## FEATURES

- WiFi 802.11 a/b/g/n
- 20 and 40MHz SISO
- Bluetooth Classic 2.1
- Bluetooth Smart 4.1
- NFC Forum type 2 Tag
- NFC Field Detect Wakeup
- Digital PCM Audio + SBC and A2DP
- Integrated high performance trace antennas
- Optional u.fl RF coax connector
- Low Power <2.5W
- SDIO 4 bit Interface
- PCM for Bluetooth Audio
- UART and I2C Interfaces
- <800uA WiFi connected idle
- Small QSFP+ 45mm x22.3mm x 3.7mm form factor
- -20C to +70C Operation
- RoHS Compliant
- FCC/IC/ETSI/CE/TELEC Certified

APPLICATIONS

- AV Multimedia Streaming
- Medical
- Appliances / White Goods
- Industrial Automation
- Video Conferencing
- Smart Gateway
- HVAC Control
- Lighting Control
- IoT
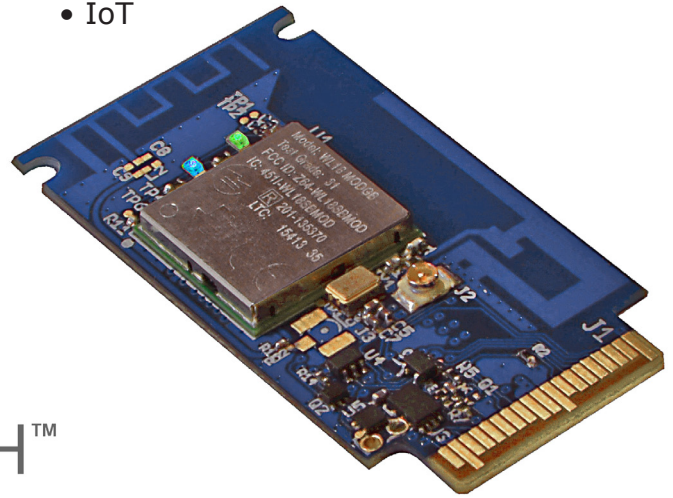
DESCRIPTION

The mangOH™ IoT Connector is an open interface standard from Sierra Wireless to simplify product development with a single interface for connectivity and sensor module technology. Just as the minicard standard simplified development for the laptop, tablet, and networking industry, so the IoT connector brings plug'n'play hardware solutions offering electrical and feature compatibility across various IoT technologies. Talon has numerous RF and wired IoT connector devices available or under development.

The Talon "MIRAGE" RF module on mangOH™ form factor is a low power extremely high performance IEEE 802.11 a/b/g/n compliant, FCC/IC/ETSI/CE/TELEC certified 2.4GHz RF Module with integrated and external antenna options. The MIRAGE is based on the TI WiLink WL1831 dual mode Bluetooth + WiFi platform.

The development environment is based on Legato open source Linux which is designed to simplify embedded IoT project with a suite of development and build tools -- target, host, and build tools to create apps ready for deployment to your devices.

The Talon MIRAGE IoT Module brings out 3 different communication and 1 programming interface for maximum usability and flexibility including:

- 1 x UART
- 1 x PCM
- 1 x SDIO bus
- 1 x JTAG

Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when the device is used in a normal manner with a well-constructed network, the Mirage wireless IoT card should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Talon Communications, Inc. accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Mirage wireless IoT card.

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Revision History

Revision number	Release date	Changes
1	September 2016	Created

Mirage IoT Expansion Card Specification

1

1.1 Overview

The Talon Wi-Fi + Bluetooth + NFC IoT Expansion Card is based on the Sierra Wireless IoT Expansion Card specification. The card provides concurrent 2.4 GHz Wi-Fi a/b/g/n, Bluetooth Classic, Bluetooth LE and NFC functionality with low power consumption to host platforms for use in PAN (Personal Area Networks) and other applications.

This expansion card provides the following functionality:

- 2.4 GHz Wi-Fi/Bluetooth/Bluetooth LE/NFC
    - Wi-Fi: 802.11 a/b/g/n, SISO
    - Bluetooth: v4.1, Dual mode Bluetooth/Bluetooth LE; Digital PCM audio
    - Concurrent Wi-Fi/ Bluetooth over single antenna
    - NFC Forum type 2 compliant

