mangOH™ green

User Guide

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Rev 4
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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Revision History

Revision number	Release date	Changes
1	January 2016	Document Creation
2	January 2016	Comprehensive update replacing revision 1
3	February 2016	Minor edits
4	February 2016	Updated to reflect DV4 board configuration

Contents

1: Introduction

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

Once you have the mangOH green set up, visit mangoh.io for developer documentation, code samples, and other materials.

mangOH green Components and Accessories

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

Table 1-1: mangOH green Components

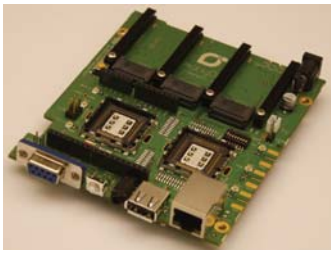
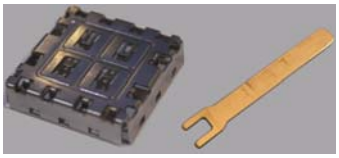
Item	Details
mangOH green	Pre-configured development board. The mangOH green supports CF3 modules. 
CF3 module(s) (See Table 1-2 on page 8 for a list of compatible Sierra Wireless modules.)	• Primary (required)—Used in the primary CF3 socket, the module includes a cellular modem and an application processor running Legato, an open source embedded platform built on Linux for hosting IoT applications (see legato.io for details).  • Secondary (optional)—[Future Use] Used in the secondary CF3 socket, the module includes a cellular modem that must be associated to an application processor in the primary CF3 socket. (In this socket, only the inner ring of pins of the CF3 footprint are used.)
CF3 module cover and cover removal tool	Industrial-quality snap-in module cover, plus cover removal tool to disconnect the cover from the mangOH green (Note: The cover and tool shown are for WP-series modules. A similar cover and tool (not displayed) are used for HL-series modules.) 
Micro-USB cable	Connects computer to the mangOH green for communication and to provide power for non-transmitting tests. 

Table 1-1: mangOH green Components

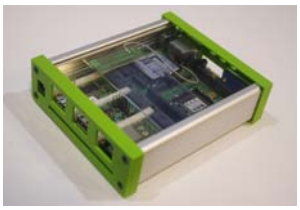
Item	Details
Power supply	• Output voltage: 4.5V to 17V • 10 W or higher • The mangOH green will operate with USB power, but DC power may be required to make and establish a full-speed mobile network connection. 
Antenna	Main RF antenna 
GNSS Antenna	GNSS (GPS/GLONASS) active antenna 
Eurocard case and mangOH green faceplates	The mangOH green fits in a Eurocard standard size casing (100x120mm). 3D-printable files for faceplates are available at mangoh.io. 
Mini-USB cable	Connects computer directly to the Arduino-compatible circuit integrated into the mangOH green 
Mini-SIM card	Mini-SIM card with an active account, or a test card for use with a call box.  *Note: Throughout this document, 'SIM' refers to 'SIM', 'USIM', and 'UIM'.*
Micro-SIM card	Micro-SIM card with an active account, or a test card for use with a call box.  The micro-SIM is used only if the CF3 module supports dual-SIMs (selecting either the mini-SIM or the micro-SIM for use at a given time). It uses the dual SIM/SD connector.
Audio cable (3.5 mm)	Audio cable or headset 
Ethernet cable	Ethernet cable (Cat5 or better) for use with the mangOH green's 100 Mbps Ethernet connector 

Table 1-1: mangOH green Components

Item	Details
RS-232 DB9 cable	Serial cable used for console output (male connector required on mangOH end) 
Battery	Rechargeable Li-Ion or Li-Polymer battery (3V7 nominal) for use when USB/DC power supply is unavailable 
Arduino-compatible shields	Plug-in boards for the mangOH green's integrated Arduino-compatible circuit 

Table 1-2: mangOH-compatible CF3 Modules[a]

Module series	Notes			
AirPrime WP8548 AirPrime WP75xx	The mangOH schematic (available at mango.io), describes all interfaces that are supported by the mangOH green. The following table identifies signals that are currently not available on WP85xx/WP75xx-series modules.			
	Pin #	**mangOH Name**	**Primary CF3 Name**	**WP85/75 Name**
	92	SPI2CLK	SPI2CLK	Reserved
	93	SPI2_MOSI	SPI2_MOSI	Reserved
	94	SPI2_MISO	SPI2_MISO	Reserved
	95	SPI2_MRDY	SPI2_CS0	Reserved
	98	UART2_RTS	UART2_RTS	Reserved
	99	UART2_CTS	UART2_CTS	Reserved
	100	GPIO_Lowpower2	GPIO34	Reserved
	101	GPIO_Lowpower1	GPIO35	Reserved
	102	GPIO20/SWD_CLK	GPIO36	Reserved
	103	GPIO31/SWD_DIO	GPIO37	Reserved
	107	ADC2	ADC2	Reserved
	108	ADC3	ADC3	Reserved
	147	IOT2_GIO4	GPIO21	GPIO21

a. Refer to Product Technical Specification documents for detailed module information.

2: Setup and Installation

Safe Handling Recommendations

To help prevent accidental damage to the mangOH green:

- Use safe ESD-handling practices (such as wearing proper ESD straps) to avoid possible ESD damage.
- Avoid touching the CF3 module sockets (J200, J601). These pins can be damaged if they catch on clothing or other materials.

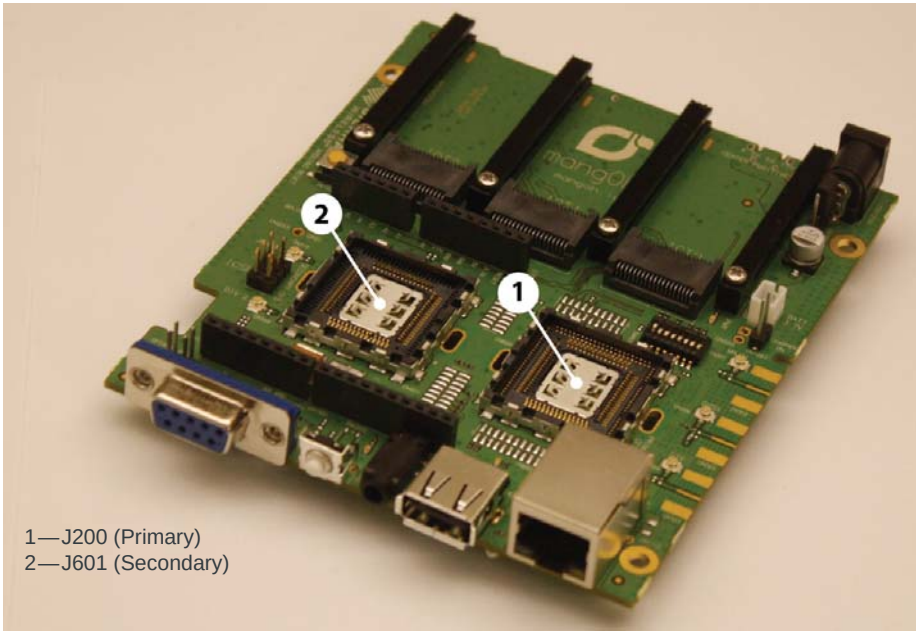


Figure 2-1: Safe Handling Recommendations—CF3 Socket Locations (Do Not Touch)

- Mount the mangOH green in a case, or 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.

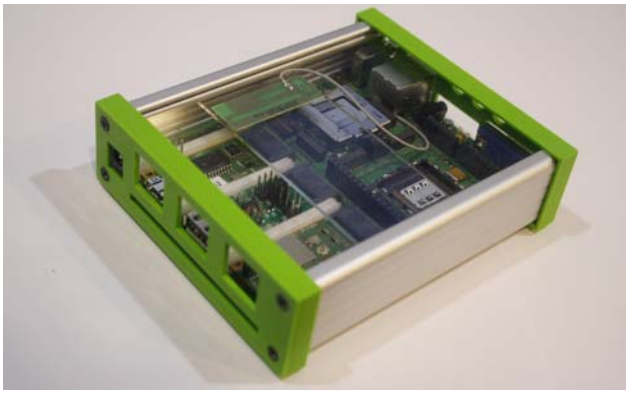


Figure 2-2: Case-mounted mangOH green

Initial Setup

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

1. Insert a suitable CF3 module in the primary socket. See Insert/Remove Embedded Modules on page 11.
2. Select Primary Power Supply. See page 15.
3. If you will be establishing a mobile network connection, insert a mini-SIM. See Insert SIM Card(s) on page 17.
4. Connect Antenna(s). See page 21.
5. Install / Update Windows Driver. See page 36.
6. Connect the mangOH green to your computer using the USB cable provided. If you selected USB power in Step 2, the power LED lights up.
7. If you selected the DC power supply in Step 2, plug a DC wall adapter into the DC barrel jack. (The wall adapter must meet the requirements in Table 1-1 on page 6.)
   The power LED lights up when power is supplied.
8. Install a Terminal Emulator. See page 37.

The mangOH green is now ready to be used.

- For information on additional hardware features, see Hardware Setup and Operation on page 11.
- For instructions on writing a program, see Write Your First Program on page 37.

3: Hardware Setup and Operation

This chapter describes how to install various components on the mangOH green, and how to configure and control features using connectors and switches.

Insert/Remove Embedded Modules

The mangOH green has two CF3 module sockets

- Primary (J200)—The primary module includes a wireless modem and application processor. All pins are used.
- Secondary (J601)—The secondary module, if used, includes a wireless modem that is associated with the primary module. Only the inner ring pins (of the CF3 footprint) are used.

