



# mangOH™ Red

## User Guide



41110400

Rev 1

Contents subject to change

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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.

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## Document details

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Author: Sierra Wireless

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## Revision History

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|-----------------|---------------|------------------|
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# 1: Introduction

1



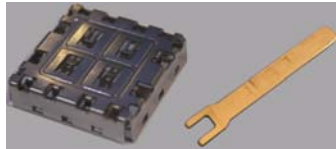


This user guide explains how to set up and begin using the mangOH™ Red with CF3 (Common Flexible Form Factor) modules.

Once you have the mangOH Red set up, visit [mangoh.io](http://mangoh.io) for developer documentation, code samples, and other materials.




## mangOH Red Components and Accessories

[Table 1-1](#) details the required and optional components needed to begin using the mangOH Red in your development environment. Some of these components are available in mangOH Red development kits (kit contents are supplier-dependent).

**Table 1-1: mangOH Red Required and Optional Components**

| Item   | Details  |
|--|--|
| mangOH Red   | Pre-configured development board for CF3 modules   |
| CF3 module(s)<br>(See <a href="#">Table 1-2 on page 7</a> for compatible Sierra Wireless modules.) | The module includes a cellular modem and an application processor running Legato, an open source embedded platform built on Linux for hosting IoT applications (see <a href="http://legato.io">legato.io</a> for details).                                  |
| CF3 module cover and cover removal tool  | Industrial-quality snap-in module cover, plus cover removal tool to disconnect the cover from the mangOH Red<br><i>Note: The cover and tool shown are for WP-series modules. A similar cover and tool (not displayed) are used for HL-series modules.)</i>  |
| Micro-USB cables   | Connect computer to the mangOH Red for communication and to provide power for non-transmitting tests.   |
| Antennas   | Main RF antenna included. Additional antennas may be connected for Diversity and Wi-Fi/Bluetooth.   |

**Table 1-1: mangOH Red Required and Optional Components (Continued)**

| Item                 | Details  |
|----------------------|--|
| GNSS Antenna         | Optional antenna may be connected for GNSS reception.<br>   |
| Micro-SIM card       | <ul style="list-style-type: none"> <li>Sierra Wireless micro-SIM card (included) with initial data allocation</li> <li>User-provided micro-SIM with an active account</li> <li>User-provided test card for use with a call box.</li> </ul>  |
| Audio cable (3.5 mm) | Audio cable or headset<br>  |

The mangOH Red schematic (available at [mangoh.io](http://mangoh.io)), describes all interfaces supported by the mangOH Red. However, some of these signals are not supported by some CF3 modules.

The following table identifies supported Sierra Wireless CF3 modules and identifies signals that (as of publication date of this document) are currently not supported. Refer to <http://source.sierrawireless.com> for current Product Technical Specification Documents.

**Table 1-2: mangOH-compatible Sierra Wireless CF3 Modules**

| Supported modules                              | mangOH Signals Not Supported By CF3 Module   |                    |                 |                    |
|--|--|--------------------|-----------------|--------------------|
|  | Pin  | mangOH Signal Name | CF3 Signal Name | Module Signal Name |
| WP7502<br>WP7504<br>WP7601<br>WP7603<br>WP8548 | 43   | IOT2_GPIO4         | EXT_GPS_LNA_EN  | EXT_GPS_LNA_EN     |
|  | 92   | SPI2CLK            | SPI2CLK         | GPIO38             |
|  | 93   | SPI2_MOSI          | SPI2_MOSI       | GPIO39             |
|  | 94   | SPI2_MISO          | SPI2_MISO       | GPIO40             |
|  | 95   | SPI2_MRDY          | SPI2_CS0        | GPIO41             |
|  | 100  | GPIO_Lowpower2     | GPIO34          | GPIO34             |
|  | 101  | GPIO_Lowpower1     | GPIO35          | GPIO35             |
|  | 102  | GPIO20/SWD_CLK     | GPIO36          | GPIO36             |
|  | 103  | GPIO31/SWD_DIO     | GPIO37          | GPIO37             |
|  | 152  | PWR_IND            | SAFE_PWR_REMOVE | SAFE_PWR_REMOVE    |
| HL%%   | %%Update as necessary - check with Ashish which signals vary between mangOH and module |                    |                 |                    |



## 2: Setup and Installation

## 2

### Safe Handling Recommendations

To help prevent accidental damage to the mangOH Red:

- Use safe ESD-handling practices (such as wearing proper ESD straps) to avoid possible ESD damage.
- Avoid touching the CF3 module (J200). These pins can be damaged if caught on clothing or other materials.

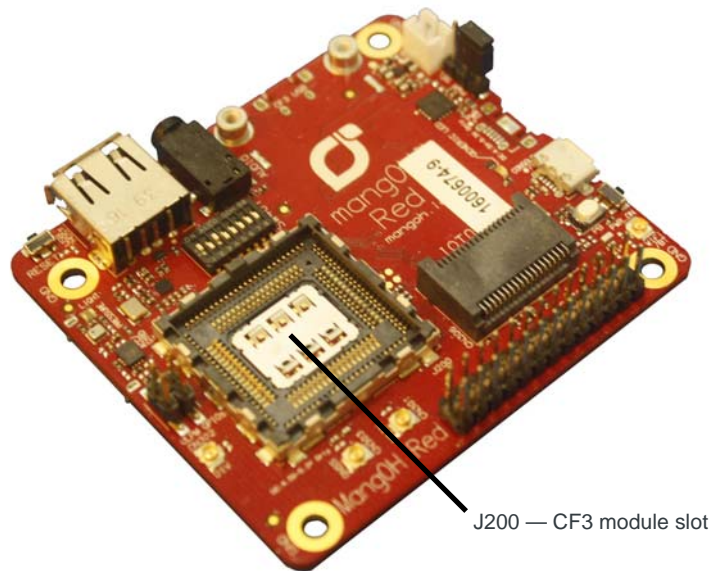


Figure 2-1: Safe Handling Recommendations—CF3 Socket (Do Not Touch)

- Optionally, attach standoffs (not included) to the mounting holes at each corner of the board to avoid damage to components on the bottom side of the board.



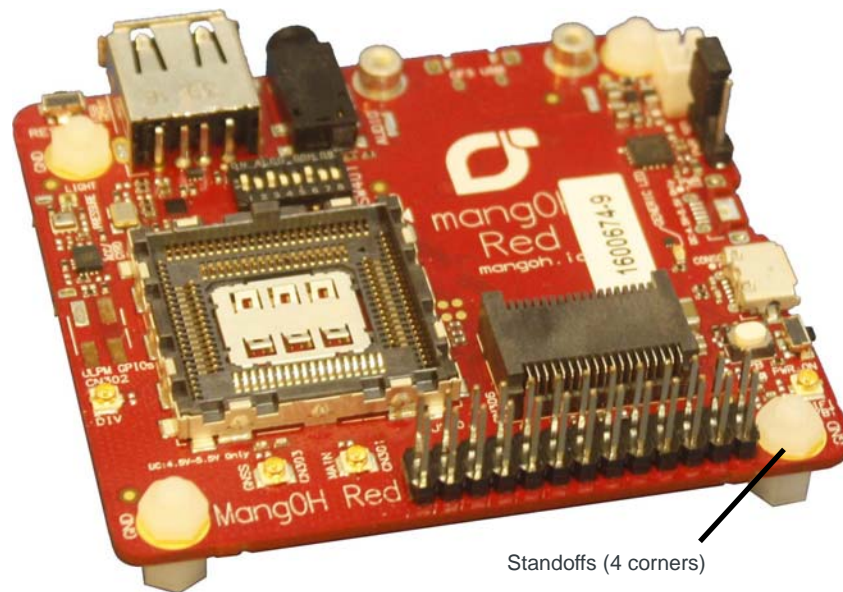


Figure 2-2: Module with Standoffs

## Initial Setup

To begin using the mangOH Red, set up your hardware and software:

1. Insert a supported CF3 module in the socket. See [Insert/Remove Embedded Module](#) on page 11.
2. [Select Primary Power Supply](#). See page 14.
3. If you will be establishing a mobile network connection, insert a micro-SIM. See [Inserting a micro-SIM Card](#) on page 19.
4. [Connect Antenna\(s\)](#). See page 17.
5. [Install / Update Windows Driver](#). See page 34.
6. Power up the mangOH Red—Plug one end of a micro-USB cable into the mangOH Red connector that you selected as the power supply in [Step 2](#) and plug the other end into your computer or an AC adapter.

---

*Note: If the mangOH Red is powered from an AC adapter, choose the appropriate micro-USB connector:*

*Console—This leaves the CF3 connector available to access the CF3 module's ECM port, issue AT commands, and download firmware updates to the Wi-Fi/Bluetooth module.*

*CF3 USB—This leaves the Console connector available to access the consoles of the CF3 module or Wi-Fi/Bluetooth module (switch-selectable), and to download firmware updates to the CF3 module.*

---

If you connected the cable to the correct micro-USB slot, the **power LED on the bottom side of the mangOH Red turns on.**

7. Use a second mini-USB cable to connect the remaining mangOH Red USB connector (CF3 USB or Console) to your computer.



**8. [Install a Terminal Emulator](#).** See page 35.

The mangOH Red is now ready to be used.

