

# Experiment 7

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## Question

### USART Connection between two microcontroller

#### Admin Microcontroller:

- Login user
- Show Details on LCD
  - ID
  - Date & Time
  - Temperature
  - Admin
- Add/Remove User
- Setup speed of stepper motor
- Change Date & Time

#### Operation Microcontroller:

- Send Temperature to admin micro
- Receive number of rotation of stepper motor and rotating it

For usart(uart) connection we have 3 function in code:

- `uart_transmit` -> This function send a integer data to another micro
- `ISR(USART_RXC_vect)` -> This function is interrupt for get data
- `uart_init()` -> For initial buand rate & enable transmitter & receiverand size of the data we send or receive.

**Note:** we need to have the same uart configuration.

Admin micro have some extra functionality like:

- login() -> to login by username and password
- home\_page() -> to show a details like temperature, date and time
- admin() -> to configure some system setting like:
  - set\_time() -> setup timer
  - set\_date() -> setup date
  - Set\_stepper\_motor -> to send number of rotation to operation micro
- notification() -> to turn light red when username of password incorrect and otherwise green

And Operation micro have bottom functionality:

- adc\_read() -> to read temperature of environment
- main() -> that rotate stepper motor by steps -> data get from adminmicro

have some common functionality like:

- show\_on\_lcd() -> for display on lcd
- go\_to\_line\_lcd() -> to go line 1-4 of lcd
- get\_key\_pressed() -> for read from keypad
- get\_number() -> for get a sequence of keypad press until user click "\*"

At the end the video of result of project attached in folder results that contain videos:

- Authentication
- Setup Date
- Setup Stepper Motor
- Setup Time
- Temperature

## References:

- [Serial Communication - Introduction » maxEmbedded](#)
- [The USART of the AVR » maxEmbedded](#)
- [Interfacing matrix keyboard with AVR](#)
- [LM044L LCD. Datasheet pdf. Equivalent](#)