To insert a CF3 module:

1. Place the mangOH green face-up.

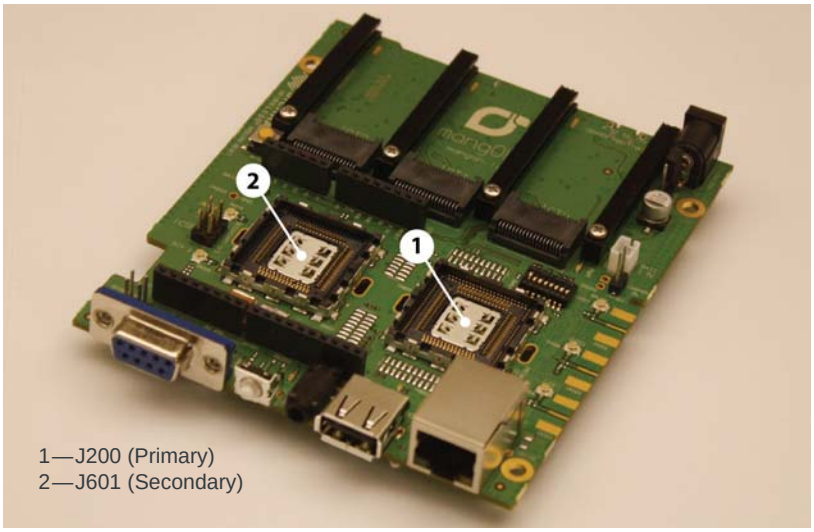


Figure 3-1: mangOH green—Top View

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

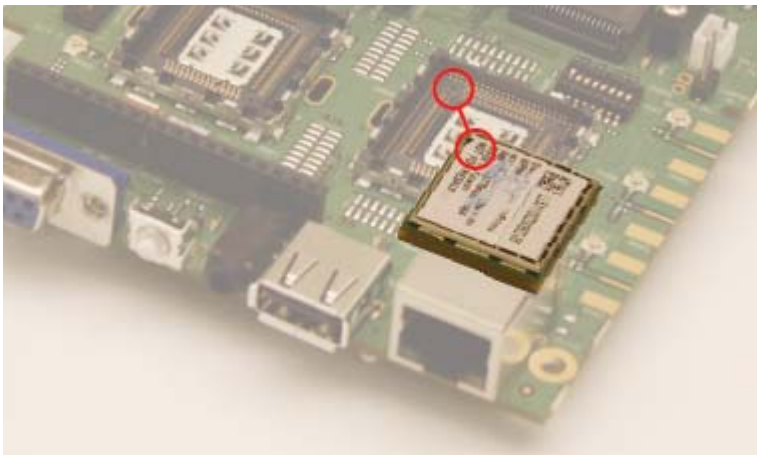


Figure 3-2: CF3 Module Positioning

3. Place the module onto 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.

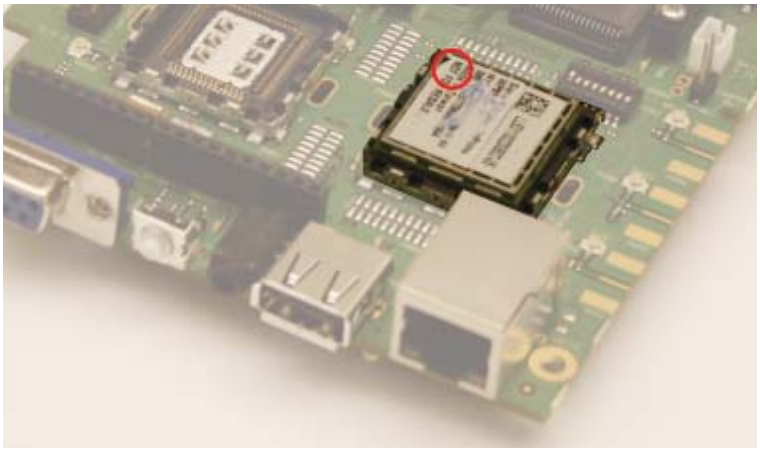


Figure 3-3: CF3 Module Inserted

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.

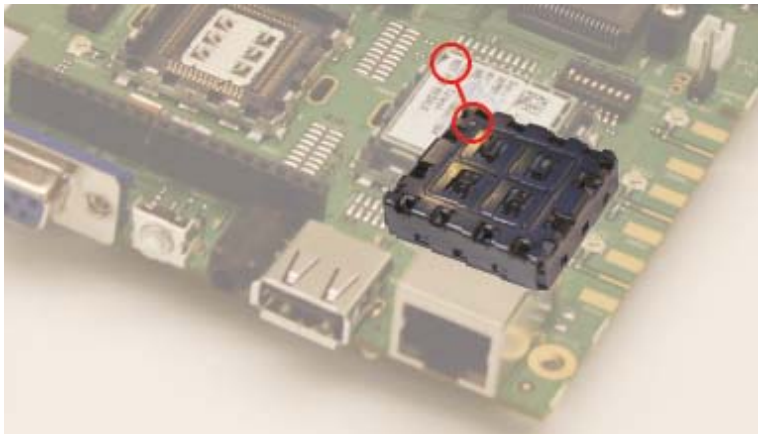


Figure 3-4: Installing Module Cover

   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.

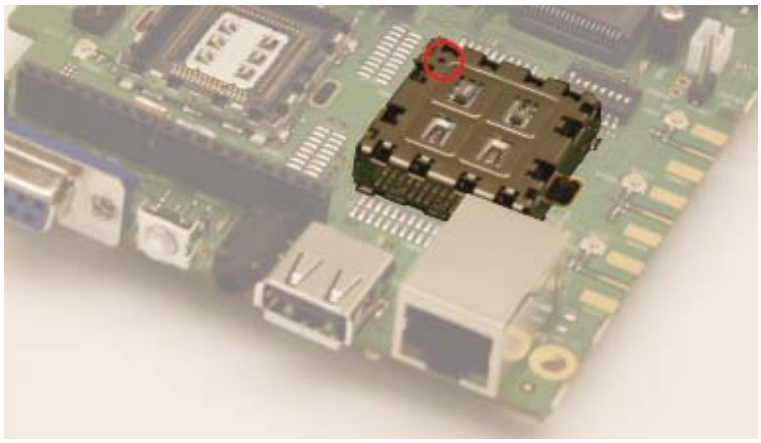


Figure 3-5: Installing Module Cover

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 (there are pairs of pry holes on each side).

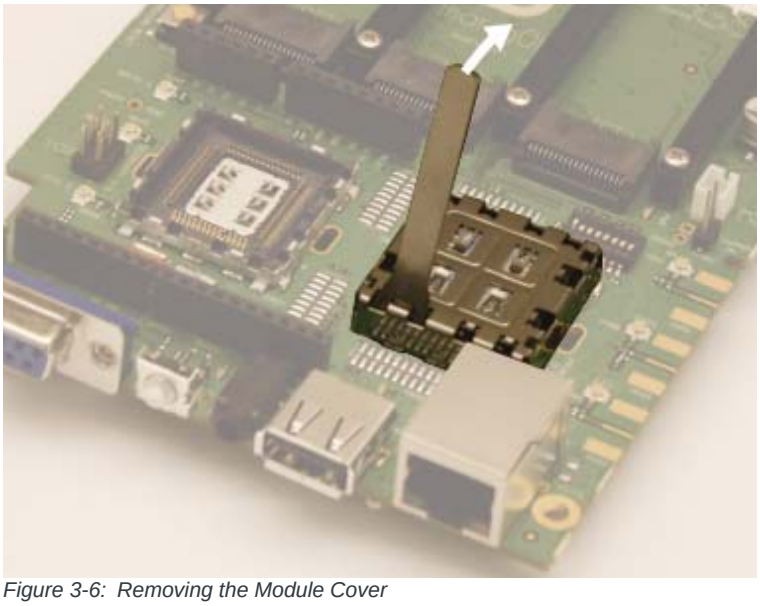


Figure 3-6: Removing the Module Cover

3. Lift the cover off the module.
4. Carefully pinch the module and pull it straight up out of the socket.

Power Supply

The mangOH green has the following supplies:

Table 3-1: mangOH green Power Supplies

Supply		Details
Primary	DC power	Primary (Required if you want to maintain a full-speed mobile network data connection)
	USB	Primary *Note: USB current (500 mA) is sufficient for non-transmitting tests, but may not be enough to satisfy full power requirements of the mangOH green.*
Backup	Battery	An optional Li-Ion or Li-polymer (3V7 nominal) rechargeable battery can be installed to power the board if the primary power supply fails.

Select Primary Power Supply

To select the primary power supply:

1. Place the mangOH green face-up and locate the power supply jumper pins (CN1204).

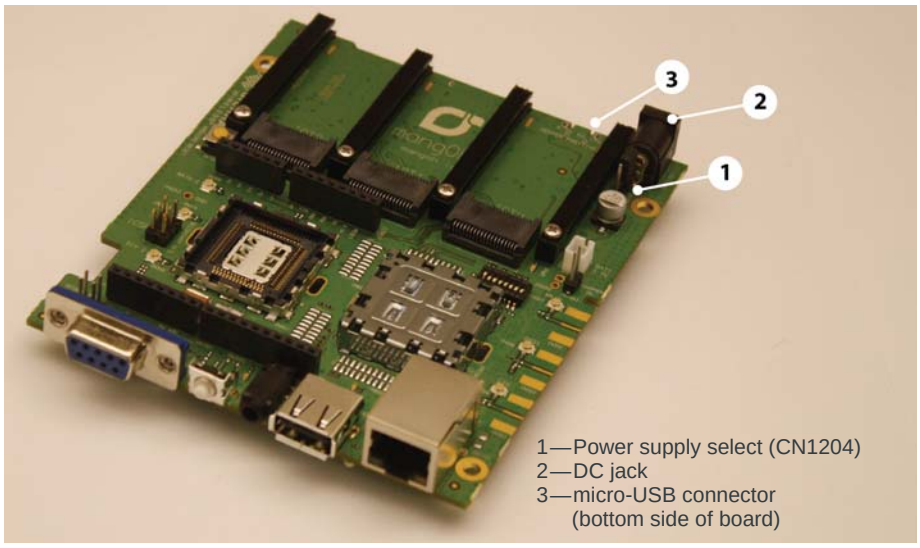


Figure 3-7: Power Supply Select (CN1204)

2. Select the power source:
   - USB power—Place a jumper across the two pins farthest from the DC power jack.
   - DC power—Place a jumper across the pins closest to the DC power jack.