- For information on additional hardware features, see [Hardware Setup and Features](#) on page 11.
- For instructions on writing a program, see [Write Your First Program](#) on page 35.

# 3: Hardware Setup and Features

## 3

This chapter describes:

- How to install various components on the mangOH Red
- Available connectors
- How to configure and control features using connectors and switches

## Insert/Remove Embedded Module

The mangOH Red has one CF3 module socket. (For a list of supported Sierra Wireless CF3 modules, see [Table 1-2](#) on page 7.)

To insert a CF3 module:

1. Place the mangOH Red face-up.



Figure 3-1: mangOH Red—Top View

2. Hold the module above the socket and line up the polarity marks on the module and socket. (Primary module installation shown.)



*Figure 3-2: CF3 Module Positioning*

3. Place the module in the socket. The module should drop into place when you have it aligned properly. Do not insert at an angle as this may damage the socket pins.



*Figure 3-3: CF3 Module Inserted*

4. Attach the module cover:
  - a. Hold the module cover above the CF3 module and line up the polarity marks on the module and cover.

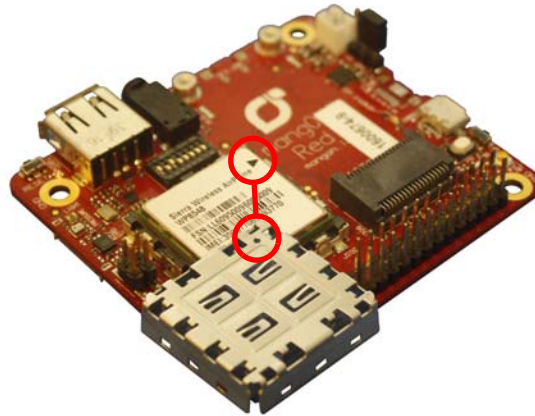


Figure 3-4: Installing Module Cover

- b. Place the cover on the module, then press down carefully until you hear the cover click into place. Make sure all sides of the cover have clicked into place.

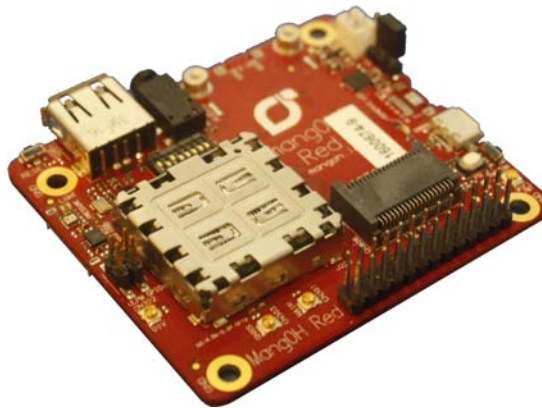


Figure 3-5: Module Cover Installed

To remove a CF3 module (primary module displayed below):

1. Remove the module cover using the module cover removal tool—Starting at one corner, insert the tool in the pair of holes and carefully pry the cover away from the module.
2. Repeat at the other locations (pairs of pry holes are on each side).

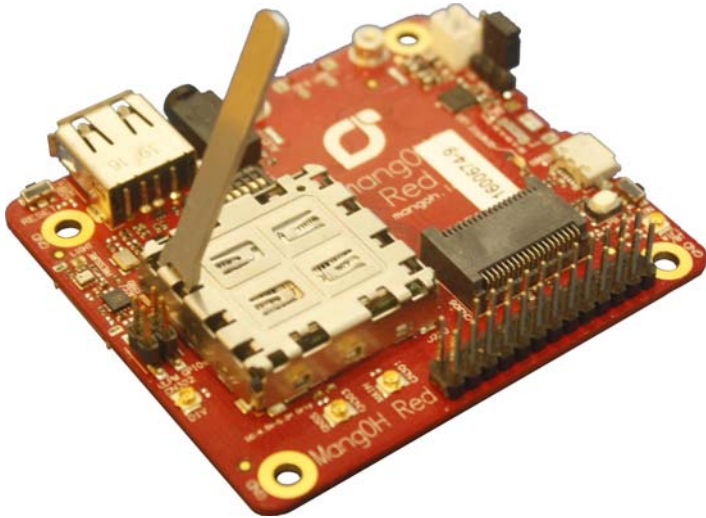


Figure 3-6: Removing the Module Cover

- 3. Lift the cover off the module.
- 4. Carefully lift the module straight up out of the socket.

## Power Supply Sources

The mangOH Red is powered via either of the board’s micro-USB connectors or an optional backup battery. The micro-USB connectors can connect to a computer’s USB port or, if greater power is required, to an AC adapter.

Table 3-1: mangOH Red Power Supplies

| Supply  |                              | Details  |
|---------|------------------------------|--|
| Primary | CN305—USB console connector  | Provides a serial connection to the mangOH Red.  |
|         | CN801—CF3 Main USB connector | Provides access to CF3 interfaces (ECM port, AT port, etc.)  |
| Backup  | CN802—Battery                | An optional Li-ion or Li-polymer (3.7 V nominal) rechargeable battery can be installed to power the board if the primary power supply fails. |

## Select Primary Power Supply

*Note: If you want to power the mangOH Red with an AC adapter instead of a computer’s USB connector, choose the appropriate micro-USB connector:*

*Console—This leaves the CF3 connector available to access the CF3 module’s ECM port, issue AT commands, and download firmware updates to the Wi-Fi/Bluetooth module.*



*CF3 USB—This leaves the Console connector available to access the consoles of the CF3 module or Wi-Fi/Bluetooth module (switch-selectable), and to download firmware updates to the CF3 module.*

To select the primary power supply:

1. Place the mangOH Red face-up and locate the power select (PWR SEL) jumper pins (CN804).

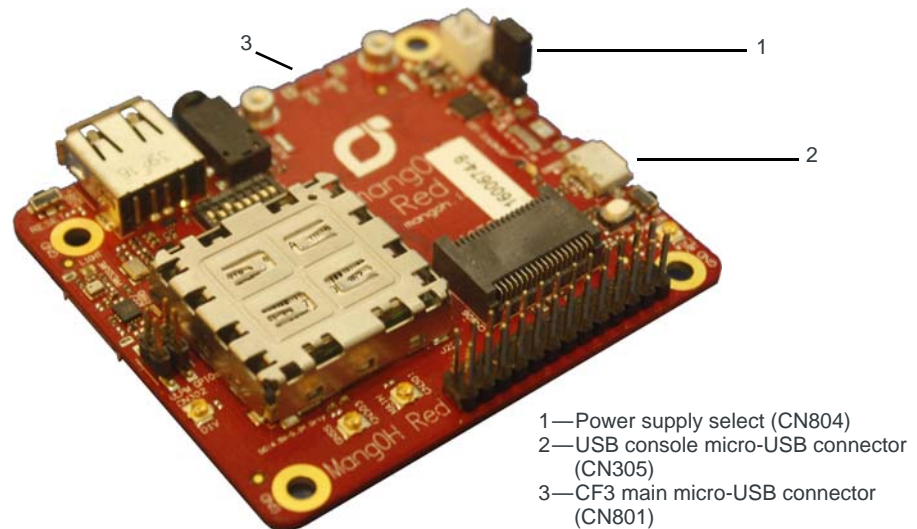


Figure 3-7: Power Supply Select (CN804)

2. Select the power source:
  - CF3 main connector—Place a jumper across the two pins closest to USB connector CN801.
  - USB console connector—Place a jumper across the two pins closest to USB connector CN305.

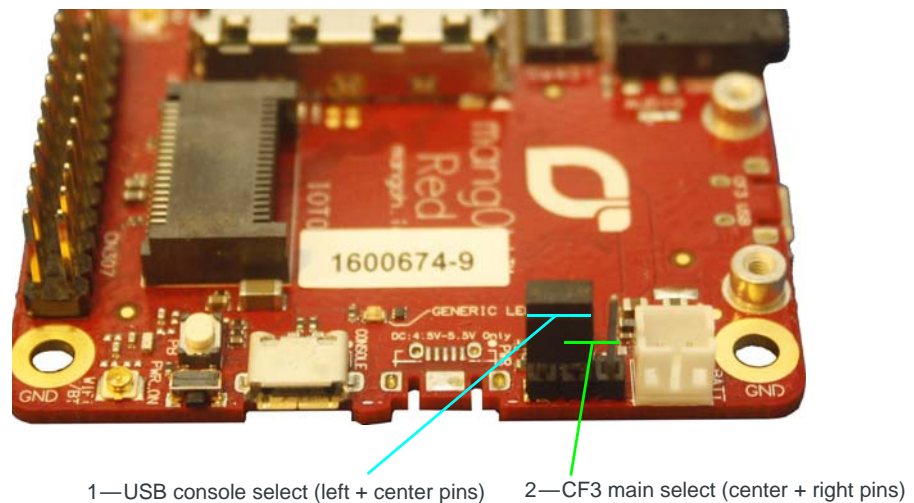


Figure 3-8: Power Source Select (DC power shown)

## Connect Battery Backup

Optionally, you can connect a rechargeable Li-Ion/Li-Polymer battery to the mangOH Red to provide uninterrupted power in the event that the primary power supply fails.

