



LM832-0474

Host Controller Interface (HCI) via SDIO and UART

USER GUIDE



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Revision	Date	Changes Description
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1. Overview

The LM832 is a compact low power Bluetooth WiFi combo module specialized for Wireless IoT applications. It has a small footprint (19mmX12mm), flexible multi-mode power supplies, up to 150 Mbps IEEE802.11bgn MIMO WiFi, and Bluetooth version 4.1 Dual Mode.

It can be easily integrated with customer products such as embedded boards, IoT nodes and gateways, tablets, ultra-notebooks, mobile devices and consumer products.

The LM832 uses a Cypress Broadcom CYM43438 WiFi/Bluetooth SoC single chip, which contains WiFi and Bluetooth functional blocks including SDiO, HS-UART, SPI, GPIO, MAC, BB and PA. It supports various operating systems, such as Windows, Linux, Android, ThreadX and Cypress Broadcom WICED SDK.

2. General Specifications

Model Name	LM832-0474
Product Name	Low power 11n + BT WiFi module SDIO interface for WLAN and HS-UART interface for Bluetooth
Standards	IEEE 802.11b/g/n/d/e/h/i Bluetooth v2.1+EDR/ v3.0/ v3.0+HS/ v4.1 Dual Mode
Data Transfer Rate	WLAN: <ul style="list-style-type: none"> ● 802.11b: 11, 5.5, 2, 1 Mbps ● 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps ● 802.11n: MCS0 to 7 for HT20 20MHz Bluetooth: <ul style="list-style-type: none"> ● Basic rate: 1Mbps ● Enhanced data rate: 2, 3 Mbps ● High Speed: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Modulation Method	WLAN: <ul style="list-style-type: none"> ● 802.11b: CCK, DQPSK, DBPSK ● 802.11g: 64QAM, 16QAM, QPSK, BPSK ● 802.11n: 64QAM, 16QAM, QPSK, BPSK Bluetooth: 8DPSK, $\pi/4$ DQPSK, GFSKFSK

Operating Channels	WLAN 2.4GHz: <ul style="list-style-type: none"> ● 11: (Ch. 1-11) – United States ● 13: (Ch. 1-13) – Europe 14: ● (Ch. 1-14) – Japan
	BT 2.4GHz: <ul style="list-style-type: none"> ● Ch. 0 to 78
Frequency Range	2.4GHz ISM band (2.400GHz to 2.4835 GHz)
Spread Spectrum	WLAN IEEE 802.11b: <ul style="list-style-type: none"> ● DSSS (Direct Sequence Spread Spectrum) WLAN IEEE 802.11g/n: <ul style="list-style-type: none"> ● OFDM (Orthogonal Frequency Division Multiplexing) Bluetooth: <ul style="list-style-type: none"> ● FHSS (Frequency Hopping Spread Spectrum)
RF Output Power (tolerance ±1.5dBm)	WLAN: <ul style="list-style-type: none"> ● 17dBm – 802.11b@11Mbps ● 15dBm – 802.11g@6Mbps ● 15dBm – 802.11g@54Mbps ● 13dBm – 802.11n@MCS0_HT20 ● 13dBm – 802.11n@MCS7_HT20 Bluetooth: <ul style="list-style-type: none"> ● Output Power : Class 1 and Class 2
Network architecture	WLAN: <ul style="list-style-type: none"> ● Ad hoc mode (Peer-to-Peer) ● Infrastructure mode ● Software AP ● WiFi Direct BT: <ul style="list-style-type: none"> ● Pico Net Scatternet

Receiver Sensitivity	WLAN: <ul style="list-style-type: none"> • -76dBm – 802.11b@11Mbps • -65dBm – 802.11g@54Mbps • -64dBm – 802.11n@MCS7_HT20 Bluetooth: <ul style="list-style-type: none"> • -89dBm@1Mbps • -90dBm@2Mbps • -83dBm@3Mbps
OS Support	Windows XP/ Linux/ Android
SDK	WICED
IoT Applications	IoT Node, IoT gateway, Amazon AWS, Microsoft Azure, etc.
Security	WLAN: <ul style="list-style-type: none"> • WPA Personal, WPA2 Personal • WMM, WMM-PS(U-APSD), WMM-SA • WAPI, AES(Hardware Accelerator) • TKIP(host-computed), CKIP(SW Support) BT: <ul style="list-style-type: none"> • Simple Pairing
Bus interface	WLAN: <ul style="list-style-type: none"> • SDIO 2.0 1 bit and 4 bit modes • Generic SPI 16-bit and 32 bit • GPIO • SPI BT: <ul style="list-style-type: none"> • High Speed UART
Operating Temperature	<ul style="list-style-type: none"> • -20 ~ 60° C ambient temperature • 5 to 90 % (non-condensing)
Storage Temperature	<ul style="list-style-type: none"> • -20 ~ 70°C ambient temperature • 0 to 95 % (non-condensing)
Dimension	19 x 12 x 2 mm (LxWxH)

3. Power Supply

The LM832 WiFi Bluetooth module supports multimode power supplies: SDIO bus power level DC 3.3V, 2.8V or 1.8V.

If the voltage level of the SDIO bus is DC 3.3V like most PC or NB, then the LM832 can be powered by the single DC 3.3V from the SDIO bus. But if the voltage level of SDIO bus is DC 2.8V or 1.8V like most embedded platforms, then those would be used instead.

