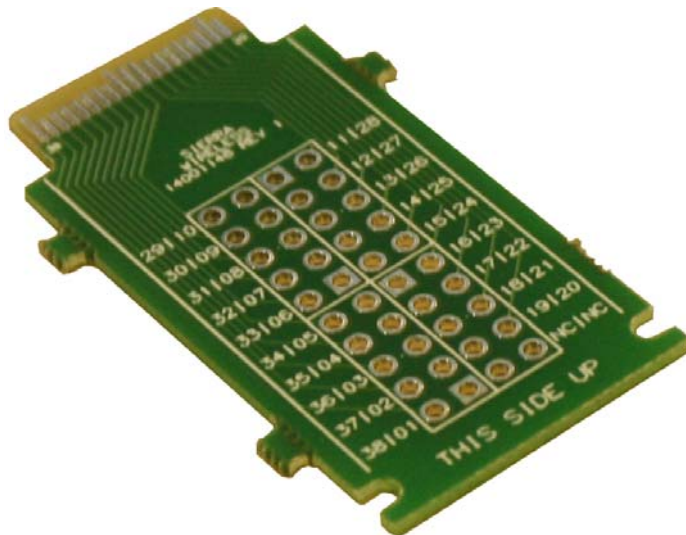# Breakout Board IoT Expansion Card

Product Specification

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 wireless devices such as the Sierra Wireless modem are used in a normal manner with a well-constructed network, the Sierra Wireless modem 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. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless modem, or for failure of the Sierra Wireless modem to transmit or receive such data.

Safety and Hazards

Do not operate the Sierra Wireless modem in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, the Sierra Wireless modem **MUST BE POWERED OFF**. The Sierra Wireless modem can transmit signals that could interfere with this equipment.

Do not operate the Sierra Wireless modem in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless modem **MUST BE POWERED OFF**. When operating, the Sierra Wireless modem can transmit signals that could interfere with various onboard systems.

Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless modems may be used at this time.

The driver or operator of any vehicle should not operate the Sierra Wireless modem while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

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Document details

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Revision History

Revision number	Release date	Changes
1	October 2016	Created

1: Breakout Board IoT Expansion Card Specification

1.1 Overview

The Sierra Wireless Breakout Board IoT Expansion Card is an open hardware reference design based on the IoT Expansion Card specification.

This expansion card provides the following functionality:
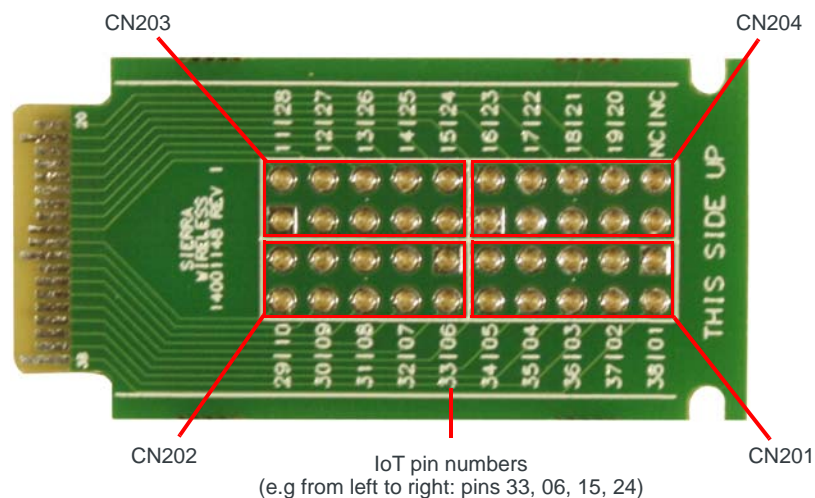- Breakout board (test points) for testing IoT interfaces

1.2 Specifications

The following tables describe key features and specifications of the Breakout Board IoT Expansion Card:

Table 1-1: Hardware Features

Feature	Notes
Test points	• 40 test points in four groups of 10 (38 used for IoT, 2 NC) • 10-pin connectors can be added to each group

Figure 1-1: Breakout Board IoT Expansion Card Top View

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 5.0V	
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	Any slot	
Hot Swappable	No	
Environmental Specifications		
Ambient Operating Temperature	Expansion Card— Temperature not tested.	Reference design. Not tested for compliance with IoT Expansion Card Design Specification.