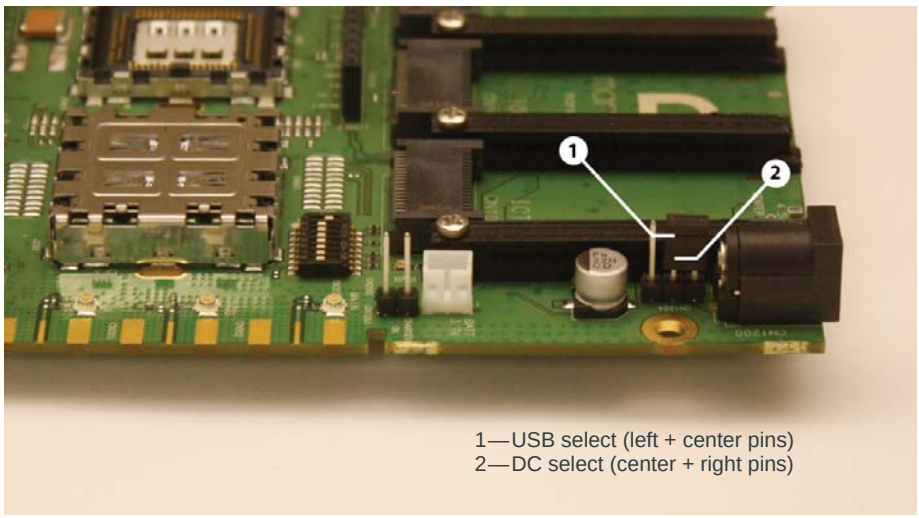


Figure 3-8: Power Source Select (DC power shown)

Connect Battery Backup

Optionally, you can connect a rechargeable Li-Ion/Li-Polymer battery to the mangOH green to provide uninterrupted power in the event that the primary power supply (DC or USB) fails.

If a jumper is placed on CN1201, the mangOH green 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 green:

1. Connect the battery to CN1202.

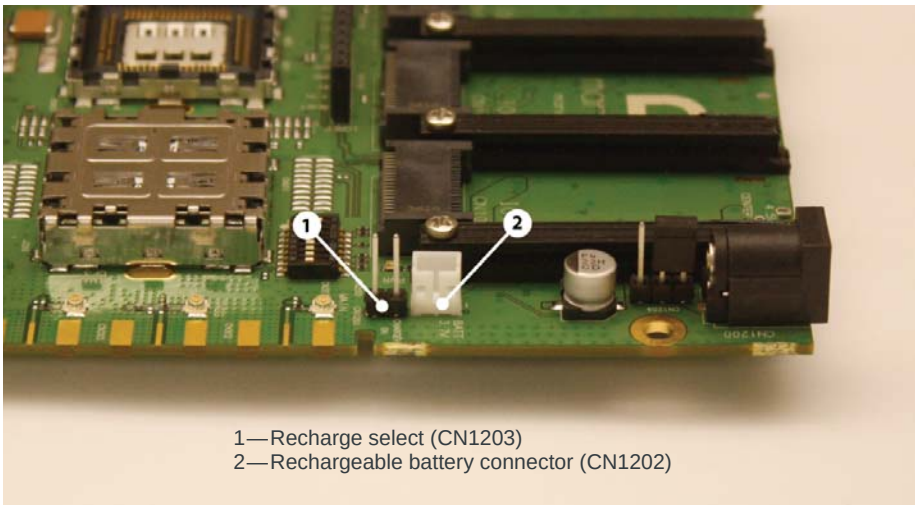


Figure 3-9: Battery Backup (CN1202/CN1203)

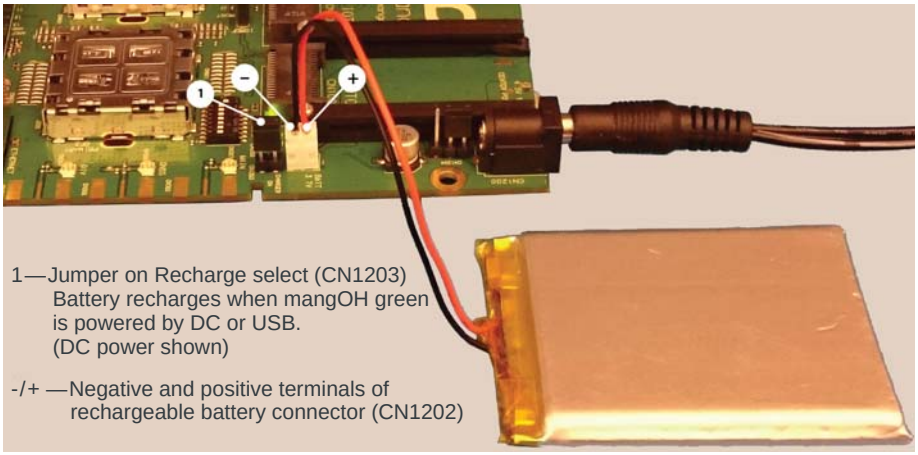


Figure 3-10: mangOH green With Rechargeable Battery Connected

2. If you want the battery to recharge while connected to the board, place a jumper across the pins on CN1203 (Recharge select).

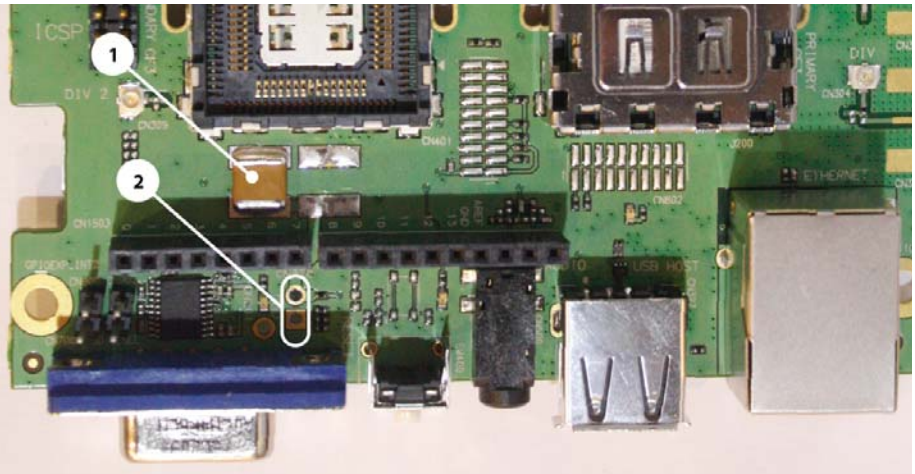
Caution: *If a rechargeable battery is not connected to the board, make sure to remove the jumper from CN1203.*

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, DO NOT place a jumper on CN1203 as this will damage the battery and possibly the board.*

RTC Capacitor

The mangOH green provides a capacitor that maintains the RTC.

To enable the ability to manually discharge the capacitor, install a switch on CN320. (For details, see the mangOH green schematics available at mangoh.io.) The capacitor can then be discharged by pressing this switch.



1—RTC capacitor (C346)
2—Discharge switch location (CN320)

Figure 3-11: RTC Capacitor

Insert SIM Card(s)

The mangOH green supports dual SIM functionality (if supported by the CF3 module).

Table 3-2: SIM connectors

CF3 Interface	Type	Connector	Details
UIM1	Mini-SIM	CN801	Hot-swappable By default, a SIM detect switch is activated when a mini-SIM is inserted or removed. For details, see Table 3-6 on page 31.
UIM2	Micro-SIM	CN802	Not hot-swappable

To establish a mobile network connection with a UMTS/LTE CF3 module, you must install at least one SIM card:

- Live card(s) with active accounts, *or*
- Test card(s) for use with a call box (for example, an Agilent 8960 or Rohde & Schwarz CMU200)

Note: A SIM card is not required if you want to connect to a LAN using the Ethernet port.

To install the SIM card(s):

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

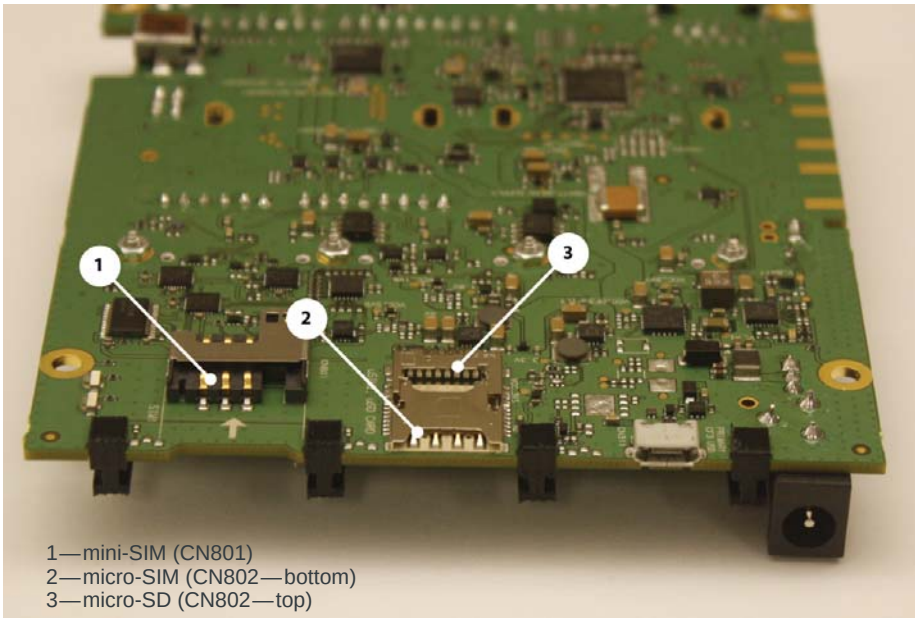


Figure 3-12: SIM Connector and micro-SD Locations

2. Insert the SIM card(s) with contacts face-down into the desired slot(s)—note the locations of the notched corners of the cards in Figure 3-13. (The mini-SIM is inserted with the flat end first, and the micro-SIM is inserted with the notched end first.)

