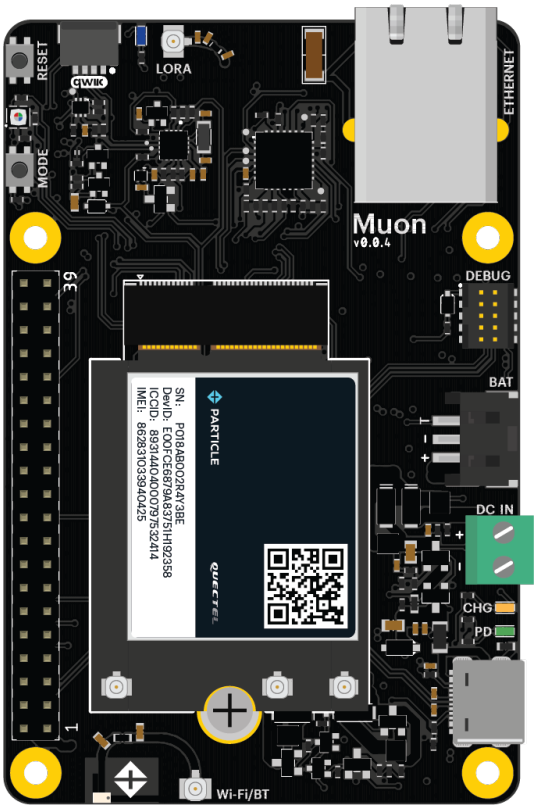
Muon datasheet

This is a preliminary overview of the Muon. A full datasheet will be released at a later date.

Overview

The Muon is a developer kit based on the M-SoM with additional peripherals for easy prototyping.

- LoRaWAN module (Quectel KG200Z, 862 – 928 MHz)
- Expansion connector
- Temperature sensor (TMP112A)
- Real-time clock and watchdog chip (AM1805)
- Ethernet (WIZnet W5500)
- Reset and mode buttons
- RGB status LED
- Power input options
  - USB-C
  - VIN (6-12 VDC)
  - LiPo battery with temperature sensor (3-pin JST-PH)



M-SOM

The Muon contains a Particle M-SoM that the following functional units:

- M.2 SoM form-factor, like the B-Series SoM
- Can use cellular or Wi-Fi (2.4 GHz or 5 GHz) for the cloud connection
- Realtek RTL8722DM MCU (BLE and Wi-Fi)
- Cellular modem
  - M404: Quectel BG95-M5 LTE Cat M1/2G (Global)
  - M524: Quectel EG91-EX LTE Cat 1 with 2G/3G fallback (EMEAA)
  - M635: Quectel BG95-M5 LTE Cat M1/2G (Global with satellite)

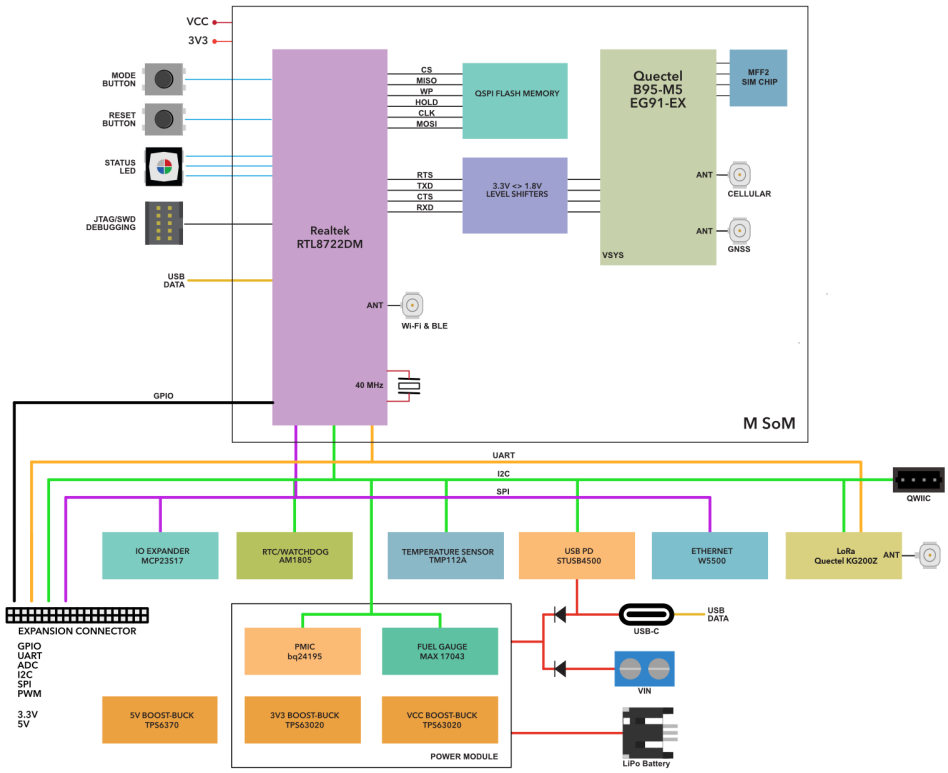
The M404 is fully supported in the United States, Canada, and Mexico. It is in beta testing in other locations. See the carrier list for country compatibility information.