If SW401 pin 5 is ON, the mangOH Red recharges the battery and then provides a trickle charge to maintain the battery's full charge.

To connect a rechargeable Li-Ion/Li-Polymer battery to the mangOH Red:

1. Connect the battery to CN802.

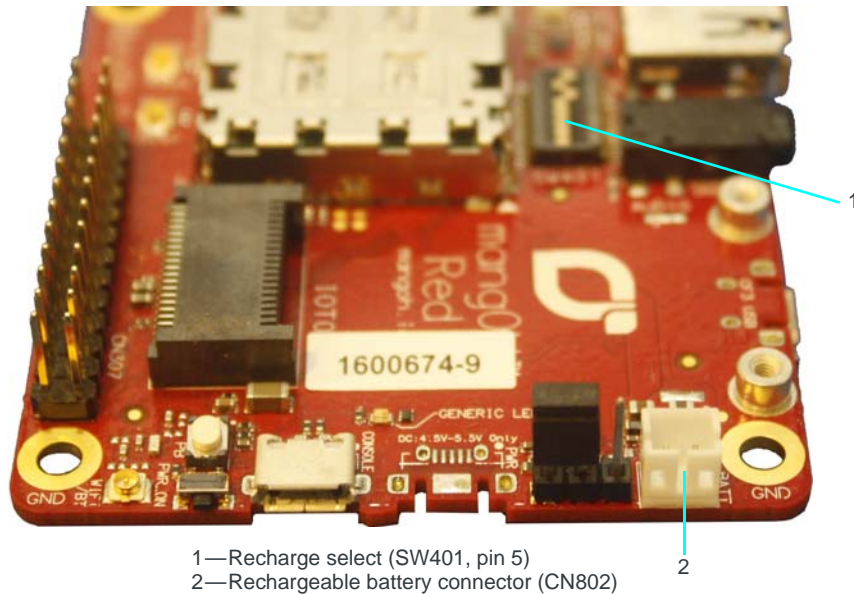


Figure 3-9: Battery Backup Connector

2. If you want the battery to recharge while connected to the board, set switch SW401 pin 5 to ON.

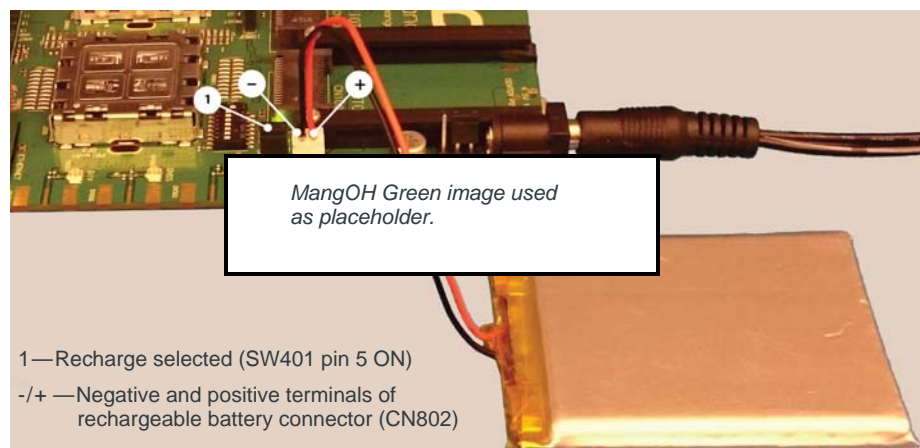


Figure 3-10: mangOH Red With Rechargeable Battery Connected





**Caution:** If a rechargeable battery is not connected to the board, make sure to set switch SW401 pin 5 to OFF.

**Caution:** The board is designed to use a rechargeable Li-Ion or Li-polymer battery. Regular (non-rechargeable) batteries are NOT recommended. However, if a regular battery is used, switch SW401 pin 5 MUST be set to OFF, otherwise the battery and possibly the board will be damaged.

## Connect Antenna(s)

The mangOH Red includes four antenna ports for the primary CF3 module.

**Table 3-2: Antenna Ports**

| Type              | Connector <sup>a</sup> | Details   |
|-------------------|------------------------|---|
| Main              | CN301                  | Required to establish a mobile network data connection  |
| Diversity         | CN302                  | Used only if primary CF3 supports diversity.  |
| GNSS              | CN303                  | <ul style="list-style-type: none"><li>Required to enable access to GNSS functionality</li><li>Active</li><li>3.3 V bias voltage</li></ul> |
| Wi-Fi / Bluetooth | CN1000                 | Required to establish TBD   |

a. U.FL connectors



To connect an antenna to the Main, Diversity, GNSS, or Wi-Fi/Bluetooth antenna connector:

1. Place the mangOH Red face-up.

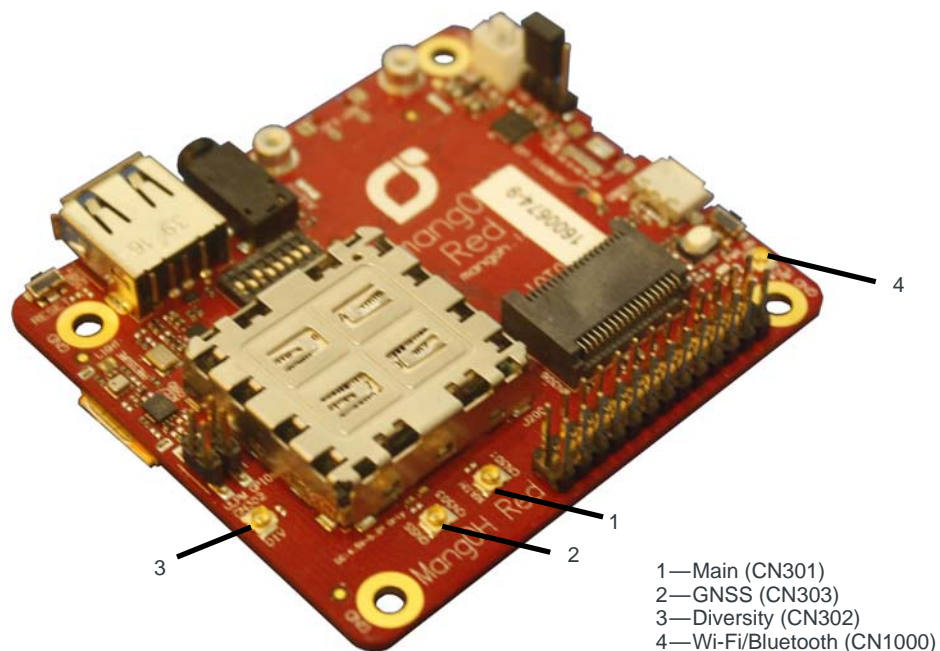


Figure 3-11: Antenna Connector Locations

2. Attach the antenna cable's female connector to the board's male connector and press firmly to get a secure connection.

(Note that female connectors are rated for a limited number of reconnects before the connector wears out, so should be left connected if possible. Use a U.FL extraction tool to put less strain on the connector during removal.)