Important: *CN802 is a dual-connector—a micro-SIM can be placed in the lower slot, and a micro-SD can be placed in the upper slot.*

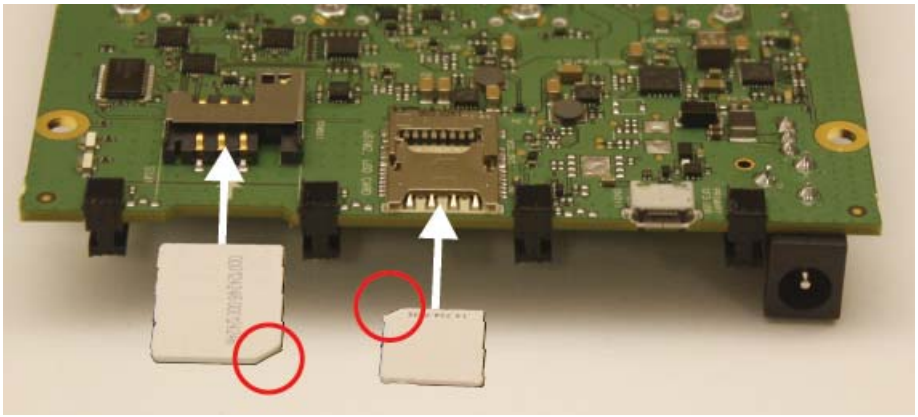


Figure 3-13: SIMs—Inserting

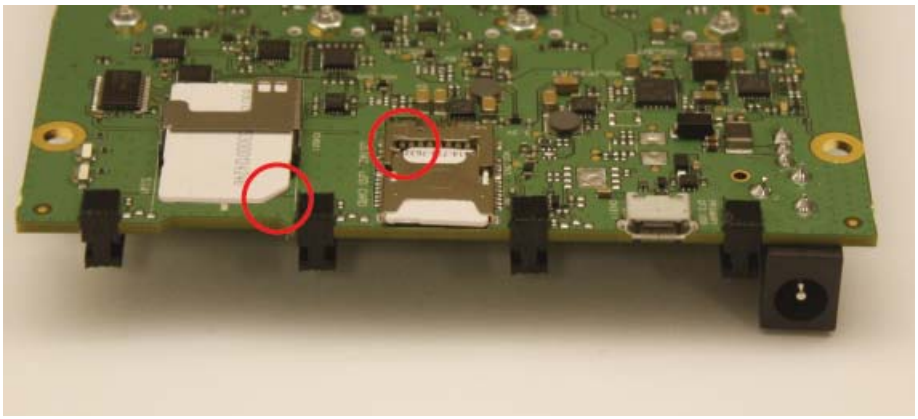


Figure 3-14: SIMs—Inserted

Insert microSD Card

The mangOH green includes a microSD card slot in the top part of CN802.

To install a microSD card:

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

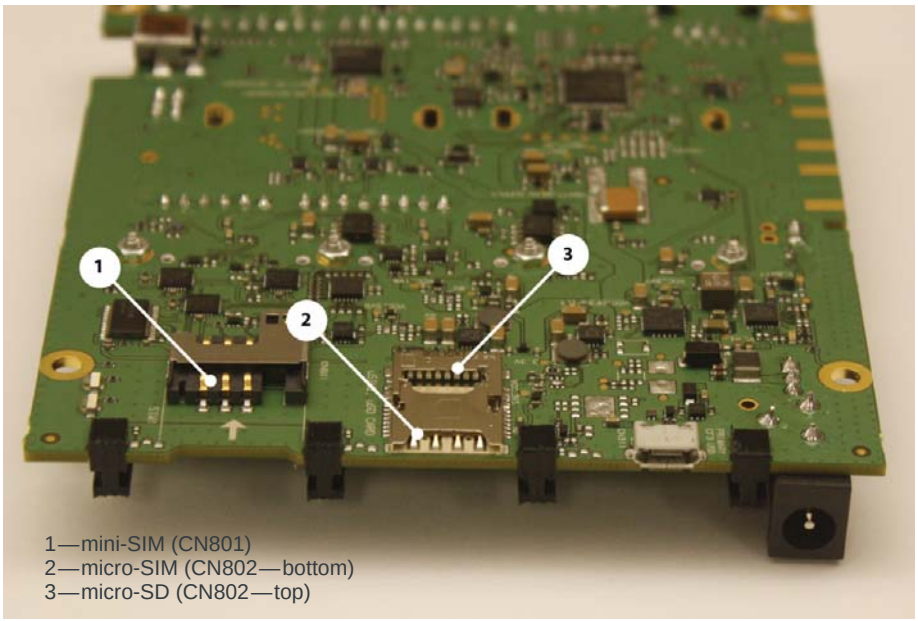


Figure 3-15: SIM Connector and micro-SD Locations

2. Insert the microSD card with contacts face-down into the top slot of CN802.

Important: *CN802 is a dual-connector—a micro-SIM can be placed in the lower slot, and a micro-SD can be placed in the upper slot.*

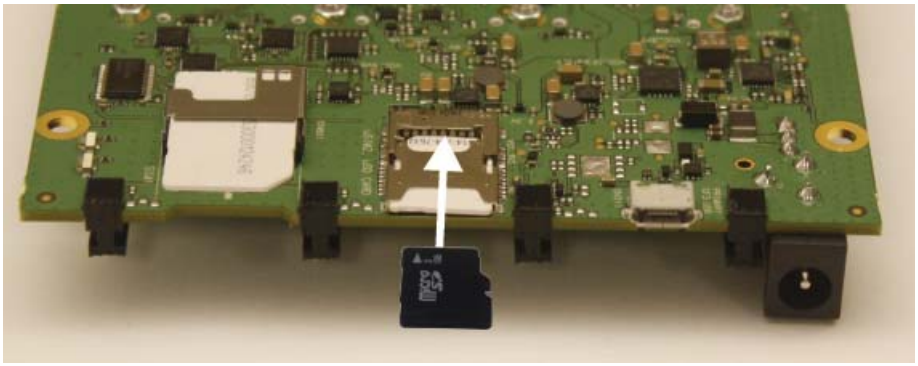


Figure 3-16: microSD—Inserting

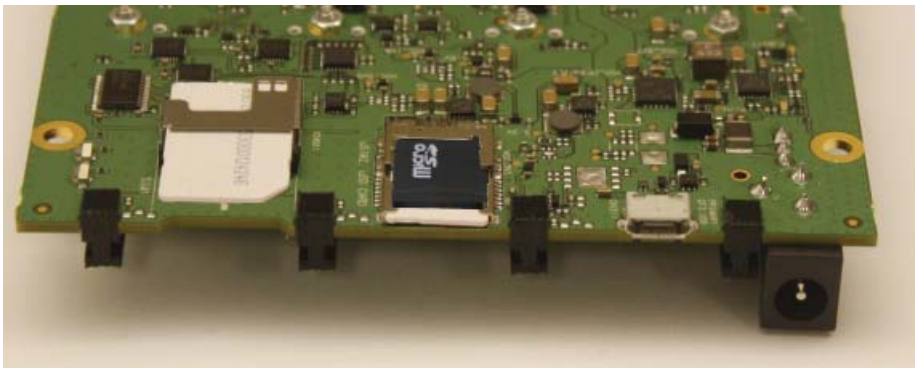


Figure 3-17: microSD—Inserted

Connect Antenna(s)

The mangOH green includes three antenna ports for the primary CF3 module.

Table 3-3: Antenna Ports

Type	Connector[a]	Details
Main	CN307	Required to establish a mobile network data connection
Diversity	CN304	Used only if primary CF3 supports diversity.
GNSS	CN306	• Required to enable GNSS functionality • Active • 3.3 V bias voltage

a. U.FL connectors

Note: If needed, the board can be configured to use SMA connectors. For details, see *Table 3-6 on page 31.*

To connect an antenna to the Main, Diversity, or GNSS antenna connector:

1. Place the mangOH green face-up.

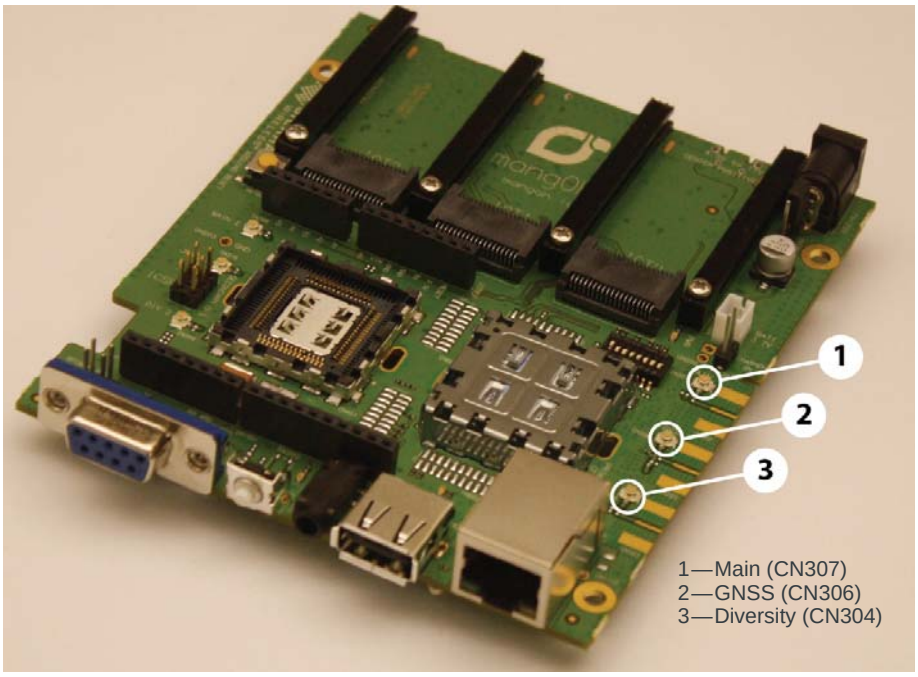


Figure 3-18: Antenna Connector Locations

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.)

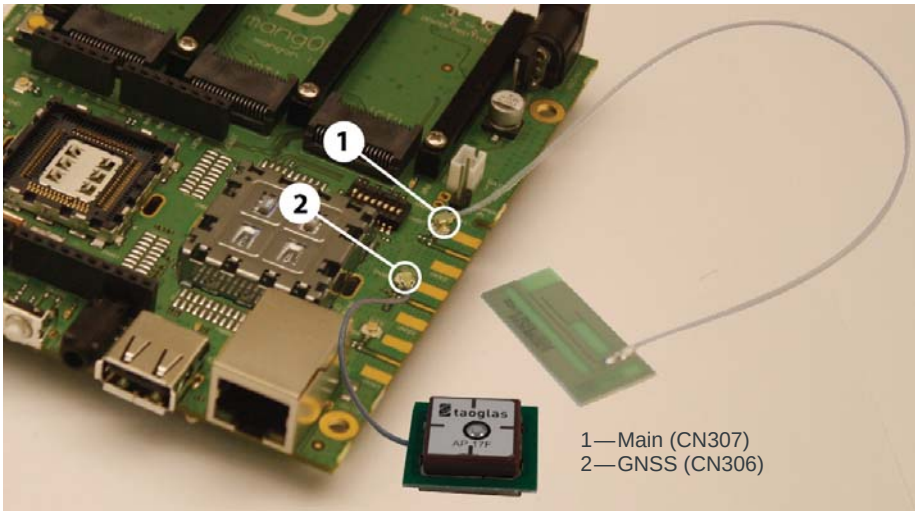


Figure 3-19: Main and GNSS Antennas Connected

Insert/Remove IoT Connectors

The mangOH green includes three single-width IoT connector slots.

