

7.4 Data Communication between UART Port of Arduino UNO and PC

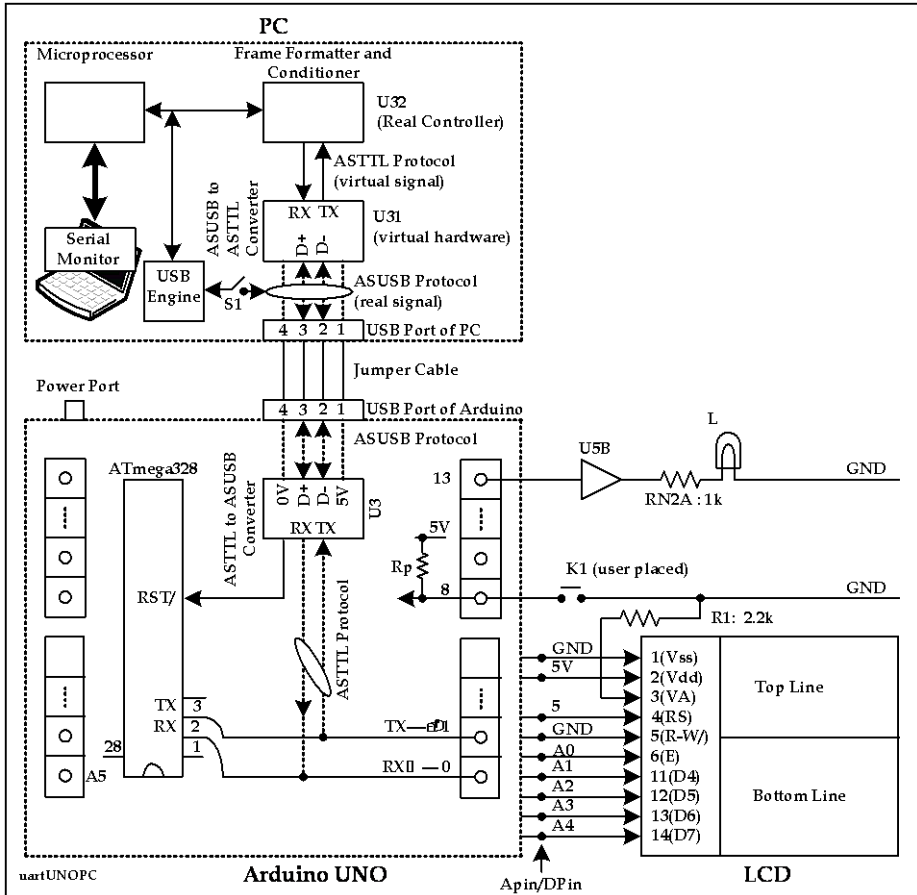


Figure-7.5: Conceptual hardware link between real UART port of ATmega328 and virtual UART port of PC

When we say 'UART Port of Arduino UNO', we want to mean that this is the UART Port of the ATmega328 Microcontroller which the Arduino UNO Learning Kit contains. The ATmega328 contains a real UART port which means that the port exits physically in respect of its hardware electronics. On the other hand, the UART port of the PC is a virtual port (U31, Fig-7.5 upper), which means that the hardware electronics of the port does not exist physically. The UART port is automatically created when we connect the Arduino Kit in a USB port of the PC (the PC must have the Arduino IDE Interface installed). The virtual UART port at the PC comes after the name COMX (X = 1, 2, 3, ...). The older PCs were equipped with physical UART Ports, and they were known as COM0/COM1 Ports. With the advent of new PCs and USB ports, those hardware UART ports had been removed; but, provision were kept to generate them using software as writing programs for UART port is much simpler compare to writing program for USB ports.

(1) Let us make the following Setup.

- (a) Connect the Arduino UNO Kit with the PC using a USB port. Open the IDE Interface and check that (*Tools* → *Port* → *COMX* → *Click*) the virtual COMX port is allocated at the PC side to establish communication with the Arduino UNO.
- (b) In the Arduino IDE perform: *Tools* → *Serial Monitor* → *Click*. Observe that the following window has appeared on the Desktop of the PC. This window is known as ‘Serial Monitor’. It is an ASCII-type display unit, and is very similar to the LCD panel that we have connected with the Arduino. This Serial Monitor can receive and display data/messages that will be sent from the Arduino; it can also take commands (in the form of ASCII characters) from the PC and send them to the Arduino using the virtual UART Port.

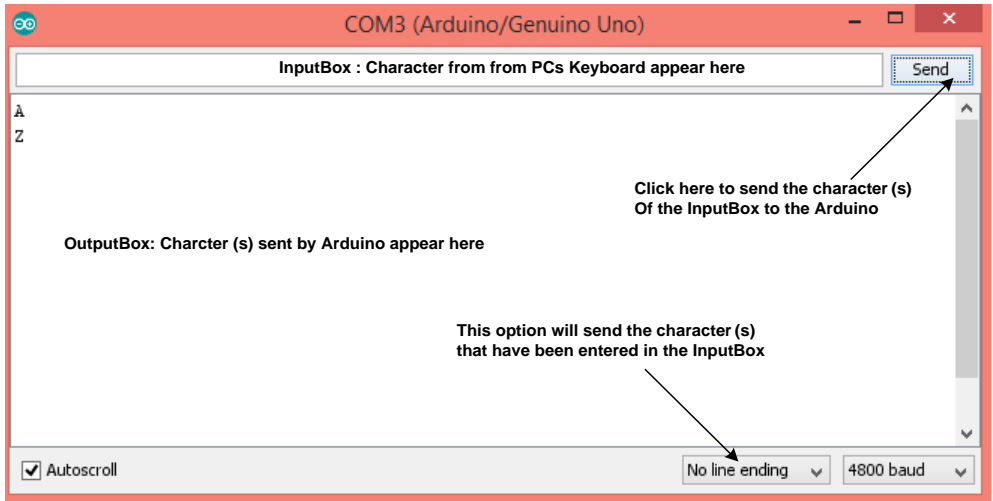


Figure-7.6: Snapshot of Serial Monitor at the PC side

- (c) Connect an LCD panel with the Arduino as per diagram of Fig-7.5. In this ASCII display, we will show all the data/messages that will come from the PC.
 - (d) Connect the switch K1 at DPin-8 (PB0-pin of ATmega328) of the Arduino UNO.
- (3) Conditions to be satisfied to exchange data between Arduino and PC using UART Port
- (a) At the Arduino side, we need a program to acquire data from the user, and then send them to the PC. We have a switch (K1) connected at DPin-8 by which user can give command/data to the MCU.
 - (b) At the Arduino side, we need a program to receive data from the PC, and show them on the LCAD Pane.
 - (c) The Arduino should be connected with the PC using a USB Port.
 - (d) At the APC side, we need a program to acquire data from the Arduino and show them on the Serial Monitor. This program is automatically invoked when the Serial Monitor option is activated from the Arduino IDE Interface.
 - (e) At the PC side, we need a program to acquire data from user via keyboard of the PC, and then send them to the Arduino. This program is automatically invoked when the Serial Monitor option is activated from the Arduino IDE Interface