MCU

The Realtek RTL8722DM is in the same family as the P2 and Photon 2 modules (RTL8721DM), but has additional GPIO.

- 802.11a/b/g/n Wi-Fi, 2.4 GHz and 5 GHz
  - U.FL connector for external antenna
- BLE 5 using same antenna as Wi-Fi
- Realtek RTL8722DM MCU
  - ARM Cortex M33 CPU, 200 MHz
- 2048 KB (2 MB) user application maximum size
- 3072 KB (3 MB) of RAM available to user applications
- 8 MB flash file system
- FCC (United States), ISED (Canada), and CE (European Union) certified

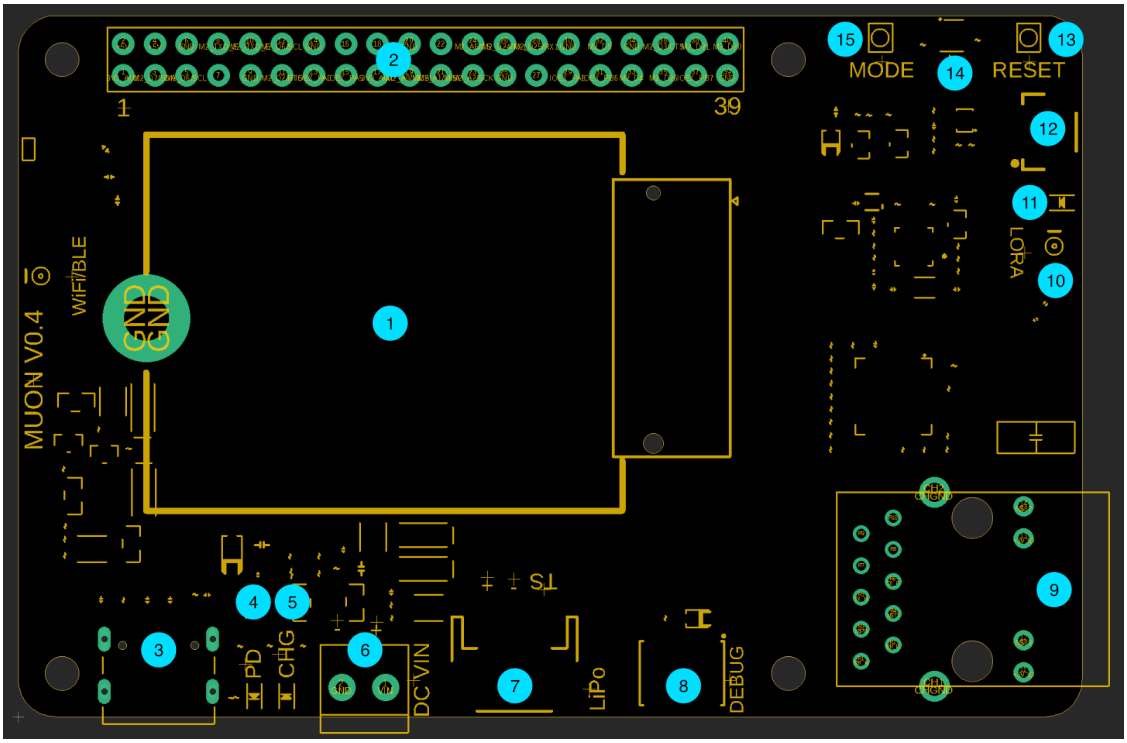
BLOCK DIAGRAM



DEVICE FAMILIES

	Cellular Only	Cellular & Wi-Fi	Wi-Fi Only
Developer devices	Boron	Muon	Photon 2
Production module	B-SoM	M-SoM	P2