If the board uses IoT connector mounting rails and you want to use a double-width (2-slot) or triple-width (3-slot) IoT connector, remove the rails between the slots you will be using.

Caution: *Handle IoT connectors carefully to make sure components are not accidentally damaged, and hold them by their edges to avoid possible ESD damage.*

To install an IoT connector in any IoT slot:

1. Remove power from the mangOH green. (This step is recommended in case the IoT connector is not hot-swappable or needs a reset.)
2. Check the IoT connector to make sure you know which side is the top. (IoT Connectors must not be inserted upside-down.)
3. Slide the IOT connector into the rails until it meets the socket, then press firmly to seat the connector into the socket.

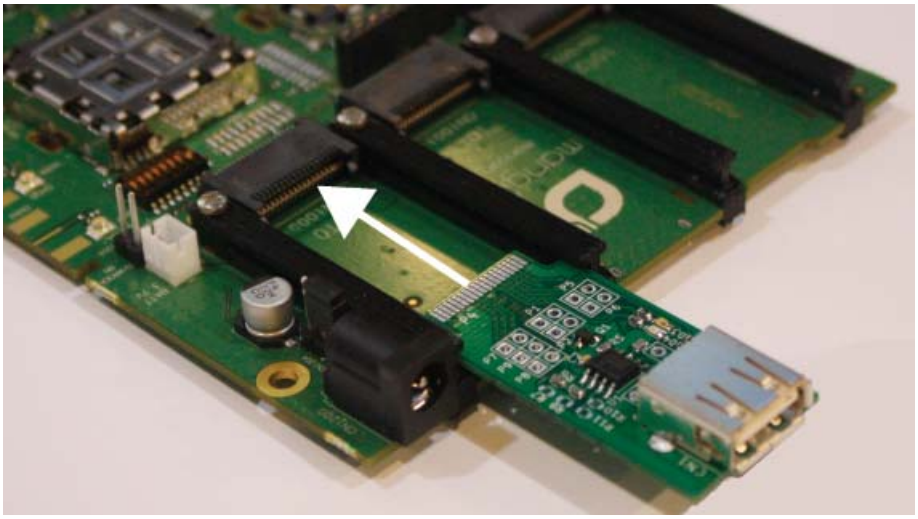


Figure 3-20: IoT Connector Insertion

Figure 3-21: IoT Connector Inserted

To remove an IoT connector:

1. Pull the connector straight out, using safe ESD-handling practices (such as wearing proper ESD straps).

For detailed interface information for each IoT slot, refer to the mangOH green Developer's Guide. For detailed information about IoT connectors, refer to the IoT Connector Specification.

Arduino-compatible Circuit

The mangOH green includes an integrated Arduino-compatible circuit (with connector for use with Arduino-compatible shields, and an Atmega32U4 microcontroller).

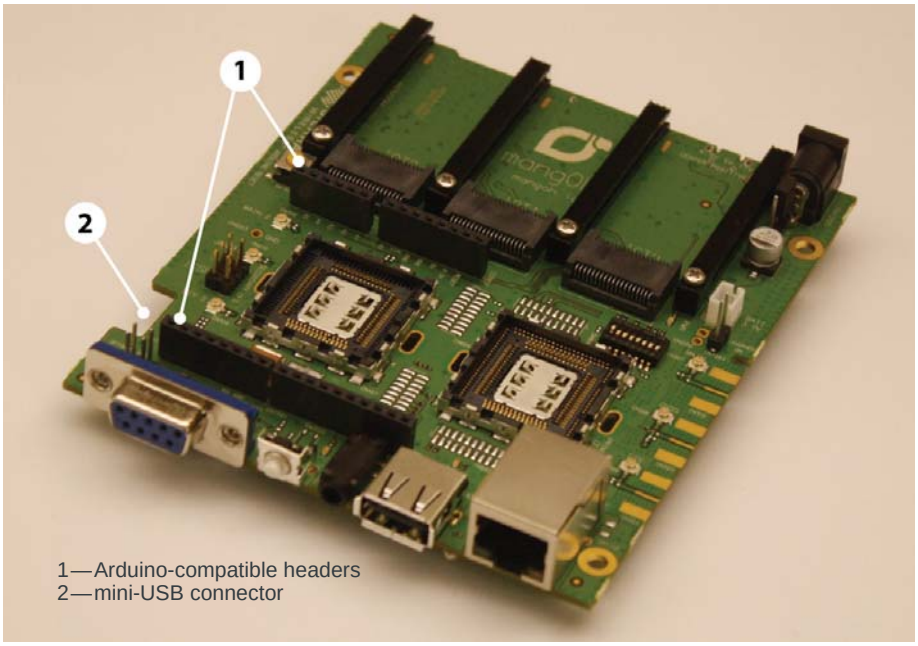


Figure 3-22: Integrated Arduino-compatible Circuit

The Arduino-compatible circuit is controlled directly via a mini-USB cable connection from your computer. This connection is used to download sketches from your computer using the Arduino IDE.

By default, the Arduino-compatible circuit's UART is configured to connect to the primary CF3 module's USB using an FTDI conversion chip (UART to USB). For details, see Table 3-6 on page 31.

The Arduino-compatible circuit can also be accessed from the primary CF3 module, as shown in Figure 3-23. The 'Bridge application' is a Legato application (downloadable from legato.io) that allows communication between the primary CF3 module and the Arduino-compatible circuit. See the mangOH to Cloud Developer's Guide for details.

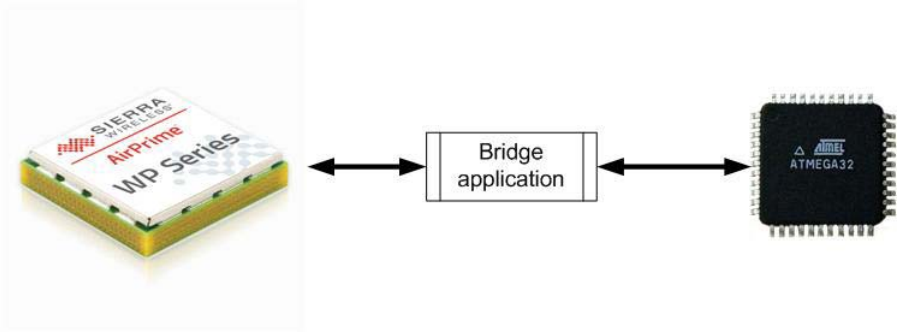


Figure 3-23: Arduino-compatible Circuit Control by Primary CF3 Module

Connect Arduino-compatible Shield

To connect an Arduino-compatible shield to the mangOH green:

1. Position the shield above the headers. (Note that the two rows of headers have different numbers of pins—make sure to position the shield correctly.)