- Antenna— Integrated high performance PIFA Inverted-F 2.4 GHz antenna for Wi-Fi/Bluetooth/ Bluetooth LE radio. (Alternate external antenna may be used)
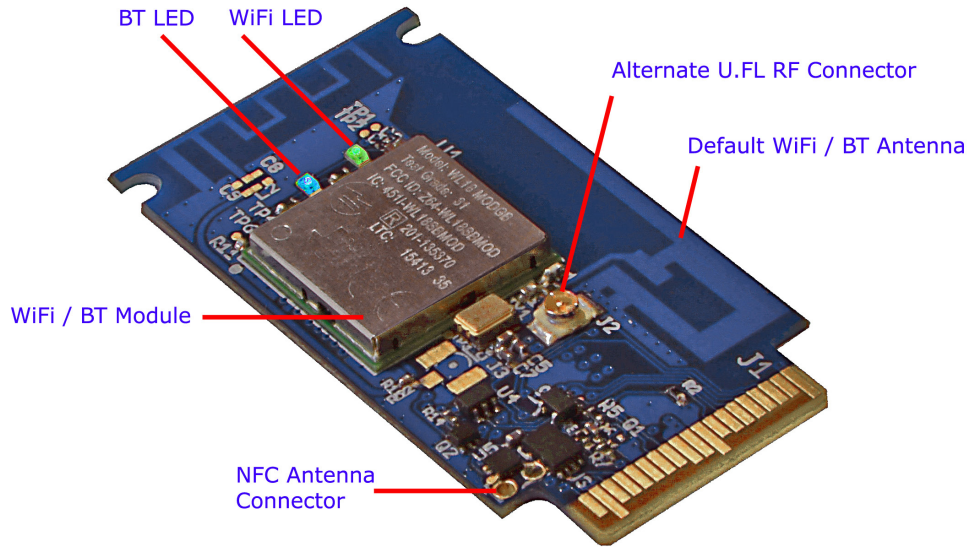
Note: If using the integrated antenna, make sure the signal is not shielded by the host platform.
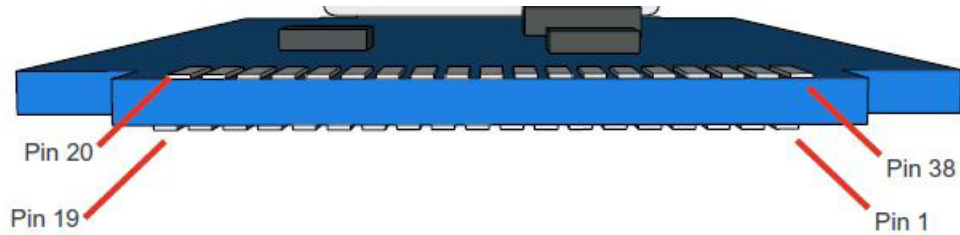
Specifications

The following tables describe key features and specifications of the Wi-Fi IoT Expansion Card:

BT LED   WiFi LED

Alternate U.FL RF Connector

Default WiFi / BT Antenna

WiFi / BT Module

NFC Antenna
Connector

Figure 1-1: Mirage Wi-Fi / BT Expansion Card Top View

Pin 20

Pin 19

Pin 38

Pin 1

Figure 1-2: **mangOH™ PCB physical pinout**

Table 1-1: Hardware Features

Feature		Notes
Antennas	Integrated PCB Trace antennas	• Wi-Fi/Bluetooth antenna is PIFA Planar Inverted-F (default) • NFC antenna is external accessible via connector J3
	u.FL connector	• J2 is alternate Wi-Fi/Bluetooth antenna *Note: To use the u.FL connector, refer to section below "Antenna Selection" for required hardware jumper modifications.*
Status LEDs	LEDs	• D1—WLAN_EN. Indicates Wi-Fi radio is active. GREEN. • D2—BT_EN. Indicates Bluetooth is active. BLUE.
2.4 GHz Wi-Fi/ Bluetooth/Bluetooth Low Energy (LE) module	Part# WL1831MOD	See http://www.ti.com/product/WL1831MOD for module specifications.

Table 1-2: IoT Expansion Card Specifications

Parameter	Value / Range	Notes
Power Specifications		
Power Category	1	Power consumption < 2.5 W
Power Supplies (Voltage Rails)	1.8V 3.3V	
Mechanical Specifications		
Height Category	1	Top height ≤14.00 mm
Dimensions	Length: 42.50 mm Width: 22.30 mm	Per IoT Expansion Card specification
# of slots required	1	
mangOH Green Slot Restriction	Slot 0	Card requires interfaces that are implemented only on Slot 0.
Hot Swappable	No	
Environmental Specifications		
Ambient Operating Temperature	Temperature not tested. Wi-Fi/BT chip (-20C to 70C).	Reference design. Not tested for compliance with IoT Expansion Card Design Specification.

