Abstract

The purpose of the thesis is to design an IoT adaptor for Digital sensors that would provide a wireless interface to already existing industrial transducers commonly used in building automation systems. Devices already available in the market are not designed to target single transducers but rather to implement specific gateway features and as such, their purpose is to interface multiple similar transducers at same time. The goal is to design a device that could be directly plugged at the transducer terminals, able to replace any pre-existing cable connection and support the transition to industry 4.0.

This thesis gives a brief research on the digital interfaces available for the building automation and presents the design of a sensor interface based on Espressif ESP32 microcontroller board with LTE-CAT-M1 capabilities, running python firmware. The thesis includes the design, prototype and tests of RS-485 and Ethernet interfaces supporting the Modbus and BACnet protocol, and Meter-Bus interface supporting the Meter-bus Protocol.

Final section of the thesis represents the schematic of the adaptor and the bill of materials (BOM) list of appropriate components required for the designed printed circuit board (PCB). Finally, the manufactured adaptor and the results of performed tests are presented.

Key Words: IoT Adaptor, LPWAN module, Digital Interfaces, Building automation Gateways, Wireless Interfaces.