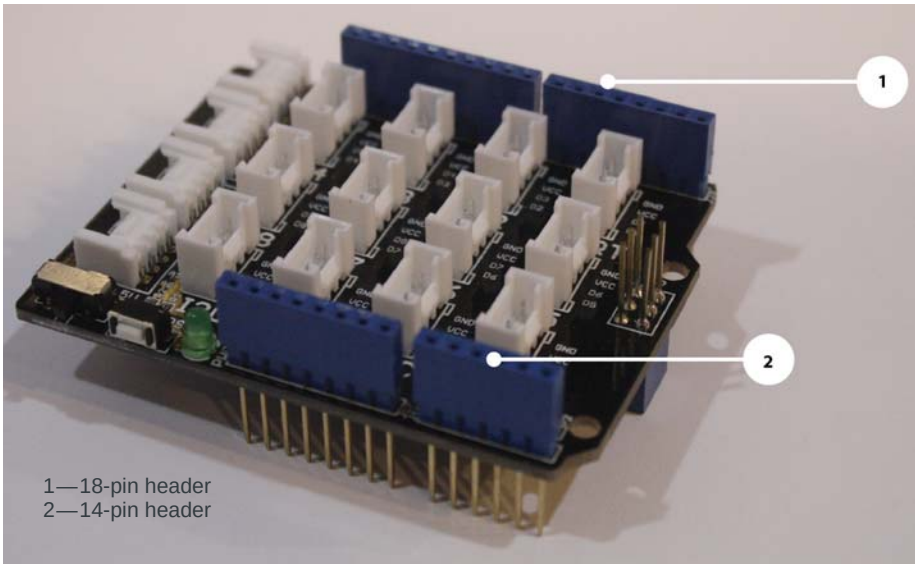


Figure 3-24: Arduino-compatible Shield Example

2. Hold the shield by its edges and press straight down into the headers.

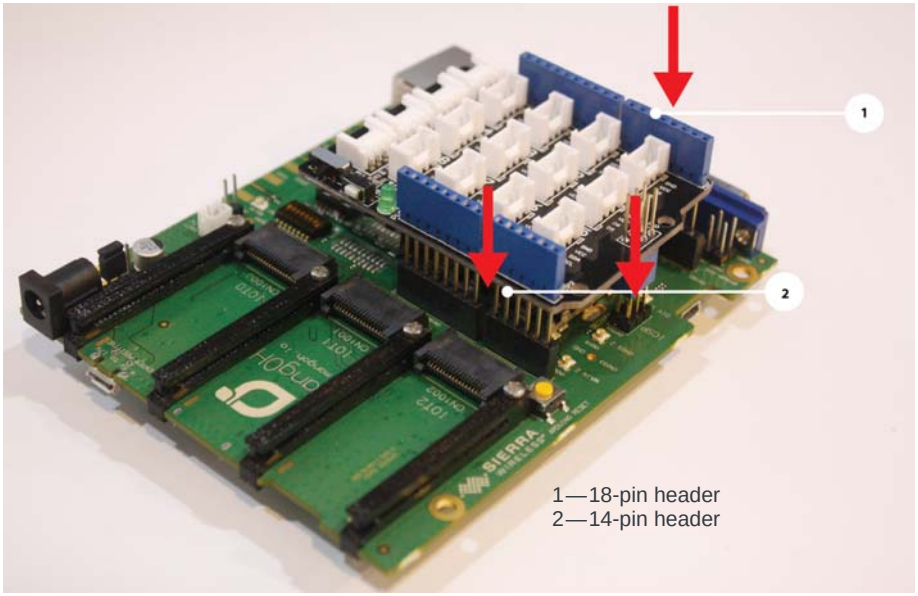


Figure 3-25: Installing an Arduino-compatible Shield

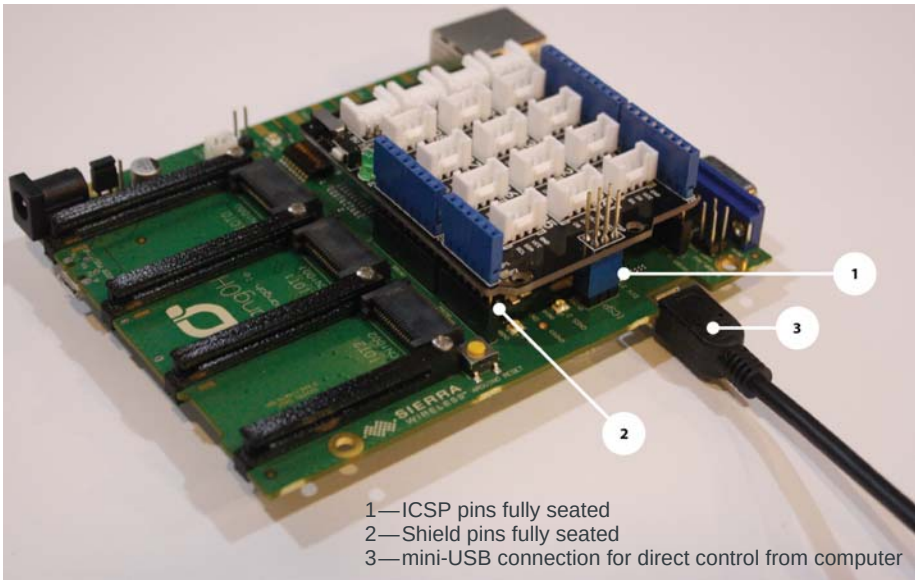


Figure 3-26: Arduino-compatible Shield Installed on mangOH green

Audio Connection

The mangOH green includes a 3.5 mm audio jack for use with audio-enabled CF3 modules. If supported by the CF3 module, the jack can be used for making 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 3-6 on page 31.

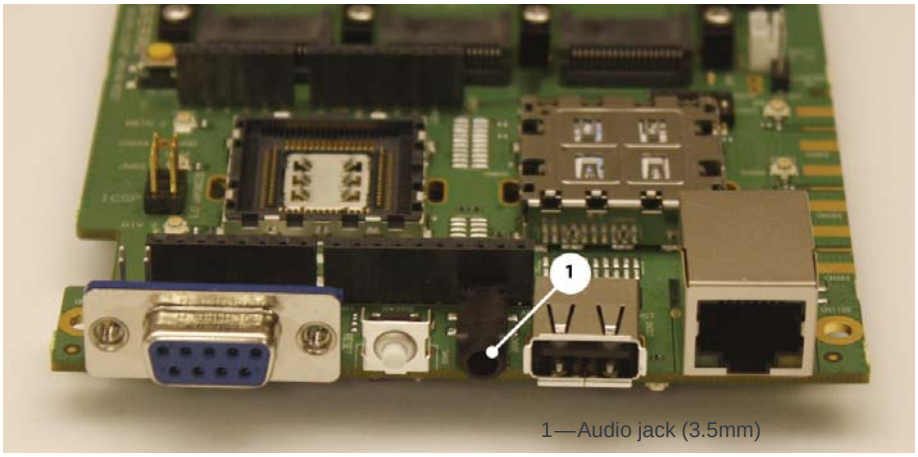


Figure 3-27: Audio Output Jack

Ethernet Connection

The mangOH green includes a 100 Mbps Ethernet port that may be used to connect the board to a LAN.

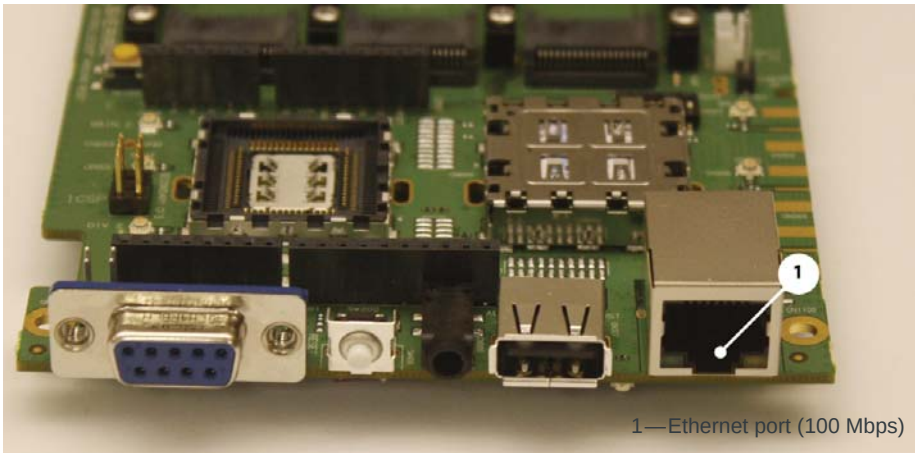


Figure 3-28: Ethernet Port

The Ethernet port has two LEDs that exhibit the behavior described in Table 3-4.

Table 3-4: Ethernet LED indicators

Pattern	Purpose	Description
Green (Left side)	Connection state	• Solid—Connected • Blinking—Connected and transmitting/ receiving • Off—No connection
Amber (Right side)	Connection speed	• On—100 Mbps • Off—10 Mbps

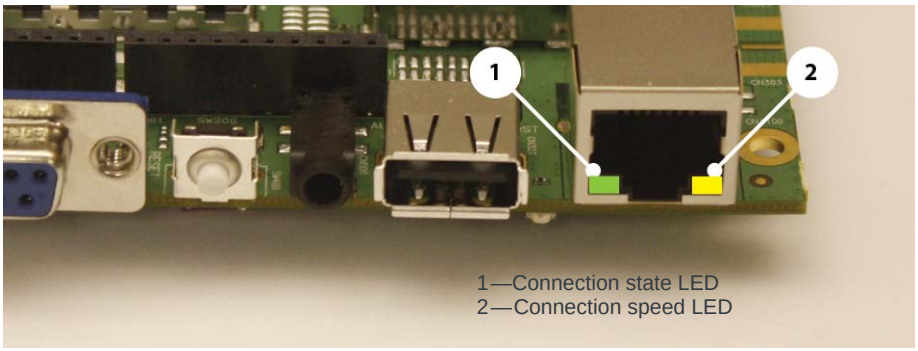


Figure 3-29: Ethernet Port LEDs

USB Host Connection

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

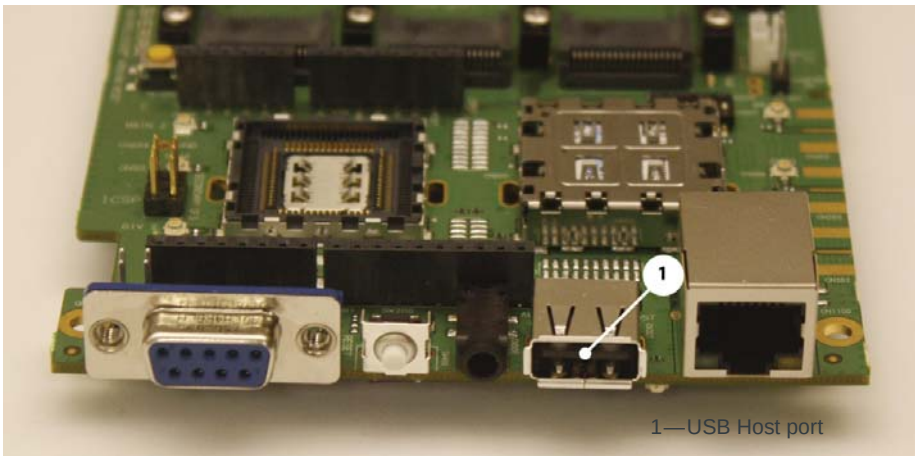


Figure 3-30: USB Host Port

RS-232 Console Output Connection

The mangOH green includes an RS-232 DB9 connector for console output.