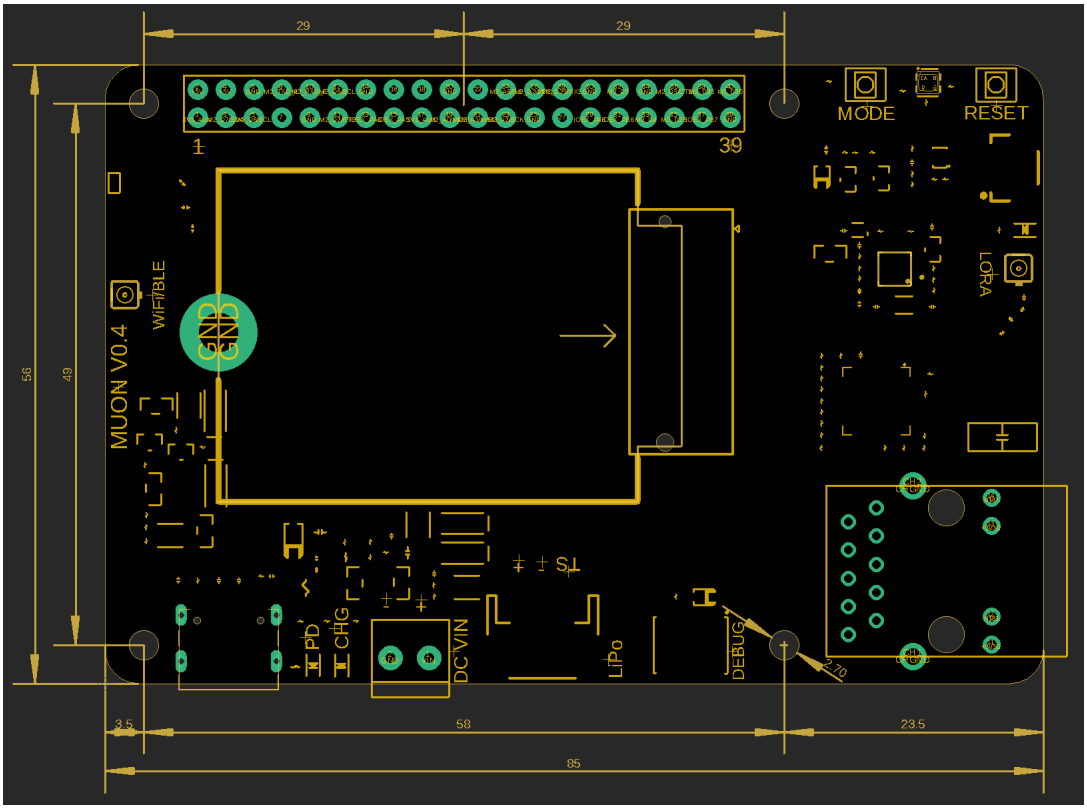
FEATURES



Label	Feature
1	M SoM
2	Expansion connector
3	USB-C
4	USB Power LED ("PD")
5	Charge LED ("CHG")
6	VIN (6-12 VDC)
7	LiPo battery connector (3-pin)
8	SWD/JTAG debugging connector
9	Ethernet RJ-45 connector
10	LoRaWAN antenna
11	LoRaWAN status LED
12	QWIIC (3.3V I2C) connector
13	RESET button
14	RGB status LED
15	MODE button

DIMENSIONS

Overall dimensions are 56mm x 85mm (2.2" x 3.35").



Dimensions in millimeters (mm)

EXPANSION CONNECTOR

The Muon has a 40-pin (2x20) male header pin expansion connector on the top of the board, allowing the use of many Raspberry Pi-compatible "hat" expansion cards that sit on top of the Muon.

The expansion connector includes:

- GPIO
- I2C
- SPI
- UART serial
- PWM (pulse-width modulation)
- 3.3V power
- 5V power

All GPIO and ports are 3.3V only and are not 5V tolerant.