Table 1-3: Software Interface Support

Interface	Supported
USB	No
SDIO	Yes
UART	Yes
SPI	No
n_RESET	Yes
ADC	No
I^2C	Yes
PCM	Yes
I2S	No
GPIO	Yes
n_CARD_DETECT	Yes
PPS	No

TALON MIRAGE IoT MODULE PINOUT 1/3

mangOH IoT Edge PIN #	mangOH IoT Edge PIN	WL1831 PIN (PIN #)	TYPICAL FEATURE	DESCRIPTION
P01	VCC_5V0	NA	POWER	NC
P02	USB0_D+	NA	USB0	NC
P03	USB0_D-	NA	USB0	NC
P04	GND	GND	POWER	GND
P05	SDIO_CLK	SDIO_CLK (8)	SDIO	SDIO CLOCK
P06	SDIO_CMD	SDIO_CMD (6)	SDIO	SDIO COMMAND
P07	SDIO_DAT3/CD	SDIO_DAT3/CD (13)	SDIO	SDIO DATA [3]
P08	SDIO_DAT2	SDIO_DAT2 (12)	SDIO	SDIO DATA [2]
P09	SDIO_DAT1	SDIO_DAT1 (11)	SDIO	SDIO DATA [1]
P10	SDIO_DAT0	SDIO_DAT0 (10)	SDIO	SDIO DATA [0]
P11	1.8v	1.8v (38)	POWER	1.8v main module power
P12	UART_TXD	UART_TXD (52)	UART	Output to Host
P13	UART_RXD	UART_RXD (53)	UART	Input from Host
P14	UART_CTS	UART_CTS (51)	UART	Optional
P15	UART_RTS	UART_RTS (50)	UART	Optional
P16	SPI SCLK	NA	SPI	NC

TALON MIRAGE IoT MODULE PINOUT 2/3

mangOH IoT Edge PIN #	mangOH IoT Edge PIN	WL1831 PIN (PIN #)	TYPICAL FEATURE	DESCRIPTION
P17	SPI MISO	NA	SPI	NC
P18	SPI MOSI	NA	SPI	NC
P19	SPI CS	NA	SPI	NC
P20	ADC0	NA	ADC	NFC FIELD DETECT INTERRUPT
P21	GND	GND	POWER	GND
P22	I2C_SDA	NA	I2C	EEPROM AND NFC DATA
P23	I2C_SCL	NA	I2C	EEPROM AND NFC CLOCK
P24	GPIO_1	WL_IRQ_1V8 (14)	GPIO	WILINK INTERRUPT *Note: If the host device uses an AirPrime WP75xx/8548, this must be connected to the WP module's GPIO42 signal (LGA pin 109).*
P25	GPIO_2	NA	GPIO	NC
P26	GPIO_3	GPIO_3	GPIO	BT LED ON WHEN DRIVEN TO '1'
P27	GPIO_4	GPIO_4	GPIO	WIFI LED ON WHEN DRIVEN TO '1'
P28	VCC_3V3	VCC_3V3 (46)	POWER	+3.3V Input from Host
P29	VCC_3V3	VCC_3V3 (47)	POWER	+3.3V Input from Host

TALON MIRAGE IoT MODULE PINOUT 3/3

mangOH IoT Edge PIN #	mangOH IoT Edge PIN	WL1831 PIN (PIN #)	TYPICAL FEATURE	DESCRIPTION
P30	GND	GND	POWER	GND
P31	NC	NA	LINUX SYSTEM CONTROL	IoT IDENTIFY MODULE AND LOAD DRIVER
P32	NC	n_RESET	SYSTEM CONTROL	
P33	PCM/I2S IN	BT AUDIO IN (56)	AUDIO	WILINK BT AUDIO
P34	PCM/I2S OUT	BT AUDIO OUT (57)	AUDIO	WILINK BT AUDIO
P35	PCM_SYNC/I2S _WS	BT AUDIO FSYNC (58)	AUDIO	WILINK BT AUDIO
P36	PCM/I2S CLK	BT AUDIO CLK (60)	AUDIO	WILINK BT AUDIO
P37	PPS	NA	STRATUM CLOCK	NC
P38	GND	GND	POWER	GND

Sample Applications

For Wi-Fi development, refer to the mangOH Green Tutorial—Wi-Fi Expansion Card, available at http://mangoh.io.

For Bluetooth development, refer to https://github.com/mangOH/mangOH/wiki/Bluetooth-WL18xx-driver-for-mangOH.

TALON MIRAGE ORDERING INFORMATION

MODULE	RF CONNECTORS
MIR-24SW-PIFA	PIFA Trace (default) + UFL (1)
MIR-24SW-UFL	PIFA Trace + UFL (default)

Restricted Use

Talon Communications, Inc. (TCI) does not assume any responsibility for the use of the described radio module ("the Module(s)"). TCI makes no representation with respect to the adequacy of the module in low-power wireless data communications applications or systems. Any Products using the Module must be designed so that a loss of communications due to radio interference or otherwise will not endanger either people or property, and will not cause the loss of valuable data. TCI assumes no liability for the performance of products which are designed or created using the Modules.

The Modules are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Module could create a situation where personal injury or death may occur. If you use the Modules for such unintended and unauthorized applications, you do so at your own risk and you shall indemnify and hold TCI and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that TCI was negligent regarding the design or manufacture of the Product.

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