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

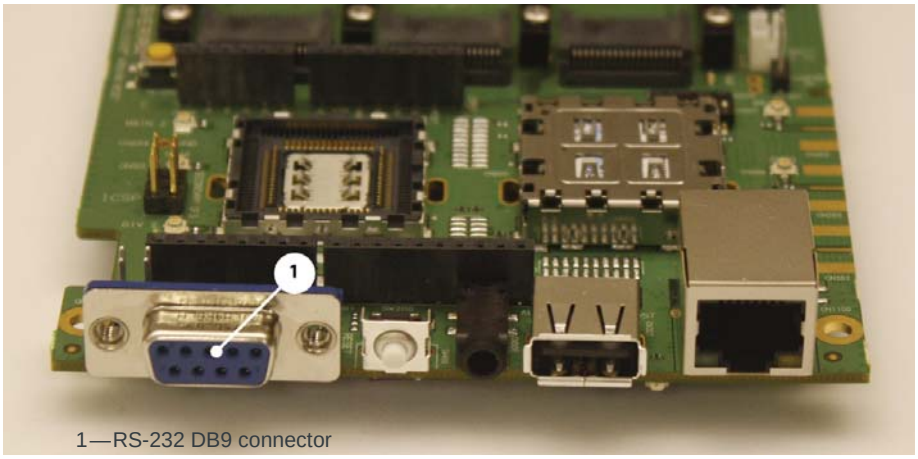


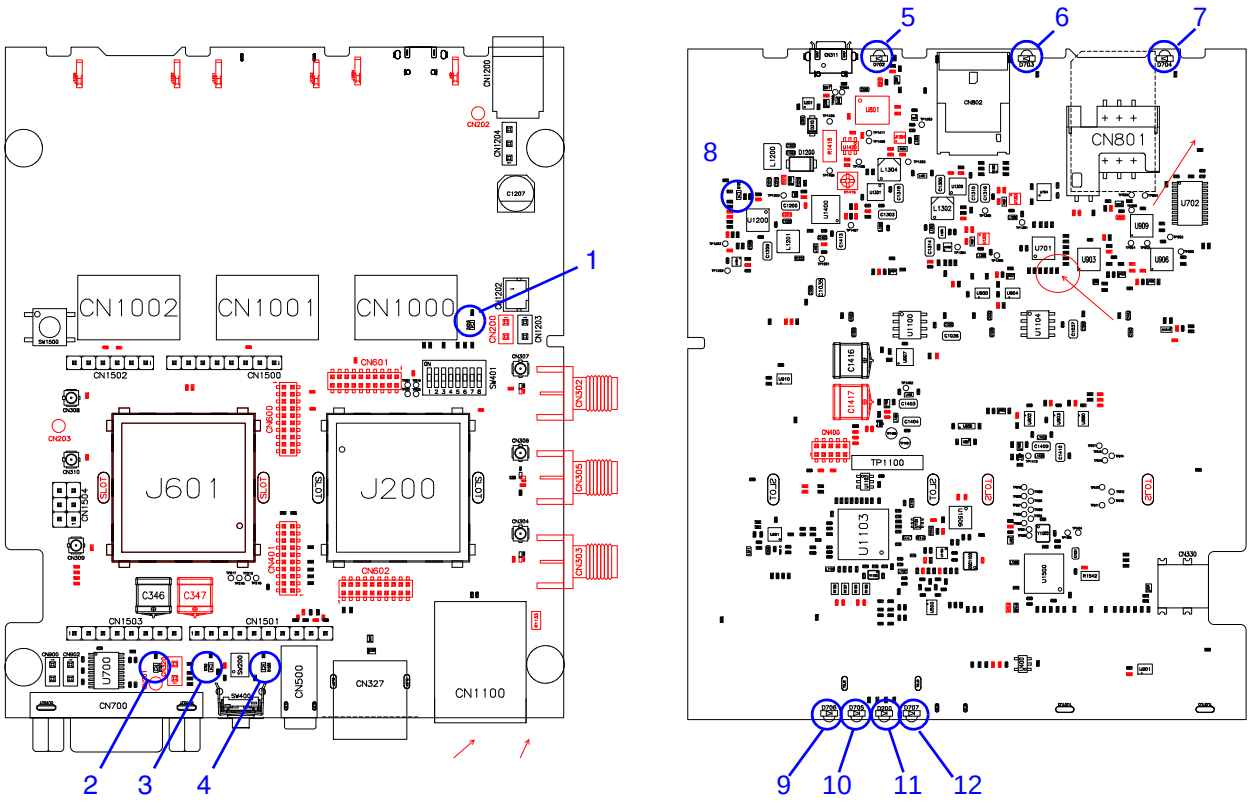
Figure 3-31: RS-232 Console Output Connection

LED Indicators

The mangOH green includes several LED indicators.

Table 3-5: mangOH green LEDs

LED	Description
1—Power (VCC_3V7)	On when power is supplied by any power source (USB, DC, battery)
2—Rx (Arduino-compatible circuit)	On when the Arduino-compatible circuit is receiving data
3—AirVantage connected	On when device is connected to AirVantage
4—Tx (Arduino-compatible circuit)	On when the Arduino-compatible circuit is sending data
5—IoT connector 0	On when an IoT connector is installed in slot 0.
6—IoT connector 1	On when an IoT connector is installed in slot 1.
7—IoT connector 2	On when an IoT connector is installed in slot 2.
8—Battery charging	On when the battery is recharging
9—SecCF3 RF Rx/Tx	On when the secondary CF3 module is sending (Tx) or receiving (Rx) data
10—PriCF3 RF Rx/Tx	On when the primary CF3 module is sending (Tx) or receiving (Rx) data
11—WLAN connected	On when the device is connected to a WLAN
12—W_DISABLE_N	On when RF power for primary CF3 module is enabled



1—Power
2—Rx (Arduino-compatible circuit)
3—AirVantage connected
4—Tx (Arduino-compatible circuit)
5—IOT connector #0 installed
6—IOT connector #1 installed
7—IOT connector #2 installed
8—Battery charging
9—Sec CF3 Rx/Tx
10—Pri CF3 Rx/Tx
11—WLAN connected
12—RF disabled (W_DISABLE_N)

Figure 3-32: LED Indicators (mangOH green DV4 Configuration)

Reset Switches

The mangOH green includes two reset switches:

- Board reset (SW400)—Press and hold for 5 seconds to reset the board (including the integrated Arduino-compatible circuit)
  Note that when the board is resetting, the reset signal is held LOW until the primary module is fully booted.
- Arduino-compatible circuit reset (SW1500)—Press and hold for 5 seconds to reset the integrated Arduino-compatible circuit.

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

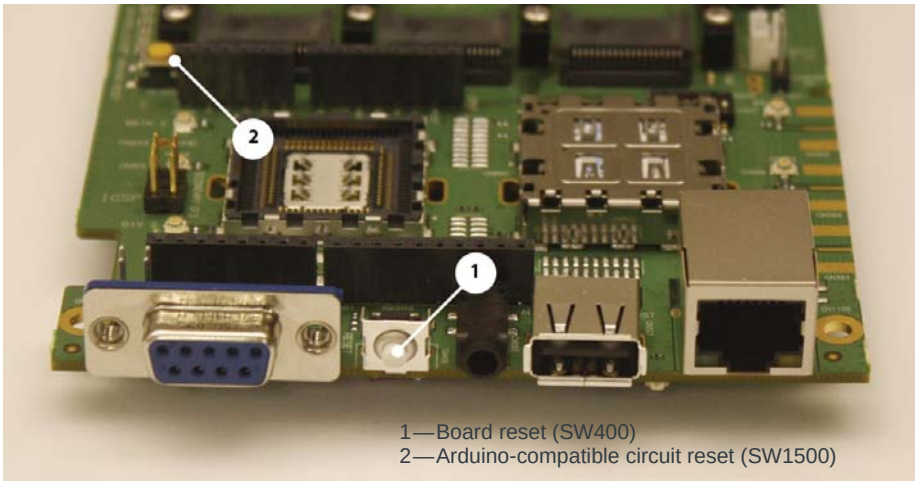


Figure 3-33: Reset Switches

mangOH green Configuration

Default Configuration

The mangOH green's default configuration is described in Table 3-6.

Table 3-6: mangOH green Default Configuration

Component / Switch	Default Configuration / Behavior	Notes
Antenna connectors (Main, Diversity, GPS)	• U.FL connectors • 3.3 V bias voltage for active antennas	SMA connectors can be added, if required, by a user who is proficient at soldering. For details, refer to the mangOH green schematic available at mangoh.io.
Audio connector (CN500)	• Connected to onboard mangOH codec • CTIA/AHJ-compatible headset	Reconfiguration to use an OMTP-compatible headset requires soldering.
RS-232 connector (CN700)	• Enabled • Connected to primary module's UART2	
LEDs	All LEDs are enabled and will exhibit their default behaviors	
System reset signal (RESET_IN_N)	Held LOW until primary module is fully booted	Peripherals on the mangOH green are not activated until the module is fully booted.

SIM1/SIM2 Detect	• SIM1 Detect uses physical sensor to detect SIM card insertion/removal
	• SIM2—Switch SW401 (position 4) can be used to indicate that a SIM is in SIM holder 2:
	  • OFF—SIM2 detected
	  • ON—No SIM	

Table 3-6: mangOH green Default Configuration (Continued)

Component / Switch	Default Configuration / Behavior	Notes
SD connector (CN802)	Connected to primary module	Board can be configured using a software command to connect primary module's SDIO signals to IOT1 instead of SD connector.
Peripheral interfaces (UART, SPI, I2C, etc.)	See the mangOH green Developer's Guide for details.	
Arduino-compatible circuit UART	Connected to primary module's USB using FTDI conversion chip (UART to USB)	Board can be configured using a software command to connect Arduino-compatible circuit's UART to WP UART1
Module Signals Control (SW401)	• POWER_ON (Dip 1)=ON (Unit is enabled) • All others = OFF	

Switch and Jumper Configuration Options

The mangOH green uses several switches and jumpers to configure the board and CF3 module's operation, as detailed below in Table 3-7 through Table 3-9.

To locate these switches and jumpers, see Figure 3-34 on page 34 and Figure 3-35 on page 35.

Table 3-7: CN1204—Board Power Select[a]

Power supply selection	Jump 1–2	Jump 2–3
USB power, through micro-USB port (CN311–USB port)	Yes	
DC power, through DC barrel jack (CN1200–barrel jack power)		Yes

a. Required: Select one option only (Jump 1–2 *or* Jump 2–3). For details, see Select Primary Power Supply on page 15.

Table 3-8: CN1203—Battery Recharge Select

Battery recharge behavior	Jump 1–2
Battery will recharge while power is supplied by USB or DC	Yes[a]
Battery will not recharge	No

a. IMPORTANT: Jumper must not be used if there is no battery connected. For details, see Connect Battery Backup on page 16.

Table 3-9: SW401—Module Signals Control

Signal	Dip	On / Off	State
POWER_ON	1	On (Default)	Enable POWER_ON signal for primary module (J200)
		Off	Disable POWER_ON signal

Table 3-9: SW401—Module Signals Control (Continued)

Signal	Dip	On/Off	State
MDM_Power	2	On	Reserved for future use
		Off (Default)	
W_DISABLE_N	3	On	Disable RF power for primary CF3 module
		Off (Default)	Enable RF power for primary CF3 module
SIM2_Detect	4	On	Indicate that SIM Holder #2 is empty
		Off (Default)	Indicate that a SIM is in SIM Holder #2
SW_PWR_ON	5	On	Enable POWER_ON signal for secondary module (J601)
		Off (Default)	Disable POWER_ON signal
UART_CTRL	6	On	Connect primary CF3 module's UART1 signal to IOT slot (#0 or #1, depending on current configuration)
		Off (Default)	Connect primary CF3 module's UART1 signal to the ATmega32U4
TP1_BOOT	7	On	Enable primary CF3 module's TP1 (boot) signal functionality. Pull the signal low to enter download mode for firmware updates.
		Off (Default)	Primary module functions normally.
DCDC_shutdown	8	On	Disable secondary power supplies (1V8, 3V3, and 5V0) so only the primary CF3 module is powered
		Off (Default)	Enable power to entire board

1—IoT connector slot #2
2—IoT connector slot #1
3—IoT connector slot #0
4—DC power (CN1200)
5—Power supply select (CN1204)
6—Battery connector (CN1202)
7—Recharge select (CN1203)
8—Signals control (SW401)
9—Main antenna
10—GNSS antenna
11—Diversity antenna
12—Ethernet
13—USB Host
14—Audio
15—Module reset
16—Capacitor discharge (DNI)
17—RS-232 DB9 console output
18—Arduino-compatible circuit header
19—RTC backup capacitor
20—Secondary Main
21—Secondary GNSS
22—Secondary Diversity
23—Arduino-compatible circuit header
24—Arduino-compatible circuit reset
25—Secondary CF3 socket
26—Primary CF3 socket