POWER

Power can be supplied to Muon by:

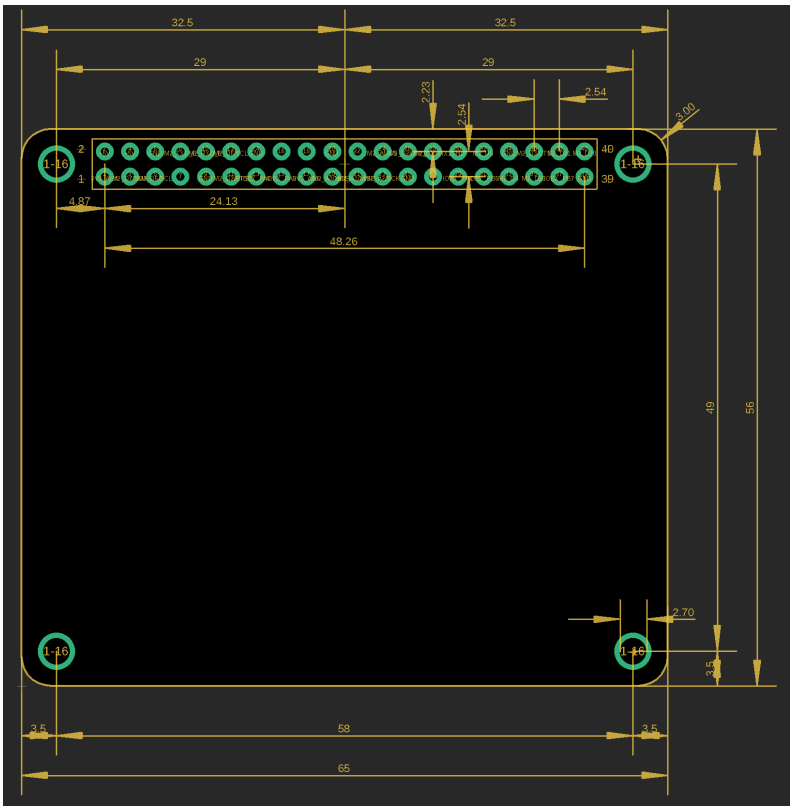
- USB-C
- VIN (6 - 12 VDC, via screw terminals)
- LiPo battery (via 3-pin JST battery connector)

Expansion card

The Muon can be expanded in several ways:

- Qwiic or Stemma-QT I2C peripherals
- Dupont wires or ribbon cables to a solderless breadboard
- A custom expansion card that sits on top of the Muon

CUSTOM EXPANSION CARDS



Dimensions in millimeters (mm)

The expansion card is intended to be 65mm x 56mm and connects to the Muon using a 40-pin female socket (0.1" pitch, 2x20). The expansion card has a female socket on the bottom that mates with the male header pins on the top of the Muon. It's a "hat" configuration.

The sample design uses a PTH (through-hole) female socket for strength and to make it easier to assemble with SMD components on the top of the expansion card, but you can use a SMD header reflowed to bottom instead if you prefer.

Ordering information

SKU	Description	Region	Modem	EtherSIM	Lifecycle	Replacement
MUON404EA	Muon LTE-M/2G Kit (Global, EtherSIM), [x1]	Global	BG95-M5	✓	In development	
MUON404KIT	Muon LTE M1/2G Kit (Global, EtherSIM), [x1]	Global	BG95-M5	✓	In development	
MUON524EA	Muon LTE CAT1/3G/2G Kit (Europe, EtherSIM), [x1]	Global	EG91-EX	✓	In development	
MUON524KIT	Muon LTE CAT1/3G/2G Kit (Europe, EtherSIM), [x1]	Global	EG91-EX	✓	In development	
MUON635EA	Muon LTE M1/2G/Satellite Kit (Global, EtherSIM), [x1]	Global	BG95-M5	✓	In development	
MUON635KIT	Muon LTE M1/2G/Satellite Kit (Global, EtherSIM), [x1]	Global	BG95-M5	✓	In development	

- EMEAA: Selected countries in Europe, Middle East, Africa, and Asia, including Australia and New Zealand. See the cellular carrier list for more information.