COMPARISON OF THE SOLUTION OF THE OPTOELECTRONIC SYSTEM BASED ON ARDUINO UNO AND USB-6009 IN THE PROGRAM LABVIEW

O.A. Moryakova oxi1996@mail.ru

Bauman Moscow State Technical University, Moscow, Russian Federation

In this article we consider the problem of implementing a microprocessor assembly Arduino Uno as a cheap and available analog of a data gathering device USB-6009 of National Instruments company, applied in developing the laser turbidity measuring system. The system is based on fixing light transmission and scattering by turbidimetric and nephelometric photodetectors. It takes into account the environment temperature and the temperature of a liquid sample, thus, it has temperature sensors. As sensor signals the system uses voltages, received from potentiometers (photodiode imitators). By adding an opto-electronic part such device makes it possible to compare and debug solutions received using Arduino Uno and USB-6009 under absolutely equal conditions without the system being significantly complicated. The hardware/software solution for working with these platforms is introduced in LabVIEW and its structural-functional scheme is also given.

Keywords

LabVIEW, NI USB-6009, Arduino Uno, turbidimeter, nephelometer, turbidity, laser measuring system, automation

© Bauman Moscow State Technical University, 2017

References

[1] Bulatov M.I., Kalinkin I.P. Prakticheskoe rukovodstvo po fotometricheskim metodam analiza [Practical guidance on photometric analysis methods]. Leningrad, Khimiya publ., 1986, 432 p.

[2] Vse otechestvennye mikroskhemy [All domestic microcircuits]. Moscow, Dodeka-XXI publ. house, 2004, 400 p.

[3] Petin V. Proekty s ispol'zovaniem kontrollera Arduino [Projects using Arduino controller]. Sankt-Petersburg, BKhV-Peterburg publ., 2015, 464 p.

[4] Revich Yu.V. Zanimatel'naya elektronika [Amusive electronics]. Sankt-Petersburg, BKhV-Peterburg publ., 2015, 576 p.

[5] Karvinen T., Karvinen K., Valtokari V. Make: sensors: a hands-on primer for monitoring the real world with Arduino and Raspberry Pi. Maker Media, 2014, 400 p. (Russ. ed.: Delaem sensory: proekty sensornykh ustroystv na baze Arduino i Raspberry Pi. Moscow, Vil'yams publ. house, 2015, 432 p.).

[6] Suranov A.Ya. LabVIEW 8.20: Spravochnik po funktsiyam [LabVIEW 8.20: functions handbook]. Moscow, DMK Press publ., 2007, 536 p.

[7] Travis J., Kring I. LabVIEW for everyone: Graphical programming made easy and fun. Crawfordsville, Prentice Hall, 2007. 1236 p. (Russ. ed.: LabVIEW dlya vsekh. Moscow, DMK Press publ., 2011, 904 p.).

[8] Peter A. Blume The LabVIEW: style book. Prentice Hall, 2007, 400 p. (Russ. ed.: LabVIEW: stil' programmirovaniya. Moscow, DMK Press publ., 2008, 400 p.).

[9] Butyrin P.A., Vas'kovskaya T.A., Karataeva V.V., Materikin S.V. Avtomatizatsiya fizicheskikh issledovaniy i eksperimenta: komp'yuternye izmereniya i virtual'nye pribory na osnove LabVIEW 7 [Automation of physical research and experiment: computer measurements and virtual devices based on LabVIEW 7]. Moscow, DMK Press publ., 2005, 264 p.

[10] Sommer U. Mikrocontroller-programmierung mit Arduino/Freeduino. Franzis, 2010, 256 p. (Russ. ed.: Programmirovanie mikrokontrollernykh plat Arduino/Freeduino. Sankt-Peterburg, BKhV-Peterburg publ., 2012, 256 p.).

Moryakova O.A. — student, Department of Radioelectronic Systems and Devices, Bauman Moscow State Technical University, Moscow, Russian Federation.

Scientific advisor — R.Sh. Zagidullin, Cand. Sc. (Eng.), Assoc. Professor, Department of Radioelectronic Systems and Devices, Bauman Moscow State Technical University, Moscow, Russian Federation.

The programming port is limited to a baud rate of 115,200 baud. I haven't found out in detail where the limitation comes from (I am not a hardware specialist), but my suspicion is that it is a combination of hardware (UART-to-USB converter) and software (OS shortcomings) restrictions. There is a little trick to push the baud rate to 230,400.Â The reason is that it is used in the very same way as the Arduino Serial function. The Arduino people kind of missed adding the SerialUSB reference to their documentation (It is mentioned somewhere in passing, but don't waste your time trying to find it). After all, the Arduino Due was listed temporarily as "not supported anymore," and then, miraculously, was revived as a product (for very good reasons, I may add). Figure 3 illustrates the dimensions of the NI USB-6008/6009 device. 81.81 mm. 23.19 mm.Â Do not operate the NI USB-6008/6009 in a manner not specified in this document. Misuse of the device can result in a hazard. You can compromise the safety protection built into the device if the device is damaged in any way. If the device is damaged, contact National Instruments for repair. Do not substitute parts or modify the device except as described in this document.Â Do not remove or add connector blocks when power is connected to the system. Avoid contact between your body and the connector block signal when hot swapping modules. Remove power from signal lines before connecting them to or disconnecting them from the device.