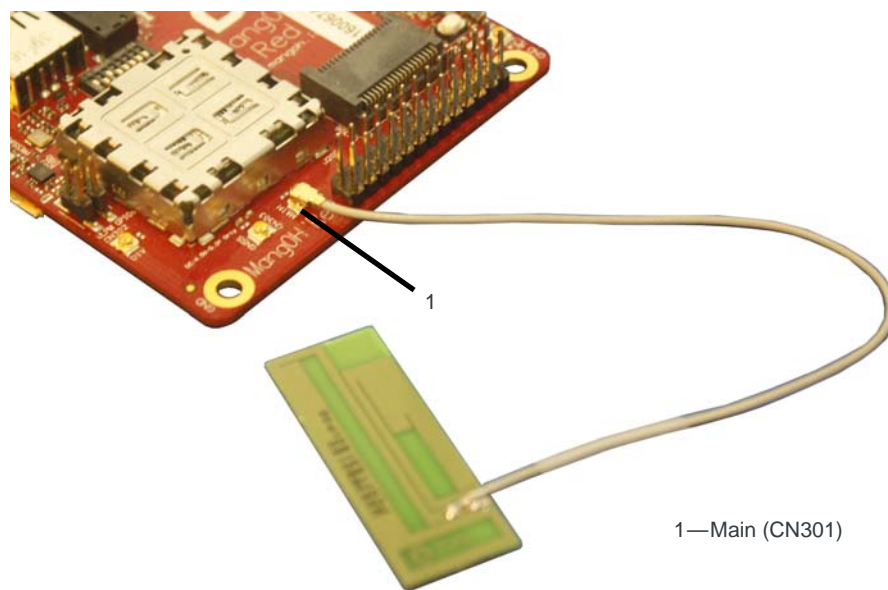


Figure 3-12: Main Antenna Connected

## SIM, SD, and IoT Expansion Cards

### Inserting a micro-SIM Card

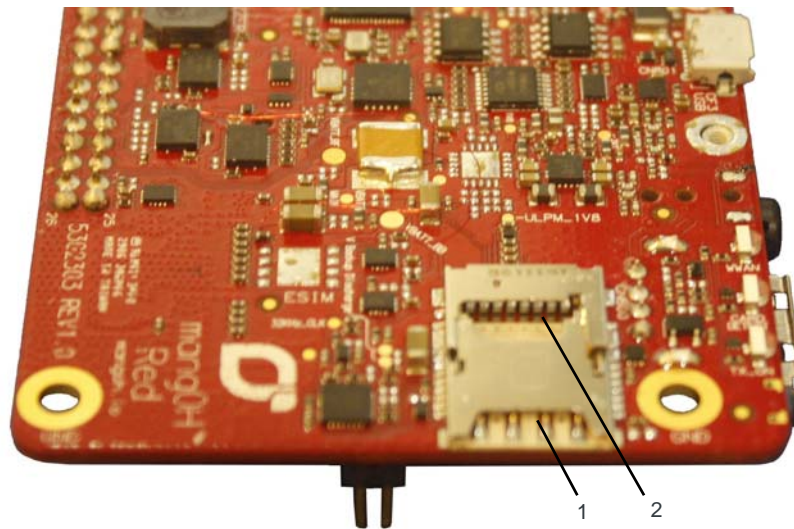


To establish a mobile network connection with a **UMTS/LTE** CF3 module, you must install a micro-SIM in the connector on the bottom side of the mangOH Red. Use either of the following:

- Live SIM card with active account (e.g. the Sierra Wireless SIM provided with the kit, or another carrier's activated card), *or*
- Test SIM card for use with a call box (for example, an Agilent 8960 or Rohde & Schwarz CMU200)

To install a SIM card:

1. Place the Dev Kit face-down (as shown).



- 1—micro-SIM (CN600—bottom)  
2—micro-SD (CN600—top)

Figure 3-13: SIM Connector and micro-SD Locations

2. Insert the SIM card with contacts face-down into the desired slot—note the location of the notched corner of the card in [Figure 3-14](#).

---

**Important:** CN600 is a dual-connector—the lower slot is for the micro-SIM, and the upper slot is for a microSD card.

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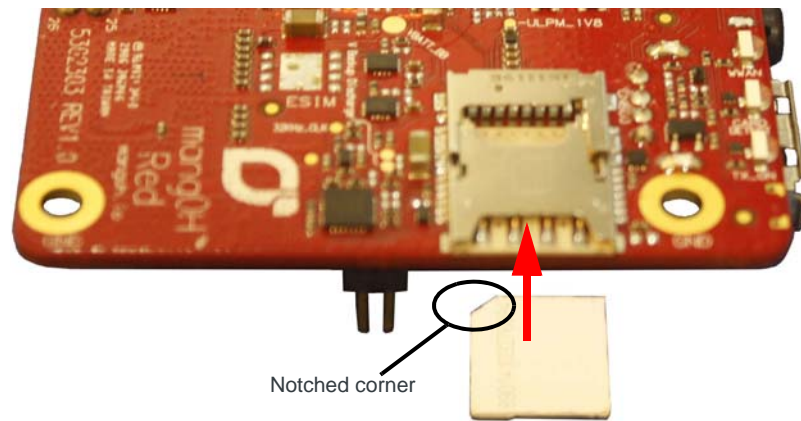


Figure 3-14: SIM—Inserting

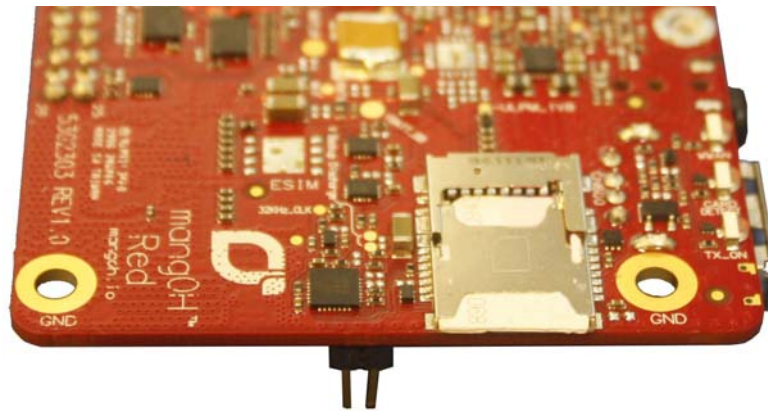
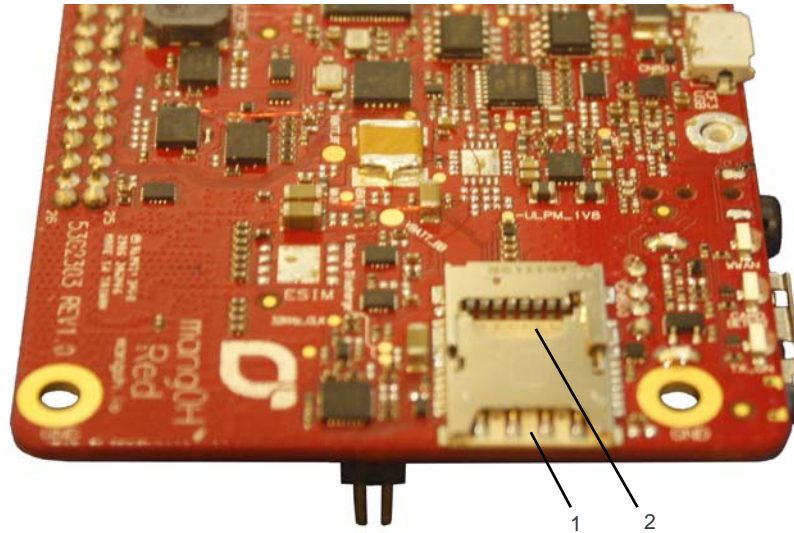


Figure 3-15: SIM—Inserted

## Inserting a microSD Card

To install a microSD card:

1. Place the Dev Kit face-down (as shown).



- 1—micro-SIM (CN600—bottom)  
2—microSD (CN600—top)

Figure 3-16: micro-SIM/microSD Connector Location

2. Insert the microSD card with contacts face-down into the top slot of CN600.

---

**Important:** CN600 is a dual-connector—the upper slot is for the microSD card, and the lower slot is for a micro-SIM.

---

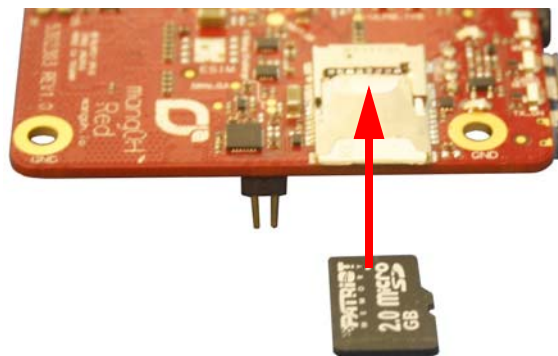


Figure 3-17: microSD—Inserting



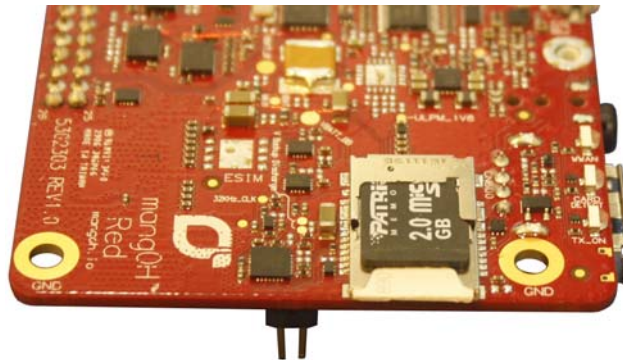


Figure 3-18: microSD—Inserted

## Inserting/Removing an IoT Expansion Card

The mangOH Red includes one IoT Expansion Card slot.

---

**Caution:** Handle IoT Expansion Cards carefully to make sure components are not accidentally damaged. Hold them by their edges to avoid possible ESD damage.

---

To install an IoT Expansion Card:

1. Remove power from the mangOH Red (disconnect the micro-USB cable from the computer or AC adapter).

---

*Note:* You must remove the power because IoT Expansion Cards are not hot-swappable—the card will be recognized when power is reapplied.

