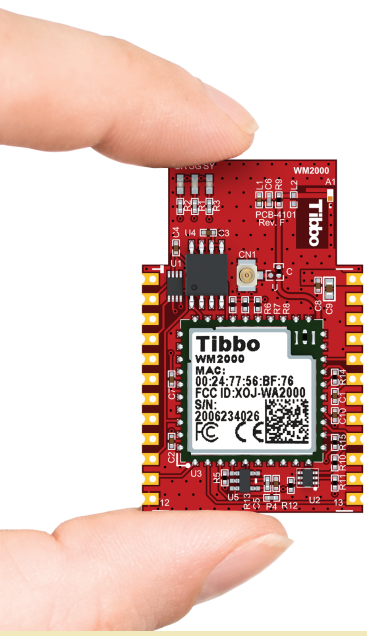
WM2000 Programmable Wireless IIoT Module



The WM2000 is the latest programmable wireless Industrial IoT (IIoT) module offered by Tibbo. It implements Wi-Fi and Bluetooth Low Energy (BLE) interfaces that introduce several new features, such as wireless debugging, over-the-air (OTA) updates, and TLS support.

The WM2000's hardware incorporates two high-speed serial ports. It also features I²C/SPI ports, onboard flash and EEPROM, a real-time clock, and 10 GPIO lines — two of which work as external interrupts. Nine lines can be configured to provide pulse-width modulation (PWM) output.

The WM2000 is ideal for creating IIoT solutions that are free from the limitations of traditional wired networks. The module is programmable in Tibbo BASIC/C and is fully supported by Tibbo IDE (TIDE) and CODY, Tibbo's project code wizard.

Dual Tibbo BASIC/C apps

The WM2000 — which has at least four times the flash storage of any predecessor — is the first Tibbo device that can store up to two compiled Tibbo BASIC/C binaries (only one can run at any given time).

A Device Configuration Block (DCB) allows you to define which of the two apps runs when the device is powered up or reboots. The DCB can be configured through the BLE Terminal web app, Tibbo's software API, or a preloaded companion app.

Simplified Wi-Fi connectivity

The WM2000 features a significantly revamped Wi-Fi API facilitating automatic association with a designated wireless network. This makes the module's Wi-Fi interface as easy to use as the Ethernet port on "wired-first" Tibbo devices.

Set the target Wi-Fi network's SSID and password, enable "autoconnect," and the WM2000 will automatically associate with the network and keep associated when in range! This also enables wireless debugging of your Tibbo BASIC/C apps.

Securely Connect to Any Cloud

Designed for the cloud, the WM2000 natively supports encrypted outgoing TCP connections using Transport Layer Security (TLS) 1.2 with the RSA-2048 cryptosystem. Implementation of this industry-standard encryption allows the module to securely communicate with popular cloud service providers — including Amazon Web Services, Microsoft Azure, and Google Cloud. With the vendor-agnostic WM2000, your applications are not tethered to a single provider and can even work with more than one.

Key Features

- High-performance ARM CPU
- Supports over-the-air (OTA) updates
- Supports external matrix and binary output keypads
- Stores two Tibbo BASIC/C apps
- Two UARTs support serial, Wiegand, and clock/data streams
- 4MB flash for TiOS and two apps + 4MB for the flash disk file system
- Integrated Wi-Fi connectivity (802.11a/b/g/n)
- 10 general-purpose I/O lines
- 2,048-byte EEPROM
- Wireless debugging via Wi-Fi
- Three-channel ADC
- 3.3V power
- TLS1.2 (RSA-2048)
- Nine PWM channels
- Onboard RTC (backup power connected externally)
- Integrated Bluetooth Low Energy connectivity (BLE 4.2)
- Can drive an externally connected buzzer
- Prototyping-friendly 2.54mm (100mil) pin pitch

Hardware

Specifications

- 32-bit architecture
- Powered by Tibbo OS (TiOS)
- Stores up to two compiled Tibbo BASIC/C binaries (apps)
  - A Device Configuration Block (DCB) defines which of the two apps normally runs on power-up
  - Forced launch of APP0 through the MD line/button
- Built-in Wi-Fi interface (802.11a/b/g/n)
  - Controlled via a simple-to-use, yet sophisticated API
  - TLS1.2 with RSA-2048 cryptosystem
  - Optional "autoconnect" — automatic association with a designated Wi-Fi network as defined by the DCB
  - Optional debugging of Tibbo BASIC/C applications via the Wi-Fi interface
- Built-in Bluetooth Low Energy (BLE 4.2)
  - Controlled via a simple-to-use, yet sophisticated API
  - Can access the DCB via a new, integrated console
- Onboard antenna (U.FL connector for an external antenna on request)
- Two high-speed serial ports (CMOS-level):
- Baudrates of up to 921,600
  - None/even/odd/mark/space parity modes
  - 7 or 8 bits/character
  - Full-duplex mode with RTS/CTS and XON/XOFF flow control
  - Half-duplex mode with direction control
  - Encoding and decoding of Wiegand and clock/data streams
  - One of the ports can function as a serial debugging port
- 10 general-purpose I/O lines
  - Two lines can work as interrupts
  - Nine lines can provide pulse-width modulation (PWM) output
  - Three lines can work as ADC inputs
- Support for externally connected matrix and binary output keypads
- RTC with dedicated backup power input
  - Only 30µA power draw on the backup power input
- 58KB SRAM for Tibbo BASIC/C variables and data
- 4MB flash for code storage
  - System files and TiOS occupy a combined 2,408KB
  - 1,688KB available for storing up to two app binaries
- Additional 4MB flash for the hardened fault-tolerant file system
- 2,048-byte EEPROM for data storage.
- Three onboard status LEDs
  - Green and red main status LEDs/lines
  - Yellow Wi-Fi/Bluetooth link LED/line
- Reliable power-on reset (no brown-out detection)
- Power: 150mA @ 3.3V (Wi-Fi on and scanning)
- Provisions for a deep power-down "sleep" mode
- Dimensions (L x W x H): 45.1 x 28.15 x 3.5mm
- Prototyping-friendly 2.54mm (100mil) pin pitch
- Operating temperature range: –40°C to +85°C
- Firmware and compiled Tibbo BASIC/C apps can be updated via:
  - Serial port
  - Wi-Fi interface
  - Bluetooth Low Energy (BLE) interface
- Tibbo BASIC/C applications can be debugged via Wi-Fi or serial
- Supplied with a companion app preloaded
  - The app allows editing of the DCB from the L.U.I.S. smartphone app (availabe on iOS and Android)
  - Users are free to modify the app for additional functionality

Programming

Platform objects:

Sockets (with TLS1.2 support), Wi-Fi, BLE, UARTs (serial ports), I/O, ADC, PWM, flash disk, EEPROM, keypad, LED patterns, RTC, and more.

Function Groups:

String functions, trigonometric functions, date/time conversion functions, encryption/hash calculation functions, and more.

Variable Types:

Byte, char, integer (word), short, dword, long, real, and string, as well as user-defined arrays and structures.

Tibbo TECHNOLOGY

Tibbo Technology Inc.
www: tibbo.com

email: sales@tibbo.com
phone: +886-2-2692-5443