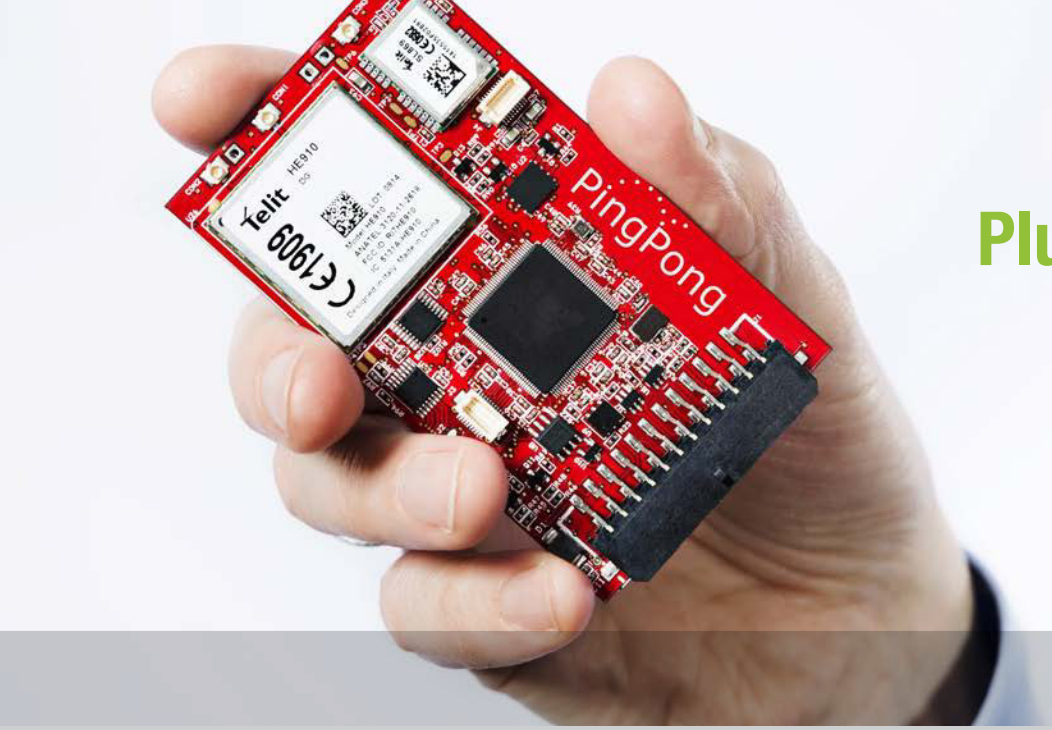

Plug, Push and Play

Open-Source and Modular IoT/M2M Hardware Platform Features High-Performance PIC32 Microcontroller

Contributed by Round Solutions

In the fast-paced world of the Internet of Things (IoT), time is money. Getting your design to market quickly is extremely important, but many times, overcoming the development challenges can slow you down. Round Solutions—a Microchip Authorized Design Partner—is a leading supplier of products and services for the industrial market, with expertise in a wide range of wired and wireless technologies. The company's **PingPong IoT Development Board** is an open-source and modular IoT/M2M hardware platform based on the high-performance PIC32MZ Embedded Connectivity family of microcontrollers (MCUs). It supports the addition of a range of extension boards to provide professional firmware/software developers with the ability to quickly and easily design Internet-enabled and mobile communications devices for industrial applications. For ultimate flexibility, the board features both wired and wireless connectivity as well as UART, SPI, CAN and I²C communication buses, making it truly a plug, push and play solution.

