

INTERNATIONAL CONFERENCE  
St Petersburg, RUSSIA  
04 March 2020



# «Metrological Support of Innovative Technologies» ICMSIT-2020

«DEVELOPMENT DIGITAL DEVICE FOR MEASURING CURRENT,  
VOLTAGE, POWER AND SIMULATION RESULTS IN THE PROTEUS  
ENVIRONMENT»

Xenia A Klimenko



**ICMSIT-2020**  
Metrological Support  
of Innovative Technologies

# Problem statement

At the current stage of electric power industry development, an important aspect is not only reliable measurement of AC and voltage values, but also convenience of representation of measured values. For this purpose digital microprocessor devices are used, which allow not only to present measured values in a convenient form, but also to provide the possibility to store and store measurement series. This article describes the development of a digital AC, voltage, and power measurement device in single-phase AC circuits. In addition, the article presents the result of modeling the operation of this device in the PROTEUS environment.

The digital microprocessor device will allow measurements of alternating single-phase current, voltage and active power. In order to achieve this task, the digital device being developed must perform the following necessary functions:

- measurement of the operating value of current and tension on loading;
- measurement of active power;
- implementation of a conclusion to the LCD display of the operating value of tension, current, active power;
- range of the measured current in a chain 0-25 A;
- range of change of tension of network  $220 \pm 20$  V;
- the error of measurement should not exceed 1-2%.

