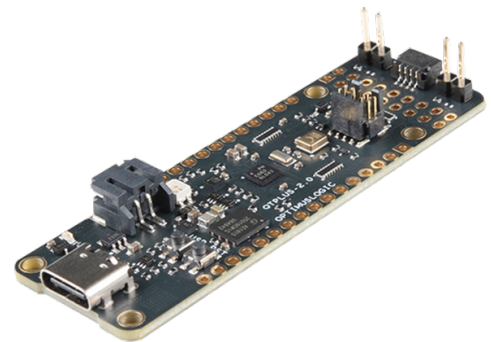# QuickLogic Thing Plus EOS™ S3

DEV-17273

Product Overview

09/19/2022

For the most up-to-date information, visit www.mouser.com or the supplier's website.

Description

SparkFun QuickLogic Thing Plus EOS™ S3 is a small form factor intended for enabling low-power Machine Learning (ML) devices. This QuickLogic Thing Plus is based on 100% open-source hardware, compatible with the feather form factor. The QuickLogic EOS S3 is built around 100% open-source software (with support for FreeRTOS, Zephyr, nMingen, Docker, and SymbiFlow). This Thing Plus is powered by QuickLogic's EOS S3 and an eFPGA-enabled Arm© Cortex©-M4F MCU fully supported with Zephyr RTOS and FreeRTOS.

The Thing Plus EOS comes with an onboard LiPo battery connector and charging circuitry, a wake-on-sound PDM microphone, and a low-power, three-axis accelerometer. The QuickLogic Thing Plus EOS S3 provides strong microphone and accelerator firmware support, making it easy to move sensor data into the embedded FPGA. This board also includes a Qwiic connector to quickly interface with an ecosystem of 150+ I^2C-compatible boards such as sensors, RFID readers, displays, keypads, and relays. The Thing Plus board is ideal for wearable, voice, and gesture sensing applications.

Features

- EOS™ S3 MCU + eFPGA SoC:
    - Arm® cortex®-M4F microcontroller:
        - Up to 80MHz operating frequency
        - Up to 512Kb SRAM
    - Embedded FPGA (eFPGA):
        - 2400 effective logic cells
        - 64Kb RAM
- Thing plus form factor:
    - Breadboard-compatible 0.1inch (2.54mm) pitch headers
    - 2.75inch x 0.9inch (70mm x 22.9mm) footprint
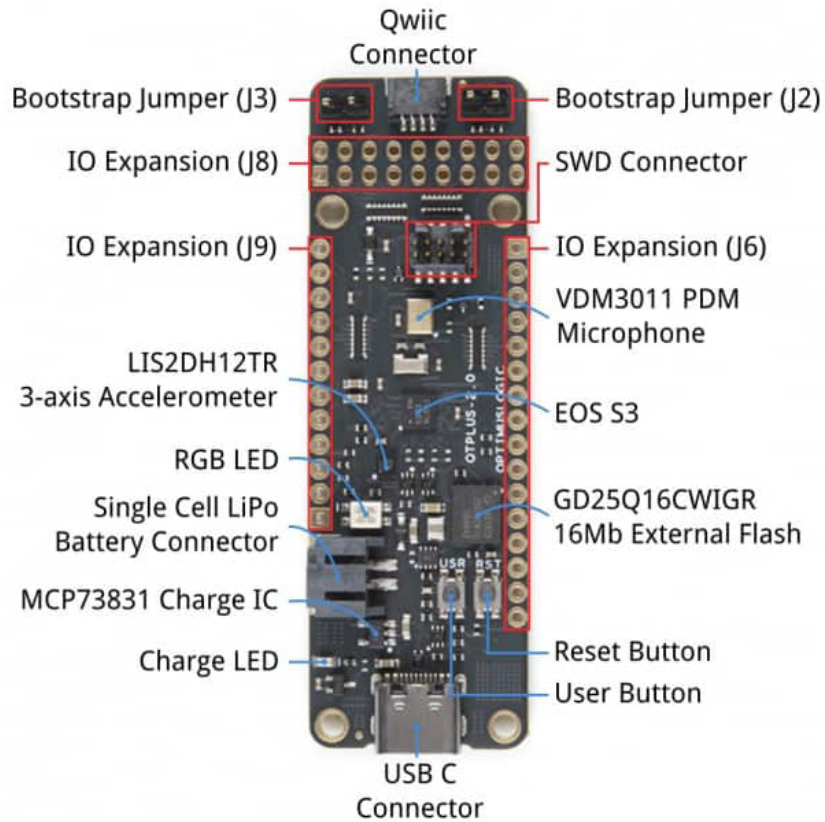   - All 20-feather defined GPIO + 14 additional GPIO

