

Development of RT16 Medical Device for Pharmacological Testing Manufacturer

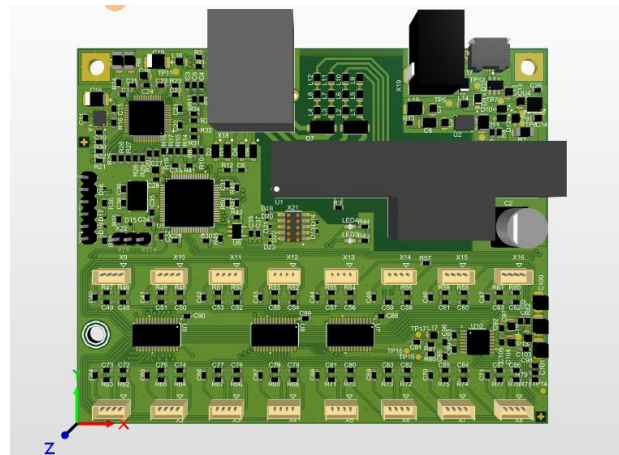
The hardware and firmware upgrade for this Medical Device enhances its functionality by doubling the number of resistance thermometers, improving temperature measurement resolution to 0.1°C and accuracy to $\pm 0.2^{\circ}\text{C}$. The update also aimed to enhance sensor capacity, add network connectivity via Ethernet (IEEE 802.3 standard), and support the MQTT protocol for data exchange and remote control.

Hardware Development:

- Designed PCB to accommodate 16 PT100 sensors.
- Integrated Ethernet and USB interfaces for communication.
- Ensured compliance with isolation barrier requirements with PoE coverage as per IEEE802.3af standards.

Firmware Development:

- Implemented Real-Time Operating System (RTOS).
- Established MQTT communication from the MCU to the Broker.
- Configured W5500 driver for Ethernet communication over SPI.
- Conducted MQTT communication unit tests to validate Ethernet, SPI, MCU, and MQTT functionality.



Technologies Used:

- STM32L4 Microcontroller
- LAN (Local Area Network)
- POE (Power over Ethernet)
- Altium for hardware development