---

2. Check the expansion card to make sure you know which side is the top. (Expansion cards must not be inserted upside-down.)
3. Slide the expansion card straight into the IoT Connector (CN306).
4. Use **two screws** to secure the expansion card to the standoffs.

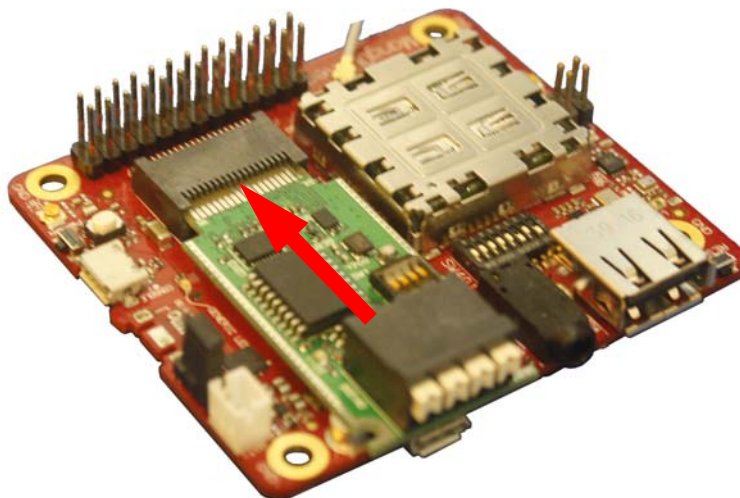


Figure 3-19: IoT Expansion Card Insertion

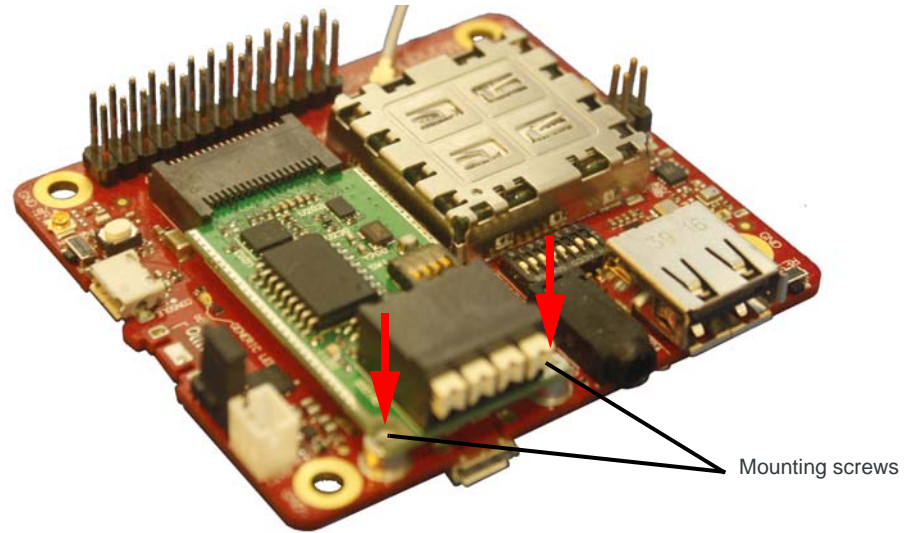


Figure 3-20: IoT Expansion Card Inserted

To remove an IoT Expansion Card:

1. Remove the two screws.
2. Pull the expansion card straight out, using safe ESD-handling practices (such as wearing proper ESD straps).

For detailed IoT Expansion Card slot interface information, refer to the mangOH Red Developer's Guide. For detailed information about expansion cards, refer to the IoT Expansion Card Specification.

## Peripheral Connectors

### Raspberry Pi Connector

CN307 is a 26-pin connector that provides access to primary Raspberry Pi Rev B pin functions.

Raspberry Pi-compatible connector



Figure 3-21: Raspberry Pi Connector

## Audio Connection

The mangOH Red includes a 3.5 mm audio jack (CN500) for use with audio-enabled CF3 modules. If supported by the CF3 module, the jack can be used to make a voice call.

By default, the audio jack is connected to the onboard mangOH codec, and is configured for use with a CTIA/AHJ-compatible headset. For details, see [Table 3-4](#) on page 29.

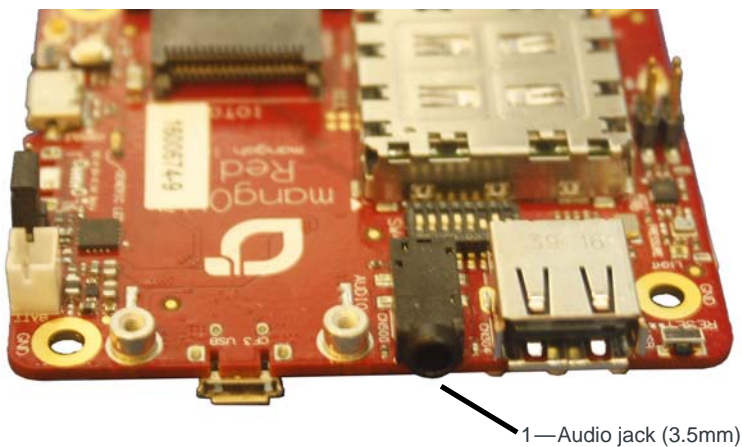


Figure 3-22: Audio Output Jack

## USB Host Connection

The mangOH Red includes a USB 2.0 Host port (CN304) for attaching a peripheral device, memory stick, etc.

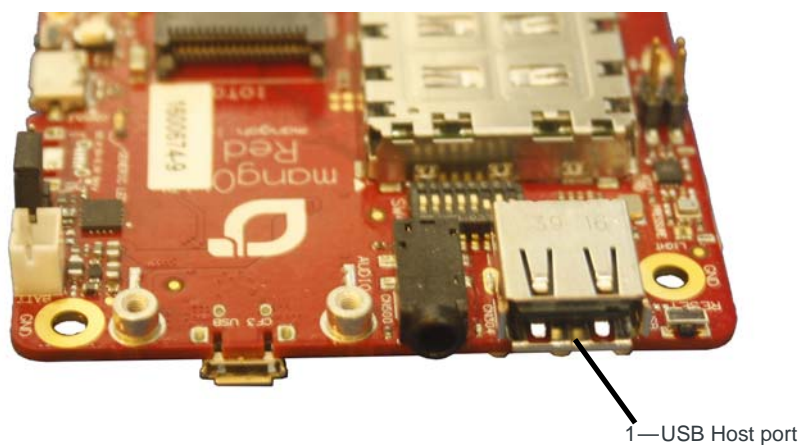


Figure 3-23: USB Host Port



## Control Connections

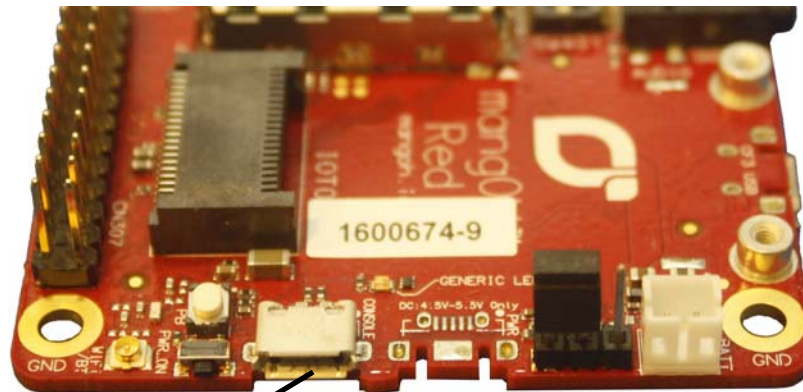
### USB Console Connector



The mangOH Red includes a micro-USB 2.0 connector (CN305) for console access.

By default, this port is enabled and configured to connect to the primary module's two-wire UART interface (UART2).

The connection can be used to access the CF3 module's Linux console (on Smart CF3 modules), Wi-Fi/Bluetooth console, and to install firmware downloads on the CF3 module.



micro-USB Console Connector

Figure 3-24: USB Console Output Connection

### CF3 USB Connection



The mangOH Red includes a micro-USB 2.0 connector (CN801) for access to the CF3 module's interfaces (ECM, AT, etc.), and to install firmware downloads on the Wi-Fi/Bluetooth module.

By default, this port is enabled and configured to connect to the primary module's TBD interface.

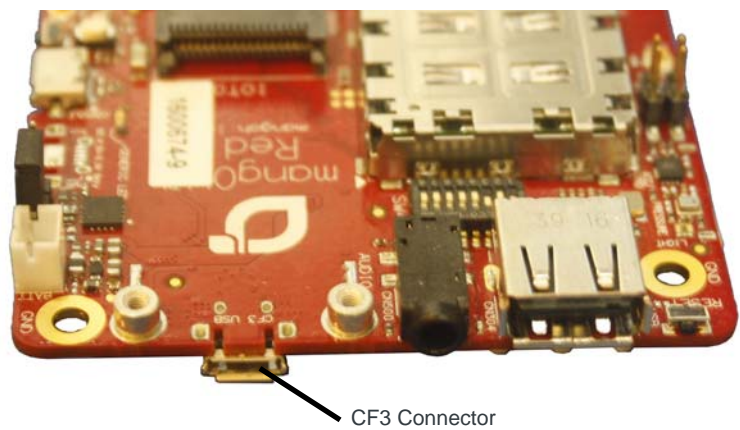


Figure 3-25: CF3 USB Connector

## LED Indicators

The mangOH Red includes several LED indicators.

