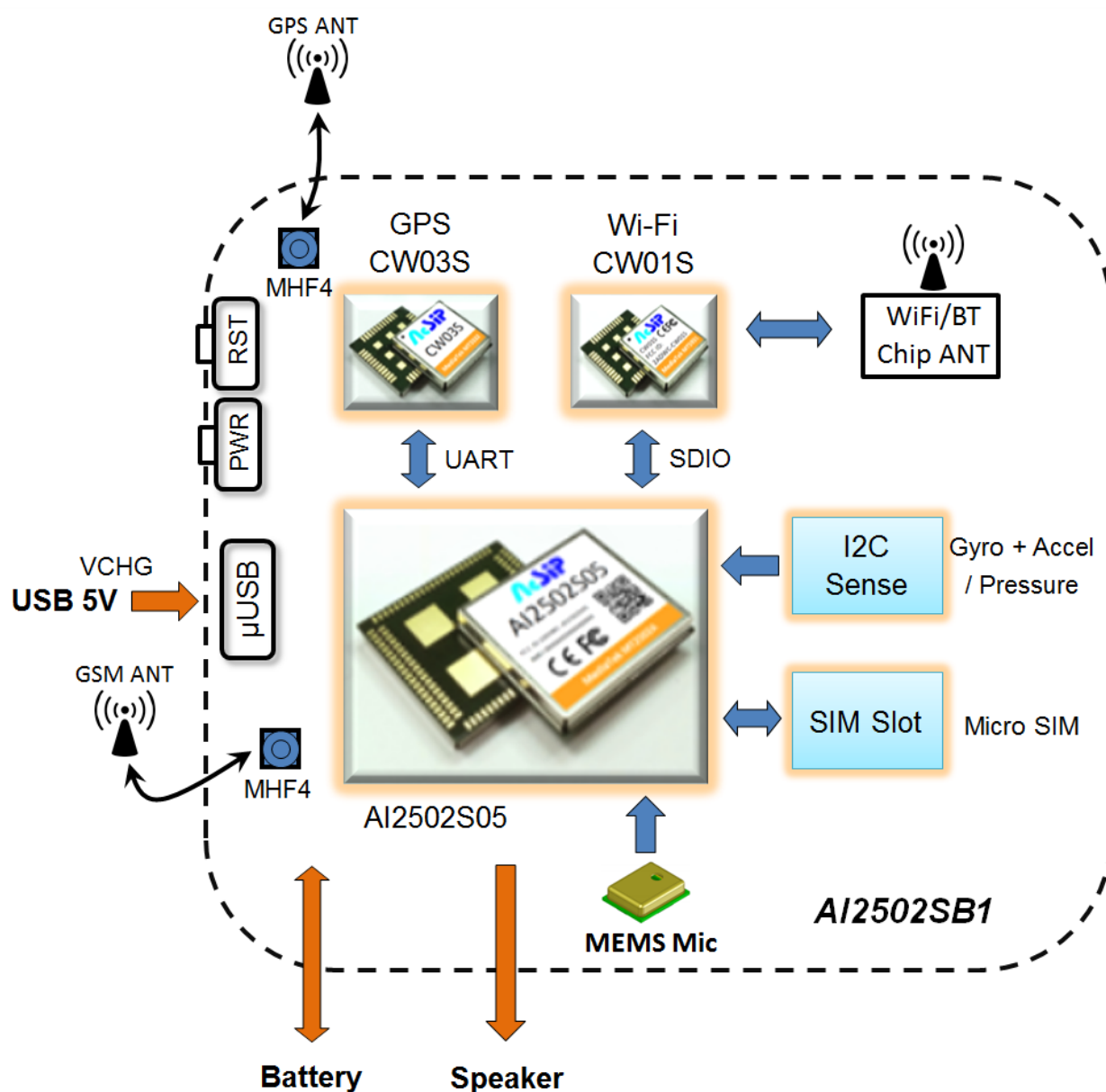
AcSiP Technology Corp. introduces a low-cost and low-power consumption IoT SiP module. The module is an operating system designed for Wearables and Internet of Things (IoT) devices that can connect to other smart devices or directly to cloud applications and services.



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### AI2502SB1 Block Diagram





AI2502SB1 Technical Specifications	
MCU + Modem + BLE Module	AI2502S05
Core	ARM7 EJ-S™
Clock Speed	260MHz
Flash	16MB
RAM	4MB
Modem	GPRS packets switched data with CS1 / CS2 / CS3 / CS4 coding schemes
	GPRS Class12
	Frequency Band: GSM850 / GSM900 / DCS / PCS
BT version	BT4.0(LE) + 2.1 EDR
Features	AFH and PTA collaborative support for WLAN / BT coexistence
GPS / Glonass Module	CW03S
Frequency	GPS, GALILEO, QZSS: L1 1575.42MHz, C/A code GLONASS: L1 1598.0625MHz ~ 1605.375MHz, C/A code
Channels	Tracking: 33 /acquisition: 99
Update rate	1Hz default, up to 10Hz
Support	QZSS/SBAS WAAS/EGNOS/MSAS/GAGAN RTCM ready
Datum	WGS-84(default)
Protocol Support	NMEA 0183 V3.01, 8 data bits, no parity, 1 stop bits (default) 1Hz: GGA, GLL, GSA, GSV, RMC, VTG
Wi-Fi Module	CW01S
Frequency	2.4GHz ISM radio band
Channel	1~14
Modulation	DSSS, OFDM, 64-QAM, 16-QAM, QPSK, BPSK, CCK, DQPSK, DBPSK
Security	WFA WPA/WPA2 personal WPS2.0 WAPI
Co-existence	Bluetooth and Cell Phone Co-existence

Operation Conditions	
Temperature	Operating : -20℃ ~ 70℃ Storage : -40℃ ~ 85℃
Humidity	Operating : 10 ~ 95% (Non-Condensing) Storage : 5 ~ 95% (Non-Condensing)
Dimension	24mm X 36mm

Electrical Specifications	
I2C Sense	Gyroscope + Accelerometer : MPU-6500 Gyroscope full-Scale range : $\pm 250$ , $\pm 500$ , $\pm 1000$ , $\pm 2000^\circ/\text{sec}$ Accelerometer full-scale range : $\pm 2$ , $\pm 4$ , $\pm 8$ , $\pm 16\text{g}$ ADCs : 16 bit I2C Address : 1101001 (AD0=1) Pressure Sensor : MS5611-01BA ADCs : 24bit Operating Pressure Range : 450 ~ 1100 mbar
Audio & Speech	MEMS MIC Sensitivity @1kHz (0dB=1V/Pa) : -42dBV/Pa Signal-to-noise ratio @1kHz (0dB= 1V/Pa) : 59dBA SPK AMP AMP Type : Class AB Gain range (dB) : -6 / 6 / 12dB Output power @ 3.7V,8ohm,1% THD : 0.8W
Charger	Support battery type : Li-ion VCHG OVP : Pre-CC=10.5V CC : 10.5V(Maximum) ; 7V (Default) Battery OVP : 4.3V (Default) CV : 4.2V (Default)
micro-SIM Card sockets	Type : Push-pull