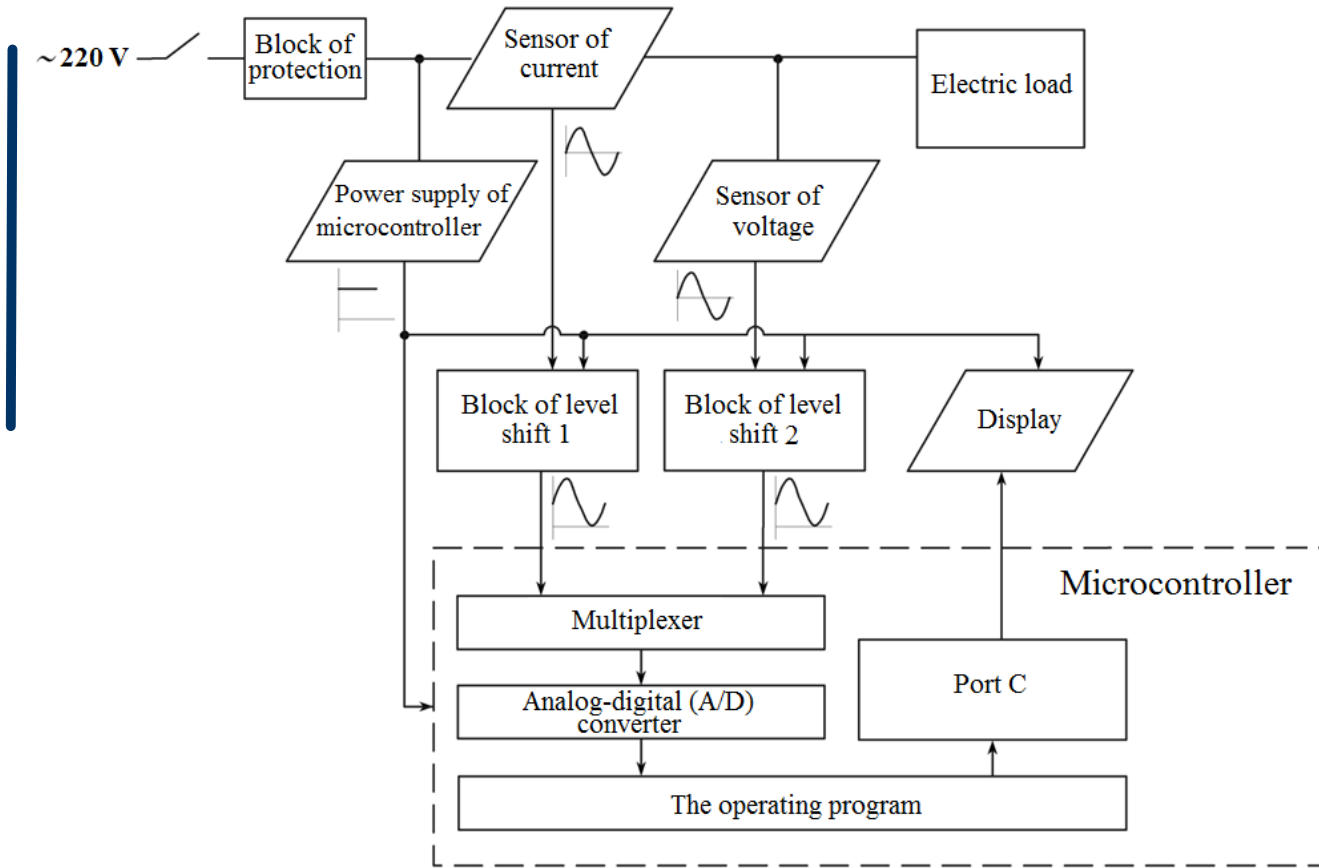


Figure 1. Block diagram of the digital device

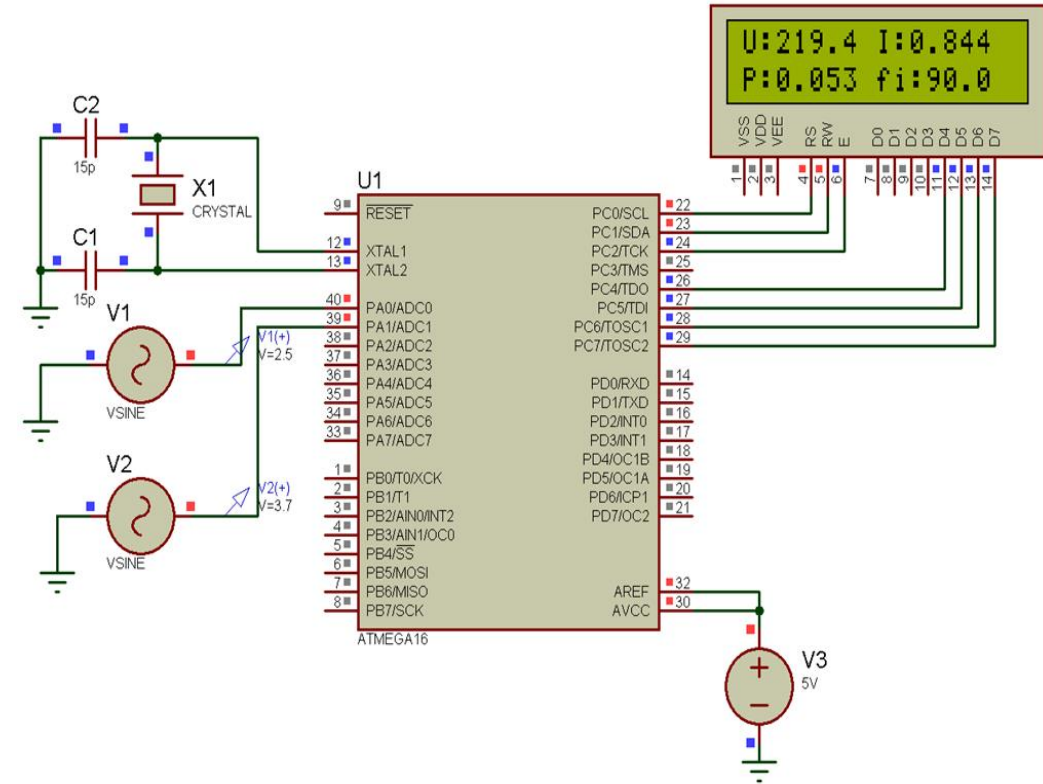


Figure 2. Device schematic diagram and simulation result in Proteus software environment

# Conclusions

This digital device allows to measure the values of alternating single-phase current, voltage and active power with high accuracy. Measuring devices can be used in industry. This device can be used not only with a current transformer, but also with minor changes in the microcontroller program code and electrical circuit with other current meters such as the Hall sensor and Rogowski belt.

# Contacts

Xenia A Klimenko

Omsk State Technical University, 11, Pr. Mira, Omsk, 644050, Russia

E-mail: [xenia\\_klimenko@mail.ru](mailto:xenia_klimenko@mail.ru)

INTERNATIONAL CONFERENCE  
St Petersburg, RUSSIA  
04 March 20120

**«Metrological Support of Innovative Technologies»  
ICMSIT-2020**