Table 1-3: Software Interface Support

Interface	Supported
USB	Yes
SDIO	Yes
UART	Yes
SPI	Yes
n_RESET	Yes
ADC	Yes
I^2C	Yes
PCM	Yes
I2S	Yes
GPIO	Yes
n_CARD_DETECT	Yes
PPS	Yes

1.3 Schematics

Schematics for the Breakout Board IoT Expansion Card and other expansion cards are available at http://mangoh.io.
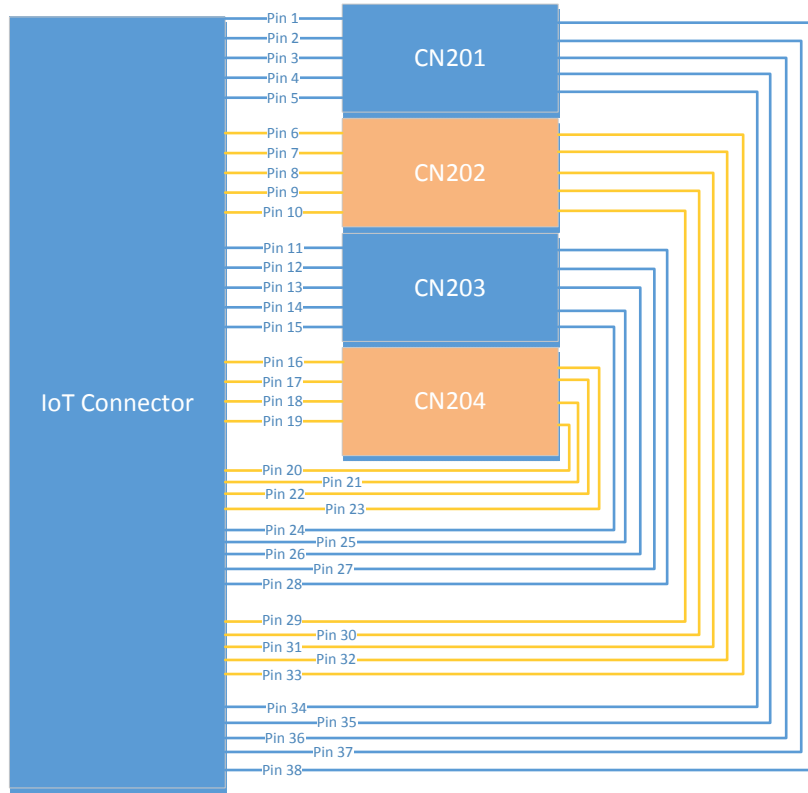
1.4 Pinout

Table 1-4: Pins Supported

Pin	Signal	Supported	Notes	Pin	Signal	Supported	Notes
1	VCC_5VC	Yes		20	ADC0	Yes	
2	USB_D+	Yes		21	GND	Yes	
3	USB_D-	Yes		22	I2C_SDA	Yes	
4	GND	Yes		23	I2C_SCL	Yes	
5	SDIO_CLK	Yes		24	GPIO_1	Yes	
6	SDIO_CMD	Yes		25	GPIO_2	Yes	
7	SDIO_DAT3/CD	Yes		26	GPIO_3	Yes	
		Yes			SPI_SRDY	Yes	
8	SDIO_DAT2	Yes		27	GPIO_4	Yes	
9	SDIO_DAT1	Yes		28	VCC_3V3	Yes	
10	SDIO_DAT0	Yes		29	VCC_3V3	Yes	
11	VCC_1V8	Yes		30	GND	Yes	
12	UART_TXD	Yes		31	n_CARD_DETECT	Yes	
13	UART_RXD	Yes		32	n_RESET	Yes	
14	UART_CTS	Yes		33	PCM_DIN	Yes	
		Yes			I2S_IN	Yes	
15	UART_RTS	Yes		34	PCM_DOUT	Yes	
		Yes			I2S_OUT	Yes	
16	SPI_CLK	Yes		35	PCM_SYNC	Yes	
		Yes			I2S_WC	Yes	
17	SPI_MISO	Yes		36	PCM_CLK	Yes	
		Yes			I2S_CLK	Yes	
18	SPI_MOSI	Yes		37	PPS	Yes	
19	SPI_SS/MRDY	Yes		38	GND	Yes	

1.5 System Block

Figure 1-2: Breakout Board IoT Expansion Card System Block

Note: Colors are used to identify groups of pins. No other meaning is implied.