ECOLE NATIONALE SUPÉRIEURE D'INFORMATIQUE

LAB N°07

Arduino-Raspberry Wired Communications

UART-I2C

I. THEORY: *(max 01 page to 02 pages)*

1.1. Definition **UART** and particularly **USB**
1.2. Introduction and Comparing Arduino vs Raspberry UART
  1.2.1. Theoretical study of UART of an Arduino MKR1010 pins and software related to UART.
  1.2.2. Theoretical study of UART of Raspberry pins and software related to UART.
1.3. Theoretical study on I2C and SPI communication and comparison of SPI, I2C, and UART protocols. (01 pages).
  1.3.1. Theoretical study of I2C of an Arduino MKR1010 pins and software **(Library)** related to I2c and **Analog-to-Digital Converter ADS1115.**
  1.3.2. Theoretical study of i2c of Raspberry pins and software **(Library)** related to I2c and to **Analog-to-Digital Converter ADS1115.**

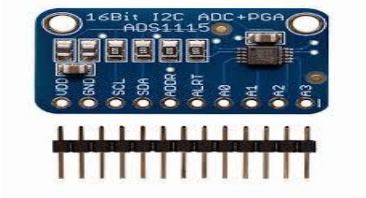

Fig 1 Analog-to-digital converter with I2C bus interface

II. ACTIVITY: *(max 04 pages)*

The component DAC, ADS1115 (Fig.1) will be used with Raspberry. **(It is worth noting to draw for each following Lab the detailed schematics).**

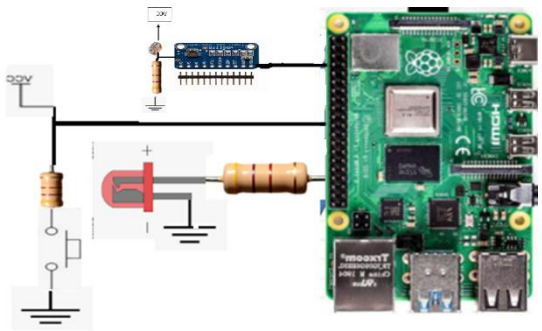

Fig 2 Analog-to-digital converter with Raspberry I2C bus interface

Using an ADC with a Raspberry

a) Raspberry -I2C(with CAN ADS1115)

Connect the external DAC converter (Fig.1.) to the I2C bus with Raspberry PI-4. (Max 02 pages).

1. Configure the system and test it with an analog sensor: (ex the LDR and or a force sensor sensor) according to Fig 2.

Communicating between Arduino and Raspberry Pi via UART

b) Arduino-Raspberry-PUSH-BUTTON-LED

Given the diagram represented in Figure Fig. 3, consisting of a Raspberry Pi and an Arduino connected via a UART serial bus. We want to turn on or off the LED-1 connected to the Raspberry Pi each time we press the push button connected at the Arduino.

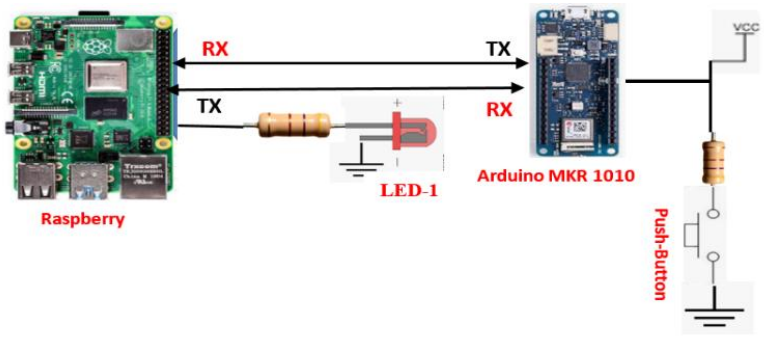

Fig 3. Communication Raspberry Arduino via Bus UART

c) Raspberry-PUSH-BUTTON- Arduino –LDR (optional)

We will dim a LED connected to PMW pin of the raspberry via an LDR connected to Arduino via ANALOG pins.

III. CONCLUSION