

# Experiments and Mini Projects with BeyonDuino

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1. Hello LED – Turn LED on.
2. Hello LED – Turn LED on for a second and then off.
3. Hello LED – Flash LED at an observable rate.
4. Hello LED – Flash LED at a rate such that the LED appears always on. Estimate the onset of the rate when the LED appears to stay on.
5. Detect source of reset – Red LED for POR. Green LED for user reset.
6. Hello Switch – Read switch (switch to be pressed and released) to toggle LED continuously.
7. Hello Switch – Read switch to increase LED flash rate. Understand persistence of vision.
8. Hello Time – Read how many switch press occurred in a 10 second window (Green LED is ON for the duration). Then pulse red LED (1 second on, 1 second off) for those many switch presses.
9. Using the switch and the three LEDs of the RGB LED, play ‘Rock-Paper-Scissors’.
10. Generate ‘Flickering Candle’ effect on a single color of the RGB LED. Use LFSR based random number generator for the flickering effect.
11. Generate a more realistic warm yellow color ‘flickering candle’ effect using the RGB LED. Use LFSR based random number generator for the flickering effect.
12. Toggle the LED every second using Timer interrupt.
13. Hello PWM – Software PWM.
14. Hello PWM – Hardware assisted PWM.
15. Hello PWM – ‘Apple’ style LED ‘breathing’.
16. Hello Intensity – Use the potentiometer to change the red LED intensity from 0 to maximum in 256 steps.
17. Hello Color – Use the switch to select the LED and then the potentiometer to set the intensity of that LED and thus create your own color from amongst 16million colors.
18. Read the ADC value of the voltage divider involving the LDR. Print the value on the serial monitor.
19. Use the LDR and estimate a threshold for the LDR value and use that to turn the RGB LED on, to simulate an ‘automatic porch light’.
20. Use the thermistor to estimate the temperature and print the raw value on the serial monitor.
21. Using two known temperature values, read the thermistor output and then fit a curve for exact temperature as listed in reference 1.
22. Place a 50-ohm (1W rating) resistor in close proximity to the thermistor. Connect the 50-ohm resistor to the +5V supply voltage and ground pins (available in the nearby 10 pin box header). This will

raise the thermistor at a higher than ambient temperature. Now blow air on the thermistor and estimate the drop in the temperature by plotting the response on the serial monitor. Use the rate change of temperature to create a 'birthday blowout candle' using the RGB LED.

23. Read the temperature and humidity values using the DHT sensor and print on the serial monitor.
24. Connect the LCD I/O Board and print 'Hello World' on the LCD.
25. Use the buzzer and play a stored message in Morse code.
26. Program the RTC and use the navigation switches on the LCD I/O board to initialize the time and then display the time. Turn the system off and turn it on again after a while and ensure that the on-board battery helps maintain correct time on the RTC.
27. Use the navigation switches to set an alarm on the RTC and when the alarm condition is satisfied, turn the buzzer on in a creative way. Assign switches for snooze and stop functions.
28. Use the on-board eeprom to store the temperature min and max values together with a time stamp.
29. Use the on-board eeprom to store temperature values every 15 minutes with a time stamp. Upon pressing the user switch, stop recording data and display the data on the LCD or serial monitor.
30. Using the navigation switches for input and LCD for output display and buzzer for sound alerts, play 'Rock-Paper-Scissors' as a two-player game.
31. Use the UART to USB bridge (MyFi Board) to communicate with the PC and print LDR/Thermistor/RTC values on the PC screen.
32. Connect two BeyonDuino boards using a 3-pin cross cable (to connect TxD, RxD and Gnd). Pressing switch S1 on one board should toggle the Red LED (of the RGB LED) on the other board and vice-versa.
33. It is possible to use the 16x2 LCD as a graphics LCD also. Program the LCD and plot the temperature reading on it in a strip-chart recorder format.
34. Two player color-conundrum game where a player sets the composite color on his RGB LED using his pot (three times, once for each primary color) and then the other player has to match that color on his LED. The two boards are connected to each other using a 3-pin serial cable (TxD, RxD and Gnd).

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