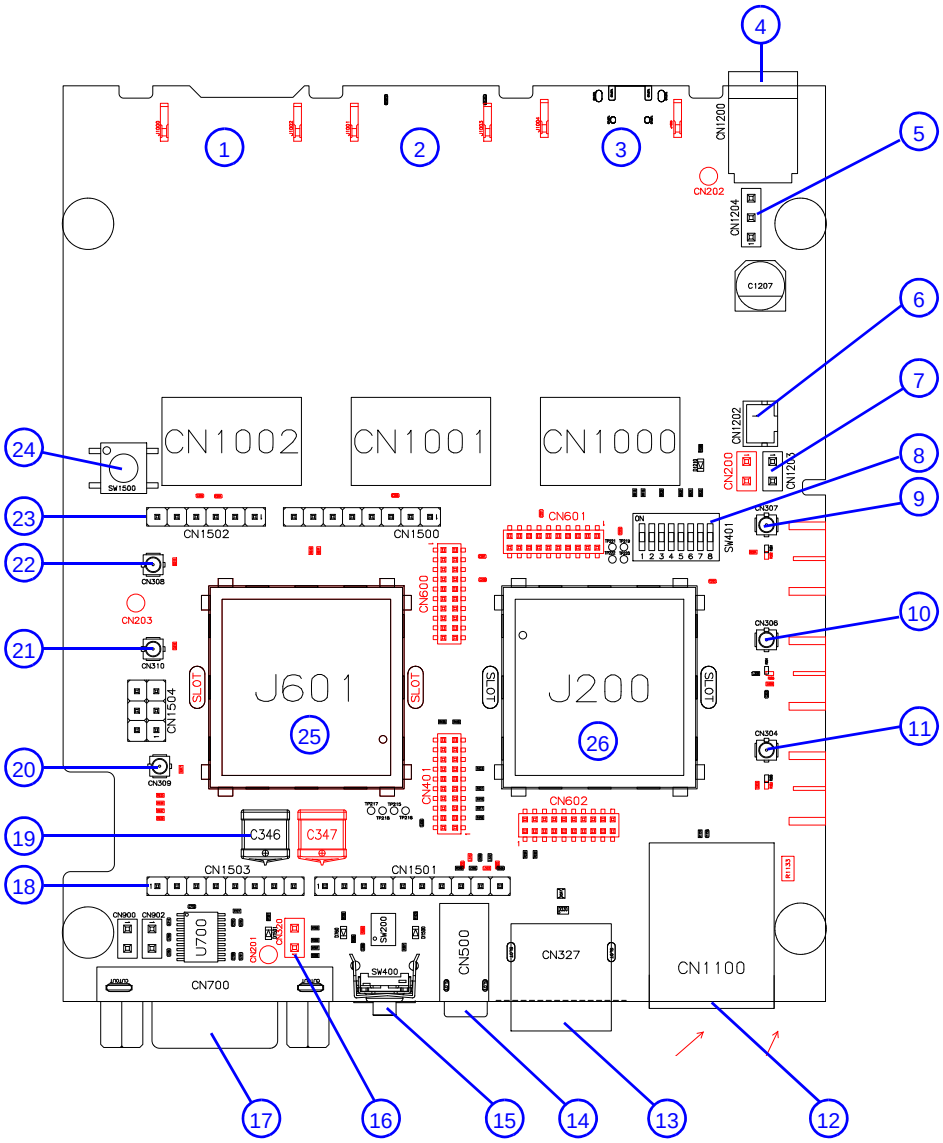


Figure 3-34: mangOH green Assembly—Top Side Switches/Connectors

Note: For reference only. For latest schematic, visit mangoh.io.

1—USB power
2—micro-SIM (bottom slot)
3—microSD (top slot)
4—mini-SIM
5—Arduino-compatible circuit mini-USB
6—ATmega32U4

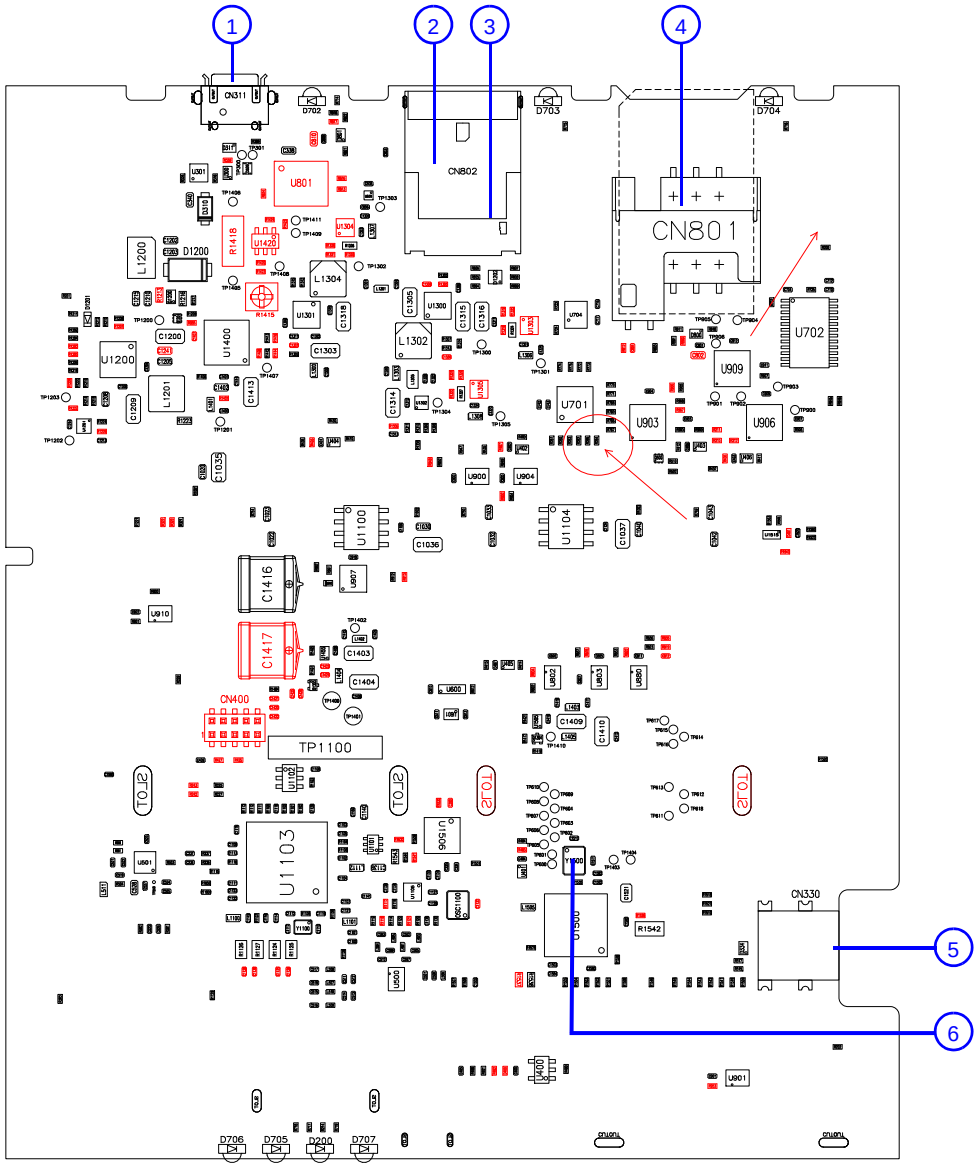


Figure 3-35: mangOH green Assembly - Bottom Side Switches/Connectors

Note: For reference only. For latest schematic, visit mangoh.io.

4: Software Setup

This chapter describes software resources that you will need on your computer to access the mangOH green and develop applications for its CF3 module and integrated Arduino-compatible circuit.

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

Install / Update Windows Driver

If you are using a Windows computer, you will need to install the Legato driver for the CF3 module that you install in your mangOH green.

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

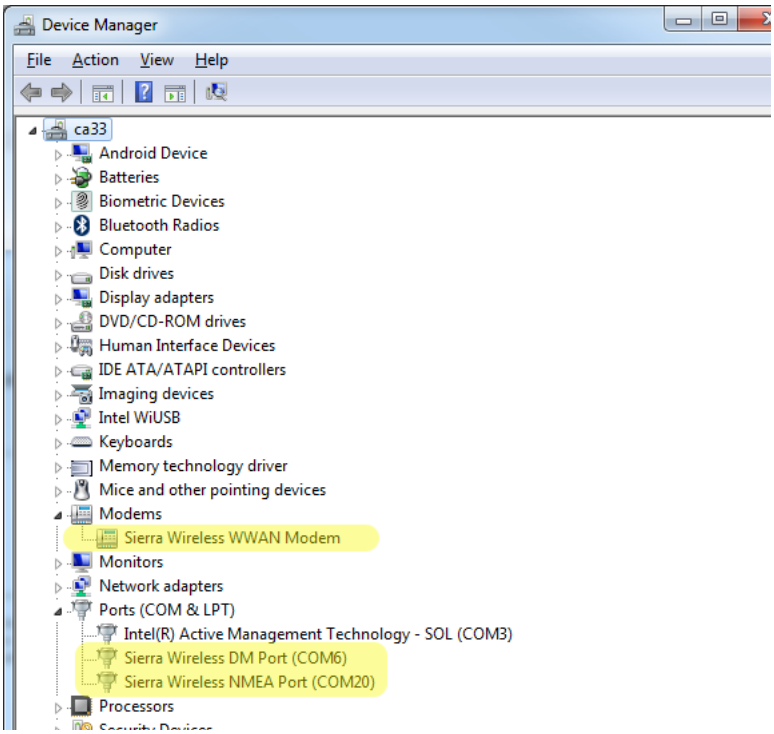


Figure 4-1: Windows Device Manager

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 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 green, 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 green:

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

Install the Arduino IDE

To work with the mangOH green's integrated Arduino-compatible circuit, you must download and install the Arduino IDE (Integrated Development Environment). The IDE is used to write code ('sketches') and upload them to the mangOH green's integrated Arduino-compatible circuit. Installation and usage information is available at mangoh.io.

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.

Download Firmware Updates

Firmware updates will be made available for download from mangoh.io.

Write Your First Program

For instructions on building applications (including writing a 'Hello World' program to test your mangOH green), and to download sample Arduino sketches and Legato applications, visit mangoh.io.