PARTICLE E SERIES

Cloud-integrated hardware platform for cellular IoT devices

Particle E Series modules
36.0 x 43.0 x 4.6 mm

WORLD'S FIRST FULLY-INTEGRATED CELLULAR HARDWARE PLATFORM WITH OUT-OF-BOX CLOUD CONNECTIVITY AND SUPPORT FOR 2G, 3G, AND LTE M1/NB1 TECHNOLOGIES

- **Hardware complete.** The E Series integrates a MCU, cellular radio, external flash storage, power and charge management, and external antenna connector into a single hardware platform
- **Fully certified.** E Series modules are FCC/CE/IC/PTCRB end-product certified, minimizing burden on product creators
- **Low profile design.** E Series modules are compatible with small and thin enclosure designs
- **Machine placeable.** E Series modules are ready for mass production with SMT-compatible tray packaging
- **Worldwide compatibility**. E Series modules have global support with lower-cost regional variants available upon request

PRODUCT DESCRIPTION

Particle's E Series module platform is the World's simplest solution for developing and deploying cellular-connected IoT products.

Hardware Features

1. *Powerful ARM Cortex M3 120MHz MCU* with ample GPIO for reading from sensors and driving motors and actuators
2. *Best-in-class 2G/3G/LTE M1 modem options* with worldwide support and lower cost regional variants available upon request.
3. *Embedded IoT SIM card* compatible with Particle's MVNO service with no-contract, out-of-box service in more than 100 countries
4. *Expandable flash storage* for sensor data and/or backup application firmware
5. *Flexible power management system* with built-in support for Li-Po batteries and dedicated DC power supplies

Robust design

E Series modules are surface mountable and feature integrated SIM cards and extended temperature operating ranges that make them a robust choice for deployment in a variety of industrial environments.

Fastest path to market for 2G, 3G, LTE products

The E Series contains the same hardware and MCU architecture as our popular Electron development kit, so your application firmware translates seamlessly from prototype to production.

Future LTE-enabled products from Particle will be released in the E Series form factor, so upgrading your product is as simple as swapping out a part on your bill of materials.

The E Series is available in 2G/3G variants today. Particle will release variants with LTE M1/NB1 connectivity in early 2018.

Fully certified

E Series modules are certified against a majority of the World's relevant certification standards including FCC/CE/IC/RoHS, as well as End Product certified by the PTCRB.

Compatible with Particle Cloud and development tools

All E Series modules are compatible with the Particle Cloud and Particle development tools which provide fully-encrypted messaging, over-the-air firmware updates, and a device management console for administering device firmware, dynamic grouping, and SIM connectivity.

Features

- u-blox SARA modules for cellular connectivity
  - LTE: SARA-R410M-02B
  - 3G: SARA-U201/U260/U270
  - 2G: SARA-G350
- STM32F205RGT6 120MHz ARM Cortex M3 microcontroller
- 1MB flash, 128KB RAM
- BQ24195 power management unit and battery charger
- MAX17043 fuel gauge
- Embedded SIM card, Particle MVNO support in 100+ countries
- Expandable flash memory

Package

- 63 pin surface mountable module
- 36.0 mm x 43.0 mm x 4.6mm
- < 10 g

Environmental data, quality, reliability

- Operating temperature -20 to +85°C (extended range)
- RoHS compliant (lead-free)

Software features

- FreeRTOS
- CoAP encrypted messaging
- Embedded TCP/IP and UDP/IP
- GNU GCC toolchain for ARM Cortex-M processors
- Firmware updates: Over the Air (OTA), USB, UART, JTAG and SWD

Certifications and approvals

Wireless certifications

- FCC
- CE
- IC

Cellular certifications

- PTCRB (End-Product Certified)
- GCF

Electrical data

- **Power supply:** 3.88 V to 12 V
- **Power consumption**
  - Operating current (cellular ON): 180 mA to 250 mA
  - Operating current (cellular OFF): 47 mA to 50 mA
  - Peak current: 800mA (3G), 1800 mA (2G)
  - Sleep Current: 0.8 mA to 2 mA

Interfaces

GPIO:

- 30 GPIOs, individually controllable.
- 12 ADC, 2 DAC, and 13 PWM pins available.

Serial:

- 3 UART, 2 SPI, 1 I2S, 1 I2C, 2 CAN, and 1 USB 2.0 communication interfaces available.

Product variants

Naming convention

E + <number of G's> + <regional (0) or global (1)> + <incremental #>

Name	Cellular technologies	Supported geographies	Hardware band compatibility	Availability
E210	2G only	Global	850/900/1800/1900 MHz	Q4 2017
E301	3G with 2G fallback	Regional (Americas/Aus)	850/1900 MHz	Q4 2017
E302	3G with 2G fallback	Regional (Eur/Asia/Afr)	900/1800/2100 MHz	Q4 2017
E310	3G with 2G fallback	Global	850/900/1800/1900/2100 MHz	Q4 2017
E402	LTE M1 only	North America	LTE B2, B3, B4, B5, B8, B12, B13, B20, B28	H1 2018

Further information

- For more information, please contact Particle at **http://particle.io/sales** or send an email to **sales@particle.io**
- For ordering information and pricing, please visit our wholesales store at **http://wholesale.particle.io**