Table 3-3: mangOH Red LEDs

| LED                    | Description   |
|------------------------|---|
| 1—Power (VCC_3V3)      | D803 - On when power is supplied by any power source (USB, battery)                             |
| 2—IoT Expansion Card 0 | D401 - On when an IoT Expansion Card is installed in slot IOT0.                                 |
| 3—CF3 RF Rx/Tx         | D402 - On when the primary CF3 module is sending (Tx) or receiving (Rx) data                    |
| 4—WLAN connected       | D200 - On when the device is connected to a WLAN<br><i>Note: Off when low power is enabled.</i> |
| TBD Generic            | D410 - Connected to WP_GPIO_7_lvl   |



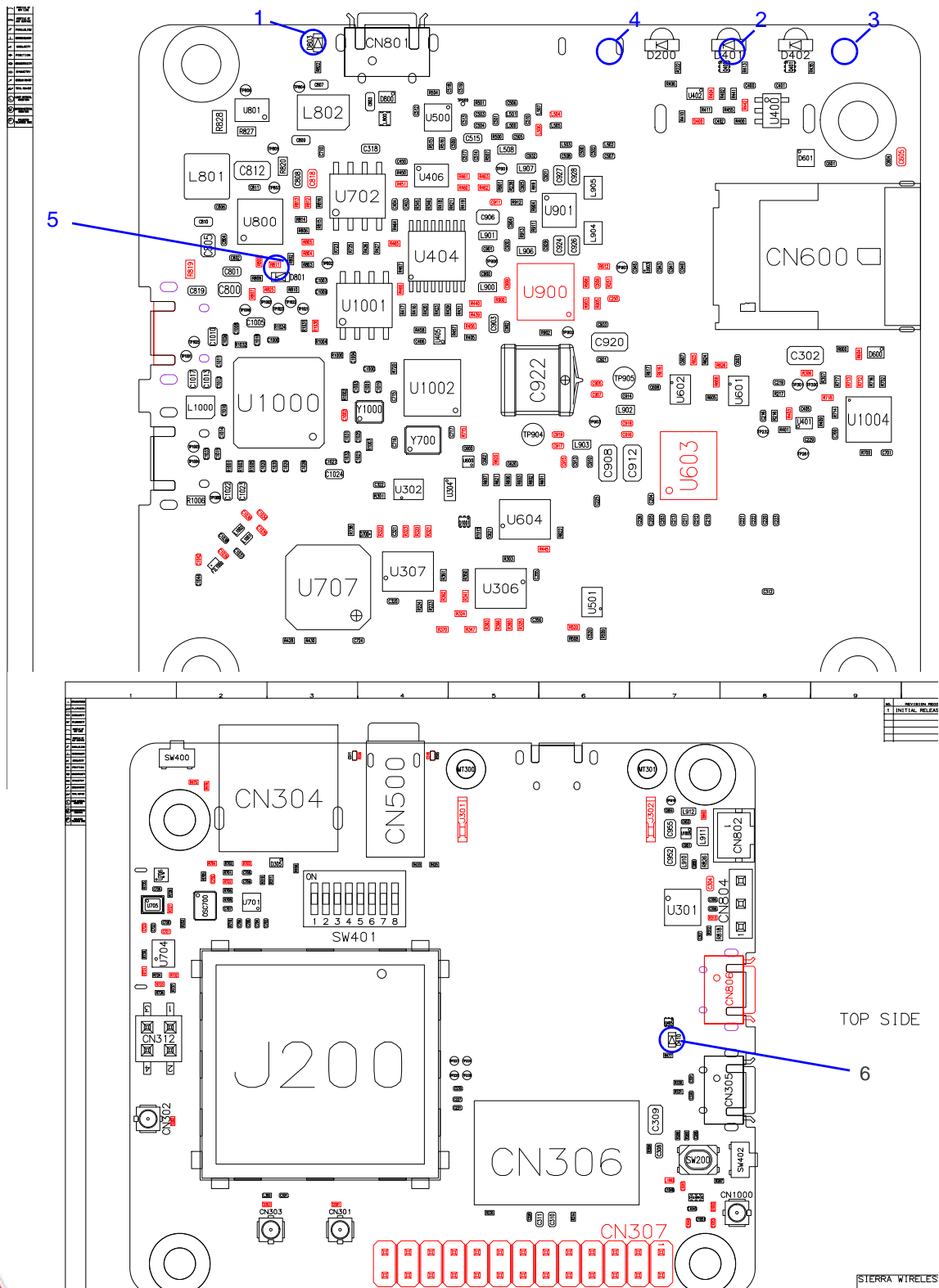


Figure 3-26: LED Indicators (mangOH Red Configuration) - NEW DRAWING REQUIRED



## Switches

### Reset Switches

The mangOH Red includes two reset switches:

- Board reset (SW400)—Press and hold for 5 seconds to reset the board.

---

*Note: When the board is resetting, the reset signal is held LOW until the primary module is fully booted.*

---

- ULPM/PWR\_ON (SW402)—**TBD**
- Generic button (SW200)—For user-defined purposes.

For details on resetting the mangOH Red or specific application blocks, see the mangOH Red Developer's Guide.

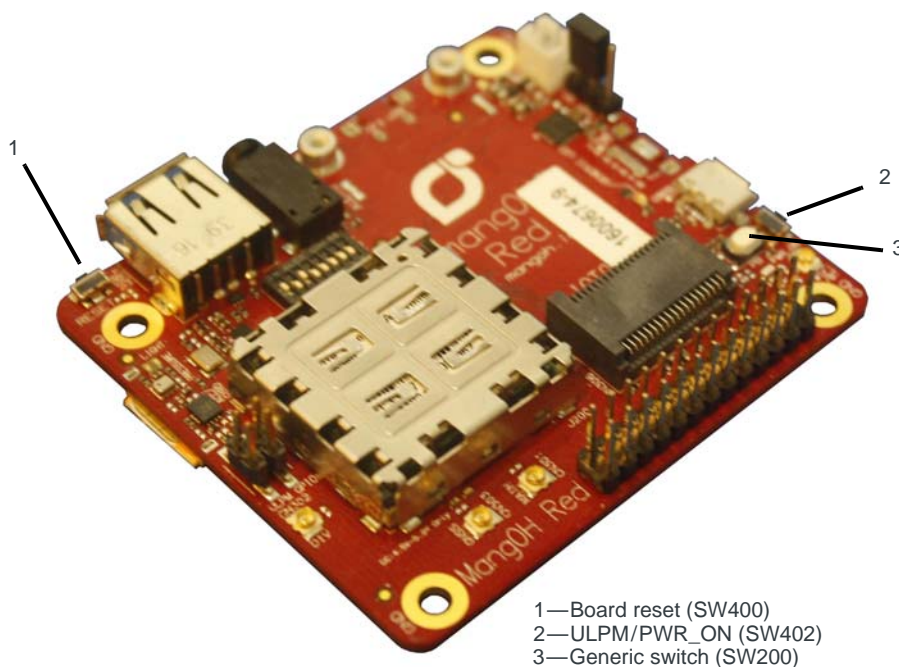


Figure 3-27: Reset Switches

### ULPM/PWR\_ON switch?

TBD

### Generic switch

Generic switch for user-defined purposes.

# mangOH Red Configuration

## Default Configuration

The mangOH Red's default configuration is described in [Table 3-4](#).