Features

- Interfaces:
  - SWD programming connector for use with USB-TTL converter
  - USB data signals are tied to eFPGA programmable logic
  - UART available via I/O headers
  - I²C available via I/O headers, and Qwiic connector
  - SPI
  - I²S
- Storage:
  - 16Mbit SPI NOR flash - GigaDevice GD25Q16CEIGR
- Sensors:
  - 3-Axis 12-bit Accelerometer - STMicro LIS2DH12TR
  - Digital pulse density modulation (PDM) microphone with Wake-on-Sound (WoS) feature - Vesper VM3011-U1
- User Interfaces:
  - RGB LED
  - User pushbutton
  - Reset pushbutton
- Power:
  - USB type-C connector (regulated to 3.3V)
  - Single cell LiPo battery
  - On-board charging circuitry - microchip MCP73831/2
  - Standard LiPo JST connector
- Software:
  - Machine learning:
    - TensorFlow lite
    - SensiML
  - Real-time operating systems:
    - Zephyr RTOS
    - FreeRTOS
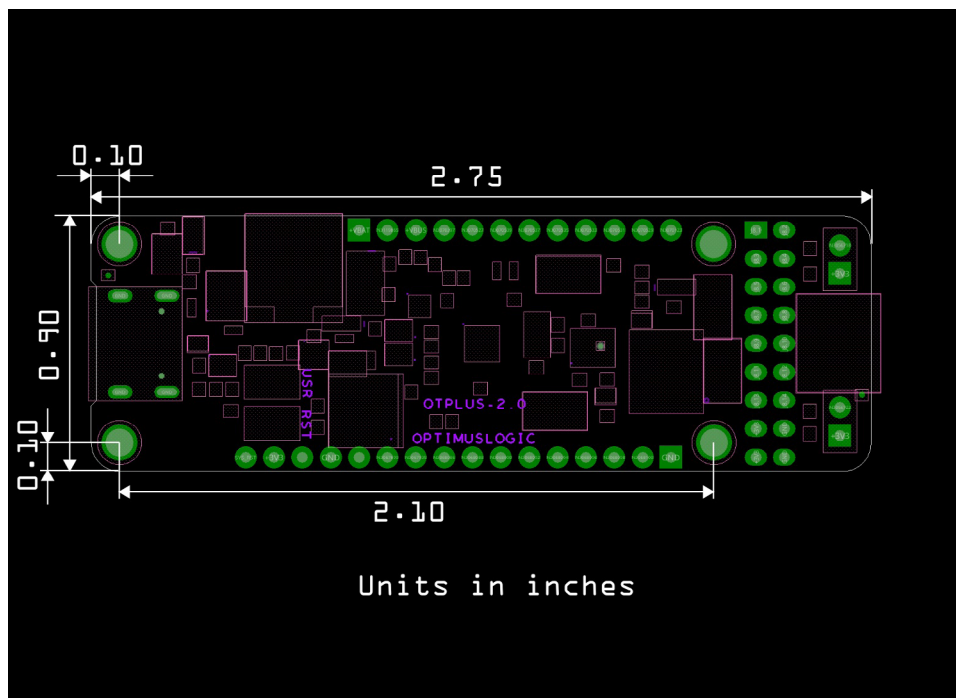 - FPGA tools:
    - SymbiFlow
    - Renode

Applications

- Tiny ML applications such as with SensiML's AI software platform and Google's TensorFlow lite
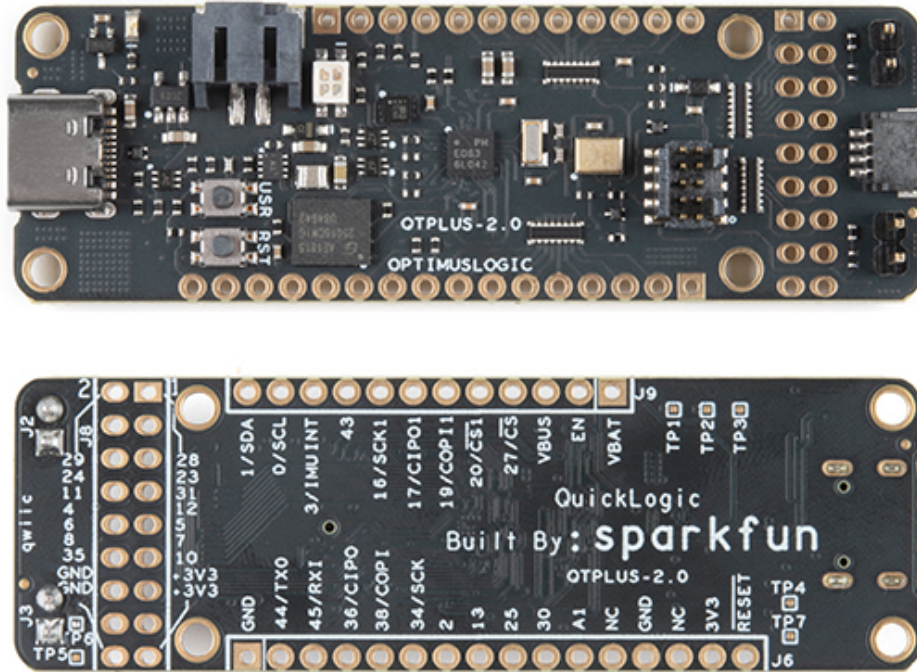- General purpose MCU applications

Board Layout

Qwiic Connector

Bootstrap Jumper (J3)
Bootstrap Jumper (J2)

IO Expansion (J8)
SWD Connector

IO Expansion (J9)
IO Expansion (J6)

VDM3011 PDM Microphone

LIS2DH12TR 3-axis Accelerometer
EOS S3

RGB LED

Single Cell LiPo Battery Connector
GD25Q16CWIGR 16Mb External Flash

MCP73831 Charge IC

Charge LED
Reset Button
User Button

USB C Connector

Board Dimensions

0.10
2.75
0.90
0.10
2.10

Units in inches

Board Overview

Additional Resources

- Schematic
- Graphical Datasheet

Mouser Part Number

View Part

To learn more, visit https://www.mouser.com/new/sparkfun/sparkfun-quicklogic-thing-plus-eos-s3/