SDIO bus power Supply	3.3V	2.8V	1.8V
Jumper 4	Short Jumper 4 (Plug in jumper connector)	Open Jumper 4 (Remove jumper connector)	Open Jumper 4 (Remove jumper connector)

4. Wi-Fi Interface and SDIO bus power

The LM832 WiFi interface is through SDIO, and it works under different SDIO bus power conditions such as DC 3.3V, 2.8V or 1.8V.

Please open the connector of Jumper 4 (see Figure. 1) to provide an additional DC 3.3V power supply to the LM832 module when it is used under the SDIO bus power of DC 2.8V or 1.8V (The additional DC 3.3V is supplied from a PWM circuit from micro-USB, so please ensure that DC power is connected to the micro-USB). Proceed to close the connector of Jumper 4 when SDIO bus power is DC 3.3V.

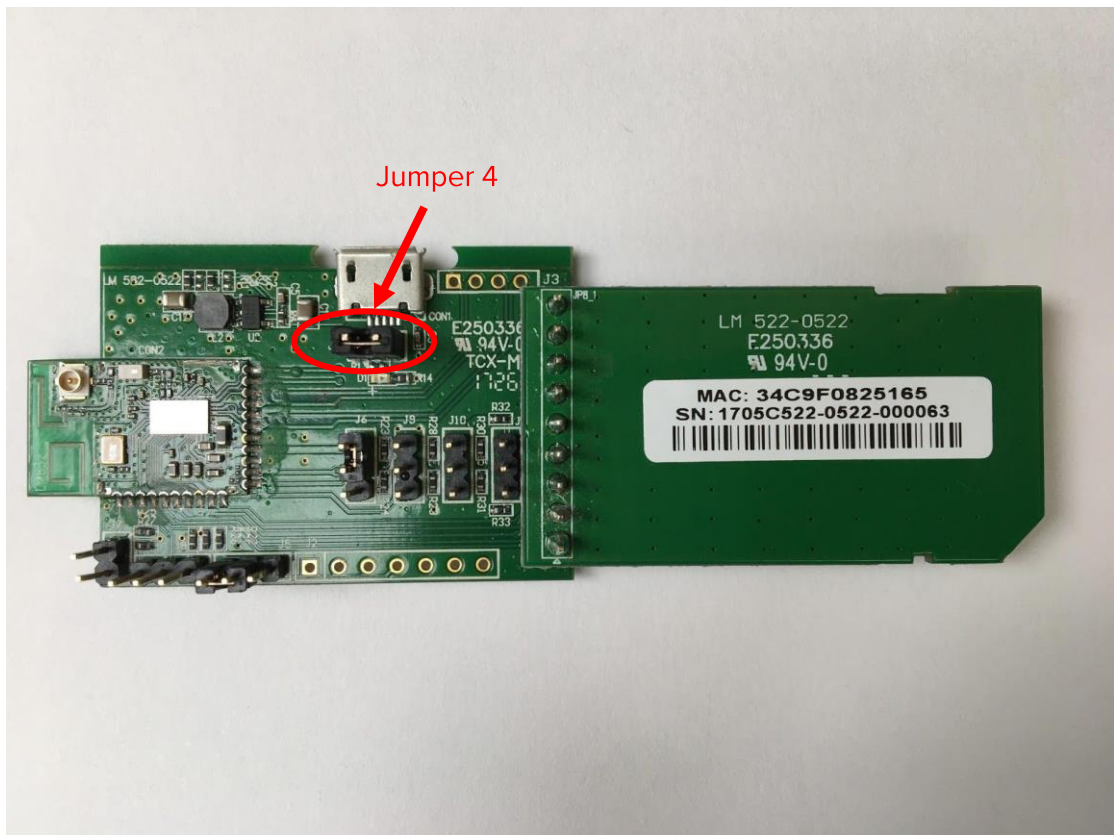


Figure 1. LM832 module connected to LM522 EVB

5. Bluetooth Interface

The LM832 Bluetooth interface is through high speed UART, provided signal of UART Tx, Rx, RTS, CTS pins.

6. Power on sequence

- Use a USB cable to connect the USB connector of the LM522 evaluation board to a PC USB port. This will supply DC 5V to the evaluation board.
- Plug in the SD adapter into your target platform.
- Your platform will acknowledge the LM832 module.

7. Bluetooth Wifi drivers

- Windows 64 and 32 bit drivers
- Linux: compat-wireless, hostapd, wpa_supplicant
- Android

8. Software Development

The LM832 Bluetooth WiFi module operates in Windows/Linux/Android OSs, thus it enables easy integration with customer applications.

It also supports the Broadcom Cypress WICED SDK, which is useful for the development of various low power applications, including IoT node, IoT gateway and sensors.

9. Applications

- IoT Node, IoT Gateway
- Bluetooth HCI
- WiFi Client/Access Point

FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Note 1: This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: The device must not transmit simultaneously with any other antenna or transmitter.

Note 4: To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier's Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, LM Technologies Ltd. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

Note 5: FCC ID label on the final system must be labeled with “Contains FCC ID: VVXLM832-0474” or “Contains transmitter module FCC ID: VVXLM832-0474”.

The transmitter module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the host product. LM Technologies Ltd. is responsible for the compliance of the module in all final hosts.

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