**Table 3-4: mangOH Red Default Configuration**

| Component/<br>Switch   | Default Configuration/Behavior  | Notes  |
|--|---|--|
| Antenna connectors<br>(Main, Diversity,<br>GPS, Wi-Fi/<br>Bluetooth) | <ul style="list-style-type: none"> <li>U.FL connectors</li> <li>3.3 V bias voltage for active antennas</li> </ul>   |  |
| Audio connector<br>(CN500)   | <ul style="list-style-type: none"> <li>Connected to onboard mangOH codec</li> <li>CTIA/AHJ-compatible headset</li> </ul>  | Reconfiguration to use an OMTP-compatible headset requires soldering.  |
| Console USB<br>connector (CN305)                                     | <ul style="list-style-type: none"> <li>Enabled</li> <li>Connected to primary module's UART2</li> </ul>  |  |
| CF3 USB connector<br>(CN801)   | <ul style="list-style-type: none"> <li>TBD</li> </ul>   |  |
| Raspberry Pi-<br>compatible<br>connector (CN307)                     | TBD   |  |
| LEDs   | All LEDs are enabled and will exhibit their default behaviors   |  |
| System reset signal<br>(RESET_IN_N)                                  | Held LOW until primary module is fully booted   | Peripherals on the mangOH Red are not activated until the module is fully booted.  |
| SIM1 Detect  | SIM1 Detect uses physical sensor to detect SIM card insertion/removal   |  |
| SD connector<br>(CN600)  | Connected to CF3 module   | Board can be configured using a software command to connect the module's SDIO signals to IOT1 instead of the SD connector. |
| Peripheral interfaces<br>(UART, SPI, I2C,<br>etc.)                   | See the mangOH Red Developer's Guide for details.   |  |
| Module Signals<br>Control (SW401)                                    | <ul style="list-style-type: none"> <li>PWR_ON (Dip 1)=tbd</li> <li>WIFI_UART1_TX (Dip 2)=tbd</li> <li>VCC_3V7_ULPM (Dip 3)=tbd</li> <li>HL_MODE (Dip 4)=tbd</li> <li>BATT_TS+ (Dip 5)=tbd</li> <li>CONSOLE_DIR (Dip 6)=tbd</li> <li>TP1_BOOT (Dip 7)=OFF</li> <li>LowPower_RESET=tbd</li> </ul> |  |

## Switch and Jumper Configuration Options

The mangOH Red uses several switches and jumpers to configure the board and CF3 module's operation, as detailed below in [Table 3-5](#) through [Table 3-7](#).

To locate these switches and jumpers, see [Figure 3-28](#) on page 31 and [Figure 3-29](#) on page 32.

**Table 3-5: CN804—Board Power Select<sup>a</sup>**

| Power supply selection              | Jump 1–2 | Jump 2–3 |
|-------------------------------------|----------|----------|
| Console micro-USB connector (CN305) | Yes      |          |
| CF3 USB micro-USB connector (CN801) |          | Yes      |

a. Required: Select one option only (Jump 1–2 or Jump 2–3). For details, see [Select Primary Power Supply](#) on page 14.

**Table 3-6: CN312—ULPM GPIO**

|     | Jump 1–2 |
|-----|----------|
| TBD |          |
|     |          |

**Table 3-7: SW401—Module Signals Control**


| Signal               | Dip | On / Off      | State  |
|----------------------|-----|---------------|--|
| <b>PWR_ON</b>        | 1   | On (Default)  | Enable CF3 module's POWER_ON signal  |
|                      |     | Off           | Disable POWER_ON signal  |
| <b>WIFI_UART1_TX</b> | 2   | On            | Enable CF3 module's firmware download (recovery) mode.<br><i>Note: Similar functionality to TP1_BOOT</i> |
|                      |     | Off (Default) | TBD                 |
| <b>VCC_3V7_ULPM</b>  | 3   | On (Default)  | While in ULPM, CF3 module and accessories receive power.   |
|                      |     | Off           | While in ULPM, only the CF3 module and accessories receive power.  |
| <b>HL_MODE</b>       | 4   | On            | When combined with LowPower_RESET, indicates that board is in HL mode.                                   |
|                      |     | Off (Default) | When combined with LowPower_RESET, indicates that board is in WP mode.                                   |
| <b>BATT_TS+</b>      | 5   | On            | Enable backup battery charging.  |
|                      |     | Off (Default) | Disable backup battery charging.   |

Table 3-7: SW401—Module Signals Control (Continued)

| Signal                | Dip | On / Off      | State   |
|-----------------------|-----|---------------|---|
| <b>CONSOLE_DIR</b>    | 6   | On            | Console USB connector accesses the Wi-Fi/Bluetooth module's console.  |
|                       |     | Off (Default) | Console USB connector access the CF3 module's console.<br><i>Note: To download firmware to the Wi-Fi module, set CONSOLE_DIR OFF.</i> |
| <b>TP1_BOOT</b>       | 7   | On            | Enable CF3 module's TP1 (boot) signal functionality. Pull the signal low to enter download mode for firmware updates.                 |
|                       |     | Off (Default) | CF3 module functions normally.  |
| <b>LowPower_RESET</b> | 8   | On            | When combined with LowPower_RESET, indicates that board is in WP mode.  |
|                       |     | Off (Default) | When combined with LowPower_RESET, indicates that board is in HL mode.  |

- 1—IoT Expansion Card slot #0 (IOT0)
- 2—Power supply select (CN804)
- 3—Battery connector (CN802)
- 4—Signals control (SW401)
- 5—Main antenna
- 6—GNSS antenna
- 7—Diversity antenna
- 8—Wi-Fi/Bluetooth antenna
- 9—USB Host
- 10—Audio
- 11—Generic LED
- 12—μUSB console connector
- 13—Raspberry PI RevB-compatible header
- 14—Generic button
- 15—PWR\_ON switch
- 16—Reset switch
- 17—CF3 socket

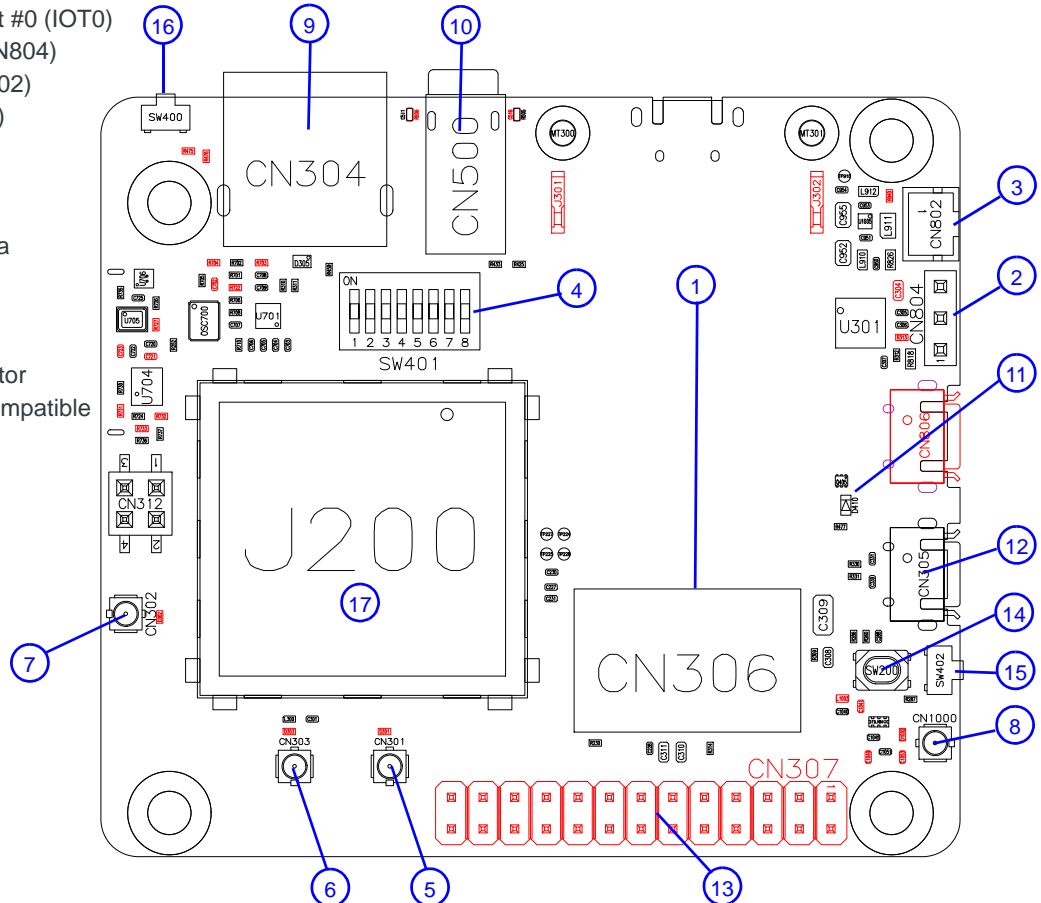


Figure 3-28: mangOH Red Assembly—Top Side Switches/Connectors

Note: For reference only. For latest schematic, visit [mangoh.io](http://mangoh.io).