A PIC32MZ Microcontroller On Board

The world's fastest 32-bit MCU powers both versions (RTOS and Linux) of the PingPong board. Round Solutions chose the PIC32MZ because it provides industry-leading performance of 330 DMIPS and 3.28 CoreMarks®/MHz, plus up to 2 MB dual-panel Flash for live-update support and large RAM (512 KB). Its connectivity peripherals—which include a 10/100 Ethernet MAC, Hi-Speed USB MAC/PHY and CAN ports—enable the development of connected industrial applications. It also incorporates an SQI™ interface and the most serial channels available on a PIC32 MCU. The PIC32MZ also has class-leading code density that is 30% better than competitive products. Rounding out the PIC32MZ's high level of integration is a full-featured hardware crypto engine with a random number generator for high-throughput data encryption/decryption and authentication such as AES, 3DES, SHA, MD5 and HMAC.

Develop innovative IoT applications using this modular IoT hardware platform.

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Modular and Customizable

In addition to the PIC32MZ MCU, the PingPong base circuit board also includes a high-speed Telit cellular module and a high-accuracy positioning component for the Global Navigation Satellite System (GNSS). It also includes Ethernet, USB and CANBus interfaces. The Evaluation Kit comes with a dedicated M2M/IoT SIM card to enable connectivity to a cloud platform. Using one or more of the available extension boards, you can add Wi-Fi®, Bluetooth®, I/O, Iridium satellite communication, Radio Frequency (RF), and NFC/RFID to your design. This connectivity format provides a plug-and-play solution that works as soon as the extension board is plugged onto the base board. You can instantly begin developing applications for sensor reading, asset tracking, routing, metering/telemetry and security surveillance, just to name a few. Round Solutions can also develop specific firmware applications for the PingPong board or produce special, cost-reduced versions that eliminate unused components to meet your design's specific requirements.

Firmware and Software

The PingPong's open-source firmware and software enable quick customization to speed up a project's time to market. The board is available in two open-source software versions. The RTOS version running in C/C++ is intended for professional C-firmware developers and features a very fast boot time. It is compatible with Microchip's **MPLAB® Harmony** integrated software framework. The Linux® version is intended for applications that require an OS to run to deliver additional performance and functionality. This version offers additional options, such as Open VPN and IPSEC tunnels for router functionality.

Microchip's **MPLAB X IDE** and **MPLAB XC32 complier** are recommended for developing applications and modifying the firmware. Also, Microchip's MPLAB Harmony integrated software framework allows you to easily configure peripherals and use different stacks in your project. MPLAB Harmony comes with a set of examples that demonstrates the use of all the peripherals integrated into the PIC32MZ2048ECM144 MCU.

Round Solutions also offers the following ready-made software packages and libraries for use with both PingPong boards:

- Remote metering
- Asset tracking
- Wi-Fi/Bluetooth gateway
- MODbus over TCP
- MODbus over RS485

Cloud Connectivity

Complete and ready-to-use access to the cloud is provided by the Telit IoT Portal and the Cumulocity IoT Cloud Platform. A graphical user interface—accessible through any web browser or via mobile devices like smartphones and tablets—allows a range of sensor data to be easily collected and sent to the cloud, providing a number of different ways to monitor, visualize, remotely maintain and control the PingPong board. The included IoT connectivity SIM card ensures stable data transfer between the PingPong board and the cloud, enabling "always on" connectivity for remote applications.

A Sample Application

Versatile and flexible, the PingPong platform offers a wide range of features to meet the demands of many industrial designs. It can be used in applications that target a single function or for applications that combine several technologies within one instrument. For example, a PingPong-based system can be used to monitor the temperature in a refrigerated truck. A temperature sensor can be connected to the PingPong board via the I/Os and the temperature data can be sent to the cloud. This application can be extended by adding GPS monitoring to track the truck's movements. The PingPong board can also be connected to the CAN interface to monitor the driving time or the vehicle's output data. Adding the Wi-Fi or Bluetooth expansion card enables alerts to be sent to the driver via smartphone.

If you are ready to get started with developing your cloud-connected industrial application, you can purchase the PingPong IoT Development Board (THW1007) and the PingPong IoT Wi-Fi/Bluetooth Expansion Board (THW1008) from **microchipDIRECT**. Visit the **Round Solutions website** for more information about the PingPong platform.