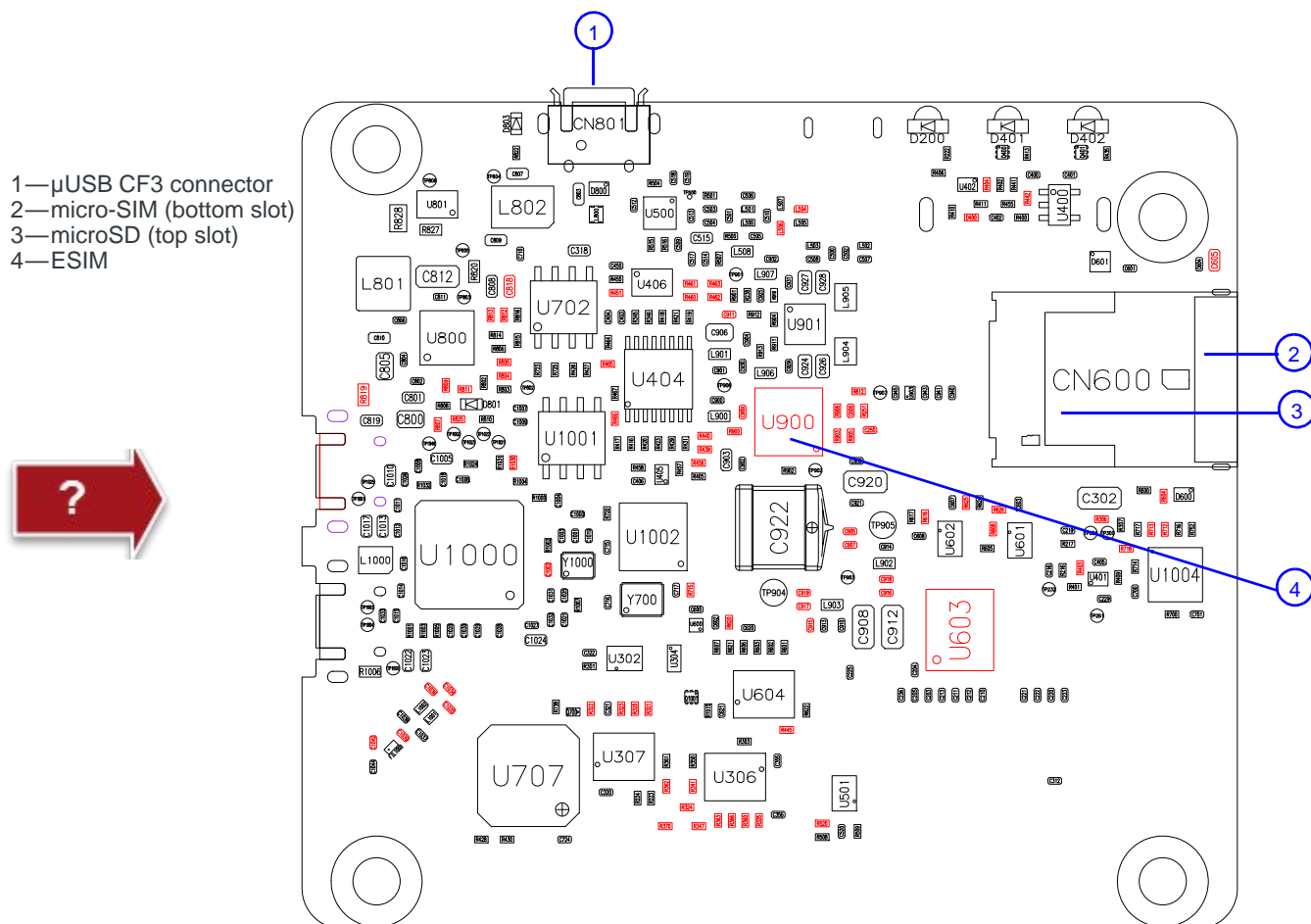


Figure 3-29: mangOH Red Assembly - Bottom Side Switches/Connectors

Note: For reference only. For latest schematic, visit [mangoh.io](http://mangoh.io).



## mangOH Red Zones

Placeholder section.

You indicated that the sensor section was being updated (and there might have been some other changes).

Please let me know what additional items on the board should be called out.

And did you want to refer (in this doc) to the various 'zones' on the board?

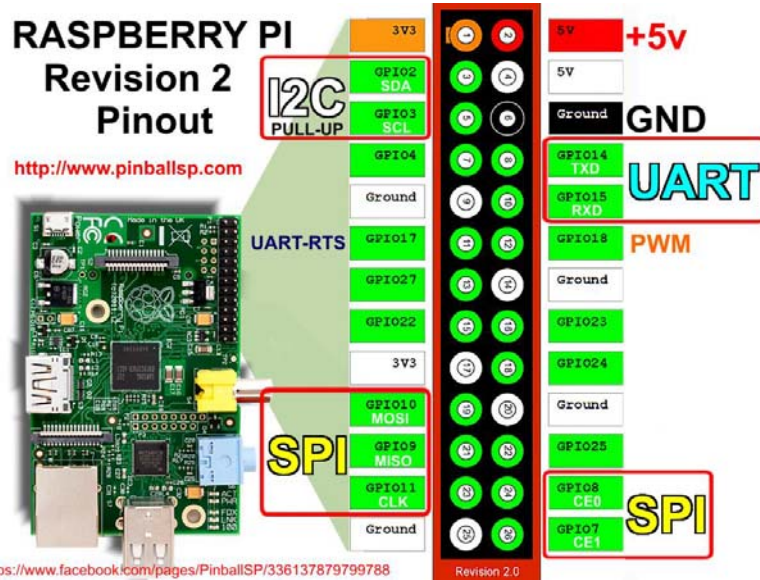


Figure 3-30: mangOH Red %Zones

## I/O Zone

%%blah

## IP Zone

%%blah

## Robotic/Drone Zone

%%blah

%%talk with ARM® Cortex-M4 on-board processor.

# 4: Software Setup

## 4

This chapter describes software resources that you will need on your computer to access the mangOH Red and develop applications for its CF3 module.

Sample applications and instructional materials are available from the sites mentioned in this chapter. For detailed information on developing for the mangOH Red, see the mangOH Red Developer's Guide and related documents (available from [mangoh.io](http://mangoh.io)).

## Install / Update Windows Driver

If you are using a Windows computer, you must install the Legato driver for the CF3 module that you install in your mangOH Red.

1. Visit [mangoh.io](http://mangoh.io) to download the Windows driver and driver installation instructions for your CF3 module.
2. Install the Windows driver.
3. When the mangOH Red is connected via USB to the computer, display the Device Manager (Control Panel > System > Device Manager).

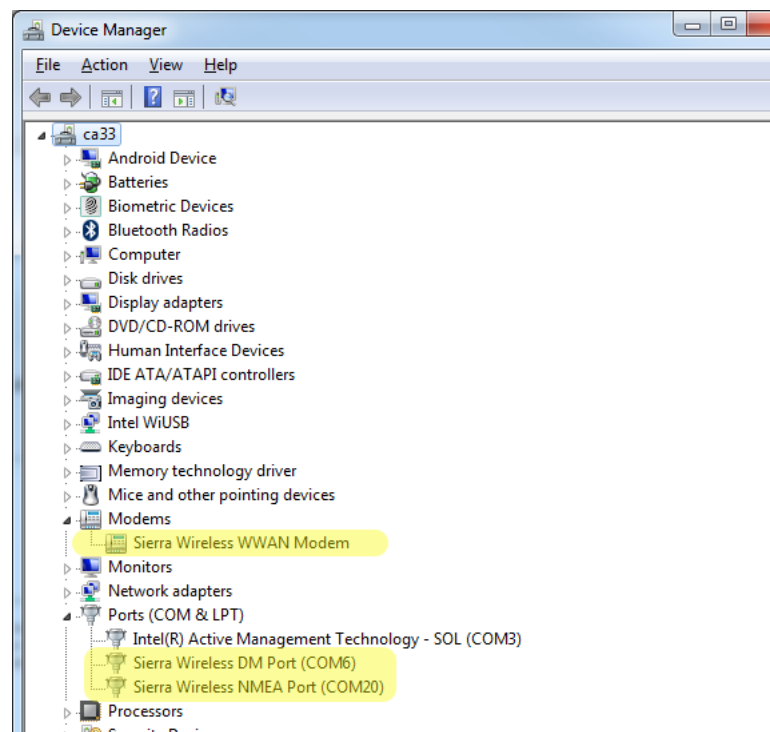


Figure 4-1: Windows Device Manager %check if same enumeration

If the driver installed correctly, you will see the following items listed:

- Modems > Sierra Wireless WWAN Modem (This is the module in socket J200.)
- Ports [COM & LPT] > Sierra Wireless AT Command Port
- Ports [COM & LPT] > Sierra Wireless DM Port

- Ports [COM & LPT] > Sierra Wireless NMEA Port (This is the port that you will use to communicate with the module from your terminal emulator.)

## Install a Terminal Emulator

To communicate with the mangOH Red, you need to use a terminal emulator program such as Tera Term or HyperTerminal®.

When you have an emulator installed, use it to establish a console connection to the mangOH Red:

- Port—Serial modem COM port (for Sierra Wireless devices, this is the Sierra Wireless NMEA Port)
- Baud rate—115200

## Install the Legato Developer Studio

To create Legato applications for the CF3 module, download and install the Open AT Developer Studio (a Legato IDE) available at [mangoh.io](http://mangoh.io).

## Download Firmware Updates

Firmware updates will be made available for download from [mangoh.io](http://mangoh.io).

## Write Your First Program

For instructions on building applications (including writing a 'Hello World' program to test your mangOH Red), and to download sample Legato applications, visit [mangoh.io](http://mangoh.io).